Semantic Analyzability of the Intra- and Inter-sentences of the Language-Disordered Children at 2- to 3-year of Language Age

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Young Tae Kim. Semantic analyzability of the intra- and inter-sentences of the language-disordered children at 2- to 3-year of language age. *Korean Journal of Communication Disorders, 1999, 4*, 61-78. The purpose of this study was to investigate the semantic analyzability of the intra- and inter-sentences of the language-disordered children. Thirty-five language-disordered children and 35 MLU-matched 2- to 3-year-old normal children served as the participants. Participants' spontaneous utterances were collected and analyzed semantically. The findings were as follows: (1) the number of grammatical units and the semantic units are significantly correlated in both groups, (2) most frequently used semantic roles and relations were common in the two groups. Only five of the semantic roles were statistically different between the two groups. Although most of the semantic roles and relations occurred more frequently in the language-disordered group, the possessor and communicative devices occurred more frequently in the normal group, (3) among the intersentence relations, the language-disordered group used significantly more juxtaposition and conjoining, while there was no difference in the use of embedding. However, adjective embedding was used more frequently in the normal group, while substantive embedding was used more frequently in the language-disordered group. This study suggested a need for a more systematic semantic analysis of early simple and complex sentences of the language-disordered children.

I. INTRODUCTION

It has been noted that young children in the single-word level begin to combine words once he has acquired approximately 50 words. If these sentences are analyzed only

in terms of grammatical aspects, much information would be missed since these early sentences are combined semantically rather than grammatically (Braine, 1963; Bloom, 1970; Brown, 1973; McLean & Snyder-McLean, 1978). Since Bloom's (1970) finding that children's early sentences are semantically oriented rather than grammatically oriented, many researchers and clinicians have developed systematic ways to semantically analyze early sentences. Often semantic roles and relations are used for analyzing early one- to three-word sentences. It has been agreed that these early semantic roles are universal (Bloom, 1970; Schlesinger, 1971; Bowerman, 1980; Owens, 1999). For example, Stockman and Vaughn-Cooke (1986) reviewed several studies of nonstandard English speakers and reported similar semantic roles to those of native standard English speakers.

For single-word sentences, Bloom (1973) categorized them into substantive words and function words, while Nelson (1973) used 4 categories: nominals, action words, personal-social words, and function words. For the sentences with more than two words, Brown (1973) reported 8 frequently used 2-word semantic relations in Brown's I-II Levels (MLU-m 1.01-2.49): agent-action, action-object, agent-object, action-locative, entity-locative, possessor-possession, attribute-entity, and demonstrative-entity. The agent-action-object, agent-action-locative, and action-object-locative relations were reported as frequently used 3-word semantic relations. McLean and Snyder-McLean (1978) reviewed previous studies and suggested a more practical and flexible analysis system. In their system, for example, the demonstrative-entity relation could be substituted by the notice-entity relation and the entity-attribute relation could be substituted by the entity-recurrence/nonexistence relation.

Retherford et al. (1977) reported several less frequently used semantic roles based on their study with 11 children in Brown's I-III Levels. These less frequently used semantic roles were instrument, comitative, created object, beneficiary/recipient, and experiencer. Retherford et al. (1981) developed a more detailed system for semantic analysis. They suggested (1) 15 main semantic categories (e.g., action, locative, agent), (2) 4 grammatical categories which have grammatical function rather than semantic function (e.g., entity, negation, attribute, adverbial), (3) conversational devices which have more conversational function (e.g., attention, affirmation), and (4) routines which are conventional or automatic expressions. Their system is differentiated from the previous systems since they attempted

not to fit all of the children's utterances into semantic roles. Rather, they looked at compositional (i.e., grammatical) aspects and automatic speech separately from semantic aspects. They suggested that we semantically analyze simple sentences and grammatically analyze the complex sentences.

Although some of the researchers or clinicians semantically analyze only simple sentences, it has been noted that children's utterances even in the primitive sentence level include complex sentences. These early complex sentences are often incomplete or incorrect. Children initially join two ideas simply by juxtaposing words. Gradually, they begin to conjoin sentences approximately in Stage IV (Miller, 1981). These early conjoining sentences tend to be semantically related rather than grammatically related.

