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General case principle applied to microwave cooking: can severely handicapped students generalize the skills they learn in the classroom

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General Case Principle Applied to Microwave Cooking: Can severely handicapped students generalize the skills they learn in the classroom?

by
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Abstract

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General Case Principle Applied to Microwave Cooking:
Can severely handicapped students generalize
the skills they learn across settings?
1995
Dr. J. Kuder
Department of Special Education

The purpose of this paper was to apply an example of general case strategy when training severely handicapped students how to use a microwave. Two types of machines were chosen that represent the range and type available: (push button, turns dial – color: white, brown).

Three students were selected to participate in the study all coming from a special education district. The students were 17 years old and classified multiple handicapped. In addition, their test scores and other data indicated they were severely disabled.

Using a task analysis approach both machines were taught simultaneously. Instruction was given on the relevant/non-relevant stimuli, and individual characteristics of each machine type. The results indicated that in two cases, general case exemplars were effective at promoting generalization of the skill to a natural setting. Two students successfully used a machine they had not previously been trained on. In one case where the student had difficulty learning both skills at once, specific modification was implemented in place of general case strategy to attempt to help student learn steps of skills more efficiently.

Mini Abstract

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Research indicates that severely handicapped students often do not generalize skills. The hypothesis of this study is that a general case strategy will increase the probability generalization will occur. After instruction two out of three severely handicapped students were able to use a microwave that they were not trained on located in a natural setting. Short term generalization objectives were met.

Acknowledgement

This research project would not have been possible without the approval and support of Dr. Paul Winkler (Director of Education - Archway Schools, Inc.) who gave permission for me to conduct this research in my classroom. He was also kind enough to proofread several chapters of my text. Heartfelt love and gratitude to my husband for his support and assistance in the collection of research data. He also allowed me to use household funds to buy microwaves.

Finally a thank you to Dr. Norris G. Haring who returned my phone call and recommended his book Generalization for Students with Severe Handicaps which served as a guide when designing this project.

General Case Principles Applied to Microwave Cooking: Can Severely Handicapped Students Generalize the Skills they Learn Across Settings?

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Dedication

To all the cherubs of the world who choose to use their wings to fly rather than stand or sit still. You teach us all that success will follow effort and that challenges are created to be mastered.

Chapter 1

Introduction

The purpose of this paper is to apply an example of general case strategy when training severely handicapped students to use a microwave. These strategies have been found to be very effective at facilitating generalization in populations that are mildly and severely handicapped. (Haring 89)

In this case microwave cooking will be introduced in the classroom. General case strategy consists of selecting a representative sample of stimuli which reflect the range found in most natural settings. Both push button and turn dial (microwaves) will be used to train students. Student progress will be noted on task analysis sheets in both general cases. An initial probe will be made by sending a task analysis checklist home for parents to indicate on them the level the student is performing prior to instruction. This evaluation along with an in-class probe will constitute baseline scores.

The hypothesis is that general case training will increase the probability that transfer of skill will occur to the untrained machine or machines. The students will be tested on microwaves that reflect the range of machine types and are located in natural settings rather than the artificial setting (classroom) where instruction had taken place.

If the hypothesis is true the result will indicate that generalization and maintenance of certain functional skills increases when general case strategies are implemented.

Recently a dental hygienist visited the classroom to examine the students' teeth. She complimented one of the students on having excellent teeth. This particular student had been brushing her teeth independently in class for over a year along with the majority of her classmates.

In addition all of the parents of the children in the classroom had received daily documentation updating their child's progress. Parents also received copies of the functional curriculum along with task analysis which outlines instructional steps and procedures.

It was assumed that once the majority of students in the classroom had reached mastery on a skill (tooth brushing) that the skill could be eliminated from the classroom routine and more skills added to the curriculum. It was also assumed that parents would play a pivotal role in the maintenance of the skill by encouraging and promoting the skill at home.

Before the dental hygienist left she asked the student if her mother was brushing her teeth at home. The student responded – "yes." Later that day the student was asked to perform the skill in class. She left out several steps, needed verbal prompts and did not perform the skill as efficiently.

The student's response to the hygienist's question and the subsequent probe made it clear that both assumptions had been wrong. It was evident from this event that the instruction strategy selected had failed to meet the desired goal of generalization of the skill.

Several questions arose from these findings. If the skill had been effectively taught in the classroom, why had it failed to generalize at home? Did the student understand enough about the natural time and sequence of the skill so that the skill could be appropriately initiated at home? Did the parents feel confident enough in the use of task analysis instruction to train and promote the maintenance of these skills? And most importantly, what instructional strategies promote and enhance the chances that generalization will occur in a natural setting?

This study might indicate that general case strategies are a more effective tool when instructing severely handicapped individuals. In addition general case principles might actually promote the generalization and maintenance of functional skills across settings.

Teachers may benefit from this research in determining which strategies to employ during the process of instruction. Students would benefit as their rate of skill and generalization increased. In the same way that microwaves have modernized the kitchen in terms of efficiency and time saved, the skill of microwave cooking

could assist the severely handicapped individual in preparing meals independently or with minimum assistance.

Chapter 2

Literature Review

A Historical Perspective

Part 1

While Bengt Nirje is not considered an expert on the technology of generalization, his view of the handicapping condition of mentally retarded individuals written in the early '70's influenced concepts of generalization. Nirje is most recognized for his Principles of Normalization (72). In this article, he outlines the conditions that challenge and often hinder people with retardation.

"I choose to see mental retardation as not one handicap but three..." Nirje writes, "the cognitive handicap, the impairment in the adaptive behavior, the learning difficulties with the repeated demands imposed by new experiences and complexities... the imposed or acquired retardation as expressed in behavioral malfunctioning or underfunctioning due to possible deficiencies in the environment... the awareness of being handicapped expressed in possible distorted self-concepts..." (Nirje, 72).

His work was a part of a growing effort toward moving mentally retarded individuals into the mainstream of society. At the same time several court cases directly influenced the movement toward educational reform. Pennsylvania Association of Retarded Children vs. Commonwealth (1972) and Mills vs. Board of Education (1972)

stipulate that people with retardation are entitled to educational services regardless of the severity of their handicap (William & Susan Stainback, 87).

In 1974, the Association for the Severely Handicapped (TASH) was organized. This organization along with The National Organization for Retarded Children were involved in developing educational programs for severely handicapped children.

Public Law 94-142 was written and passed into law in 1975. This law guaranteed the rights of all children to a free, appropriate education (William & Susan Stainback, 87).

Cognitive, environmental and empowerment issues poignantly outlined by Nirje (72) were further being addressed through educational reform. Research funded by the federal government was directed toward developing ecological assessment; functional curricula and methodologies designed to effectively teach mildly and severely handicapped children.

The curricula that had primarily been academically focused was broadening in its scope to include the skills and behaviors necessary to prepare handicapped students to become competent and independent individuals. Many felt that handicapped children should have the same opportunity to feel a sense of empowerment as their regular education peers. Tasks were identified (cooking, grooming, toileting . . .) through research that would help severely handicapped

children be more independent in school, at home and in the community (Arlene Aveino, 1987).

The issue of generalization of skills developed concurrently in the late 1970's. It became evident that the acquisition of a skill in a controlled training setting did not automatically ensure that the skill would be generalized to other settings. In 1977, Trevor Stokes and Don Baer at the University made a composite study of current success/failure rate. As a result of their analysis a technology began to emerge in the field of generalization.

