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PREVIEW

**THE EFFECT OF INSTRUCTIONAL METHOD ON SYMBOL ACQUISITION
BY STUDENTS WITH SEVERE DISABILITIES**

by

Mary M. Spillane

A DISSERTATION

**Presented to the Faculty of
The Graduate College at the University of Nebraska
In Partial Fulfillment of Requirements
For the Degree of Doctor of Philosophy**

**Interdepartmental Area of
Major: Psychological and Cultural Studies**

Under the Supervision of Professor Ellin Siegel

Lincoln, Nebraska

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DISSERTATION TITLE

The Effect of Instructional Method on Symbol Acquisition

by Students with Severe Disabilities

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GRADUATE COLLEGE
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THE EFFECT OF INSTRUCTIONAL METHOD ON SYMBOL ACQUISITION BY STUDENTS WITH SEVERE DISABILITIES

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University of Nebraska, 1999

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An alternating treatments design nested within a multiple baseline across symbol pairs was used to investigate the effect of two instructional methods (discrete trial and incidental teaching) on the rate of symbol acquisition for two ten-year old boys with autism and severe disabilities. The effect of color enhancement of symbols on learning rate was also investigated.

Coloring strategy did not appear to make a significant difference in the students' ability to learn or functionally use symbols. While one student used only background enhanced symbols functionally, the other student functionally used one symbol from each of the coloring strategies. No significant difference in rate of symbol acquisition was noted between coloring strategies for either student.

Results related to generalization were mixed. For the student with autism, only symbols taught via incidental teaching were used functionally. The second student used one symbol taught through each instructional strategy functionally.

Mixed results were also obtained regarding the comparison of discrete trial and incidental teaching strategies. While no statistical difference was found in the effectiveness of the two strategies, visual analysis of the data indicated that for the student with autism, incidental teaching resulted in a more consistent increase in performance over time. Both students showed a statistically significant level of perseveration on specific symbol locations. This resulted in a high level of variability in performance and may have resulted in the under-estimation of potential differences between instructional strategies. .

Results related to time efficiency were statistically significant, however they were also mixed. In one case, discrete trial teaching required significantly less time, in the other incidental teaching required less time. In terms of challenging behavior, incidental teaching was consistently associated with lower rates of challenging behavior.

As neither methodology was clearly superior, and both appeared to have at least some benefit for both students, a focus on the effects of mixing the two methodologies appears to be the most appropriate direction for future research.

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PREVIEW

Chapter 1

Introduction

Approximately two percent of school-aged children are children with severe disabilities (Evans, 1991). These students require extensive and on-going support in at least two major life activities which may include mobility, self-care, communication, and learning necessary for self-sufficiency (Meyer, Peck, & Brown, 1991). Many of these students with severe disabilities are non-verbal, have limited functional communication abilities, and require augmentative communication support (ASHA, 1991).

Two subgroups of students with severe disabilities are students whose sole disability is severe mental retardation and students with severe autism. While these students typically require extensive support in the areas of communication, learning, and self-care, many are independently mobile and demonstrate functional fine motor abilities. These students share several learning characteristics which may include significantly impaired receptive language abilities (McGee, Krantz, Mason, & McClannahan, 1983; Sailor & Guess, 1983), social/communicative and cognitive processing impairments (Beukelman & Mirenda, 1992), selective attention to stimuli (Repp, Karsh, & Lenz, 1990), stimulus over-selectivity (Bailey & Downing, 1994; Mirenda & Santogrossi, 1985), and difficulty spontaneously demonstrating and generalizing acquired skills (Halle, 1987; Mirenda & Santogrossi, 1985). Many of these

students also demonstrate extremely limited functional communication skills (Halle, 1987). These students are often unable to communicate even the most basic messages regarding their wants and needs to others in their home and school environments.

Communication skills impact almost every area of daily life. Limitations in functional communication skills may negatively impact a student's quality of life in several ways. Students at all levels of development benefit from the ability to control and affect their environment through choice-making activities. Students with severe disabilities or autism however, may be unable to express these preferences in a conventional manner. In many cases, these unconventional communication strategies are not recognized or are misinterpreted as non-functional and inappropriate behaviors which must be suppressed (Reichle & Johnston, 1993).

Additionally, a student's communication skills may affect the opportunities the child is given to communicate in the classroom. In a study of over 6,000 observation intervals in special education classrooms, a strong positive correlation was found between a child's communication abilities and the communication opportunities the child received (Sigafoos, Roberts, Kerr, Couzens, & Baglioni, 1994b).

Students who have limited functional communication skills may also engage in challenging behavior. Challenging behavior is defined as "behavior

emitted by a learner that results in self-injury or injury of others, causes damage to the physical environment, interferes with the acquisition of new skills, and/or socially isolates the learner" (Doss & Reichle, 1991) p.215). The outcome of a behavior is referred to as its *function*. Challenging behaviors may be communicative in nature, serving one or more of the following functions: obtain a tangible reinforcer, obtain attention, or escape/reject an object, event, or attention (O'Neill, Homer, Albin, Storey, & Sprague, 1990). Students who communicate through non-conventional behavioral means may be less likely to receive services in an inclusive educational setting than students who use more functional and less disruptive means of communication (Reichle & Light, 1992).

Historically, professionals subscribed to a readiness philosophy regarding communication intervention for students with severe disabilities and autism. More recently, the prevailing philosophy has shifted to one in which improved communication is considered possible for *all* students, regardless of developmental level (Kangas & Lloyd, 1988). Concurrently, the multi-modal nature of communication in persons with severe disabilities and autism has increasingly been recognized. As a result of these factors, instructional emphasis has shifted from a focus on isolated "speech/language" skills to the development of functional communication abilities relevant to the student's daily environment (Reichle & Karlan, 1985; Ronski & Sevcik, 1988).

