,SIMON SAYS, "HOLD THE BROOM WITH BOTH HANDS": AN ASSESSMENT OF COMMUNICATION USED IN TRAINING PEOPLE WITH MENTAL AND DEVELOPMENTAL DISABILITIES,

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SIMON SAYS, "HOLD THE BROOM WITH BOTH HANDS": AN ASSESSMENT OF COMMUNICATION USED IN TRAINING PEOPLE WITH MENTAL AND DEVELOPMENTAL DISABILITIES

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The present investigation examined the impact of the communication that occurs in training sessions for people with mental and developmental disabilities on a trainee's rate of learning and work eligibility. This study also examined the impact of both symbolic coding and trainee-generated communication, which occurred in training sessions for this population, on a trainee's rate of learning and work eligibility. Data were collected in a Midwestern county board of mental and developmental disabilities' adult services program. A field study was conducted in which program participants were observed as they were trained for competitive employment in sheltered workshops or at actual jobsites. Multiple regressions were used to analyze the impact of the communication on a trainee's rate of learning. Chi Square tests were used to analyze the impact of the communication on a trainee's work eligibility. IQ was examined in both analyses as a possible confounding variable. Results indicated some significance between the use of physical assistance prompts and both slower rates of learning and reduced work eligibility. No significance was found for the other communication variables in this study.
Severe study limitations are addressed, these include: small sample size, confounding trainee characteristics, inadequate coding schemes, and weak measurement procedures for the dependent variables. Future research implications are discussed.
ACKNOWLEDGEMENTS

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SIMON SAYS, "HOLD THE BROOM WITH BOTH HANDS":
An assessment of communication in training people with mental and developmental disabilities

CHAPTER I
INTRODUCTION

In the past ten years, the competitive employment of people with mental and developmental disabilities has been a federal and state government priority. The state of Ohio has been particularly successful in placing trained individuals in supported employment and in "real world" jobs. Considerable effort and time have been spent providing proper training for people with mental and developmental disabilities. These training efforts have also garnered substantial allocations from state and federal financial resources. Developed over the years, present training methods have most often espoused an observational learning approach to achieve reproduction of specific modeled behaviors. This method is grounded in social learning theory.

Social learning theory, according to Bandura (1977), views human nature as incredible potential constrained only by individual biological limits. Anything people need to learn can be learned through direct experience or indirect observational learning. In 1978, Bandura redefined his
conceptualization of social learning theory, moving from a behavioristic approach to a more cognitive approach that involves "personal factors" in a "reciprocal deterministic" relationship (p. 356). This definition focuses on people forming a concept or cognitive representation of particular actions based on information acquired through direct enactments or observed enactments. These concepts are guides for subsequent performances, as they relate to personal motivational factors typically associated with favorable or unfavorable consequences of the actions. The biological limits of people with mental and developmental disabilities, while somewhat restricted, appear to fall well within the realm of Bandura's incredible potential.

However, current training programs for people with mental and developmental disabilities appear to utilize a behavioristic approach to social learning theory methods. The use of prompts to elicit specific responses and modeling as strict repetition of specific behaviors seem to be standard procedures in current training programs. Past researchers, including the University of Kentucky team of Gast, Wolery and Ault (1988), cite a need for increasing the generalizability of learned behaviors over a greater number of situations. They theorize that increased cognitive learning could increase generalizability. Symbolic coding, especially when trainee-generated, may increase the cognitive learning process.
Symbolic coding occurs, according to Gerst (1971), when trainees transform modeled behaviors into symbolic forms and organize these essential components into familiar and easily recalled concepts. This symbolic coding is identified by meaningful verbal rewording and associations.

This study sought to analyze the communication used to train adults with mental and developmental disabilities for supported and independent employment opportunities. By assessing and statistically evaluating the frequency and type of communicative behaviors utilized in training this population, relationships between the various types of communication used and learning were determined.

This determination was aided by the fundamental concepts of social learning theory, that is, direct reinforcement learning and indirect observational learning. Using social learning theory's fundamental concepts and applying them to training situations, insights into training-effectiveness emerged. These insights, when utilized to train people with mental and developmental disabilities, required an understanding of the population-specific characteristics; attention-span, distractibility, locus of control, expectancy for failure and outerdirectedness. These characteristics were not examined as variables in this particular study because agency evaluations do not assess them. Thus, they were not available to the researcher. Since they do, however,
present a reasonable concern for trainers and training programs for this population, they are reviewed in the theoretical underpinnings of this study.

