

# THE COMPREHENSION OF SPATIAL ADJECTIVES BY CHILDREN WITH NORMAL AND CHILDREN WITH DEVIANT LANGUAGE DEVELOPMENT

David W. Illerbrun,  
Institute of Child Guidance and  
Development and College of Education,  
University of Saskatchewan,  
Saskatoon, Canada.

## RESUME

Vingt enfants de développement linguistique normal, dont la durée de parole moyenne était d'entre 4.56 et 6.06 morphèmes, et qui étaient âgés de 4 ans 2 mois à 5 ans 6 mois, étaient assortis avec 20 enfants de développement linguistique anormal, dont la durée de parole moyenne était d'entre 4.54 et 6.04 morphèmes, et âgés de 6 ans 5 mois à 12 ans 6 mois. Six paires d'adjectifs spatiaux en trois formes différentes (polaires, superlatifs et comparatifs) ont été choisies comme stimuli. Pour juger de leur compréhension des 36 adjectifs spatiaux, on a montré aux enfants 36 images en noir et blanc représentant les adjectifs choisis. L'analyse des données indiquait que les enfants comprenaient beaucoup plus facilement ( $p < 0.05$ ) les adjectifs polaires et superlatifs que les comparatifs. Les enfants semblaient comprendre le membre marqué d'une paire d'adjectifs au même temps que le membre non marqué. Aussi bien, il n'y avait au développement linguistique normal et les autres, quand ils étaient assortis par des critères linguistiques tels que la durée moyenne de la parole.

## ABSTRACT

Twenty children with normal language development, with a mean length of utterance of 4.56 to 6.06 morphemes and ranging in age from four years and two months to five years and six months, were matched with 20 children with deviant language development, with a mean length of utterance of 4.54 to 6.04 morphemes and ranging in age from six years and five months to twelve years and six months. Six pairs of selected spatial adjectives in three different forms (polar, superlative, comparative) were used as stimuli. A total of 36 plates containing simple black and white line drawings representative of the selected adjectives were used to assess the child's comprehension of the 36 spatial adjectives. Analysis of the data indicated that children find it significantly ( $p < 0.05$ ) easier to comprehend the polar and

superlative adjective forms than the comparative form. The children appeared to comprehend the marked member of an adjective pair at the same time as its unmarked member. As well, there were no differences in the comprehension of spatial adjectives between children with normal language development and children with deviant language development when matched on a linguistic criteria such as mean length of utterance.

---

Currently there is considerable interest in the child's acquisition and comprehension of spatial adjectives (Clark, 1971; E. Clark, 1973; Bowerman, 1974; Morehead and Morehead, 1974). Donaldson and Wales (1970) investigated the acquisition of relational terms by 15 children ranging in age from three years and six months to five years. Although Clark (1970) has criticized the procedures of their study, he noted the children's superior performance on the positive pole of the superlative and comparative terms in contrast to the negative pole, i.e., longest, longer were found to be easier than shortest, shorter. Donaldson and Wales did not study the polar relational terms, e.g., long-short.

Clark (1971, 1973) has formulated a theoretical framework based in part on the psycholinguistic rationale provided by Greenberg's (1966) "markedness" theory and Bierwisch's (1967) "semantic universal features" theory, through which the child's percepto-cognitive system could be studied. Clark postulated that the child applies spatial terms to those concepts of space which he already knows. The semantic features are considered to be a product of the percepto-cognitive system. Clark further postulated two hypotheses through which he attempted to relate the non-linguistic and linguistic systems of human beings. The first hypothesis, the Correlational Hypothesis, states that the structure of man's perceptual space will be preserved in his language space. The second hypothesis, the Complexity Hypothesis, states that given two terms A and B, where B requires all the same rules of application as does A plus one more, then A will normally be acquired before B. For example, in the following spatial adjective pairs: **long-short, high-low, tall-short, deep-shallow, wide-narrow, and thick-thin**; it is the first member of each pair which is considered less complex because it is unmarked, positive, and names the dimension. The second member of each spatial adjective pair is considered more complex because it is marked, negative and names the defective dimensional scale (Clark, 1973, p.41). Markedness theory has been described as: "The general meaning of a marked category states the presence of a certain property A; the general meaning of the corresponding unmarked category states nothing about the presence of A and is used chiefly but not extensively to indicate the absence of A" (Greenberg, 1966, p.72). Using spatial adjectives as an example; **short** is used primarily but not exclusively to indicate the absence of A; A in this case is **high** and in this case names the dimension, **height**.