Research for Korean children's semantic development has been attempted longitudinally (Zho, 1982) and cross-sectionally (Kim, 1998). Kim (1998) analyzed 78 2- to 3-year old children and reported 8 frequently used semantic roles (object, entity, agent, action, statement, attribute, locative, negation). In addition, she reported 5 of the frequently used 2-term semantic relations (object-action, entity-statement, background(locative)-action, agent-action, possessor-possession(entity)). Results indicated that most frequently used 3-term relations were extensions of the object-action or background-action (i.e., agent-object-action, object-background-action, agent-background-action). Most frequently used 4-term relations were also extensions of the frequent 2-term relations (agent-action, entity-statement) or 3-term relations (agent-object-action).

A few of comparative studies between the normal children and the language-disordered children showed that the language-disordered children used less variable semantic roles. Leonard (1984) and Trauner et al. (1995) reported that the language-disordered children began combining words later and showed less variable than the normal children did. However, compared with the MLU-matched normal children, the language-disordered children did not show noticeable difference on 2-word semantic relations. For exmaple, Freedman and Carpenter (1976) reported no differences except in the introducer-entity relation between the normal and the language-impaired children at Stage I. Based on these results, researchers suggested that the language-disordered children have capacity to develop their semantic aspect of language appropriate to their language age (Morehead & Ingram, 1973; Wells, 1974; Leonard, 1984).

Even in the 90's, semantic relations have been an important goal of language intervention. Especially in the natural or pragmatic language intervention program, semantic relations have been a main target for the language-disordered children at 2- to 3-word sentence level (Kim & Lombardino, 1991; Warren et al., 1994; Kaiser & Hester, 1994).

In Korea, many language-disordered children at early sentence level have been trained on the basis of their semantic and pragmatic level of development. However, few studies have been conducted for semantic characteristics of the language-disordered children. In addition, their intersentence relations have been ignored.

The purpose of the present study was to examine the semantic characteristics of the language-disordered children's utterances based on the following aspects: (1) the relations among the chronological ages, the grammatical unit of the utterance length, and the semantic units of the utterance length, (2) the most frequently used intrasentence relations (semantic roles and relations), and (3) the most frequently used intersentence relations (juxtapositions, conjoining, embedding). For this purpose, the MLU-matched normal children's data were compared with the language-disordered children's data.

. METHOD

1. Participants

Thirty-five language-disordered children who showed 2- to 3-year of language age served as the participants of this study. They showed more than 2 years of language delay and have received less than 6 months of speech therapy. None of the participants showed physical, sensory, or behavior problems. To compare the language-disordered children's data with the normal data, 35 normal children's data were selected from the researcher's previous study (Kim, 1997). They were identified as normal by the results of the Picture Vocabulary Test (Kim et al., 1995). The two groups of children were matched by their MLU-w (the Mean Length of Utterance in Words), one by one. The means of MLU-w for the normal and the language-disordered were 2.48 (1.16-3.72) and

2.45 (1.17-3.68), respectively. The means of CA for the normal and the language-disordered were 2;9 (2;0-3;10) and 6;4 (2;7-13;1), respectively. Results of t-test indicated that the mean difference of MLU-w for the two groups was not significant ($t = .24$).

2. Procedure

Language samples of each child were collected during free conversation in a play setting. The language samples were audio-recorded for 30 to 40 minutes and transcribed within 1 or 2 days. From each sample 100-200 spontaneous utterances were transcribed and 70 natural and representative utterances were selected and analyzed. The utterance was defined when one of the following criteria was met: (1) when one sentence is finished, (2) when there is a prosodic change or a pause longer than 5 seconds, or (3) when topic is changed (Klee & Fitzerald, 1985; Rondal et al., 1987; Owens, 1999; Kim, 1997).