LITERATURE REVIEW

Social learning theory has developed from the initial psychodynamics of Freud in which human behavior was viewed as being motivated from within by various needs, impulses and instincts (Bandura, 1986). Skinner's radical behaviorism utilized a social learning theory in which behavior was believed to be initiated by specific antecedent stimuli and modified by reinforcing consequent stimuli (Bandura, 1986). Social learning theory, also known as social cognitive theory, most recently adopted an explanation for human functioning that posits a model of triadic reciprocality where behavior, cognition and environmental factors operate to produce learning (Bandura, 1986). This learning process involves two primary types of learning: 1) direct experiential learning through direct reinforcement of behavior, and 2) indirect, observational learning through modeling.

DIRECT/REINFORCEMENT LEARNING

The direct method of learning, fundamentally involving first-hand experience, centers on the success and failure of everyday actions. Through a process of trial and error,
people observe which actions produce desirable consequences and which actions produce undesirable consequences. Over time, positive and negative reinforcement precipitates learning such that actions which produce undesirable effects are discarded and actions which produce desirable effects are retained (Bandura, 1971).

Reinforcement learning, by consequence, is limited to several basic functions. Bandura (1971) defines these basic functions as informative, motivational and reinforcement. The informative function serves to provide factual information that will guide future action by determining outcomes to particular behaviors. By observing responses to their actions, people form hypotheses about which actions are most appropriate for future applications. The motivational function serves to provide experiential expectations about particular behaviors. People are motivated by past consequences to anticipate future consequences. The reinforcing function serves to provide regulation of already-learned behaviors. When a particular behavior is performed and subsequently rewarded, that behavior is increased because of the reward involved regardless of the outcome of the behavior.

In Bandura's classic study (1965), children acted-out aggressive behaviors toward a plastic Bobo doll. Those children who were rewarded or saw no negative consequences of the aggressive behavior exhibited more aggressive
behavior. Those children who were punished exhibited fewer aggressive behaviors.

The intervening influence of cognitive response affects the reinforcing consequences of people who believe from other available information that particular behaviors will be rewarded or punished based on whether those same behaviors were rewarded or punished in the past (Estes, 1972). Bandura took great pains to distinguish between the mechanics of human behavior and the faculty of behavior regulation when he stated that "people do not simply react mechanically to situational influences--they actively process and transform them" (1978, p. 351). This implies that the methods people use to process and transform direct learning may be an indicator of successful methods for indirect learning.

**INDIRECT OBSERVATIONAL/MODELING LEARNING**

Part of the active processing and transformation from direct learning comes from learning through observation or modeling. Learning through trial and error is tedious and sometimes, dangerous. Observational learning provides a method for learning that allows people the benefit of observing various consequences without actually performing the antecedent behavior.

Bandura's "Bobo Doll Study" (1965) produced evidence in support of the effect of observational learning. Children observing models of aggressive behavior towards an
inflatable, plastic doll behaved similarly to the children who had direct experience with the doll. That is, children who saw the modeled aggressive behavior of another child rewarded or unpunished exhibited more aggressive behaviors. Children who saw modeled aggressive behaviors punished exhibited fewer aggressive behaviors.

Bandura (1971) defines four dimensions of the observational/modeling learning as: attentional, retentional, motor reproduction, and motivational. The attentional dimension of modeling requires people to bracket certain characteristics of the modeled behavior and to attend to the important characteristics of the desired behavior. What behavior is modeled, who the model is, how the behavior is demonstrated, and the perceived importance of the modeled behavior can all impact the attentional dimension of observational learning.

The retentional dimension of observational learning concerns itself with the actual ability to remember the modeled behavior. Retention of verbal instruction is increased when observers are given an opportunity to symbolically code the behavior. It is this step in Bandura's (1971) social learning theory framework that is most relevant to this investigation. Observational learning such as modeling produces learning through what is primarily an information-processing function. Observers generally form symbolic representations of the modeled behaviors.
rather than particular stimulus-response associations (Decker, 1980). By coding those symbolic representations, an observer can more easily retain and retrieve the information for future use. Bandura (1971) emphasizes that symbolic coding is not a direct copying activity; instead, observer's impose a personally meaningful organization on the modeled behavior. Hakel & Decker's (1986) study of college freshmen demonstrated that when trainees symbolically coded modeled behaviors, their retention and performance was more accurate than when symbolic coding was not used. And, when the symbolic coding was trainee-generated rather than trainer-generated the trainee's retention and performance was even more accurate. This increase in accuracy was attributed to the actual cognitive process of forming the code (Hakel & Decker, 1986).