Norris Haring building on the work of Stokes and Baer conducted another composite study in 1989. Three more generalizations strategies were explored and analyzed.

After completing his/her analysis of generalization strategies, Haring made several conclusions:

1) Often generalization fails to occur because appropriate instructional strategies are not being selected.
2) Although generalization is a desired outcome, it is often not a consideration before, during and after instruction.
3) Generalization goals and objectives are not clearly stated and included in the child's Individual Education Plan.

Research continues that might help resolve some of the issues and problems associated with generalization.

The educational reform movement begun in the 1970's continued in full force. It can be credited with producing many changes in the quality of education for severely handicapped individuals. The ultimate test though will be if these reforms produce significant effect on the transition of these individuals from the school to the community.

Part II

Researchers and practitioners that claim there are methods which increase the probability that generalization will occur (Stokes and Baer, 1977) suggest that trial sequencing may influence generalization. Trial sequencing has been researched by Berman and Opalski and has been found to be a variable that when considered with other factors such as the nature of the task, the power of the task in the environment, and initiative increase the influence of sequencing on generalization (1984). Berman and Opalski define trial sequencing as "a process of presenting a stimulus across time and situation which results in a response which is trusted to operate in natural environments" (1989). There are four basic methods of trial sequencing which are reviewed by Berman and Opalski.

Stimuli can be presented serially - one item at a time or concurrently presented all at the same time to a specified criterion. It is further defined by sequencing trials. Massed refers to trials that occur close together

and distributed where trials are broken apart and interwoven with trials from other related programs (Berman & Opalski, 1989). Massed serial, massed concurrent, distributed serial and distributed concurrent are the four methods of sequencing reviewed by Berman & Opalski (1989).

In 1975, Clark and Sherman utilized a massed sequence to attempt to train severely handicapped children to respond to questions. The children continued to be dependent on the trainer for cues after instruction. The students failed to generalize skills.

In 1979, Marholin, O'Toole, Touchette, Berger and Doyle trained four retarded individuals using a distributed concurrent trial sequencing method. These individuals were successfully trained to "ride a bus to a specified destination, order and purchase an item." Training occurred in the classroom, on a bus and in a shopping center (1979). Berman and Opalski suggest that the natural cues and relevant stimuli present in the natural setting contributed to the transfer of skills (1989). Distributed sequencing was more effective at promoting generalization.

Berman and Opalski reviewed three studies that compared serial and concurrent training to generalization (Panyan & Hall, 1978; Schroeder & Baer, 1972 and Waldo, Guess & Flanagon, 1982). Concurrent training favorably influenced generalization.

Berman and Opalski state that "in serial training the subject made one response repetitiously to a fairly constant stimulus. On the other hand, in concurrent training several items are trained simultaneously, thus the individual must attend to the discriminating features of each task" (1989).

Research suggests that distribute concurrent sequencing is more effective at promoting generalization. Berman and Opalski (1989) state "that the type of skill trained should determine what sequencing strategy is used," and that other influences play a significant role in generalization.

More recently, Matson, Taras, Sevin, Love and Fridley attempted to teach a wide range of self-help skills to children who were autistic and mentally retarded utilizing a whole task chaining strategy. All of the steps of the activity were presented at once "...a) the trainer modeled and verbally described the target behavior, b) the trainer physically and verbally guided the child through the entire sequence of task analyzed steps and c) the child was instructed to perform the behavior independently" (Matson, et al., 1990).

Most of the children learned at least two or more adaptive skills within 8 - 14 sessions or 6 - 12 weeks. They continued to demonstrate skill after instruction had been discontinued. Performance gains were noted even in the three cases where two of the students failed to learn the complete sequence of a skill. Matson, et al. suggest that

additional time and training is all that might be needed for these students to reach mastery of skill.

One of the major criticisms of the whole task analysis approach is that a student, particularly one with severe or multiple handicaps, may not be able to learn all of the steps involved in an entire sequence thus creating overload (1990). Many researchers felt that when steps were presented one at a time, as in the case of backward or forward chaining (Wombold & Salisbury, 1978), fewer errors would occur because correction or reinforcement would be given immediately upon completion of each step.

The task analysis involves ordering the sequence of skills necessary in performing a task into teachable units (steps) of instruction. A probe is made to determine what steps the student cannot perform and what type of assistance will be needed to guide the student to mastery of the task

In 1978, Wombold and Salisbury utilized a task analysis procedure to effectively instruct and monitor severely handicapped children. They used an increased prompt hierarchy consisting of verbal, modeling and physical prompts, fading and reinforcement to assist children in the learning of self-help skill. Students demonstrated increased performance or mastery of skill over time (3 years). Increased hierarchy has been extended to include indirect verbal prompt, a direct verbal prompt or gesture, a model, a physical prime, and full physical guidance (1990).

Karsh and Repp (1992) compared a Standard Prompt Hierarchy (SPH) with a Task Demonstration Model (TDM) in a group format. The SPH involved a time delay strategy that was expected to promote the maximum amount of correct responses. "If the student made an error" wrote Karsh and Repp or did not respond within 10 s., a least to most prompting hierarchy was used in the following sequence, repeated instruction, instruction plus gesture, instruction plus modeling, instruction plus physical prompt, instruction plus full physical guidance (1992).

The Task Demonstration Model included a general case component which presented the student with a representative sample of stimuli that was likely to be encountered by the student in the natural setting. Not only was stimuli presented in which the skill should be used, negative and irrelevant stimuli was also introduced and the student was required to distinguish and match samples.

An analysis of strategies that facilitate generalization was conducted by Haring and associates in 1989. At that time they looked at eight studies that had been found to utilize general case programming either solely or in combination with another strategy. General case programming proved 100% effective at promoting generalization in each of those studies. They concluded no other strategy equals the effectiveness of general case programming.

Karsh and Repp findings suggest that students with severe handicaps benefit most from general case programming (TDM). One of the benefits of general case programming is that students learn how to disregard negative or irrelevant stimuli. This method also brings the student in closer proximity to his/her environment (Karsh & Repp, 1992). Karsh and Repp used this method to teach groups of severely handicapped individuals identification of "eating utensils, self-care items, clothing, coins and bills, functional words and symbols..." (1992).

Studies of general case programming have demonstrated its effectiveness in promoting acquisition and generalization of skills. Because it is uniquely responsive to the needs of severely handicapped learners, general case programming has been widely used in community based instruction (University of Utah, 1990).

Sprague and Horner (1984) and Gaylord-Ross, Haring, Breen and Pitts-Conway (1984) are examples of early studies that successfully utilized general case programming to teach students how to use vending machines and appropriate social skills. Two separate studies conducted by Neef, Lenbower, Hockersmith, DePalma, and Gray (1990) and Domaracki and Lyons (1992) look at general case simulation versus naturalistic instruction when teaching washing skills and vocational skills. Their findings conclude that while simulated general case is much more efficient in terms of

training time and cost (1990), naturalistic instruction promotes better acquisition of vocational skills (1992). The training time needed for students to acquire skills was decreased using naturalistic instruction (1992). Neither strategy significantly influenced the transfer of skills to untrained situations, particularly when individuals with severe handicaps were involved. Nancy A. Neef, et al. suggest that a combination of both strategies will be most effective at promoting generalization.