Each utterance was analyzed in terms of (1) utterance lengths measured by the number of words and the number of semantic units, (2) intrasentence relations (semantic roles and relations), and (3) intersentence relations (juxtaposition, conjoining, embedding). Juxtaposition relations were observed in terms of substantive and action/state roles. Conjoining relations were observed in terms of temporal, concurrent, contrary, conditional/hypothetical, additional, reason/cause, purpose/intention, change, concession, no relation, and background. Embedding relations were observed in terms of subtantive, action/state, adjective, and background roles.

The semantic roles are coded in Table 1 which is based on Retherford et al.'s system (1981) and supplemented by the researcher of the present study (see Kim, 1998 for detailed coding guidelines). The intersentence semantic relations are coded in Table 2 which is a composite revision based on several studies (Clancy et al., 1976; Hood & Bloom, 1979; Nam & Ko, 1983). For example, the utterance of " " (meaning of "I am full because I ate a lot") is analyzed as follows:

the number of words: 3
the number of semantic units: 3
semantic roles: agent, reason, statement, adverbial, action

semantic relations: reason (adverbial-action) - statement

intersentence relation: reason conjoining

3. Data Analysis

To examine analyzability of the semantic unit as a measure of utterance length, the Pearson correlation coefficients were calculated among CA, grammatical units (MLU-w), and semantic units. The semantic units were further divided into (1) the mean number of semantic units (MSU), (2) the mode number of semantic units (MoSU), and (3) the maximum number of semantic units (MxSU).

To analyze the intrasentence relations, top 10 of the most frequently used semantic roles and relations (2-, 3-, and 4-terms) were selected. And the frequency of the each role and relation was analyzed by t-test to compare the two groups. To analyze the intersentence relations, the mean frequency of each type (juxtaposition, conjoining, embedding) was analyzed and compared the two groups by t-test.

4. Interjudge Reliability

Interjudge reliability was calculated for 25 % of the languge samples. A graduate student in speech pathology served as a second judge. Interjudge agreements were 92 % in dividing utterances, 85 % in counting number of words and semantic units, and 82 % in coding intra- and inter-sentence roles and relations.

. RESULTS

1. Relationships among CA, Grammatical Units, and Semantic Units

As seen in Table 3, in the language-disordered group, all of the units of the utterance length (MLU-w, MSU, MoSU, MxSU) were correlated significantly. Especially, MLU-w and MSU showed the highest correlation (r = .91, $p < .01$). In the normal group, MLU-w

Table 1. Definitions of Intrasentence Semantic Roles

Composi-tional Role	Semantic Role		Definition
. Substantive Roles	agent		A performer (animate of inanimate) of an action.
	experiencer		Someone or something that undergoes a given experience or mental state.
	possessor		One who possesses (an) object(s).
	comitative		One who performs or participates together.
	recipient		One who benefitted from an action.
	object		A person or thing that receives the force of an action
	entity		A substantive word that is stated without action.
	created object*		A person or thing that has been made or changed.
. Action / State Roles	action		A perceivable movement or activity engaged by an agent.
	state	mental state*	A mental condition experienced by a person or object.
		entity state*	The stated condition/labelling of an entity.
		negative state*	The stated condition that includes negative meaning.
. Adjective Roles	attribute		A description of size, shape, quality of an object or person.
	adverbial		A description of degree or quality of an action or statement.
	back-ground*		A description of background of action or statement.
		negation	The negative modifier of an action: nonexistence, rejection, cessation, denial, or disappearance.
		time	The expression of time of an action or statement.
		location	The place where an object or action was located or toward which it moved.
		instrument	Something that an agent uses to carry out an action.
		reason	The expression of reason, intention, or cause of an action or statement.
		condition*	The expression of condition of an action or statement.
		comparison	The expression of comparison of the substantive meaning.
		recurrence	The expression of additional instance or reappearrence.
		concession*	The expression of concession or permission of action or statement.
. Commu-nicative Devices	attention		Use of an individual's name or other expression to gain attention.
	repetition request		Use of terms like "what", "huh" etc. to request repetition of speaker's utterance.
	exclamation*		Use of terms like "oh", "ah".
	affirmation		Use of affirmative terms to assert that a previous utterance or behave is correct or to indicate compliance with request from previous utterance.
	emphasis*		Use of reduplicated meaning.
	sounds accompanying		Noises or sounds used to replicate sounds of agent or object.
	greeting		Use of greeting like "hi".
	conjunction*		Use of conjuncture in a simple sentence.
	routine		Use of rote counting or recitation of story/song/poem.