The motor reproductive dimension concerns the ability of the observer to transfer symbolic, abstract concepts into realistic representations. The observer must not only pay attention to a modeled behavior and remember it, the observer must then be able to reproduce the behavior.

When verbal descriptions of a desired behavior are unable to accurately demonstrate the intricacies of the behavior, visual observation may be required (Martens, 1975). Gerst's (1971) study had adult subjects observe a filmed model perform difficult motor responses in a range of verbalizability. Four groups of subjects then used various
symbolic activities: summary labeling (personally meaningful verbal labels applied to modeled stimuli); imaginal coding (vivid imagery used to mentally reinforce modeled responses); verbal description (modeled movement described in concrete terms); and control group (performed arithmetic calculations to impede any symbolic coding). The group which symbolically coded the modeled stimuli into meaningful, verbal elements and the group which used imaginal coding achieved a higher level of observational learning. Reproduction of modeled behavior was significantly more accurate for observers who transformed modeled actions into symbolic codes and rehearsed them cognitively than those who did not (Bandura & Jeffery, 1973).

The motivational dimension concerns the outcomes and anticipated outcomes of adopting a modeled behavior. It is not limited to the motivational function in reinforcement learning in which people mechanically continued or discontinued a particular behavior based solely on whether their actions were rewarded or punished. The observational learning concept of Bandura's (1971) motivational dimension includes an evaluative reaction initiated by self-satisfaction that involves a person's primary need for self-esteem.

"In any given instance, then, the failure of an observer to match the behavior of a model may result from
any of the following: not observing the relevant activities, inadequately coding modeled events for memory representation, failing to retain what was learned, physical inability to perform, or experiencing insufficient incentives" (Bandura, 1971 p. 29). Since Bandura (1971) specified the need for adequate coding of modeled events, increasing the effectiveness of an observer's coding process should increase the effectiveness of observational learning.

**OBSERVATIONAL LEARNING IN TRAINING**

Bandura's (1971) notion of observing has been used in training procedures as a matter of routine planning. However, the "coding" process may be an area of concern to researchers as it is a primary tool in methods utilized to teach task and relationship skills through behavior-modeling. These behavior-modeling based methods include: observation of a desired behavior, practicing a desired behavior, social reinforcement of the desired behavior, and exchange of modeling information (Decker, 1984).

The success of behavior-modeling in instructional programming has been documented (Latham & Saari, 1979). Decker's (1980, 1982) work on symbolic coding in behavior modeling training has defined "learning points" which assist an observer in effectively reproducing modeled behavior (see also Meyer & Raich, 1983). These learning points are further defined as: 1) behavioral learning points (graphic detailed behavioral steps); 2) summary label learning points
(meaningful headings for fundamental behaviors); 3) and rule-oriented learning points (the framework undergirding the desired behavior). Decker (1984) found that the use of learning points, in conjunction with observational learning, significantly improved the efficacy of modeling training. This efficacy was enhanced by distinctiveness in coding. Encoding and retrieval were differentiated as subcategories of symbolic coding to determine the effect of coding behavior distinctiveness on generalization and recall. Making key behaviors more distinctive by modeling them out of context or exaggerating them increased their ability to be reproduced from memory. Increased meaningfulness positively affected their generalizability (Mann & Decker, 1984).

In studies using children in observational learning, Asher, Oden & Gottman (1977) defined coaching as a training procedure. Coaching centered on language and verbal instructions to relay important concepts in the formation of desired social behaviors. It was important that the children were given an opportunity to verbalize instructions using language appropriate for their level of intelligence.

To ensure accurate and observer-relevant coding, effort should be made to encourage observers or trainees to generate their own personally relevant codes. Hogan, Hakel & Decker's (1986) study demonstrated the significant affect of trainee-generated coding and trainer-generated coding on
supervisory behaviors. Using twenty first-line hospital supervisors as trainees, participants used either trainee-generated codes or trainer-generated codes to learn specific behaviors. Self-generation of codes presented an effective method of organizing material presented through modeling displays. Self-generation of codes also increased the depth of mental processing and meaningfulness of the codes. In addition, Hogan et al. (1986) state that when the competency of the observer population is in question, certain procedures that permit rewording of rules to facilitate matching behaviors with limited cognitive abilities is recommended. Because this trainee-generated rule coding provides more information processing than trainer-generated codes, it is focal to any study evaluating communication in training programs.

