THE ACQUISITION OF SEMANTIC FEATURES

in

CHILDREN WITH DOWN'S SYNDROME

by

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ABSTRACT

This study was designed to test the notion that children with Down's Syndrome develop their receptive language in the same order as normal children. E. Clark's Semantic Features Hypothesis which predicts a specific hierarchical acquisition of spatial adjectives was used to test this thesis.

Two groups of preschool children, a group of children with Down's syndrome and a group of matched for chronological age were presented with forty tasks involving the selection of spatial adjectives. No significant differences were found in the performances of the two groups when taken as a whole. However, there were significant differences between the performances of the children in the younger group with Down's Syndrome and the other those of the other three groups of children.

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My appreciation is not enough to thank those teachers and parents who welcomed me into their schools and homes. Their ideas, co-operation, friendship, and most of all patience helped make this study possible. I would especially like to thank the children who participated in the study. They taught me to look for similarities rather than differences.

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CHAPTER ONE

I. Introduction

For many years, the assumption that Down's Syndrome children had qualitatively different language from everyone else and developed that language in a unique way prevailed in the literature (Cowie, 1970; Evans; Lenneberg et al; Sabsay, 1975; Share, 1975; Sommers & Starkey, 1977; Spreen, 1965; Zisk & Bialer, 1967). However, within the last five years, this assumption has been questioned (Clements et al, 1976; Koch & de la Cruz, 1975; Rynders et al, 1978). These earlier studies assumed homogeneity between subjects, failed to recognize the traumatic effects of institutionalization, and perhaps most importantly, did not distinguish between receptive and expressive language. Almost all of the investigation of the language development of Down's Syndrome children explored either vocabulary or syntactic development. There has been very little research investigating the pragmatics or language functions with Down's Syndrome children. Rynders et al (1978) point out the weaknesses in the earlier studies, and recommend the comparison of Down's Syndrome children with 'normal' children following rigorous psychometric and sampling techniques. Rynders et al (1978) point out the weaknesses in the earlier studies, and recommend the comparison of Down's Syndrome children with 'normal' children following rigorous psychometric and sampling techniques.

The work of E. Clark on Semantic Features has been widely tested in the field of general semantic research. Clark hypothesized that: 1) the order of acquisition of dimensional adjective pairs will correspond to their order of semantic generality, 2) that semantically positive terms are acquired before their unmarked or negative counterparts, and 3) the meaning of the unmarked term will be extended to describe those terms best described by the marked term. It is the first hypothesis which will be investigated in this paper with a population of Down's Syndrome children.

II. Statement Of Problem

The present study is based on the proposition that children with Down's Syndrome follow the same sequence of development of spatial adjectives as that predicted by E. Clark (1973). Specifically, the children will acquire first the most general spatial adjectives, followed by increasingly more specific adjectives. The adjectives used are the same as those in Clark's original study and refer to spatial concepts.

CHAPTER TWO

I. Review Of The Literature

The review of the literature is reported in two sections: 1) mental retardation and language, and 2) the Semantic Features Hypothesis. The first section reviews the pertinent research with particular reference to Down's Syndrome. The second section reviews the research on the acquisition of semantic features, in particular, the hypothesis of the acquistion of semantic features proposed by E. Clark.

II. Mental Retardation And Language

> "There are none so depraved and stupid, without even excepting idiots that they cannot arrange different words together, forming of them a statement by which they make known their thoughts."

When he made this statement, Descartes could have added the codicil - that they do it in approximately the same way, no matter their nationality, intelligence, or handicap.

Much has been written about the development of language in delayed children. Villiger (1911) considered language to be separate from intelligence. Osnato (1920) took the opposite view by suggesting that "speech is the visible expression of intelligence and develops apace with the latter". This issue remains to to be settled. However, it is

reasonable to assume some relationship between language and cognitive devlopment. However, it is reasonable to assume some relationship between language and cognitive devlopment. Individuals with scores under twenty on standard tests of intelligence present extreme language delay. Ninety percent of those whose scores are below fifty and forty-five percent of those individuals whose IQ scores range from fifty to ninety exhibit some type of language acquisition delay. Range from fifty to ninety exhibit some type of language acquisition delay.

Much of the literature on language and developmentally delayed children which ties linguistic competence to chronological age leads to the assumption that the speech is deviant rather than delayed. Where do the differences occur? A frequent difference noted between the language of mentally retarded children and normal children is the age of onset of language. Some children described as mentally retarded show a substantial delay in the onset of babbling and first words (Karlin & Strazzulla, 1952). However, Abt, Adler, & Bartelme (1929) reported only moderate relationships between onset of speech and later IQ (Karlin & Strazzulla, 1952). Children with delayed language also seem to require more acquisition time. Some developmentally delayed children progress more slowly through the stages of language acquisition. Comparative studies of mentally retarded children with "normal children" on the basis of Mental Age suggest that the two groups compare favourably on vocabulary measures (Laycock & Clark, 1947; Thompson & Margaret, 1947). A third factor needs

also to be considered and that is the extremely high percentage of speech disorders among the retarded population. The articulation defects may act to hinder or handicap language development. The present work was developed to support the notion of language delay first proposed by Karlin and Strazzulla (1952).

III. Expressive And Receptive Language Development

The recent theoretical work by Bloom (1974) and Chapman (1974) suggests that different processes are involved in comprehension and production. Bartel, Bryen, & Keehn (1974) note that up to 1973 virtually all the research involving the language of retarded children has concerned their language production rather than understanding or reception. Duchen & Ericksen (1976) attempted to verify the existence of a greater comprehension-production

The recent theoretical work by Bloom (1974) and Chapman (1974) suggests that different processes are involved in comprehension and production. Gap for retarded children than for intellectually average children. They found no significant difference (at the .01 significance level) in the performances of normal and retarded children when matched for average number of elements per utterance.

Bartel et al (1974) compared the linguistic comprehension of a group of trainably retarded children with that of an intellectually normal population. Carrow's Expressive Test Of

Linguistic Comprehension was given to both groups of children. The authors found that while the intelligence score related positively to the performance of children on the test there was also systematic language development in children with intelligence scores as low as twenty. This finding agrees with an earlier study by Bartel (1970).