E. Clark (1972) has investigated the child's acquisition of dimensional terms by children ranging in age from four years to five years and five months. She used a word opposites task in order to elicit responses from the children. She further reported a definite hierarchy in the child's acquisition of dimensional terms, i.e., **long-short** followed by **tall-short**, then **high-low**, **thick-thin**, **wide-narrow**, and finally **deep-shallow**. In discussing the results of her study E. Clark stated that she found no evidence that the child acquired the less complex (unmarked) member of antonym pairs earlier than the more complex (marked) member of the antonym pair. This finding provided evidence against Clark's (1971) Complexity Hypothesis with particular reference to the aspect of "markedness". E. Clark did not study the acquisition of the superlative and comparative spatial adjective forms.

A more recent study reported by Stone (1973) attempted to further test Clark's Complexity Hypothesis and determine the acquisition hierarchy of selected spatial adjectives. He tested 28 children ranging in age from three years and six months to five years and two months utilizing six spatial adjective pairs in the polar form. The superlative and the comparative forms were not assessed. Stone's findings in reference to the acquisition hierarchy were similar to E. Clark's (1972) with the exception being a reversal in the order of acquisition for the fifth and sixth adjective pairs. Stone's (1973) findings supported those of E. Clark (1972) in relation to the aspect of "markedness". They both reported that the children did not evidence asymmetry in the acquisition of spatial adjective pairs, i.e., the marked member of each pair was acquired at about the same time as the unmarked member.

The preceding review of the literature concerning children's comprehension of spatial adjectives indicates that all of the studies to-date have been conducted with linguistically normal children. It therefore seems of considerable value to compare children who are deviant in language development with linguistically normal children who are both actively engaged in developing language. Recent research in language acquisition suggests that there may not be significant linguistic differences between normal and deviant child language groups especially when a linguistic criteria is used in matching the subjects (Morehead and Ingram, 1973). However, before this statement can be accepted as fact not only more studies but more specific studies in language acquisition are required.

The term "language deviant" has been operationally defined in terms of mean length of utterance (MLU) which is based on Brown's (1973) number of morphemes per utterance (Morehead and Ingram, 1973). The child who is deviant in language is described as having a lower MLU than expected for his chronological age when compared to children with normal language and their corresponding MLU values. It appears that the term "language deviant" defined operationally, provides a valid categorization as opposed to an etiologically based, diagnostic classification such as deaf and mentally retarded or purely

descriptive categorization such as delayed speech and articulation defect (Menyuk, 1971). Mean length of utterance is highly correlated with linguistic behavior at least for young children (Brown, 1973), and states nothing about etiology because the latter mentioned are not based on linguistic parameters. Since labels such as deaf or mentally retarded are not useful linguistic categories, it seems advisable to avoid their use in selecting and matching subjects for language behavior investigations. Therefore, the measure of MLU appears to be a more valid method of selecting and matching subjects to be employed in language behavior studies, at least for young children.

The purpose of this study was to investigate the comprehension of spatial adjectives by children with normal language and children with deviant language development. The questions of interest in the present study were: (1) Do children find it easier to understand the marked or the unmarked form of spatial adjectives? The unmarked forms are: **tall, long, high, thick, deep, and wide**; and the marked forms are: **short, short, low, thin, shallow, and narrow**. (2) Do children find it easier to comprehend the polar, superlative or the comparative forms of spatial adjectives? For example: **tall, tallest, taller, and short, shortest, shorter**. (3) Do children with deviant language development differ from children with normal language development in their understanding of spatial adjectives when mean length of utterance (MLU) is the same for both?