General case exemplars were also found to be more effective for purposes of staff training. Ducharme and Feldman looked at the training of people who teach severely handicapped individuals self-help skills. They looked at "performance based training using a single client exemplar versus a multiple client exemplar (general case exemplars)." Their findings indicate that staff were sufficiently trained only after general case exemplars were used. Staff could effectively apply training across "client's settings and programs" (1992).

Day and Horner (1989) compared general case instruction with specific modification strategy in teaching pouring skills to individuals with severe handicaps.

Their findings built upon prior research completed by Engelmann and Carnine which indicated that easy and difficult examples are needed early in instruction in order

to promote the transfer of new skills to novel situations (1982).

The results of Day and Horner's research indicate that specific modification is limited in that it does not produce the transfer to new skills to an untrained situation or setting. Only after general case instruction were the students able to successfully transfer generalization skills to new situations. The individuals were also able to use pitcher and receptacles not used in the original training.

Whether or not individuals with severe handicaps can benefit from cognitive training is still uncertain. One could argue that general case programming is an intricate type of cognitive training but it still relies initially on behavioral cues, instruction (presenting a group of samples that represent a task) and reinforcement.

Don Bachor (1988) poses the question "Do mentally handicapped adults transfer cognitive skills from the instrumental enrichment classroom to other situations or settings?" Bachor looks at the handicapped individual as a "retarded performer" focusing on modifying the performance of the individual rather than the individual. In his research he measured whether individuals were taught thinking skills, i.e. actually used them successfully in new situations or settings when required. Many of these individuals demonstrated transfer or near transfer of the

cognitive skills but the interpretation of the results are inconclusive and no clear relationship can be made.

Chapter 3

Method

Setting and Subjects

The study took place at a private special needs school. Three students; two female and one male were selected from a classroom consisting of teenage children with multiple handicaps. All students had psychological test scores that reflected a range of severe disability. Their parents agreed to their participation in this study and cooperated in many ways including a parent survey, sending in microwave lunches, and suggesting words to be added to a word list.

Student C is a 17 year-old female who is classified as multiple handicapped. She has cerebral palsy which has left her with significant physical handicaps. Student C's only means of locomotion is an electric wheelchair which she operates independently. She also has limited use of her hands. An operation performed a year ago gives her greater use and movement in her left hand. Despite Student C's handicap she usually finds ways to complete tasks. She loves to learn and is highly motivated. Student C has good number recognition and good functional reading skills. Because of Student C's reading skills, it seemed reasonable that Student C could learn to read and follow a simple recipe using the microwave with adaptions to compensate for physical limitations.

Student C's parent indicated that she had no prior training on either one of the microwave types prior to instruction. This was supported by the initial evaluation.

Student S is a 17 year-old male who is classified multiple handicapped. He also demonstrates some autistic behaviors. Student S is very verbal, participating in verbal self stimulation as well as appropriate social interaction. If introduced to a group of new flashcard words, Student S will take them and rehearse them over and over until he has learned them. He has good number recognition skills.

Student S is very mobile and has no significant physical limitation. He can also follow verbal directions accurately.

Student S becomes quite aggressive when frustrated. It was predictable that the introduction of microwave cooking would trigger some aggression because it was new.

Student S's parent indicated on her survey that Student S was operating a push button microwave at home. In the home Student S would consistently set the timer on two minutes, and then add two minutes until food was cooked. Parent indicated that Student S had no prior training in using a turn dial microwave. The initial evaluation approximated what the parent stated.

Student E is a 17 year-old female who was new to the classroom. Student E demonstrates moderate autistic

behavior. She is classified multiple handicapped. Student E did not have number or word recognition prior to training. Her training began with number recognition and number matching. Student E's program required her to set the timer by matching the number to a flashcard.

Student E's physical condition was good. She had no prior training in the use of microwaves before instruction. Student E's parents also indicated on their survey that they would very much like her to learn this skill.

The other students in the class also received instruction although they were not a part of this research. Student profiles are located on Table 1 entitled Participating Students.

Table 1
PARTICIPATING STUDENTS

Pupil	Chronological Age	Sex	Primary Handicapping Condition	Secondary Handicapping Condition	Most Recent Psychological Test		Medications
					Chronological Age (at time of testing)	Score & Test Name	
	17 - 2 mos.	F	Cerebral Palsy	Multiple Handicapped	13.2	Peabody Picture Vocabulary Test 1.7 - 4.8 mos.	Melleril
	16 - 9 mos.	F	Cerebral Palsy	TMR	15.0	Vineland Social Maturity 4 - 9 years	
	18 - 3 mos.	M	Emotionally Disturbed Autism	TMR		"None Appropriate"	
	19 - 4 mos.	M	TMR	Multiple Handicapped	16.2	Vineland Adaptive Behavior 2 - months	
	13 - 1 mos.	M	Autism	Moderate Retardation	10.5	Vineland Adaptive Behavior 1.6 mos. - 2 years	
	20 - 4 mos.	F	TMR	Multiple Handicapped	14.6	New Jersey Developmental Scale	
	17 - 5 mos.	M	TMR	Autism	11.9	TARC Assessment Inventr Vineland Adaptive Behavior Scales 2 - 4 years	
	18 - 4 mos.	M	TMR	Multiple Handicapped	17.2	Wehler Intelligence Scale for Children 1.6 - 1.5 mos.	

Design

When selecting microwaves the primary objective was to select a sample that would provide relevant stimuli and be representative of what the student might see outside the classroom.

The two standard designs selected and purchased were push button and turn dial in two colors, brown and white (which represented the color range).

A variety of different foods were used during instruction representing a small sample of the wide range of foods possible. They included: bacon, waffles, popcorn, vegetables, frozen meals, sausage, eggs, french fries . . .

Instruction was provided directly in the classroom. Students were taught the chain of skills necessary to operate each of the two types of microwaves using a task analysis. Then the students were tested on untrained machines found in their natural setting. It was hypothesized that the students would be able to use the untrained machine at the level maintained in the classroom despite the fact these machines were slightly different.

Table 2, General Case Analysis of Microwave Cooking outlines the design of the program utilized for instruction.

Table 2
GENERAL CASE ANALYSIS OF MICROWAVE COOKING

Generic Responses	Generic Stimuli and Relevant Characteristics	Relevant Stimulus Variation	Relevant Response Variation	Exception/Potential Errors
Open microwave door	1) Microwave location/ student orientation a) instructional setting and b) non-instructional setting	Door opens	Slight variation in how door opens	Location of microwave (convenience store)
Place food in microwave	2) Person instructing student			Location of food items
Close door of microwave	3) Type of food: popcorn soup tea. . .	Menu guide	Popcorn: turn up or down Put vents in plastic Remove from box	Symbol or words on microwave
Activate machine	4) Machine Activator Light Noise Timer Signal that food is done	Push button on panel, Turn timer	Activate through panel or timer Noise/light bell at end of cooking	People using microwave Food already in microwave (remove food first) Condition of microwave
Remove food from microwave	Temperature of food	Food not done, reset timer		Food removal

Methodology

A functional approach was used to teach microwave cooking. The functional approach is basically a task analysis approach which teaches each step toward mastery of a given skill. Task analysis sheets were developed for each type of microwave with an objective for task. An objective was also written for generalization of the skill post instruction (Table 3 and 4). Baseline scores were tabulated by combining results from a parent survey indicating the performance level of the student at home and on initial probe.