When vocabulary acquistion is investigated, mixed findings are common. Many studies (Mein, 1968; Dunn & Hottell, 1961; Budoff & Purseglove, 1963) have used the Peabody Picture Vocabulary Test as the basis for vocabulary size determination. This test has shown only moderate correlation to intelligence (Mein, 1962). Slightly higher correlations were found between Mental Age and other vocabulary measures until children reached the Mental Age of 7 or 8 which has been thought to be the ceiling age for consistent

When vocabulary acquistion is investigated, mixed findings are common. Many studies (Mein, 1968; Dunn & Hottell, 1961; Budoff & Purseglove, 1963) have used the Peabody Picture Vocabulary Test as the basis for vocabulary size determination. This test has shown only moderate correlation to intelligence (Mein, 1962). Slightly higher correlations were found between vocabulary development (Spreen, 1967). Spreen (1967) has been thought to be the ceiling age for consistent vocabulary development (Spreen, 1967). Spreen (1967) found that in vocabulary size measures retarded individuals show equal levels to normal children

matched for Mental Age. Found that in vocabulary size measures found that when matched for Mental Age, there was no significant difference in the use of lexical items by mentally retarded children. Bartel et al (1973) demonstrated the mastery of trainable children over vocabulary retarded individuals show equal levels to normal children matched for Mental Age. Rosenberger (1964) account for the limited vocabulary development noted in some retarded populations (O'Connor & Hermelin, 1963).

Blount (1968) maintains that "the fact that he (the individual) is retarded adds no information to his linguistic problems as the data show that his kinds of problems and his development both found that when matched for Mental Age, there was no significant normal intelligence (p. 28). Difference in the use of lexical items by mentally retarded children. Bartel et al (1973) demonstrated the mastery of trainable children over vocabulary items. Restrictive environments may account for the limited vocabulary development noted in some retarded populations (O'Connor & Hermelin, 1963).

Blount (1968) maintains that "the fact that he (the individual) is retarded adds no information to his linguistic problems as the data show that his kinds of problems and his development both of linguistic problems and normal language are the same as they are for subjects with normal intelligence" (p. 28). Spreen in his review of Neufield & Schlanger (1968) found that retarded children develop morphology in a manner which is comparable to normal children.

Using Berko's test they showed that the order of acquisition of grammatical (bound) morphemes was virtually identical for normal and MR children. 250 publications in the past thirty years dealing with language and the mentally retarded, suggested that the precise relationship between language delay and mental retardation is obscure. No particular type of language impairment is associated with any form of mental retardation. Every known type of speech impairment occurs in both normal and retarded populations. As a result, retarded or delayed language development has become a catch phrase which is used to describe the whole range of language dysfunctions.

Recent research indicates that developmentally delayed children acquire language in the same manner as "normal" children (O'Connor, 1963). Neufield & Schlanger (1968) found that retarded children develop morphology in a manner which is comparable to normal children. Using Berko's test they showed that the order of acquisition of grammatical (bound) morphemes was virtually identical for normal and mentally retarded children. Lackner (1968) suggests that "retarded individuals develop language functions in the same sequence as normal children but with increased spacing between developmental landmarks " (page 311). O'Connor and Hermelin (1963) concluded that the structure of the language used by mentally retarded children resembles that of normal children at a <u>corresponding stage of mental development</u>. When mentally retarded children are compared with normal children at the same level of development - the same mental age - the stages

and sequence of language development appear to be essentially the same. The onset may be delayed, the rate of development may be slow, and the final level of competence achieved may remain below that of other adults, but the path of development is the same. The difficulty associated with the appropriate assessment of mental age in the mentally

In 1978 Rynders et al again criticized the earlier research on Down's Syndrome. They noted that homogeneity of performance among Down's Syndrome subjects was assumed. Most studies did not report individual charactieristics such as sex, age of testing, residence, length of stay in institution. Nor did the studies consider the deleterious effects of institutionalization. Retarded was considered in the preparation of the present study. As a result, this work is an extension of Lackner's work on language function acquisition.

IV. Language Development In Down's Syndrome

J. Langdon Down (1866) identified Down's Syndrome and used it as the basis for his belief in a common ancestral heritage between the world's races. His supposition that "Mongolian Idiots" were a throwback to an earlier evolutional form of human was taken as evidence for the superiority of the Western European individual. Down was able to identify two characteristics of Down's Syndrome which were neglected by scientists for the next one hundred years. To quote from Down's first monograph ....the subjects "are usually able to

speak; the speech is thick and indistinct, but may be improved very greatly by a well-directed scheme of tongue gymnastics". Down also noted that "the co-ordinating faculty is abnormal, but not so defective that it cannot be greatly strengthened" (page 3-4). Yet, it was not until 1961 that Kugel and Reque recommended at least delaying the institutionalization of children with Down's Syndrome until five years of age in order to permit maximum growth in motor and speech skills.

In 1978 Rynders et al again criticized the earlier research on Down's Syndrome. Down's Syndrome. All three groups were matched for they noted that homogeneity of performance among Down's Syndrome subjects was assumed. Most studies did not report individual characteristics such as sex, age of testing, residence, length of stay in institution. Nor did the studies consider the deleterious effects of institutionalization. The typical child with Down's Syndrome (Trisomy 21), seems to be at his best during the first year of life. Without intervention it appears that the developmental course is characterized as a deceleration of the developmental rate. If hypotomia (general muscle weakness), a common characteristic of Down's Syndrome, is present along with the typical oral cavity malformations, articulation problems are almost inevitable. Cornwell & Birch (1970) compared Down's Syndrome children who lived with their families with normal populations and found that the intellectual and social performance of the Down's Syndrome subjects was much more heterogeneous than had been previously suspected. Their findings "did not support a stereotyped view of children with