## METHOD

### Subjects

The subjects were 40 children. Twenty children with normal language development, with a mean length of utterance (MLU) of 4.56 to 6.06 morphemes (mean MLU 5.33) and ranging in age from four years and two months to five years and six months (mean age 58.70 months), and 20 children with deviant language development, with a mean length of utterance (MLU) of 4.54 to 6.04 morphemes (mean MLU 5.31) and ranging in age from six years and five months to twelve years and six months (mean age 99.95 months). The subjects were in attendance at a nursery school or enrolled in formal education classes in a school system. The first 40 children who met the following criteria became subjects for the current study: (1) All subjects were native English speakers. (2) All subjects had a mean length of utterance which allowed their placement in one of the two experimental language groups of 20 subjects.

A 50-utterance language sample (Templin, 1957; Winitz, 1959; Darley and Moll, 1960; Lee, 1966) of each subject's spoken language was obtained and recorded on a Sony tape recorder (Model TC-102M) from which a mean length of utterance was computed following Brown's (1973, p.54) criteria. As a measure of reliability, five children's MLU transcribed data sheets were selected

at random and re-scored according to Brown's criteria, by a person other than the original investigator who was familiar with the technique. The two sets of results for the five children's MLU was compared and a reliability coefficient computed. A coefficient of 0.89 was accepted as an adequate level of reliability.

**Stimuli.** The materials consisted of simple, black and white line drawings which were considered to be representative of the lexical items being tested. There were 12 plates for each of the three tasks. Each plate for the polar and superlative tasks contained four line drawings. The plates for the comparative task contained six line drawings as this task required a "middle" relational item. Each plate was 8½" x 11" and was considered to be large enough to provide the child with line drawings which were dissimilar in the particular attribute inherent in the spatial lexical item being tested, i.e., visual discrimination between small differences among line drawings was controlled. Two pairs of spatial lexical items were represented on each plate in the following three sets: (1) High-Low, Thick-Thin. (2) Wide-Narrow, Long-Short. (3) Tall-Short, Deep-Shallow. This particular grouping was maintained for all three tasks. However, the sequence of their arrangement on each of the four plates for each of the three sets was varied randomly. Thus, a total of 36 plates were used to test the child's comprehension of the 36 spatial adjective lexical items investigated in the present study.

**Procedure.** The subject's comprehension of selected spatial terms was measured on three different comprehension tasks. All subjects were tested individually. A demonstration item preceded each of the tasks. The 12 items comprising each task were randomized for the presentation as well as the three tasks. Approximately 20 minutes was required to complete the testing for each subject. The subject received one point for each correct response and a zero for each incorrect response.

Task 1. The Polar spatial adjectives tested were: **high-low, thick-thin, wide-narrow, long-short, tall-short, and deep-shallow.** The subject was presented each of the 12 plates individually and was asked to "Touch the \_\_\_\_\_ one."

Task 2. The Superlative spatial adjectives tested were: **highest-lowest, thickest-thinnest, widest-narrowest, longest-shortest, tallest-shortest, and deepest-shallowest.** The subject was presented with the 12 plates individually and was asked to "Touch the \_\_\_\_\_ one."

Task 3. The Comparative spatial adjectives tested were: **higher-lower, thicker-thinner, wider-narrower, longer-shorter, taller-shorter, and deeper-shallower.** The subject was presented with each of the 12 plates individually and was asked to "Touch the one that is \_\_\_\_\_ but not the (highest)."

## RESULTS

An analysis of variance (ANOVA) appropriate for a three-factor split-plot factorial design was used to analyze the data (Kirk, 1968, p.298). The results are presented in Table 1.

Table 1. Summary of ANOVA to test for differences in mean number of items responded to correctly by 20 children with normal language development and 20 children with deviant language development for three spatial adjective forms with two levels for each form.

Source	df	MS	F	p
Language Groups (A)	1	1.0666		
Adjective Forms (B)	2	15.7092	8.0370	0.01
A x B	2	1.5542		
Markedness (C)	1	10.4166		
A x C	1	0.2668		
B x C	2	1.6792		
A x B x C	2	3.4459		

The results of the ANOVA (Table 1) provided evidence that there was a significant main effect for the three spatial adjective forms, i.e., polar, superlative and comparative ( $p < 0.01$ ). Children do find some forms of spatial adjectives easier to understand than others. Tukey's Honestly Significant Differences (HSD) test was then used to make all pairwise comparisons among the three spatial adjective form means (Kirk, 1968, p.88). The results indicated that children found the polar adjectives ( $\bar{X} = 16.85$ ) and the superlative adjectives ( $\bar{X} = 16.45$ ) both significantly easier (HSD = 3.25; ( $p < 0.05$ )) (HSD = 2.25; ( $p < 0.05$ )) to comprehend than the comparative adjectives ( $\bar{X} = 0.40$ ), but not significantly different from each other.