BACKGROUND ON MENTAL AND DEVELOPMENTAL DISABILITIES

Mental disability is assessed through standard intelligence measurement techniques. Substantially low performance on standard intelligence tests such as the Stanford-Binet Intelligence Scale or the Wechsler Intelligence Scale for Children (WISC) resulting in an IQ of 70 or below indicates mental retardation or a mental disability. However, this limit could be extended to include an IQ of 75 or above if behavior is impaired and determined through clinical means to be attributable to deficits in reasoning and judgment (Patton et al., 1986).
While intelligence tests prove to be valuable tools in assessing a person's progress, they are limited in that they measure only those mental abilities that are evaluated in any particular test at any given time. For people with mental disabilities the concept of mental age seems to be more appropriate. Mental age (MA) allows for a longer period of intellectual development in a life span (Robinson, N. & Robinson, H. 1976). The MA is obtained by determining an individual's basal level (the level where all items on a test are passed) and ceiling level (the level where all items on a test are failed) and providing a certain number of months credit for each item passed above the basal level (Patton et al., 1986). People with mental disabilities are often grouped according to their MAs rather than their chronological ages (CAs).

Terman (1916) refined the mental age concept by developing the IQ (intelligence quotient). This IQ computation divides an individual's MA by CA and multiplies it by 100. This allows the IQ, as it pertains to people with mental disabilities, to become a better measure of mental rate of growth than test performance alone (see Table 1.1).

Within these IQ ranges, some further classifications are noted. Grossman (1983) defines four classifications of mental retardation, they are; mild mental retardation, moderate mental retardation, severe mental retardation, and
Table 1.1
Terman's Intelligence Quotient Classifications

<table>
<thead>
<tr>
<th>Terman's Classifications (1937 S-B distribution)*</th>
<th>IQ Range</th>
<th>Wechsler's Classifications (WAIS distribution)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very superior (1.33%)</td>
<td>[160-169]</td>
<td>Very superior (2.2%)</td>
</tr>
<tr>
<td></td>
<td>[150-159]</td>
<td></td>
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<td></td>
<td>[140-149]</td>
<td></td>
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<tr>
<td></td>
<td>[130-139]</td>
<td></td>
</tr>
<tr>
<td>Superior (11.3%)</td>
<td>[120-129]</td>
<td>Superior (6.7%)</td>
</tr>
<tr>
<td>High average (18.1%)</td>
<td>[110-119]</td>
<td>Bright normal (16.1%)</td>
</tr>
<tr>
<td>Normal average (46.5%)</td>
<td>[100-109]</td>
<td>Average (50.0%)</td>
</tr>
<tr>
<td>Low average (14.5%)</td>
<td>[90-99]</td>
<td>Dull normal (16.1%)</td>
</tr>
<tr>
<td>Borderline defective (7.6%)</td>
<td>[80-89]</td>
<td>Borderline (6.7%)</td>
</tr>
<tr>
<td>Mentally defective (0.63%)</td>
<td>[70-79]</td>
<td></td>
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<td></td>
<td>[60-69]</td>
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<td></td>
<td>[50-59]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[40-49]</td>
<td>Defective (2.2%)</td>
</tr>
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<td></td>
<td>[30-39]</td>
<td></td>
</tr>
</tbody>
</table>
profound mental retardation. The characteristics of each classification are overlapping and personal abilities are subject to individual interpretations.

Characteristics of mildly retarded individuals (IQ scores of 50 or 55 to approximately 70) include their ability to be educated. They are almost always able to maintain themselves independently or semi-independently in the community.

Those individuals with moderate retardation (IQ scores from 35 or 40 to 50 or 55) are considered trainable. That is, they are capable of learning self-help, communication, social, and simple occupational skills but are restricted in academic and vocational skills.

Severe mental retardation, often defined as dependent retardation (IQ scores from 20 or 35 to 35 or 40), describes individuals who require continuing and close supervision. They may perform self-help and simple work tasks provided appropriate supervision is available.

Profound mental retardation (IQ scores below 20 or 25), on the other hand, is usually present in combination with other disabilities. While some individuals may be able to perform very simple self-help tasks, the degree of supervision required makes even the most basic of work tasks prohibitive.