Down's Syndrome" (p. 348). Belovsky and Share (1965) comparing profiles of Down's Syndrome children to the test norms on the ITPA. They found that the profile patterns were stable and not significantly different from these norms. Share (1975) distinguishing expressive from receptive language, noted that the receptive language of Down's Syndrome children was better developed than their expressive language. Buckholt Et Al (1978) found no significant differences in the MLU of normal and Mental Age matched Down's Syndrome children. Share, comparing a Down's Syndrome population with a normal population on the Gesell scales found speech development to be the area showing the greatest diference. He did indicate, however, that speech develops at the Mental Age of fifteen months to three years, which <u>is</u> on a par with normal development. (share, 1975) lenneburg et al (1964) maintains that the best predictor of language level is <u>not</u> Mental Age but the absence of specific motor milestones at the appropriate age. In Down's Syndrome, they claimed, the rate of physical aging appears to be accelerated, while the maturation of the brain is decelerated. Other researchers postulated the existence of qualitatively different language in the Down's Syndrome population. While Mein (1961) noted a delay in the decline of noun usage with increased Mental Age in Down's Syndrome which gave support to this theory, Lyle (1961) recorded incidence of jargon, sign-language, and inappropriate verbalizations. Cromer (1974) compared normal children with individuals with Down's Syndrome and severely retarded individuals who did not have Down's Syndrome. All three groups were matched for

Mental Age. Cromer reported that the Down's Syndrome chldren applied phonological rules inconsistently. The pattern of articulation errors were also not explainable by misuse of phonological rules. Cromer maintains tht Down's Syndrome children tend to use syntactically simpler statements in order to express semantic relations (Cromer, 1974). Subjects learning language beyond the age of puberty may adopt this type of simplified strategy and thus behave differently from younger children in the process of language acquisition. He included the Down's Syndrome population in this category (Cromer, 1974). Cornwell & Birch (1970) compared Down's Syndrome children who lived with their families with normal populations and found that the intellectual and social performance of the Down's Syndrome subjects was much more heterogeneous than had been previously suspected. Their findings "did not support a stereotyped view of children with Down's Syndrome" (p. 348). Belovsky and Share (1965) compared profiles of Down's Syndrome children to the test norms on the ITPA. They found that the profile patterns were stable and not significantly different from these norms. Share (1975), distinguishing expressive from receptive language, noted that the receptive language of Down's Syndrome children was better developed than their expressive language. Buckholt et al (1978) found no significant differences in the MLU of normal and Mental Age matched Down's Syndrome children. Share, comparing a Down's Syndrome population with a normal population on the Gesell scales found speech development to be the area showing the greatest difference. He did indicate,

however, that speech develops at the Mental Age of fifteen months to three years, which is on a par with normal development (Share, 1975). The present study focuses on the receptive development of children with Down's Syndrome. This group was chosen for study because of the reliability of population identification and the prevalence of mild to moderate retardation exhibited in those individuals with the syndrome. The proportion of expressive language difficulties and the proposed extensive comprehension/production gap in this population resulted in the development of a receptive language comparison.

V. Children In Institutions

Studies of language development of the mentally retarded have largely focused on children over six years of age, who live in Mental Retardation residential facilities. In these institutions, where there is generally a high adult/child ratio, children do not experience intimate adult/child relationships. Evidence has shown that there are many differences between institutionalized and home reared mentally retarded subjects, even when they have been matched for mental age (Hagen & Hagen, 1973). To quote Gesell and Amatruda's Developmental Diagnosis (1974):

> First and foremost, the child in an ...institution lacks the stimulus of language....no matter how noisy the institution sometimes is... No matter how footsteps....of the caretakers break the quiet, a

> veritable pall of meaningless sound tends to hang over the nursery where the runabouts and creepabouts are congregated...this arena of quadrupedal and bipedal locomotion is relatively devoid of speech. There is little social laughter. Even crying has lost much of its language value; it is only a primitive form of emotional release. There is no jargon among the children; and very little conversation between child and adult (page 189).

Kugel and Reque (1961) noted a significant retardation difference between home-reared and institutionalized Down's Syndrome children, particularly in speech and language development. Ninety percent of the home-raised children were using words meaningfully by the age of four as compared to twenty-five percent in institutions. Similarly, over sixty percent of the home-raised subjects were using appropriate sentences (elements greater than or equal to three) by age eight, while less than ten percent of the institutional sample had acquired the same skill by that age. Spreen noted that the literature showed a clear inferiority on the part of institutionalized groups when their language development was compared to that of mentally retarded subjects living at home. He also indicated that this discrepancy increased with period of institutionalization.

On the basis of these studies, it was decided to avoid the depressive effects of institutionalization by selecting for the present investigation only those children living with their families.

VI. The Semantic Features Hypothesis

A specific area of interest for many researchers has been the development of semantic features of normal children. Eve Clark (1971) hypothesized that children acquire the semantic features of language in a definite order. This order of acquisition reflects not only ease of acquisition but the strategies children use in learning. More global, general categories, Clark surmised, are acquired before specific, and therefore more feature-laden categories. For example, the category of 'big' may be acquired before 'tall' or 'wide', which represent aspects of 'big' and therefore include more features. Clark based this hypothesis on the supposition that the child in the early stages of language acquisition may use and interpret words differently from adults. She presented evidence that this interpretive difference would be most apparent in the referential errors made by children (Clark, 1971). This hypothesis assumes that the earliest features encoded by the child will be derived from his own concepts and that the more general semantic features will be acquired first (Clark, 1973).

Clark reviewed many studies of language learning and concluded that overextensions of categories appear to be universal in child language learning.

Overextensions can occur when a child attibutes the meaning of one word in a word pair to both words. Other investigators made similar findings in studies of adjective

pairs, including Donaldson & Balfour (more-less), 1968; Donaldson & Wales (more-less, same-different) 1970; and Clark (more-less) 1971. Such as Donaldson & Balfour (more-less), 1968; Donaldson & Wales these studies supported the interpretation that the meaning of 'big' first extends over the meanings of the terms like 'long', 'high', 'tall', and 'wide'. The child learns to apply the other dimensional adjectives to more specific areas of the semantic domain later in his development (Clark, page 92) supporting the notion that 'big' is the most general of the spatial adjectives (Brown,1958).