The number of steps 2-12 the student could perform independently or with verbal prompts were divided by the total number of steps performed to give a percentage. Step 1 was eliminated completely from tabulation of the results because none of the students except Student C had the reading skill necessary to complete the step. Scores were tabulated on a graph.

Students were taken to a machine on which they had not trained located in a natural setting. They were asked to microwave a familiar food item. Scores were again tabulated on a graph.

These two scores were compared. It was predicted that students would maintain the level of skill demonstrated

after instruction. If this were true then, as hypothesized, the general case strategies used during instruction could have contributed to the success of the student in generalizing the skill.

Table 3

TURN DIAL

1. Student will follow steps to microwave cooking outlined on task analysis sheets to the level of verbal independent prompt within 20 sessions. 2. After instruction student will operate a machine that he/she has no training on located in a natural setting, independently or to the level obtained in class. Success will be determined by comparing the results on the task analysis sheets.	Session 1	Session 2	Session 3	Session 4	Session 5
1. Read the instructions on package or follow the recipe					
2. Follow instructions for removing food from the package. Keep the instructions.					
3. Open microwave door.					
4. Place package or dish in center of oven.					
5. Close door tightly.					
6. Set the microwave oven's timer to the correct time.					
7. Push START, POWER, or ON according to manufacturer's instructions.					
8. Turn oven off to turn dish or stir food, according to directions.					
9. Close door and continue microwaving.					
10. When timer sounds, remove food carefully, using pot holder(s) to avoid being burned.					
11. Let food stand before being served.					
12. Serve food, or let it stand according to directions.					

COMMENTS:

I-independent V-verbal M - modeling P - physical O - can not perform task

*Step 1 was eliminated from the tabulation of results.

Table 4

PUSH BUTTON

1. Student will follow steps to microwave cooking outlined on task analysis sheets to the level of verbal independent prompt within 20 sessions. 2. After instruction student will operate a machine that he/she has no training on located in a natural setting, independently or to the level obtained in class. Success will be determined by comparing the results on the task analysis sheets.	Session 6	Session 7	Session 8	Session 9	Session 10
1. Read the instructions on package or follow the recipe					
2. Follow instructions for removing food from the package. Keep the instructions.					
3. Open microwave door.					
4. Place package or dish in center of oven.					
5. Close door tightly.					
6. Set the microwave oven's timer to the correct time.					
7. Push START, POWER, or ON according to manufacturer's instructions.					
8. Turn oven off to turn dish or stir food, according to directions.					
9. Close door and continue microwaving.					
10. When timer sounds, remove food carefully, using pot holder(s) to avoid being burned.					
11. Let food stand before being served.					
12. Serve food, or let it stand according to directions.					

COMMENTS:

I-independent V-verbal M - modeling P - physical O - can not perform task

*Step 1 was eliminated from the tabulation of results.

Chapter 4

Results

Introduction

The hypothesis of this study asserts that general case strategies will promote the effectiveness of generalization. General Case was chosen over other strategies because of its high rate of success among populations that are moderately and severely handicapped.

Baseline Phase

Parents were asked to complete a task analysis form for each microwave (see Tables 3,4). They were asked how many of the steps their child could complete independently or at the level of verbal prompt. Student E and Student S had microwaves at home that their parents were using to train them on. Student C did not have a microwave in her home and had not been given prior training on any machine. Her baseline scores (parent survey) were tabulated as 0.

A baseline exercise was initiated in class which required the student to microwave an item without any preliminary instruction or cues. Student S and Student C when given the request to microwave could not open the door and therefore could not proceed through the sequence of steps. Their scores are represented by 0

on the turns microwave dial (Table 5). As the parent indicated on the survey, Student S had prior training on the push button and scored significantly higher on the initial probe (70%). Student C was again stuck at opening the door. Keep in mind that Student C was in a wheelchair and some of the issues related to positioning herself so that she could open the door. After several attempts, she was unable to get close enough. As a result, both her scores for the initial probes were tabulated as 0.

Student E was able to complete a few steps at the level of verbal prompt. She may have also benefited by seeing other students (see participating students) perform task before her. This might explain why student E received a higher score on the initial probe than indicated on parent survey or in the first session (see Graphs 3 & 6).

Instructional Phase

As indicated on Graph 3, Student E scored 80% consistently and failed to master skill because she could not perform Steps 6, 10 & 11 to criterion by the end of instruction. The graph does indicate, however, her improvement in overall skill performance during the instructional phase of research (Graphs 3 & 6). Students C and S no longer required instruction to complete the task in the classroom (Graph 1, 2, 4 & 5).

Their training was complete well before the 20 sessions were over.

Some of the comments documented on the task analysis sheets demonstrate the problem solving methodology used to resolve individual difficulties during instruction and help students learn task. Here are examples of problems encountered. In one case of a participating student, an occupational therapist adapted a microwave to help student's performance of task. This adaption, however, failed to achieve the desired goal.

For Students S and C, number recognition was a prerequisite skill. Functional words relating to microwave were also introduced and learned by students. Examples of words include: timer, start, beep, power, Light-on, Light-off, Clear End, Time Cook, Menu Guide... Parents were asked to send in microwave words that were relevant to their machine at home. These words were added to the flashcard list. Student C could read and follow directions written on the blackboard. Examples are:

Chicken and Rice
Pull tab along front
and remove strip
Lift and fold back right corner to vent
Cook on high 5 minutes
Remove from oven
Peel and remove lid
Mix and serve

Student C had to move her electric wheelchair several times in order to position herself to complete task. She positioned to open and close door; put food in and take food out of microwave. These steps were practiced using a massed serial approach or until she could perform steps comfortably on her own.

Both Student S and Student C ended up burning food (pop corn) because they set the timer over the specified time. This might have motivated them to set timer to the exact time.

Student E had trouble consistently identifying numbers. Number recognition was taught as a separate skill. Student E was required to match a specific number to the number on the microwave. As the student began to demonstrate some number recognition, she was given a number and asked to set timer. Although her performance had improved, she did not consistently set timer correctly. She was able to set the timer with some consistency to Numbers 2 and 4.

By the end of instruction all of the students demonstrated performance gains. Two of the students had mastered the skill of microwave cooking.

Generalization Phase

Generalization scores were gathered after instruction. Students were given two opportunities to demonstrate generalization of skill in a natural

setting. They were considered successful if they performed independently or at the level of verbal prompt. Student C and Student S successfully met the criterion for generalization of skill (Graphs 1, 2, 4, & 5). Student E (Graph 3) could also have been considered successful at generalizing the skill, despite the fact she did not meet the instructional goal, if she had performed to the level she had reached by the end of instruction. She did not reach criterion and therefore, failed to generalize skills. It is noteworthy to highlight again, her performance gains during instruction and generalization (Graph 3).