(Based on Retherford et al., 1981; Kim, 1998)
*: added or revised semantic role by the present researcher.

Table 2. Definitions of Intersentence Semantic Relations

Intersentence Relations	Description	Example
Juxtaposition	Simply juxtapose (list) several words which have the same semantic roles.	" , , ." [meaning "I like apples, watermelon, grapes."]: agent - object juxtapositions - action
Conjoining	Two phrases / sentences are combined mainly by one of the following conjunctional relations: temporal, concurrent, contrary, conditional/hypothetical, additional, reason/cause, purpose/intention, change, concession, no relation, background	" , ." [meaning "If (you) eat, (I will) give (it)."]: action - conditional conjoining - action
Embedding	Combine two phrases/sentences by an incorporation of one within the structure of the other.	" " [meaning "I told not to do."]: agent - action embedding (negation - action)

and MSU also showed the highest correlation ($r = .89$, $p < .01$). However, significant correlation was not found between MLU-w and M₀SU in the normal group.

In the language-disordered group, only low correlations were found between CA and either unit of the utterance length (grammatical unit and semantic unit). In the normal group, however, CA showed significant correlations with MLU-w ($r = .61$, $p < .01$) and with MSU ($r = .49$, $p < .01$).

2. Intrasentence Relations

A. Semantic Roles

The semantic roles which ranked within the 10th were summarized in Table 4. In semantic roles, entity, object, and agent were the most frequently used substantive roles in that order. Most of (all 4 in the language-disordered group, 3 out of 4 in the normal

Table 3. Correlations among CA, Grammatical Unit, and Semantic Units

		CA	Grammatical Unit (MLU-w)	Semantic Units		
				MSU	MoSU	MxSU
CA	LD					
	N					
Grammatical Unit	LD	.27				
	N	.61**				
Semantic Units						
MSU	LD	.30	.91**			
	N	.49**	.89**			
MoSU	LD	.39*	.49**	.64**		
	N	.14	.33	.47		
MxSU	LD	.09	.63**	.61**	.12	
	N	.52**	.63**	.65**	.08	

N: normal group, LD: language-disordered group,
*$p < .05$, **$p < .01$

group) the action/state roles ranked within the 10th. Action was used most frequently, followed by mental state, entity state, and negative state in the order given. In adjective roles, only the background (location) and adverbial roles ranked within the 10th. In the case of communicative devices, only the affirmation and attention roles ranked within the 10th.

Most of the semantic roles (25 out of 35) were used more frequently in the language-disordered group than in the normal group except for the following 10 semantic roles: possessor, comitative, entity, action, entity state, location, negation, condition, recurrence, and communicative devices. However, statistically significant differences were found only in 5 semantic roles: possessor ($t = 4.00$, $p < .01$), negative state ($t = 2.97$, $p < .01$), reason ($t = 2.27$, $p < .05$), repetition request ($t = 2.70$, $p < .01$), and exclamation ($t = 3.52$, $p < .01$). Three of them (negative state, reason, and exclamation) were more frequently used in the language-disordered group than in the normal group and possessor and repetition request were used more frequently in the normal group.

B. Semantic Relations

The 2- to 4-term semantic relations which ranked within the 10th are demonstrated