Some authors take issue with the use of forced-choice paradigms as suggested by Clark (Townsend, 1976; Glucksberg, Hay, & Dank, 1976; Brewer & Stone, 1975; Richards, 1979). Brewer and Stone (1975) using a task which represented two independent spatial dimensions simultaneously, maintain that Clark's paradigm forced the child to choose by pole, not dimension. In other words, if the child did not think that the adjective 'tall' applied, the only choice left to him was 'short'. The task illustrated by Brewer & Stone allowed subjects to choose from (for example) 'big' as well as 'short' if they felt that 'tall' did not apply.

Eilers, Kimbrough, Oller, & Ellington (1974), and Bartlett (1976) suggested that children younger than the minimum of 3:6 years be used as subjects. Bartlett, using younger subjects (2-3 years) found that children acquire adult meanings for spatial adjectives in the order of the least to

the most complex. This finding has been supported by a number of other studies (Richards, 1976). Richards, summarizing these studies, also supports the idea of a standard order of acquisition of spatial adjectives.

VII. Non-linguistic Strategies

A number of researchers have suggested that definable non-linguistic strategies are employed by young children. Bartlett (1976) noted that the order of acquisition is consistent with adult usage frequencies as reported by Kucera & Francis (1967). The frequency with which certain words are heard by children was investigated further by Klatzky, Clark, & Macken, (1973). They found that children learning consonant-vowel-consonant clusters exhibit the same asymmetry as has been previously reported (Donaldson & Balfour, 1968; Donaldson & wales, 1970; Clark, 1971).

Another aspect affecting adjective acquisition may be preference on the part of children. Eilers et al (1974) prepared a task designed to uncover children's preferences. They thought that their younger subjects might prefer smaller objects. Children of 2:6 to 3:6 years, showed a significant preference for the smaller of two objects.

Clark developed a series of studies (3) which involved the use of 'in','on', and 'under'. Clark predicted that the more cognitively complex the adjective, the later it would appear in the child's speech. (Clark, 1973). These errors

on the part of young children may result in certain predictable responses having little to do with the child's understanding of the adjective in question. (Clark & Garnica, 1975; Richards, 1979; Bartlett, 1976; Brewer, & Stone, 1975).

The object of the present study will be to add support to the thesis that children with Down's Syndrome develop receptive language in the same order as normal children. To this end, it is vital that the selected topic for comparison be one which has received wide support when normal children are used as subjects. The hierarchical acquisition of spatial adjectives proposed by E. Clark's Semantic Features Hypothesis appears to be just such a topic.

VIII. Summary

Children appear to acquire the meanings of spatial adjectives in a hierarchical order from general to specific and they may exhibit a non-semantic preference for the smaller of any adjective pair. When children receive feedback for the appropriateness of word usage, their performance is improved (Hilgard & Bower, 1975). Therefore, those children who are given immediate feedback may be assumed to perform significantly better in subsequent language tasks. This feedback will be added to the present study to uncover any confounding effects of task unfamiliarity.

The literature suggests that the language of children with Down's Syndrome their performance is improved.

Therefore, those children who are given immediate feedback may be assumed to perform significantly better in subsequent language tasks. Who are living with their families, follows the same patterns of development as that of normal children. If this is the case, then the order of acquisition of spatial adjectives and the effect of feedback for these children should not differ significantly from that of a group of normal children. This similarity should also be evident in any non-semantic preferences exhibited by the Down's Syndrome group.

IX. Predictions

The main prediction of this thesis is:

1) There will be no significant differences between the performances of the normal and the Down's Syndrome children on the tasks.

The following predictions will also be tested: the following predictions will also be tested.

2) There will be a significant difference between the overall performances of the older subjects and the younger subjects.

3) The experimental groups will perform better on the replication than the control groups.

4) The children's performances will show a positive relationship to the semantic generality of the adjective pairs.

5) There will be a significant difference in the

performances of the children on the positive and negative adjectives.

6) The children will show a significant preference for the smaller (negative) object in each pair when given a free choice. (negative) object in each pair when given a free choice.

CHAPTER THREE

Method

I. Design

Thirty-two children were included in the study. The children were grouped according to chronological age and the presence or absence of Down's Syndrome. This resulted in four groups of children:

I) Down's Syndrome present, age 3.3 years or above

II) Down's Syndrome present, age less than 3.3 years

III) Down's Syndrome absent, age 3.3 years or above

IV) Down's Syndrome absent, age less than 3.3 years

Within each block, the children were randomly assigned to experimental and control groups. The experimental groups received feedback on the correctness of their response during the first administration of the tasks. The order of presentation of the forty tasks was randomly set for each child prior to the administration of the tasks. This established order of presentation was maintained throughout the study.

II. Subjects

Two groups of twenty children ranging in age from two years four months to five years four months were selected from two preschools, one day care centre, and six special preschools in the lower mainland of British Columbia.

Four children in the Down's Syndrome group became ill

during the testing period and had to be dropped from the study. In order to maintain equal groups, four children, chosen at random, were dropped from the first group of children. This resulted in a total sample of thirty-two children all of whom attended a pre-school.

All subjects came from families who were fluent in English. Some families were bilingual or multilingual. The socio-economic status of the families ranged from lower middle to upper middle class. The younger children in the normal group used three to five elements per phrase, while the older children were speaking in simple and complex sentences. The MLU for six of the eight older Down's Syndrome children was at least three elements, and all were using adjectives in their speech as were three of the younger Down's Syndrome children. Five of the younger children with Down's Syndrome had MLU's ranging from two to four. Three of the younger children and two of the older Down's Syndrome group were using words as labels and had little spontaneous speech.

III. Procedures

III.I Initial Contact

Testing was done in a room separate from the preschool classroom. During the initial testing session, several of the children were accompanied by their teacher and in four cases the teacher stayed for the first test period. After this initial shyness, however, the children seemed eager to go to the testing room with the author. During testing, the child

sat at a low table across from the author. On two occasions testing took place in a carpeted room with a very small table. In this situation, the children and author sat on the floor.

Children were put at ease by a short period of play and conversation before the tasks were begun. This initial period was unstructured and no attempt was made to record either the children's speech or actions. During this time, the author was able to determine if the child understood the command "Give me" by asking for a small styrofoam ball.