Table 5

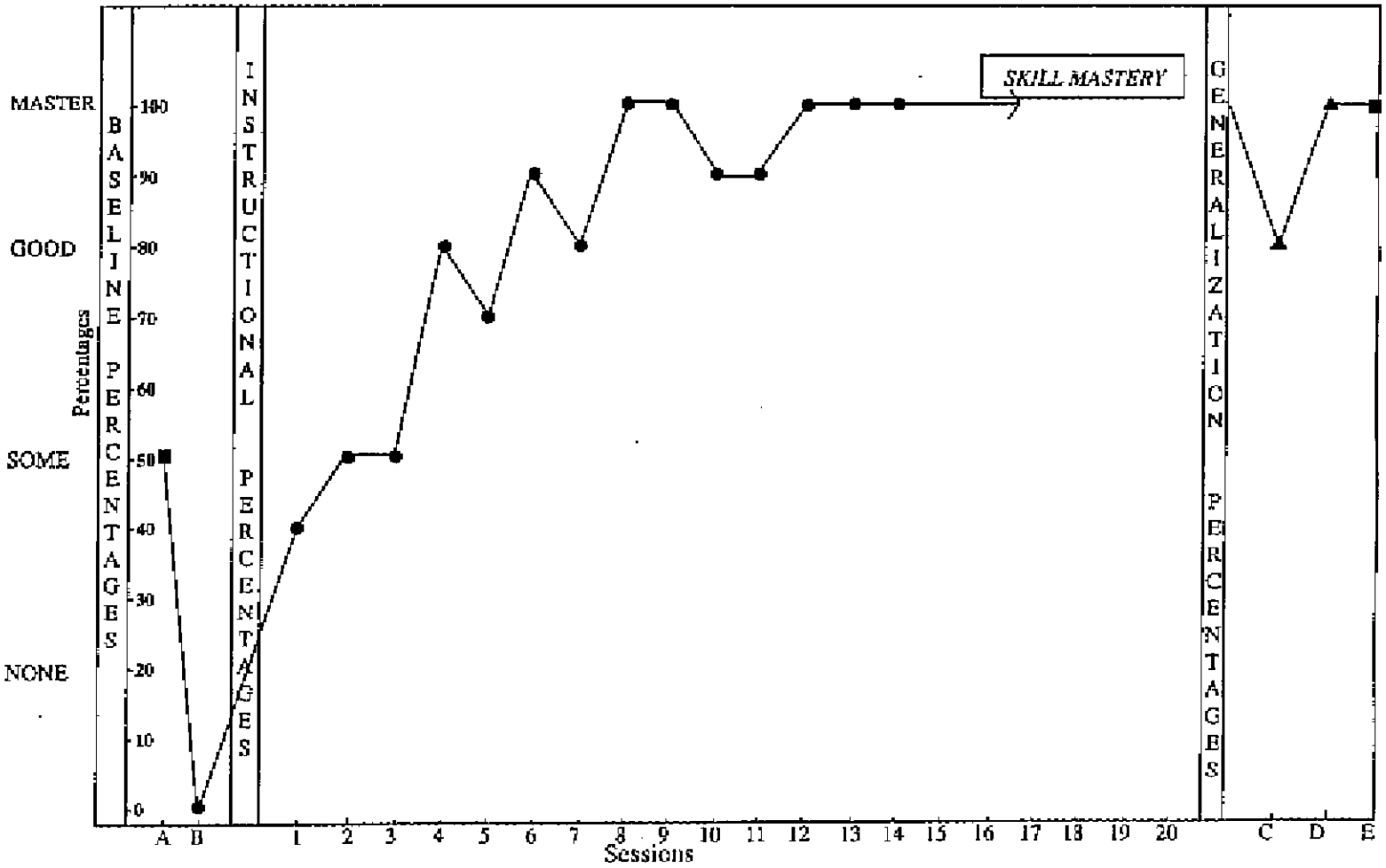
Ratings in Percentages

BASELINE RATING			INSTRUCTIONAL RATING																			GENERALIZATION RATING		
	Survey	Parent Probe	Initial	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	First Try	Second Try	
Turns Dial Microwave																										
Student S	50	0		40	50	50	80	70	90	80	100	100	90	90	100	100	100		*Performs Steps in class without instruction*					90	100	Student S
Student C	0	0		0	40	60	60	70	70	90	80	100	100	90	80	90	100	100	*Performs Steps in class without instruction*					100	100	Student C
Student E	0	30		0	50	50	70	70	90	70	80	80	80	80	70	80	80	80	80	80	80	80	80	50	70	Student E
																has dificulty setting timer, removing food at appropriate time										
Push Button Microwave																										
Student S	100	70		70	70	70	90	70	90	100	100	100	100						*Performs Steps in class without instruction*					90	100	Student S
Student C	0	0		0	070	70	80	80	90	80	100	100	90	100	100	100	100		*Performs Steps in class without instruction*					90	100	Student C
Student E	0	20		0	40	50	50	50	50	50				*Skill discontinued , want to focus on turns dial with fewer steps - specific modificatation*										---	---	Student E

GRAPH 1

Turns dial microwave Student S

Performance at home (square) in the classroom (circle) and in a natural setting(triangle) shown on graph.