Another type of disability that affects the population at issue in this study is identified as a developmental
disability. This identification term refers to a serious chronic disability caused by mental or physical impairments, or some combination of mental and physical impairments. This type of disability is expected to continue over time, substantially limiting major life activity, and requiring special care or treatment over a person's lifetime.

According to Piaget (1969), mental development results from an individual's constant interaction with and adjustments to the environment as it is subjectively perceived. People progress through various stages of development where specific cognitive skills are acquired. These stages include: 1) the sensorimotor stage (from birth to two years of age); 2) the preoperational stage (two to seven years of age); 3) concrete operations (seven to eleven years of age); and 4) formal or abstract operations (eleven years and older).

Experiences involving sensory awareness and motor activity characterize the sensorimotor stage. A child or person at this stage begins to awaken to external surroundings, separating self from other. The preoperational stage surpasses basic physical phenomena. In this stage a child or person becomes a symbol user and imitates observed actions. Classification and codification of the external world occurs in the concrete operations stage. Experiences gained are limited to direct learning consequences. Abstract thinking and more sophisticated
levels of reasoning characterize the final level of development.

People with mental disabilities progress through the same stages of cognitive development as people without mental disabilities. Any differences would pertain to rate of progression and final level achieved (Inhelder, 1968 & Woodward, 1979). Each stage is reached later in the case of people with mental disabilities. The more severe the disability, the later the stage is reached. In some cases, all stages of development may not be achieved. Inhelder (1968) states that people with IQ scores of 50 or 55 to approximately 70 (often classified as mildly retarded) may reach concrete operations, but people with IQ scores of 35 or 40 to 50 or 55 (often classified as moderately retarded) will not usually progress beyond preoperational stages.

One of the factors that changes as all people progress through the cognitive stages of development is attention-span. Zeaman and House (1963) used research to formulate attention theory as it pertains to people with mental and developmental disabilities. Their hypothesis stated that learning problems of people with mental and developmental disabilities are due primarily to attention deficiencies. Although they acknowledged that attention is a multibehavioral process, they identified previous research variables as: 1) the stimulus object; 2) developmental criteria; and 3) characteristics of the research
participants.

Relevant attention research findings for this study included confirmation that once a participant attended to the particulars of a stimulus, those particulars were transferable to other learning situations (Zeaman & House, 1963). Verbalizing the particulars of a task improved performance on the task and verbalizing irrelevant communications interfered with performance on the task regardless of mental age (Milgram & Noce, 1968). Attention deficiencies due to lower mental age may be reduced by effectively manipulating the characteristics of the task. These manipulations could involve the use of exaggeration, descriptions of adverse consequences, humor or other devices to make particular characteristics of the task more meaningful. And, regarding attention theory, Fisher & Zeaman (1973) stated that learning rate was not related to intelligence.

Manipulating the characteristics of the task being trained was a method employed to reduce distractibility. Turnure (1970) has suggested that what appears to be a response to distractions, focusing attention on something other than the task, may be a search for more information. Making the task at hand more interesting and more personally relevant were successful manipulations.

Robinson and Robinson (1965) argued that on difficult tasks or lengthy training sessions, people with mental and
developmental disabilities were not distracted any more or less than people without mental and developmental disabilities. Their performance across all conditions, however, was inferior to the "normal" population.

Because a person's mental development is directly related to their interaction with the environment -- that is, the people and things in the person's immediate surroundings -- informational directions that indicate appropriate behavior in that environment become more important, and training provides this informational direction.

TRAINING PEOPLE WITH MENTAL AND DEVELOPMENTAL DISABILITIES

Learning by direct experience has been dominant in the field of training in general, and in the field of training people with mental and developmental disabilities in particular. Direct experiential learning which controls behavior by systematically manipulating the consequences of the behavior is called operant conditioning (Wallace & Kauffman, 1978). Desirable actions are rewarded and undesirable actions are punished as they occur.

The reinforcement aspect of operant conditioning and social learning theory, as it applies to people with mental and developmental disabilities, requires attention to three aspects. These aspects are locus of control, expectancy for failure and outerdirectedness (Cromwell, 1963).

The locus of control concerns accountability for a
person's behavior. An internal locus of control indicates a personal accountability for behavior. On the other hand, an external locus of control assigns accountability for behavior to persons or things other than the person exhibiting the particular behavior. Children ordinarily progress from a perception of external locus of control to an internal locus of control. People with mental and developmental disabilities tend to remain more externally oriented than those people without disabilities (Mercer & Snell, 1977).