III.II Test Period

III.II.I Part One

Following the random order established for each child, a pair of objects were placed on the table directly in front of the child but out of reach. The author then used the following sentences (filling in the blanks for each pair):

(Name), here are two -------'s

One is ------ and one is -------.

(At this point the objects were pushed across the table to the child)

(pause) (Name), Give me the ------- one.

The researcher then extended her hand palm up above the pair of objects.

If the child was in one of the experimental groups, the experimenter countered each response with either:

Yes, that's right,

or

No,

ameslan is being used in the special preschools as a supplementary form of communication.

Then

Here is the ------ one, (touch the object)

and

Here is the ------- one. (touch the other object)

(At this point each object was touched again as its dimension was stated a second time.)

The children in the control groups received no feedback other than "Thank you", and "You're a good worker today, (name)" or "good". The Down's Syndrome children who were not verbal but knew American Sign Language were given praise in sign along with the words "very good", "good boy", or "good girl". Ameslan is being used in the special preschools as a supplementary form of communication.

The children's responses were then recorded on a score sheet (see Appendix A) and the next pair of objects was presented.

This procedure was followed throughout the first two sessions. When the tasks were replicated a week to ten days later, there was no feedback given to either experimental or control groups. During these sessions, the author only responded with a sign or word of praise; she did not comment on the correctness of the child's response.

III.II.II Part Two

At the end of the fourth session, each pair of objects was placed on the table across from the child and out of his reach. The experimenter then said:

Here are two ------s.

Give me one.

And pushed the pair close to the child while holding her hand palm upward above them. The responses of the child were again recorded and another stimulus pair placed in front of him or her. The individual order of presentation which had been established earlier was used for each child.

IV. Materials

Where possible, the materials selected were based on those used in Bartlett (1976). Three sets of stimuli were used. The first set, representing overall size, consisted of three pairs of objects varying simultaneously along all dimensions. These were identical large and small dolls, blocks, and balls. The second set of stimuli consisted of pairs of objects varying along one dimension only: two pairs varied in height (drawings of trees, and drawings of houses), two differed in length (strings of balls, and pieces of ribbon), and two in width (strips of paper and pieces of ribbon). Care was taken to ensure that the children were able to recognize the items chosen whether they were drawn or in solid form.

Bartlett (1976) suggested that it is important to also

use objects which varied inversely along at least two dimensions. This procedure is necessary in order to determine if children can in fact extract from the properties of the stimulus that dimension that serves as the basis for comparison (p.208). The last set consisted of eight pairs of books, candles, blocks, strings of balls, ribbon, paper, pencils, and pictures of buildings. These object pairs all differed along only two dimensions.

V. Analysis

The correct response rate for each of the adjective pairs is the dependent variable. Statistical analysis will be a repeated measures univariate analysis with the following planned future comparisons:

1) The children will make more correct responses on "big/little" than they do on the other pairs.

2) The children will make more correct responses on the first four pairs (size, height, length, width; one-dimension) than they will on the last three (height, length, width; two-dimensions).

2) Both groups will make more correct responses on "long/short" and "tall/short" than they will on "wide/narrow".

4) There will be no significant difference in performance on "long/short" and "tall/short".

Dunn's Statistics (Kirk,1968) will be used.

CHAPTER 4

Results

The dependent variable was the proportion of correct responses to all objects associated with each adjective pair. The cell means and standard deviations appear below in table I. The different number of responses across categories and the proportional distribution created the necessity of applying an angular transformation (Kirk, 1968) to the raw data before the analysis of variance was conducted. I. Preparation Of Data And Analysis Of Variance

The dependent variable was the proportion of correct responses to all objects associated with each adjective pair. The cell means and standard deviations appear in Appendix A. The different number of responses across categories coupled proportional distribution created the necessity of applying an angular transformation (Kirk, 1968) to the raw data before the analysis of variance was conducted.

Data from the trial factors were then analysed using a repeated measure univariate analysis. The data from the blocking groups of Down's Syndrome versus Normal were tested for homogeneity of variance using Hartley's Test and were found to be not significantly different (.99 F max 2,15=3.638). Using the BMD program R:2V two significant main effects were uncovered. They were Replication (.99 F 1,24 =8.21) and Pairs (.99 F 1,24=15.11). The remaining three main

effects were not significant at an alpha of .01 (Down's vs. Normal .99 F 1,24 2.96; Feedback .99 F 1,24 .17; and Age .99 F 1,24=7.13)

Two first order interactions were apparent. Polarity by Pair was significant at .01 (.99 F 6,144=3.64), as was polarity by Group at the same alpha level (.99 F 1,24=7.88). No complex interactions were apparent from the initial analysis. (The pertinent summary statistics appear in Table I. The complete summary table is presented in Appendix A)

TABLE I
Pertinent Summary Of Analysis Of Variance

Source	d f	Mean sq.	F
group (D)	1	3.422	2.96
exp. (E)	1	0.202	0.17
age (A)	1	8.242	7.13
rep. (R)	1	2.336	8.21
pole (S)	1	0.276	0.82
task (T)	1	3.571	15.1
DE	1	0.683	0.59
DA	1	0.852	0.74
RD	1	0.668	2.35
SD	1	2.652	7.88
SA	1	0.051	0.15
TD	1	0.499	2.11
RT	1	0.293	2.41
ST	1	0.846	3.64

Using Dunn's Statistic (Kirk, 1968), the four non-orthogonal planned comparisons were next investigated. An alpha level of .05 was used because of the conservative nature of this test. Based on the confidence interval formula, there was insufficient evidence to reject the null hypothesis in three of the four contrasts. The means and standard deviations appear in Table II.

TABLE II
Summary Statistics For The Seven Adjective Pairs

Pair	N	Mean	SD.
big/ltl	3	.8229	.060
tall/sht	2	.5780	.071
lng/sht	2	.6640	.110
wid/nar	2	.5550	.060
tall/sht(2)	4	.5640	.061
lg/sht(2)	4	.5780	.066
wid/nar(2)	3	.4557	.115

The children did indeed make more correct responses on "big/little" than they did on the other pairs (.95 t'D 4,144 yielded a confidence interval of 3.10819 +/- 2.5).