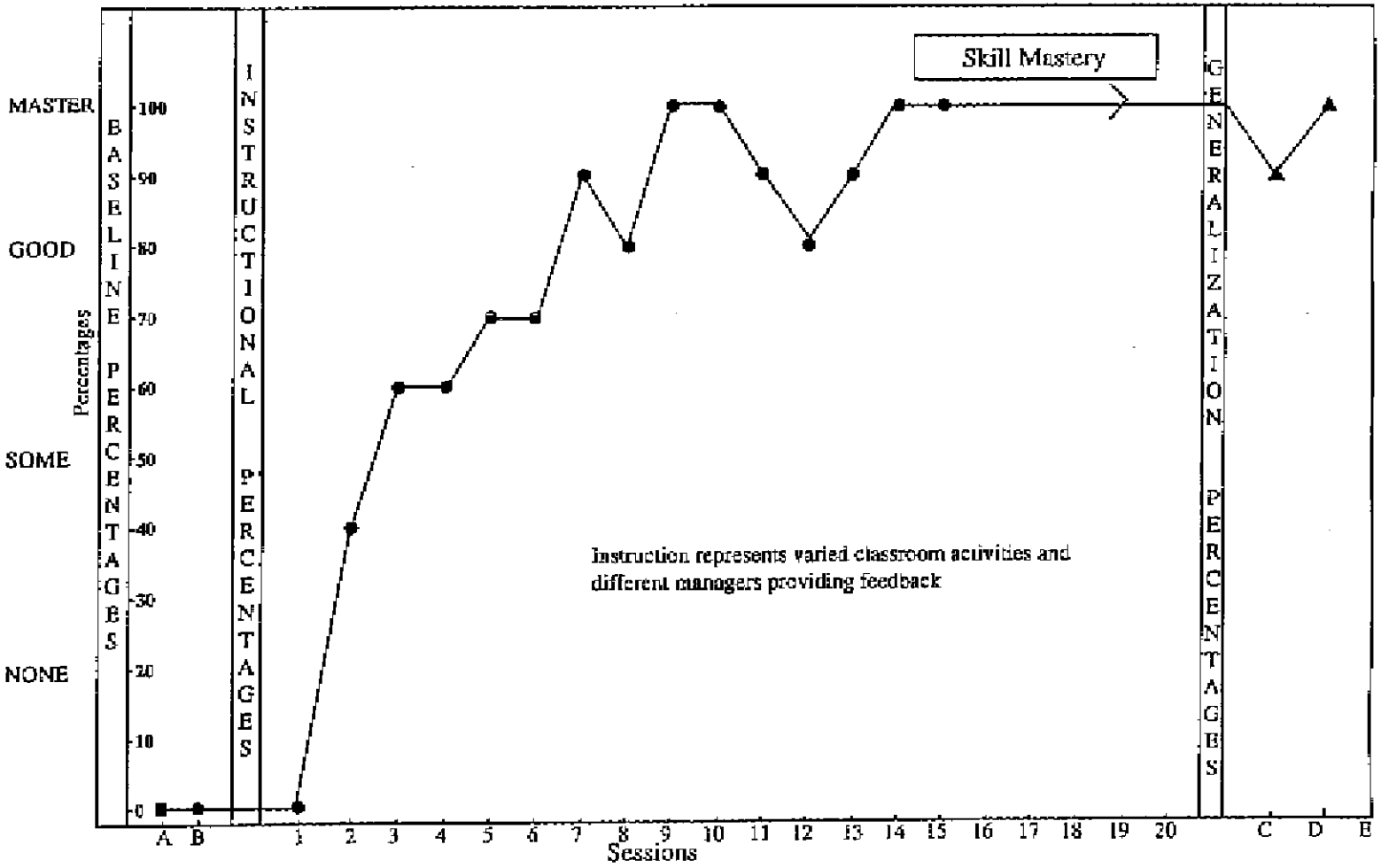


Student S met the instructional objective (circles) for the turns dial microwave. Probes in natural setting (triangles) after instruction; probe at home (squares) indicate good generalization of skill. Therefore student S met the generalization criteria.

GRAPH 2

Turns dial microwave Student C

Performance at home (square) in the classroom (circle) and in a natural setting(triangle) shown on graph.

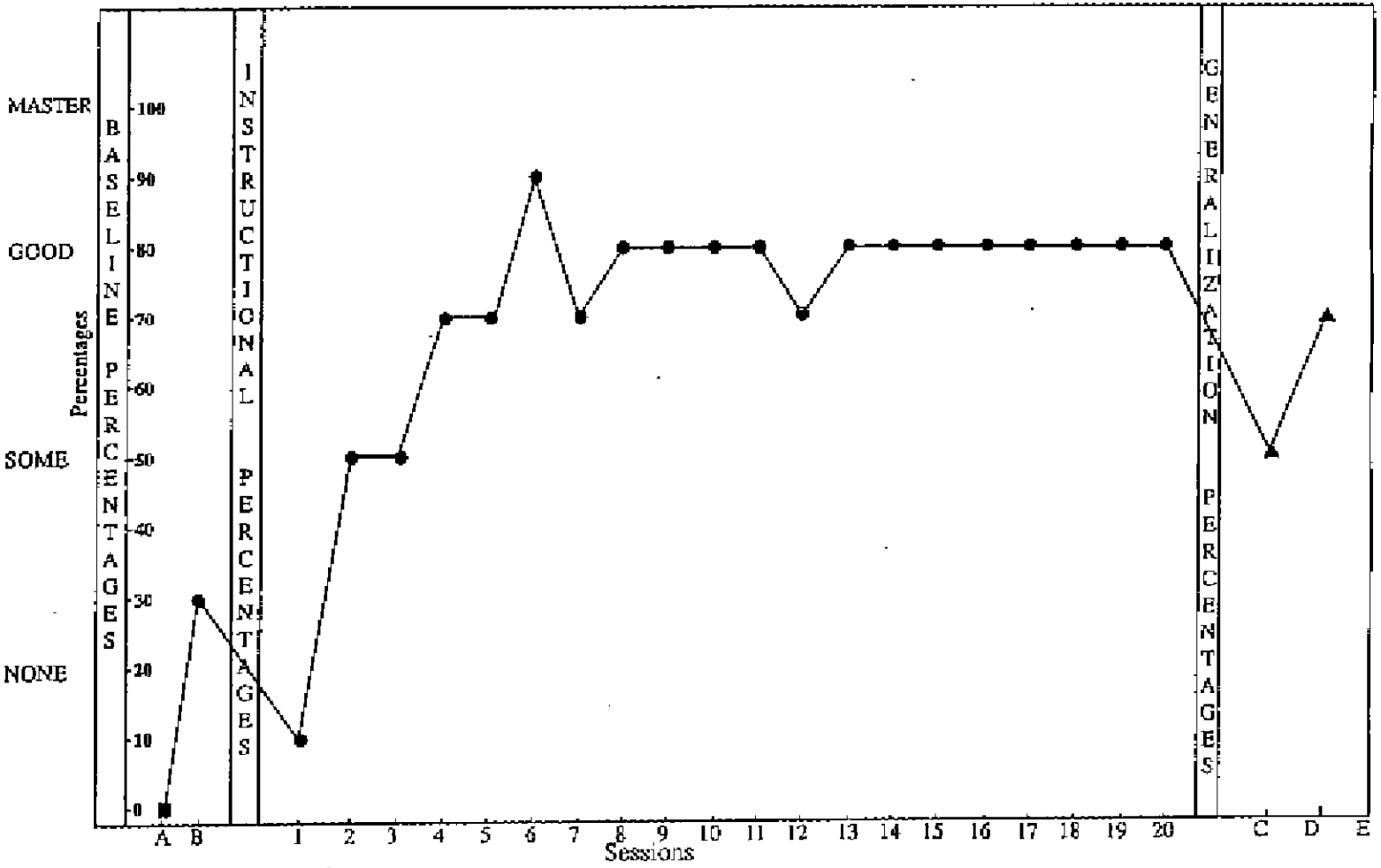


Student C met the instructional objective (circles) for microwave cooking using the turns dial microwave. Probes in the natural setting (triangles) after instruction indicate good generalization of skills therefore student C met the generalization criteria.

GRAPH 3

Turns dial microwave Student E

Performance at home (square) in the classroom (circle) and in a natural setting(triangle) shown on graph.