## DISCUSSION

The results of the present study provide evidence that there are no significant differences in the ease of comprehension of spatial adjectives by children with normal language development and by children with deviant language development when they are matched on mean length of utterance (MLU). This

particular finding lends support to other recent findings (Ingram, 1972; Morehead and Ingram, 1973). Differences which do exist between normal language and deviant language children appear to be quantitative and creative differences rather than qualitative differences (Lackner, 1968; Menyuk, 1969; 1971; Morehead and Ingram, 1973). These results emphasize the importance of matching language deviant children and normal language children on linguistic criteria rather than criteria such as intelligence quotient (IQ) or chronological age (Morehead, in press). One such linguistic criteria, at least for young children, is Brown's (1973) MLU.

A second finding was that the children in the present study had significantly more difficulty in understanding the comparative form in relation to the polar and the superlative spatial adjective form. Donaldson and Wales (1970) were the only other investigators to study the child's acquisition of the superlative and comparative forms. Although their data is difficult to interpret (Clark, 1970) it can be seen that children did slightly better on the comparative than the superlative form of spatial adjectives. In contrast, the current study provides evidence that the converse is true, i.e., the superlative form is significantly easier than the comparative form. Based on these findings it would seem that the Donaldson and Wales (1970) data was inaccurate and misleading, perhaps due in part to its exploratory nature. On the basis of the current results it can be concluded that children find the polar and superlative adjective forms significantly easier to comprehend than the comparative adjective form. The latter finding could be explained in terms of the theory put forth in Clark (1970). Clark's theory states that the child first learns the nominal use of polar spatial adjective pairs in the sense that they both mean "having extent". The child then acquires the subordinate property of antonyms, i.e., their contrastive use. The more general use of contrastive adjective forms is learned first followed by the more specific. In addition, the acquisition of the comparative forms requires a more complex syntactic structure (Clark, 1970). For example, "This pencil is longer than that one," requires three propositions to assert that a pencil has length: this pencil has length, that pencil has length, and the second pencil length is less than the first. In contrast, the superlative form, i.e., "The longest pencil," requires two propositions to assert that this pencil is longer than average. The polar form, i.e., "The long pencil," requires only one proposition to assert that a pencil has length. The assumption is that the more complex the linguistic form, the more difficult that form will be to understand and conversely, the less complex the linguistic form, the easier it is to understand.

Finally, the present study found that there was no difference in the child's ease of comprehension between the unmarked (long, deep) and the marked (short, shallow) adjective member pairs. Clark (1970) predicted that children would find it easier to understand the unmarked as opposed to the marked member of adjective pairs. Cazden (1972) in discussing the Donaldson and Wales (1970) study in relation to Clark's prediction concerning markedness,

stated that the unmarked member of each pair (long, deep, high) is learned first by children followed by their marked counterparts (short, shallow, low). This prediction was supported by the results of a study reported by Tashiro (1971) who stated that when a child misunderstands the negative form of a spatial adjective pair his response was to the positive form. Tashiro commented that it appeared that the child knew all the rules for the positive term but not the one extra rule for the correct application of the negative rule. E. Clark (1972) and Stone (1973) have offered evidence from their studies of the child's acquisition of spatial adjectives which is in direct opposition to Clark's (1970) prediction. The results of the present study support those of E. Clark (1972) and Stone (1973). In conclusion, it can be stated that children show no difference in the comprehension of marked and unmarked forms of spatial adjectives. The present study provides evidence that this finding is the same for both normal language and deviant language children when they are matched on linguistic criteria such as MLU.