There were no significant differences in the percentage of correct responses for "big/little" coupled with the three unidimensional pairs (height, length, width) when compared to the three two dimensional pairs (height, length, width), (.95 t'D 4,144 yielded a confidence interval of 1.96 +/- 2.5).

As predicted there was no significant difference between the total sample's performance on "long/short" and "tall/short" when one and two dimensional adjective pairs were used (.95 t'D 1,144 yielded a confidence interval of .65778 +/- 2.5). However, there was also no significant difference between the subjects performances on the above pairs when compared with "wide/narrow" (.95 t'D 4,144 yielded a confidence interval of 1.26 +/- 2.5).

II. Analysis Of Prediction One

The main prediction, that the performances of children with Down's Syndrome would not differ significantly from the normal group was supported. As the differences between these groups were approaching significance (p=.09) it was felt that further analysis was warranted. The mean response for the normal group was higher than the mean percent correct response of the Down's Syndrome group. These summary statistics appear in Table III.

TABLE III

Summary Statistics For The Two Groups Of Children

Group	n	mean	s.d.
Normal	16	.6816	.052
Downs Syn.	16	.5381	.100
Total	32	.6098	.106

Further analysis of the insignificant interaction between the grouping and ages uncovered what appeared to be an interesting ordinal interaction. The normal children in both age groups as well as the older Down's Syndrome group responded in much the same manner. However, the mean correct response of the younger Down's Syndrome group was much lower. See Table IV for the means and standard deviations.

TABLE IV

Summary Statistics Reported By Age And Group

Group	Age	n	Mean	S.d.
Normal	>3.5	8	.6953	.042
	<3.5	8	.6678	.076
Downs Syn.	>3.5	8	.6179	.068
	<3.5	8	.4583	.005
Total	>3.5	16	.6566	.064
	<3.5	16	.5630	.128

a post hoc comparison between the two Down's Syndrome groups revealed that this difference failed to reach significance at .05 (Tukey Confidence interval q = 1.96 +/- 2.92).

III. Analysis Of The Secondary Predictions

Prediction two stated that there would be a significant difference in overall performance between the two age groups. Based on the initial analysis, this hypothesis was not supported (.99 F 1,24=7.13). At the same time an inspection of the means yielded the information that although the difference was not significant, the older children did perform better than the younger children (see Table IV). The age by group interaction also supported this premise. A post hoc Scheffe revealed a significant difference between the mean correct response for the young Down's children and the other three groups (.95 S 1,24 6.425).

Prediction three, which suggested the higher scores on

the part of experimental groups during the replication was not supported. The means and standard deviations for experimental versus control groups are presented in Table V. Inspection of the two factors failed to uncover a systematic interaction.

TABLE V

Summary Statistics For The Exper. And Control Groups

Group	Rep.	N	Mean	SD.
Control	Rep1	16	.5856	.230
	Rep2	16	.6849	.211
Exper.	Rep1	16	.5394	.213
	Rep2	16	.6004	.213
Total	Rep1	32	.5625	.032
	Rep2	32	.6427	.059

there was little difference overall between the two groups, and what difference there was occurred equally in experimental and control situations. The performance of both groups improved significantly on the replication as indicated by the analysis of variance main effect (.99 F 1,24=8.99).

Prediction four stated that there would be a positive relationship between the semantic generality of the adjective pairs and the subject's mean percent correct responses. The results of the first and fourth planned comparisons lent support to this premise. Past research has supported the

labelling of the pair "big/little" as the most general and in this study, the mean response of the subjects was indeed significantly higher for this adjective pair than for the remaining pairs (.95t'D 4,144 3.10819). The pairs "tall/short" and "long/short" yielded responses which did not differ significantly from each other, and this supports Bartlett's suggestion that they are semanticly similar. However, the responses to the pair "wide/narrow" did not differ significantly across groups when compared with "tall/short" and "long/short". When the two pairs, "wide/narrow" (one dimension) and "wide/narrow" (two dimensions) were compared across all groups using Tukey there was no significant difference at the .05 level (.99 q 2,144 1.3054).

The preliminary analysis did not lend support to Prediction five as it failed to uncover a main effect based on the polarity of the adjective for either extreme (see Table VI).

TABLE VI

Summary Statistics Based On Polarity

Polarity	n	Mean	SD.
Positive	56	.6054	.098
Negative	56	.599	.1586

however, two significant first order interactions were evident. When polarity was combined with group an ordinal interaction occurred. Inspection of the graphed means, along

with post hoc analysis (Tukey) yielded the information that it made no difference which group the child was in for the negative extremities - both normal and Down's Syndrome groups performed in the same manner. However, the Down's children achieved a significantly lower mean score on the positive adjectives when compared to the normal children (.95 q 2,24 3.68). The scores of both groups on this positive extremity were not significantly different from their scores on the negative extremity (.95 S 1,24 1.902) (see Table VII for means and standard deviations).

TABLE VII

Summary Statistics For Polarity Within Groups

Polarity	Group	n	Mean	SD.
Positive	Normal	56	.7124	.1916
	Downs Syn.	56	.4985	.1923
Negative	Normal	56	.6373	.2306
	Downs Syn.	56	.562	.216

The other first order interaction involved the polarity of the adjective across pairs (.99 F 6,144 3.64) (see Table VIII for summary statistics). It was felt that this interaction may have affected the previous one. Inspection of this interaction showed two pairs worthy of further tests. Post hoc analysis on pair number three "long/short" yielded a non significant result (.95 q 2,144 2.198). A comparison of

the two extremes of pair number seven "wide/narrow"(two dimensions) was also insignificant (.95 q 2,144 2.124).