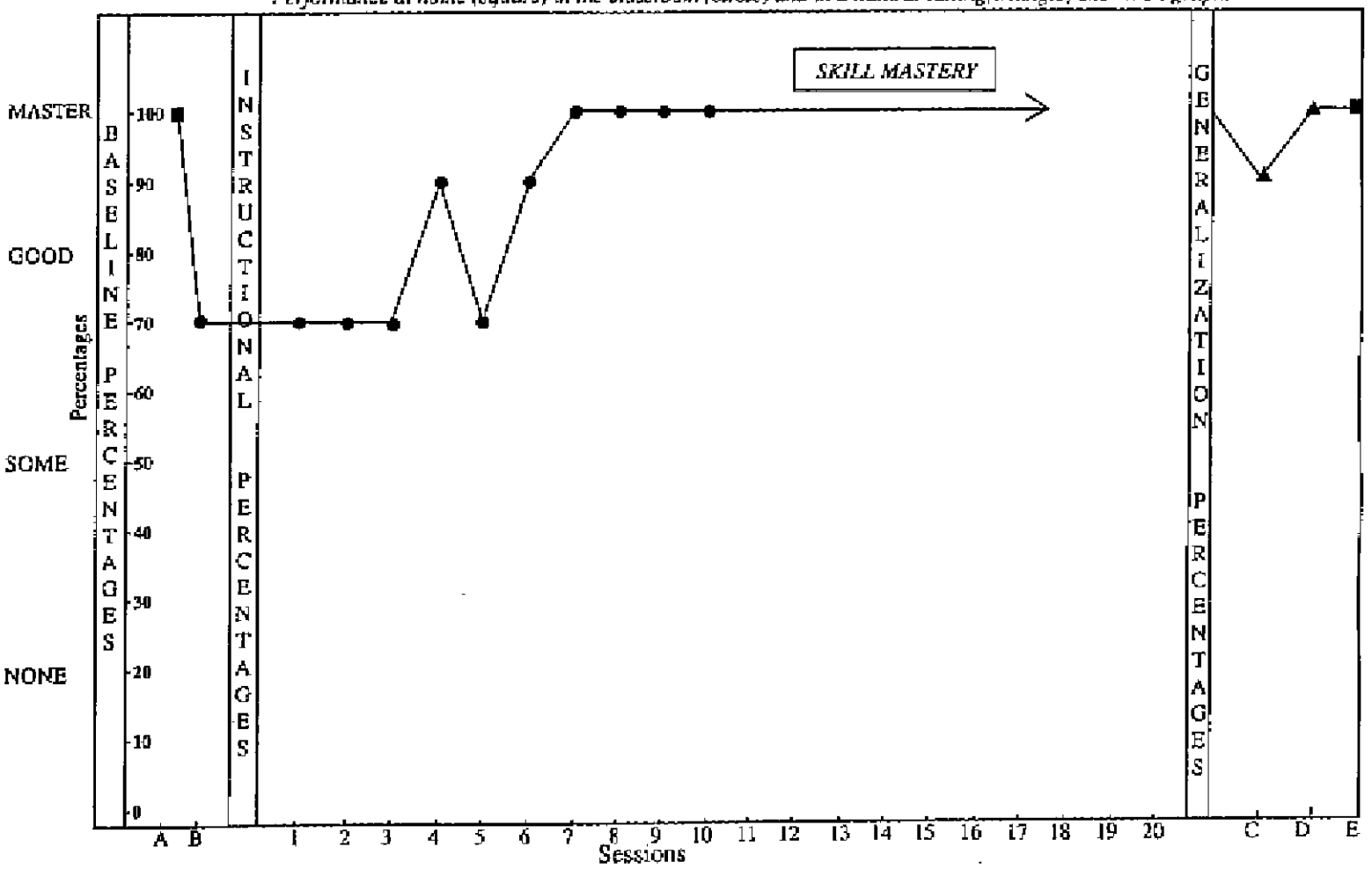


Student E did not meet instructional objective (circles) for use of a turn dial microwave cooking altough she demonstrated increased performance. Probes in the natural setting indicate moderate generalization. Student E did not sufficiently meet the generalization criteria.

GRAPH 4

Push Button Microwave Student S

Performance at home (square) in the classroom (circle) and in a natural setting(triangle) shown on graph.

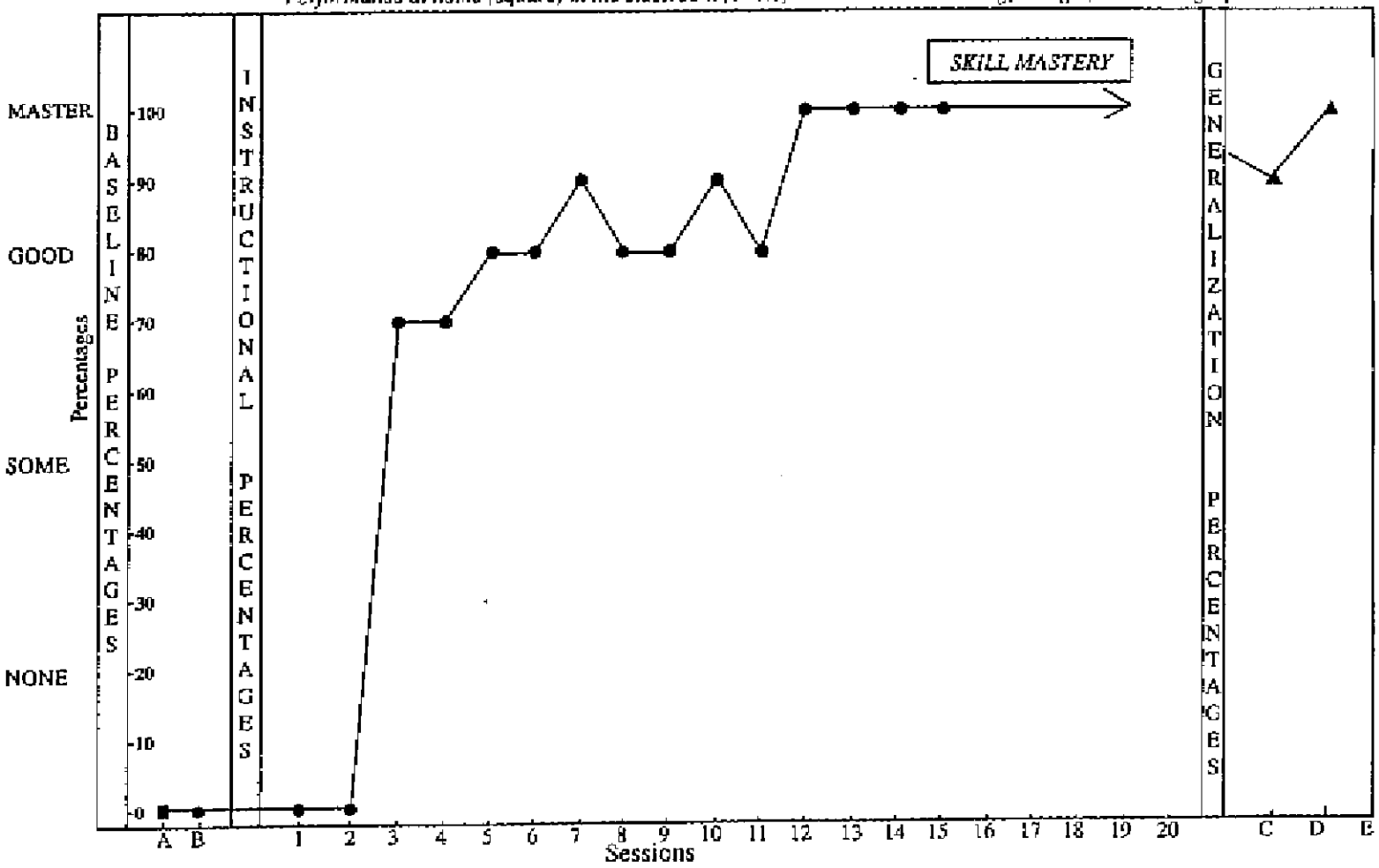


Student S met the instructional objective (circles) for the push button microwave. Probes in the natural setting (triangles) as well as follow-up probe in the home indicate good generalization of skill. Student S met the generalization criteria.

GRAPH 5

Push Button Microwave Student C

Performance at home (square) in the classroom (circle) and in a natural setting(triangle) shown on graph.