## REFERENCES

- Bierwisch, N., Some semantic universals of German adjectivals. **Foundations of Language**, 3, 1-36 (1967).
- Bowerman, M.F., Development of concepts underlying language. In R.R. Schiefelbusch and L.L. Lloyd, (Eds.), **Language Perspectives-Acquisition, Retardation, and Intervention**. Baltimore: Univ. Park Press (1974).
- Brown, R., **A First Language**. Cambridge, Mass: Harvard Univ. Press (1973).
- Cazden, C.B., **Child Language and Education**. New York: Holt, Rinehart and Winston, Inc. (1972).
- Clark, E., On the child's acquisition of antonyms in two semantic fields **J. verb. Learn. verb. Behav.**, 11, 750-758 (1972).
- Clark, E., What's in a word? On the child's acquisition of semantics in his first language. In T.E. Moore (Ed.), **Cognitive Development and the Acquisition of Language**. New York: Academic Press (1973).
- Clark, H., The primitive nature of children's relational concepts: A discussion of Donaldson and Wales. In J.R. Hayes (Ed.), **Cognition and the Development of Language**. New York: John Wiley & Sons (1970).
- Clark, H., Space, time, semantics and the child. Paper presented at the Conference of Developmental Psycholinguistics, State Univ. of New York at Buffalo, Buffalo, N.Y. August 2-5, 1971.
- Clark, H., Space, time, semantics, and the child. In T.E. Moore (Ed.) **Cognitive Development and the Acquisition of Language**. New York: Academic Press (1973).

- Darley, F.L., and Moll, K.L., Reliability of language measures and size of language sample. **J. Speech Hearing Res.**, 3, 166-173 (1960).
- Donaldson, M., and Wales, R.J., On the acquisition of some spatial terms. In J.R. Hayes (Ed.), **Cognition and the Development of Language**. New York: John Wiley & Sons (1970).
- Greenberg, J.H., **Language Universals**. The Hague: Mouton & Co. (1966).
- Ingram, D., The development of phrase structure rules. **Lang. Learn.**, 22, 23-33 (1972).
- Kirk, R.E., **Experimental Design: Procedures for the behavioral sciences**. Belmont, Calif.: Wadsworth Publishing Co. (1968).
- Lackner, J., A developmental study of language behavior in retarded children. **Neuropsychologia**, 6, 301-320 (1968).
- Lee, L.L., Developmental sentence types: A method for comparing normal and deviant syntactic development. **J. Speech Hearing Dis.**, 31, 311-330 (1966).
- Menyuk, P., **Sentences Children Use**. Cambridge, Mass.: The M.I.T. Press (1969).
- Menyuk, P., **The Acquisition and Development of Language**. Englewood Cliffs, N.J.: Prentice-Hall (1971).
- Morehead, D., The study of linguistically deficient children. In S. Singh (Ed. ), **Measurement in Hearing, Speech, and Language**. Baltimore: Univ. Park Press, (In press).
- Morehead, D., and Ingram, D., The development of base syntax in normal and linguistically deviant children. **J. Speech Hearing Res.**, 16, 330-345, (1973).
- Morehead, D., and Morehead, A., From signal to sign: A piagetian view of thought and language during the first two years. In R.L. Schiefelbusch and L.L. Lloyd, (Eds.), **Language Perspectives-Acquisition, Retardation, and Intervention**. Baltimore: Univ. Park Press (1974).
- Stone, J.B., The acquisition of spatial adjectives by children. Honors thesis, Univ. of Illinois, (1973).
- Tashiro, L., On the acquisition of some non-comparative terms. Senior Honors thesis, Stanford Univ. (1971).
- Templin, M.C., Certain language skills in children, their development and interrelationships. **Instit. Child Welf. Monograph Series**, 26, Minneapolis: Univ. Minn. Press (1957).
- Winitz, H., Language skills of male and female kindergarten children. **J. Speech Hearing Res.**, 2, 377-386 (1969).

## ACKNOWLEDGEMENT

This article is based on a doctoral dissertation completed in the Department of Speech and Hearing Science, University of Illinois, under the supervision of Lois J. Sanders. The author greatly appreciates the assistance of John Lewchuk, Superintendent of Pupil Service Personnel, Saskatoon Separate School Board and Millicent Marshall, Director of the Preschool Center, Institute of Child Guidance and Development, University of Saskatchewan, for their assistance in providing subjects for this study.