Expectancy for failure concerns the anticipated reinforcement for a particular behavior. One expectation involves whether a negative or positive reinforcement is anticipated. A second expectation results from past experience and creates a generalized reaction to an activity. Because of a high expectancy for failure, due to many past failures, people with mental and developmental disabilities often fall victim to a self-fulfilling prophecy where anticipated failure leads to actual failure (Zigler, 1973).

Problem-solving is limited by expectancy for failure to what Cromwell (1963) terms outerdirectedness. A person who is outerdirected relies on others for behavior cues and guidelines. A high level of outerdirectedness is common among people with mental and developmental disabilities because their frequent past failure severely reduces their
self-confidence (Zigler, 1966).

While these aspects are important in the development of training programs and procedures for people with mental and developmental disabilities, their influence was not assessed in this study as pertinent data was not available to the researcher. One area in which these aspects could impact this study focuses on the importance of training programs that utilize symbolic coding which includes past accomplishments and successes (Mercer & Snell, 1977). By reinforcing past successes, the locus of control is more internally focused. Expectancy for failure is reduced by framing the new task in terms of previously successfully learned tasks. And, the level of outerdirectedness is reduced by increasing self-confidence.

Research using observational techniques for people with mental and developmental disabilities is limited. Recently, studies such as those cited below have revolved around procedures using a system of least prompts. The system of least prompts categorizes prompting or assistance according to the level of involvement required between the trainer and trainee (see Appendix B). These prompts are antecedent and consequent stimuli, are presented in conjunction with task instructions, and require specific responses. Instructional prompts are usually repeated verbatim until the correct response is given. Prompts requiring physical assistance or hand-on-hand guidance are the most involved prompts. Verbal

21
cues or instructions are the next most involved prompts. A modeling prompt may be given in conjunction with a verbal prompt or may occur separately. Modeling as a separate prompt is less involved than when paired with a verbal instruction, and motivational prompts are the least involved of the prompts.

The goal of the system of least prompts is to gradually withdraw the prompts, moving from the most involved to the least involved, until a trainee can perform a specific behavior without any prompts (Connis et al., 1981; Patton et al., 1986).

Using the system of least prompts and related observational techniques, recent studies have demonstrated that observational learning is a method often used for training adults with mental and developmental disabilities. Foss, Auty and Irvin (1989) compared modeling (a model demonstrates a behavior and observers reproduce it), problem-solving (observers discuss a situation to determine alternatives and consequences), and behavior rehearsal (observer responses are modified so that only desired behaviors are rehearsed). In their study, which involved teaching employment-related interpersonal skills to 122 high school students with mild mental retardation, Foss et al. (1989) concluded that modeling or observational learning was not as effective by itself as it was when combined with more involved cognitive processes. Problem-solving was the most
successful of the three methods evaluated for dealing with problems with supervisors (such as criticism, requesting assistance and following instructions) and problems with co-workers (such as work cooperation, teasing and ridicule, and other areas of personal concern). The study further suggested that problem-solving was not routinely used as a training procedure for people with mental and developmental disabilities because it required a more advanced level of social competence. When combinations of the three methods were examined, modeling combined with problem-solving was substantially more effective at producing learning. While modeling provided the "how," problem-solving provided the "why."

Problem-solving approaches to observational learning allow for generalization of the learned behavior over a greater number of situations (Hughes & Rusch, 1989). This increases a trainee's independence and ability to perform tasks which may come up in an employment environment. Employment is a dynamic process, constantly changing, and requiring employee adaptability to changing jobs, people, procedures and environments (Agran, Fodor-Davis & Moore, 1986). Problem-solving allows the trainee to symbolically code the modeled behavior which, in turn, increases the learning impact (Decker, 1984; Hakel & Decker, 1986). This problem-solving/modeling approach, also referred to as self-instruction/modeling (Park & Gaylord-Ross, 1989; Hughes &
Rusch, 1989), may be effective as a training method for both task instruction and social skill development in sheltered workshops and field site environments.

In a follow-up study on employees with mental and developmental disabilities after six years of employment, a consumer's skill before job placement was less important than his/her ability to generalize across tasks (Wehman et al., 1985). Ability to generalize from observational learning by communicative interacts that facilitate trainee-generated symbolic coding of desired behaviors has resulted in incidental learning in others when performed in a group setting (Doyle et al., 1990). This presents the possibility of trainees teaching other trainees by chunking modeled behaviors into manageable concepts for easier learning.