Table 4. Rank and Mean Frequency of the Semantic Roles and Relations

Rank	Mean Frequency of Occurrence							
	Semantic Roles		Semantic Relations					
			2-term		3-term		4-term	
	LD	N	LD	N	LD	N	LD	N
1	action (19.2)	action (22.16)	ent-sta (22.5)	obj-act (20.6)	age-obj-act (16.1)	age-obj-act (14.0)	age-bac-bac-act (9.3)	age-bac-obj-act (14.9)
2	entity (14.6)	entity (17.0)	obj-act (20.3)	ent-sta (19.0)	ent-bac-sta (14.5)	age-bac-act (14.0)	age-obj-adv-act (9.3)	ent-bac-att-sta (14.9)
3	mental state (9.3)	mental state (8.4)	bac-act (11.7)	bac-act (12.6)	obj-bac-act (11.3)	ent-bac-sta (11.2)	ent-bac-adv-sta (7.4)	pos-ent-bac-sta (8.5)
4	object (8.0)	object (7.1)	adv-act (8.3)	bac-sta (8.2)	age-bac-act (11.0)	obj-bac-act (8.8)	ent-bac-att-sta (5.6)	act-bac-bac-act (8.5)
5	agent (5.2)	entity state (5.7)	age-act (7.9)	age-act (7.5)	age-adv-act (5.5)	obj-adv-act (6.4)	exp-bac-ent-sta (5.6)	att-ent-adv-sta (6.4)
6	entity state (4.8)	agent (5.0)	bac-sta (7.3)	adv-act (6.2)	obj-adv-act (5.2)	age-adv-act (4.4)		
7	back (location) (4.4)	back (location) (4.8)	exp-sta (4.8)	pos-ent (5.7)	exp-bac-sta (3.9)	pos-ent-sta (4.4)		
8	adverbial (4.4)	adverbial (3.9)	bac-ent (2.8)	exp-sta (4.0)	ent-adv-sta (2.9)	ent-adv-sta (2.8)		
9	affirma-tion (3.7)	affirma-tion (3.6)	att-sta (2.5)	pos-sta (3.5)	exp-ent-sta (2.9)	att-ent-sta (2.8)		
10	negative state (2.4)	attention (3.4)	att-ent (2.2)	att-sta (3.0)	adv-bac-act (2.9)	exp-bac-sta (2.4)		

* LD: language-disordered group, N: normal group
act: action, adv: adverbial, age: agent, att: attribute, bac: background, ent: entity, exp: experiencer, obj: object, pos: possessor, sta: state

in Figure 1. In the 2-term relations, entity-state was used most frequently, followed by object-action and background(location)-action (see Figure 1a). The possessor-entity and possessor-state relations ranked within the 10th only in the normal group. This result seems to be related with the differential use of possessor between the two groups.

Meanwhile, background-entity and attribute-state ranked within the 10th only in the language-disordered group.

In the 3-term relations, agent-object-action was used most frequently, followed by entity-background-state and object-background-action (see Figure 1b). Most of the top ten of the 3-term relations (8 out of 10) were composed of the two of the 2-term relations which ranked within the 10th. For example, agent-object-action seemed to be extended from agent-action and object-action. Two of the 3-term relations (possessor-entity-state, attribute-entity-state) ranked within the 10th only in the normal group. Meanwhile, experiencer-entity-state and adverbial-background-action ranked within the 10th only in the language-disordered group.

The four-term relations did not appear frequently in both groups (see Figure 1c). The 4-term relations showed more than 4 times in the language-disordered group were agent-background-background-action, agent-object-adverbial-action, and entity-background-adverbial-state. In the normal group, agent-background-object-action and entity-background-adverbial-state relations appeared most frequently, followed by possessor-entity-background-state and agent-background-background-action.

3. Intersentence Relations

The juxtapositions and conjoining intersentence relations were used more frequently in the language-disordered group than in the normal group ($t = 2.62$, $p < .05$), the difference being statistically significant. However, the frequency of the embedding intersentence relations were not significantly different between the two groups.

As seen in Figure 2a, entity was the most frequently juxtaposed semantic role, followed by object and comitative in the language-disordered group. In the normal group, entity and comitative were the most frequently juxtaposed, while object was not frequently juxtaposed. In conjoining intersentence relations, as seen in Figure 2b, temporal, conditional, and concurrent relations occurred most frequently in both groups. In embedding intersentence relations, as seen in Figure 2c, adjective roles were the most frequently embedded in the normal group, while substantive roles were the most frequently embedded in the language-disordered group. Specifically, created object and entity were