TABLE VIII

Summary Statistics For The Adjective Pairs By Pole

Polarity	Adj/pr	N	Mean	SD.
Positive	size	6	.7810	.245
	hght	.4	.6016	220
	lgth	.4	.5860	.222
	wid	4	.5230	.255
	hght(2)	8	.6094	.190
	lgth(2)	8	.6060	.140
	wid(2)	6	.5313	.175
Negative	size	6	.8646	.158
	hght	4	.5547	.188
	lgth	4	.7422	.148
	wid	4	.5860	.208
	hght(2)	8	.5195	.170
	lgth(2)	8	.5508	.189
	wid(2)	8	.6615	1.17

based on the significant result in the comparison of the positive extremes between groups, a graph showing the pairs by groups and polarities was constructed. This graph suggested that normal children performed better on the positive terms than did those children with Down's Syndrome. But the two groups responded at about the same level on the negative terms (smaller extremity). A post hoc Scheffe revealed that this difference in correct responses for the positive terms failed to reach significance (.95 S 6,144 3.104). Appendix I shows

the means and standard deviations for the positive and negative adjectives broken down by group feedback, age, and pair. Inspection of these means led to the graphing of only the Down's Syndrome responses. This graph did not yield any pair interactions worthy of post hoc analysis.

CHAPTER FIVE

Discussion

I. Summary

The present study examined the responses of two groups of children to a set of semantic tasks. The effects that age, Down's Syndrome, and feedback had on an individual's responses were compared.

Data from all measures indicated that the children, regardless of their age, whether or not they had Down's Syndrome or received feedback on the correctness of their response, followed the hierarchical development of spatial adjectives hypothesized by E. Clark (1973). All children in this study had fewer correct responses in the one dimensional and two dimensional categories of height and length than had been previously reported (Richards, 1979). As a result, only one of the six predictions was supported.

The results of this study support Bartlett's finding that children acquire both poles of the general size adjective simultaneously. Polar effects on the single dimension adjectives were not significant. Results of this study failed to differentiate between single and double dimension adjective pairs. Neither was a reliable difference between the ability of the children to comprehend positive and negative terms uncovered on any of the adjective pairs, regardless of dimension.

When Bartlett's results are compared with the results of

the present study, very similar responses for general size and width categories are obtained. Different results were obtained for length and height, particularly for the positive poles. Bartlett's children had higher mean scores for these two adjective pairs across groups than did any of the children in this study. Unlike the earlier study, the scores of the children in the present study did not differ significantly when positive and negative adjectives were compared.

The mean score of the children in this study were not as high overall as those achieved by the children in Bartlett's study, upon which this one was based. This is probably attributable to the inclusion of younger children than had previously been tested on all pairs. Bartlett's youngest group was tested on "big/little" only. At the same time, the oldest children in this study were four months older that Bartlett's although they were the same age as those included in Clark's studies.

The difference in the results between Bartlett's study and the present one are possibly attributable to sampling differences or testing location.

As in past research (Richards, 1979), the present study does not explain how the child initially acquires the spatial adjectives. Only three children, all in the young Down's Syndrome group, did not perform well above chance on the general size pair. At the same time, all but one of the older children gave every indication of having acquired all four one dimensional pairs (size, height, length, width).

Many children commented that they knew which item in each pair was "big" or "little". Their knowledge of "size" terms resulted in accurate responses for all the single dimension tasks. When the child was asked to differentiate between the two dimensional objects there was more confusion. The children chose either the height or the length as the significant dimension when responding. This resulted in a variation in the accuracy of their responses to "wide" when it was one of two dimensions. Another trend noted, was the consistently superior performance of all children on the length (one dimension) pair over the height (one dimension) pair. Although this difference failed to reach significance, it does suggest the importance of comparing these two dimensions.

When actual performance on the tasks was compared, there was little difference between the two groups, and what difference there was was lodged in the performance of the younger Down's Syndrome children. The older Down's Syndrome children and both groups of normal children did not differ in performance levels, while the performance of the younger Down's children was consistently lower.

Another difference between the two groups occurred in the case of the younger children. The Down's Syndrome children appeared to have established dominance at an earlier age than would be expected. All of the sixteen Down's Syndrome children showed stronger dominance than their normal

counterparts. Researcher have suggested that dominance established before the age of three years may be indicative of neurological dysfunction (Bayley, 1969; Gesell,1941).

There are several possible explanations for the lower mean scores of the younger Down's Syndrome children. The mean length of utterance (MLU) of five of these children ranged from two to four and the remaining three children had virtually no spontaneous speech. This compares with an average MLU of over three for the younger normal children and the older Down's Syndrome children. Work in the last ten years has shown that MLU is a more reliable indicator of language development than is chronological age (Menyk, 1969; Bloom, 1970; Brown, 1973; Morehead & Ingram, 1973; Duchan & Erickson, 1976). The scores of the three non-verbal children in this group were also performing at the level of chance and this served to depress the mean scores.

II. Non Semantic Preferences

Unlike the results of Eilers et al (1974) the performances of the children in this study did not show a consistent preference for the smaller (negative) of the two adjectives presented. Their preferences were obscure and inconsistent. The younger Down's Syndrome children were the only groups who showed preferences for either pole and in each case it appeared to depend entirely upon the individual pair being assessed.

The evidence gathered by this study does not support the preferences suggested in the literature. Observation during this study showed that in many cases, the child would reach for one item and then hand the tester the other object. In other situations, the child would say "No" if asked to give away one item, and it was only upon the promise that it would be returned that an object would be reluctantly handed to the tester.

If any preference was uncovered by this study, it was that the children, in particular those with Down's Syndrome consistently relinquished the item closest to their preferred hand. In the case of the children with Down's Syndrome, eleven times out of sixteen, the child methodically picked up the item closest to his left hand and passed it to the tester. There seemed to be a rather high incidence of left handedness in this sample of children with Down's Syndrome. The older normal children were predominately right handed and also exhibited a preference for the subject closest to their hand of choice. The younger normal children had not, for the most part given any evidence of having established hand dominance and no preferences of any sort were apparent.