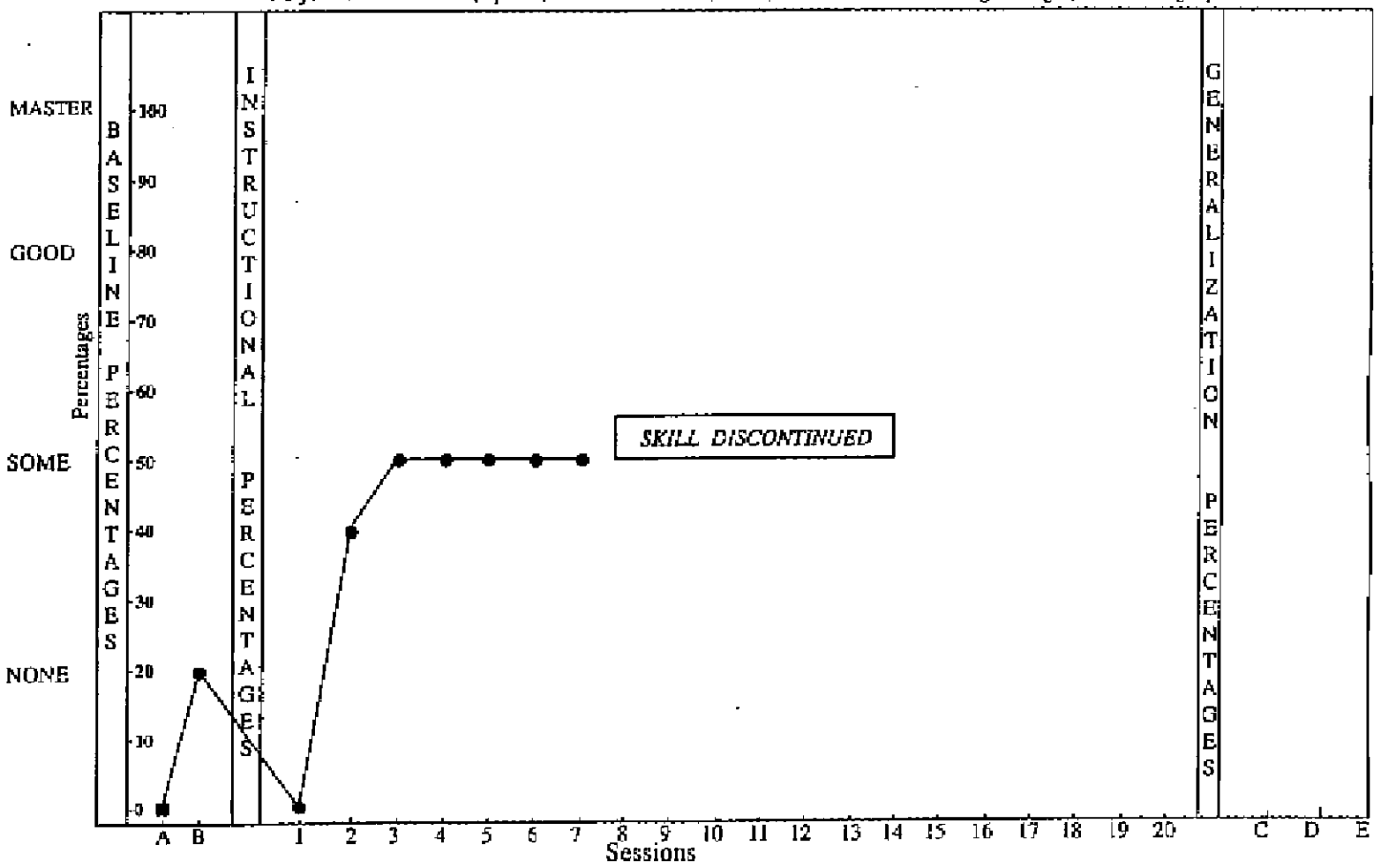


Student C met the instructional objective (circles) for the push button microwave. Probes in the natural setting after instruction (triangles) indicate good generalization of skill. Student C met the generalization criteria.

GRAPH 6

Push Button Microwave Student E

Performance at home (square) in the classroom (circle) and in a natural setting(triangle) shown on graph.



This skill was discontinued. A sequential modification strategy was applied which consist of training one situation at a time. (turns dial then push button.) Since Student E never met criteria during instruction for the turns dial or the generalization objective, instruction on push button was never continued during research period. (See results from graph 3)

Chapter 5

Discussion

As noted in the literature review, severely handicapped children often do not generalize skills in new settings. Norris Haring and others suggest that functional skills are only meaningful if they are functional in the environment or environments for which they were intended.

What would happen to our psyche if we woke up one morning and could no longer perform everyday functional skills. For instance, if we needed assistance combing our hair, tying our shoes, brushing our teeth or cooking our meals. We would probably feel a great loss of empowerment and enormous feelings of helplessness. Perhaps this is similar to what the severely handicapped individual feels. Functional skills that are successfully generalized have the potential of increasing the severely handicapped individual's viability and personal sense of empowerment. Functional skills that have been successfully generalized allow individuals that are handicapped to perform normal, age appropriate activities without requiring anyone's help or assistance.

Research findings indicate that general case principle tend to enhance the effect of generalization

particularly in populations that are severely handicapped. This study attempts to test an application of general case principle in teaching severely handicapped young adults how to microwave with the ultimate goal of generalization. Microwaves were chosen over conventional ovens because they were smaller and more efficient. They also required a shorter amount of time to cook foods and less food preparation.

A set of independent variables, relevant and non-relevant such as 1) door openings, 2) machine activators, 3) signals that foods were finished cooking, 4) type of food utilized and 5) color of machine (see Table 2) were presented that would have influence on the generalization of this skill.

The skill was taught in a comfortable setting (classroom) with familiar people. The machines were constant throughout the period of instruction.

Instructional methodologies were developed by trial and error in an effort to problem solve around a particular step or steps. Instruction represented various classroom activities.

Two of the three students demonstrated mastery of the skill in the classroom. They successfully completed the entire sequence of steps to master the task well within the 20 sessions. Short term

objectives and generalization objectives were both met. These objectives state that students will follow steps to microwave cooking outlined on task analysis sheets to the level of verbal/independent prompt and after instruction, operate a machine that he/she has no training on located in a natural setting independently or at the level obtained in class.

In these two cases the hypothesis that general case strategy is more effective at promoting generalization proved true.

One of the students (Student E), however, demonstrated problems early on with the application of general case strategy. Because of a lack of prerequisite training, number skills and word recognition were taught simultaneously with microwave skills.

Massed trial remediation of specific steps was implemented to increase skill level. The student was never able to complete the whole task independently or with verbal prompts throughout instruction and failed to meet the generalization criteria. After specific modification was implemented, the student demonstrated some significant gains in performance even though she did not master the skill.

Several reasons may be given in explanation. Student E is both autistic and hyperactive. These

conditions might have hindered her from acquiring the sequence of skill necessary to complete task. Secondly because the child needed to acquire the perquisite skills in addition to microwave training, it might have required more time to acquire all of the skills necessary to reach mastery.

One of the drawbacks of this study is that the research had to be conducted in a short period of time. There was only enough time at the end of the study to test short term generalization outcomes. This research does not test the effectiveness of general case strategy over long term and in a variety of circumstances.

When it seemed that Student E was not picking up the skill, specific modification was implemented in an effort to enhance learning. Learning is such an individual action each student may respond differently to techniques and procedures implemented. Perhaps other techniques and strategies could have been implemented that would have been more effective at teaching this student. Further research is needed into problem solving and finding solutions when a strategy or technique appears not to work.

In general this project supports the claim that general case strategies are effective at helping students who are severely handicapped to learn

functional skills. The more complex the task, however, the more difficult it will be to present enough representative variables to help the student learn all the possible responses. Further research into cognitive training may have significant impact on the future learning and positive generalization of more complex functional skills.

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