the most frequently embedded in both groups. In addition, attribute was the much more frequently embedded role than adverbial in the language-disordered group, while no difference was found in the normal group.
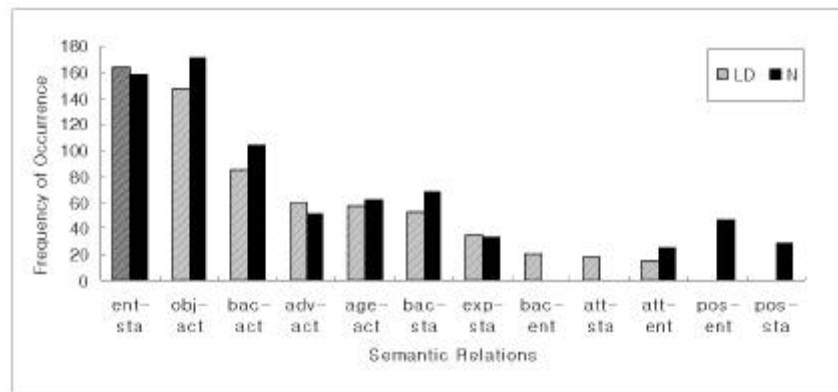

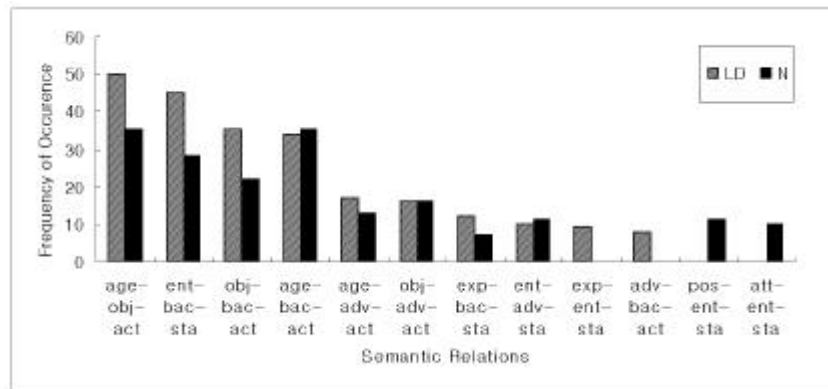Figure 1a. Most Frequently Used 2-Term Semantic Relations

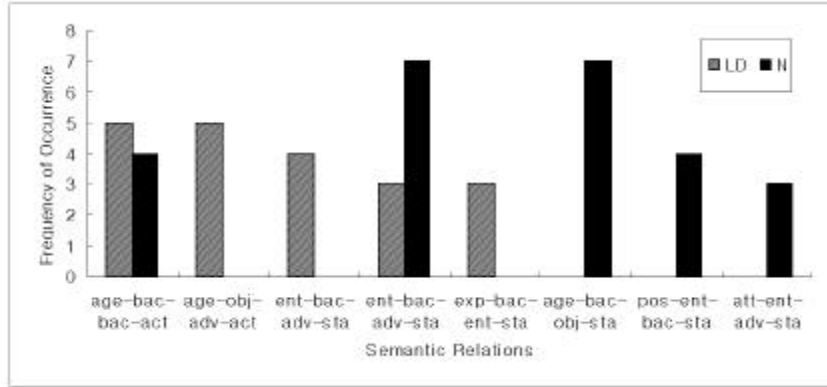Figure 1b. Most Frequently Used 3-Term Semantic Relations

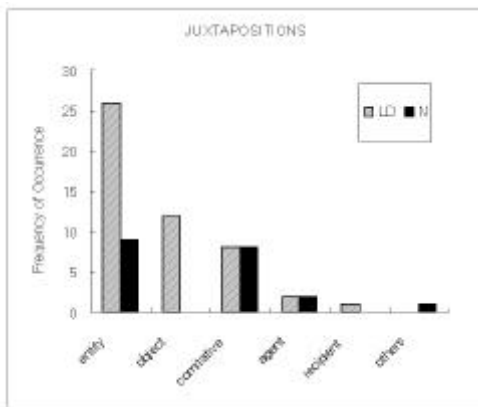Figure 1c.   Most Frequently Used 4-Term Semantic Relations
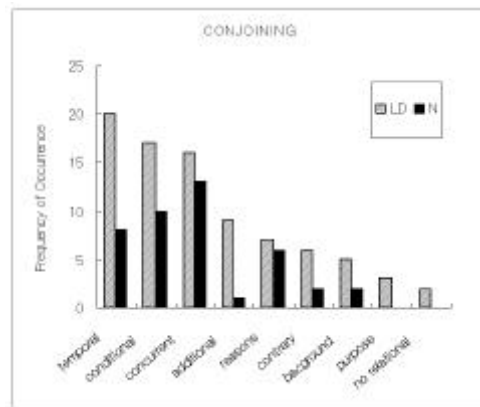