III. Methodological Implications

It is important to ascertain whether or not the age appropriate responses of the older Down's Syndrome children can be generalized to other semantic tasks. Does the receptive language of Down's Syndrome individuals continue to

progress at an age appropriate level as the individual matures, Or is there a premature aging which might hinder continued progress? Another interesting question is the possible effects of the Infant Stimulation programs that have recently been established for children with Down's Syndrome? The attitudes and expectations of parents may also be influenced by early intervention and parent support groups. Positive expectations affect the child's progress. Observation during this study showed that in many cases, the child would reach for one item and then hand the tester the other object. In other situations, the child would say "No" if asked to give away one item, and it was only upon the promise that it would be returned that an object would be reluctantly handed to the tester.

If any preference was uncovered by this study, it was that the children, in particular those with Down's Syndrome consistently relinquished the item closest to their preferred hand. In the case of the children with Down's Syndrome, eleven times out of sixteen, the child methodically picked up the item closest to his left hand and passed it to the tester. There is no evidence in the literature of this rather high incidence of left handedness in Down's Syndrome . It would appear to warrant further investigation. The older normal children were predominately right handed and also exhibited this preference for the subject closest to their hand of choice. The younger normal children had not, for the most part given any evidence of having established dominance and no preferences of any sort were apparent.

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APPENDIX A

Cell Means For The Dependent Variable Within All Factors

Rep	Grp	Age	Ex	s	n	siz	ht	lg	wid	h2	l2	w2
1	Norm.	>3.5	Ex	+	4	1.0	.5	.75	.25	.81	.75	.66
				-	4	1.0	.5	.75	.62	.44	.38	.75
			Cn	+	4	1.0	.75	.88	.88	.75	.75	.25
				-	4	1.0	.62	.75	.5	.75	.75	.33
		<3.5	Ex	+	4	1.0	.50	.50	.50	.68	.62	.50
				-	4	1.0	.62	.5	.5	.5	.44	.33
			Cn	+	4	.66	1.0	.50	.88	.68	.44	.33
				-	4	.66	.5	.88	.62	.56	.56	.33
	D.S.	>3.5	Ex	+	4	.66	.62	.38	.12	.5	.25	.5
				-	4	.83	.5	.62	.75	.5	.62	.25
			Cn	+	4	1.0	.38	.62	.62	.62	.5	.58
				-	4	.83	.5	.88	.38	.68	.75	.42
		<3.5	Ex	+	4	.66	.38	.50	.38	.19	.5	.16
				-	4	.66	.38	.62	.62	.38	.19	.16
			Cn	+	4	.5	.38	.12	.12	.38	.62	.58
				-	4	.75	.25	.5	.5	.25	.31	.16

				+	4	.92	.88	.88	.62	.75	.75	58
			Ex	-	4	1.0	.38	.75	.5	.38	.44	.66
		>3.5		+	4	1.0	.75	1.0	.75	.68	.68	.58
			Cn	-	4	1.0	.62	.87	.37	.68	81	.5
	Norm.			+	4	1.0	.88	.75	.5	.62	.56	.66
			Ex	-	4	1.0	.62	.88	.25	.62	.38	.33
		<3.5		+	4	.83	.75	.50	.88	.94	.81	.58
			Cn	-	4	1.0	1.0	1.0	1.0	.62	.75	.16
2				+	4	.58	.25	.58	.62	.68	.62	.5
			Ex	-	4	1.0	.88	.88	.75	.62	.5	.41
		>3.5										
				+	4	.92	.62	.62	.62	.44	.62	.83
	D.S.			+	4	.58	.38	.38	.25	.38	.56	.41
			Ex	-	4	.75	.38	.62	.5	.25	.5	.33
		<3.5		+	4	.16	.62	.5	.38	.62	.62	.75
			Cn	-	4	.7	.5	.62	.5	.31	.69	.5

APPENDIX B

Summary Table For Analysis Of Variance

Source	d.f.	Mean sq.	F
Group (D)	1	4.6072	5.29
Feedbk(E)	1	0.9225	1.06
Age (A)	1	8.2429	7.13
Rep.(R)	1	2.3360	8.21
Pole (S)	1	0.2763	.820
Tasks (T)	6	3.5710	15.1
DE	1	.6830	.590
DA	1	.8517	.740
EA	1	.6310	.550
DEA	1	.0274	.020
Residual	24	.2847	
RD	1	.6681	2.35
RE	1	.0291	0.10
RA	1	.3568	1.25
RDE	1	.0352	.12
RDA	1	.1024	0.36
REA	1	.0866	0.30
RDEA	1	.0002	0.00
Residual	24	.2846	
SD	1	2.652	7.88
SE	1	0.000	0.00
SA	1	.0510	0.00

SDE	1	.5950	1.77
SDA	1	..3572	1.06
SEA	1	.001	0.00
SDEA	1	.005	0.02
Residual	24	.3366	
RS	1	.0647	.31
RSD	1	.5993	2.86
RSE	1	.0262	0.13
RSA	1	.0000	0.00
RSDE	1	.0200	0.10
RSDA	1	.0048	0.02
RSEA	1	.1696	0.81
RSDEA	1	0.011	0.05
Residual	24	.2094	
TD	6	.4992	2.11
TE	6	.2354	1.00
TA	6	.1513	0.64
TDE	6	.5480	2.32
TDA	6	.3264	1.38
TEA	6	.2632	1.11
TDEA	6	.1217	0.52
Residual	144	.2363	
RT	6	.2932	2.41
RTD	6	.1264	1.04
RTE	6	.0872	0.71
RTA	6	.1810	1.48
RTDE	6	.0624	0.51

RTDA	6	.1022	0.84
RTEA	6	.1586	1.30
RTDEA	6	.2198	1.80
Residual	144	.1218	
ST	6	.8460	3.64
STD	6	.2116	0.91
STE	6	.1501	0.65
STA	6	.1184	0.51
STDE	6	.0388	0.17
STDA	6	.2618	1.13
STEA	6	.4544	1.95
STDEA	6	.1053	0.45
Residual	144	.2326	
RST	6	.1802	1.16
RSTD	6	.1417	0.91
RSTE	6	.0836	0.54
RSTA	6	.0969	0.63
RSTDE	6	.3184	2.05
RSTDA	6	.2374	1.53
RSTEA	6	.1684	1.89
6X-inter.	6	.1123	1.09
Residual	144	.1550	