One strategy that has been used to address both functional communication deficits and challenging behavior in students with severe disabilities and autism is Functional Communication Training. Functional Communication Training is the process of teaching socially appropriate communication strategies (e.g., the use of words, gestures, symbols, or an augmentative communication device) to communicate the same function as that communicated via challenging behavior (Carr & Durand, 1985).

Functional communication training has been used to address a variety of challenging behaviors serving the socially motivated (communicative) functions of requesting tangibles, requesting attention, requesting assistance, and escaping non-preferred activities and situations in both school and community settings (Mirenda, 1997). Although initial studies focused on training verbal communicative responses, later studies have successfully replaced challenging behavior with the use of tokens containing written words (Durand & Kishi, 1987), tangible symbols (Durand, 1990), a picture communication system (Robinson & Owens, 1995), gestures/signs (Wacker et al., 1990) and voice output communication devices (Durand, 1993).

Augmentative communication strategies used in the development of functional communication skills fall into two primary categories—gestural strategies (unaided) and strategies using object or graphic symbols (aided) (Lloyd & Fuller, 1986). Many studies have demonstrated that sign language is

an effective intervention for some students with severe disabilities (Seal & Bonvillian, 1997; Wacker et al., 1990). However, due to fine motor limitations and extraneous hand movements, many students with severe disabilities and autism produce signs in a highly idiosyncratic fashion that may be unintelligible even to skilled sign language users. In addition, potential communication partners are limited to those fluent in sign, a group which rarely includes most of the student's non-disabled peers and adults in community settings (Rotholz, Berdowitz, & Burberry, 1989).

Aided communication strategies, including voice output communication devices require the use of some type of symbol to represent the message to be communicated. To communicate his or her message, the student may exchange an object or picture with an adult, point to an object or picture on a communication board, or activate the corresponding location on a voice output communication device via direct selection or scanning (Beukelman & Mirenda, 1992). The use of graphic symbols is common in interventions for young students and students with significant cognitive disabilities (Ronski & Sevcik, 1988). A variety of picture symbol sets are commercially available. These symbol sets have several distinct characteristics which may affect the learning ability of students with severe disabilities or autism (Sevcik, Ronski, & Wilkinson, 1991).

One symbol set that is frequently cited in the literature relating to students with severe disabilities and autism is the Picture Communication Symbols set (PCS) (Mayer-Johnson, 1989). These symbols are available in black and white or color and can be accessed through a computer graphics program for easy construction and customization.

The Problem

Many students with severe disabilities or autism require instruction in augmentative communication strategies to develop functional communication skills. While some students can successfully acquire rudimentary signing skills, many require the use of aided AAC techniques. In addition, students who are functional signers may need alternative aided strategies to communicate with non-signing communication partners. Most aided communication strategies involve some form of graphic symbols, therefore, the ability to discriminate among symbols is a highly desirable skill for augmented communicators.

Two instructional methods frequently used with students with severe disabilities and autism are discrete trial teaching and incidental teaching. Both of these methodologies rely heavily on the carefully planned application of prompting and reinforcement procedures (Quill, 1997). The primary differences between these methodologies relate to levels of adult control, child motivation factors, and the relevance of identified reinforcers to the target behavior which they serve to reinforce.

During a discrete trial teaching session, stimulus items are pre-selected by the interventionist. These items are then presented in a pre-determined order regardless of the apparent interest level of the student. Reinforcers are arbitrarily selected from a pool of items identified as reinforcing to the child. While some attention is given to increasing the value of social praise as a reinforcer, few other natural reinforcing consequences are used. As a result, reinforcers are frequently not directly related to either the stimulus item or the target behavior.

In an incidental teaching interaction, a variety of stimulus items are again selected by the interventionist. In this case, however, the items are placed in a visible location and used to elicit target behaviors as the student expresses interest in interacting with those items. Reinforcement in this case typically involves social praise paired with access to the target item or activity. In its purest form, incidental teaching is totally based upon child initiations. Due to the lack of initiation behaviors common to children with severe disabilities, several modifications of the original incidental teaching techniques have been developed for these students. Two modifications which are frequently used with students with severe disabilities are the "Mand-Model Technique" (Halle, 1982) and the "Time Delay Procedure" (Halle, Baer, & Spradlin, 1981).

Both discrete trial and incidental teaching methodologies have been effectively used to teach basic communication functions to students with severe

disabilities or autism. Both methodologies have also been used to teach basic communicative forms (signs, spoken words, symbols). Two studies that attempted to conduct controlled comparisons of the effectiveness of the two methodologies with students with autism or severe disabilities produced mixed results. McGee, Krantz, and McClannahan (1985) investigated the effectiveness of the two methodologies when teaching preposition use to children with autism. A later study by Miranda-Linne and Melin (1992) compared the two methodologies in regard to the acquisition, generalization, and spontaneous use of color adjectives. Both of these studies involved subjects who were verbal and identified the correct spoken production of specific words as target behaviors. No studies were identified that have compared the effectiveness of the two methodologies in relationship to the acquisition and functional use of graphic symbols.

In addition to instructional methodology, the visual presentation of graphic symbols should also be considered. PCS symbols have been successfully used with many students to support a variety of communication skills. Several color coding schemes have been recommended to enhance the ability of students to visually attend to and discriminate among symbols. These schemes include coloring the figure as realistically as possible, coloring the entire symbol and background area according to grammatical category, combining a realistically colored figure with a grammar-coded colored ring around the symbol, and