Figure 2a. Juxtaposing Intersentence
Relations
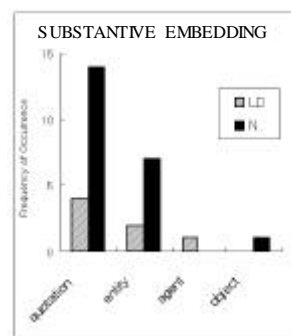
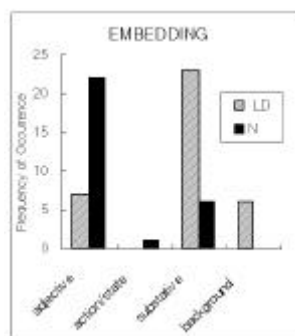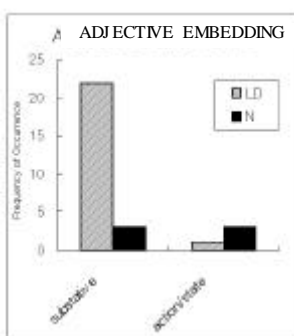

Figure 2b. Conjoining Intersentence
Relations

Figure 2c. Conjoining Intersentence Relations

. DISCUSSION

High correlations between the number of grammatical units and the semantic units in both groups indicate that the number of semantic units, especially the mean number of semantic units (MSU), can be used as an important measure of expressive language development of young children. However, the correlations between the number of units of the utterance length and chronological age were not significant in the language-disordered group. This result seems to be due to the participants' wide range of chronological ages in the language-disordered group. Many researchers reported low correlations between MLU and CA beyond age of 4. Poor correlations between the number of semantic units and CA in the language-disordered group indicate that the mean number of semantic units, like MSU, is not a sensitive measure of language development beyond certain age. More detailed research could be conducted to investigate the relationships between MSU and CA with the normal children beyond age of 4.

Results of the analyses of frequently used semantic roles and relations suggest that there are no quantitative differences between the language-disordered children and their MLU-matched normal children. However, some qualitative differences were found in this study. For example, some of the semantic roles (e.g., possessor and repetition request) were used significantly more in the normal children, while some (e.g., negative state, reason, exclamation) were used significantly more in the language-disordered children. These differences seem to be related to the language-disordered children's limited use of communicative devices and confirmative expressions. These results support the previous assumption that the language-disordered children have language-age-appropriate semantic capacity to develop language.

Most of the frequent 3-term relations were composed of the frequent 2-term relations which ranked within the 10th. These results support Slobin's suggestion (1973) that acquisition of a new languge structure is often coordinated with the existing language structures.

Although some of the researchers semantically analyze only simple sentences and grammatically analyze complex sentences of the young children's language, both the simple

and complex sentences were analyzed semantically in this study. Among the intersentence relations, the language-disordered group used significantly more juxtaposition and conjoining, while there was no difference found in use of embedding. However, adjective embedding was used more frequently in the normal group, while substantive embedding was used more frequently in the language-disordered group. The language-disordered children showed even more delay in embedding (especially in adjective embedding) than the normal children at the same language level. The results indicate that it is more difficult for the language-disordered children to acquire embedding intersentence relations.

Based on the results of this study and the present researcher's clinical experiences, the previous dichotic analysis system seems to miss a lot of information and to lead to an underestimated assessment.

Further research could be conducted to develop and verify the semantic assessment and intervention of young children's complex sentences.

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