Observational/modeling demonstrations, in combination with the use of symbolic learning points, facilitated increased reproduction and generalization of the modeled behavior (Decker, 1984). Trainees should not be restricted to trainer-generated coding for modeled behaviors. Rather, trainees should be instructed to implement their own symbolic coding of a desired, modeled behavior and to have that trainee-generated code reinforced.

Hogan et al.'s (1986) study showed that if the trainee's competence is questionable, trainers should provide rules and information to fit a particular trainee's "individual cognitive framework" (p. 473).
Trainee-generated symbolic coding may be critical to training programs for people with mental and developmental disabilities. This population requires a greater level of concentration in learning task-related behaviors and social skill development. Training programs for people with mental and developmental disabilities center on observational/modeling procedures that are designed to evoke a given response to specific question prompts. Communicative interacts between trainee and trainer, as indicated in training manuals, restrict communication to particular programmed responses (Connis, Sowers & Thompson, 1978, 1981; Froman, Johnson, Schaafsma, Talarico, Byrne & Lemly, 1982). Manuals used to train people with mental and developmental disabilities do not appear to encourage symbolic coding of desired behaviors (Connis et al., 1981; Froman et al., 1982).

The utility of symbolic coding mechanisms for the retention and reproduction of observationally-learned simple and complex motor behavior has been conclusively demonstrated (Bandura & Jeffery, 1973; Gerst, 1971). In fact, Bandura (1977) has even stated that it is virtually impossible to find accurate behavior reproductions that are not cognitively represented in memory retention. Bandura (1977) further argued for the importance of symbolic coding schemas congruent with the existing mental structure of the observer. Trainer-generated coding would not be devoid of
meaning and would presumably facilitate retention and thus some degree of observational learning on the part of trainees. However, trainee-generated coding requiring that each trainee independently generate, in his/her own words and symbols, meaningful relationships between the task being trained and some previously accomplished task, may be an even more effective method for what Bandura (1977) describes as transforming the new into the familiar.

Since research appears to indicate that trainee-generated symbolic coding may increase the effectiveness of observation/modeling as a learning tool, it seemed prudent to assess the role it played in the types of communication used to train people with mental and developmental disabilities. It is in this light that the present study was conducted.
RESEARCH QUESTIONS

RQ1. What is the frequency and type of communication that occurs in training people with mental and developmental disabilities?

RQ2. Is there a relationship between the frequency and type of communication used in training people with mental and developmental disabilities and a trainee's rate of learning?

RQ2a. Is there a relationship between trainee-generated communication and a trainee's rate of learning?

RQ2b. Is there a relationship between trainer-generated communication and a trainee's rate of learning?

RQ2c. Is there a relationship between the use of symbolic coding and a trainee's rate of learning?

RQ3. Is there a relationship between the frequency and type of communication used in training people with mental and developmental disabilities and a trainee's work eligibility?

RQ3a. Is there a relationship between trainee-generated communication and a trainee's work eligibility?

RQ3b. Is there a relationship between trainer-generated communication and a trainee's work eligibility?

RQ3c. Is there a relationship between the use of symbolic coding and a trainee's work eligibility?
Definition of terms:

Communication- any single verbal or nonverbal concept generated by a trainer or trainee that conveys information about task or attitude (this may include a cluster of unbroken comments about the same instructional or attitudinal concept)

Rate of learning- determined by the trainer of each task of behavior. It will be indicated on a scale of one to five with one representing a trainee who learned much more slowly than anticipated, two represents a trainee who learned somewhat more slowly than anticipated, three represents a trainee who learned as anticipated, four represents a trainee who learned somewhat more quickly than anticipated, and five represents a trainee who learned very much more quickly than anticipated.

Verbalized symbolic coding- trainee or trainer generated rewording of instructions or descriptions of any part of a new task or behavior that makes the concept more meaningful or more familiar

Work eligibility- offered employment or recognition by trainers that a trainee has learned the skills necessary to be assigned to a particular job
Subjects

The sample population consisted of all trainees enrolled in initial training programs at the Adult Services Program of the Board of Mental Retardation and Developmental Disabilities in a large Midwestern county and their program trainers. Trainees included enrollees in both sheltered workshop settings (jobs located in county-run shop facilities and supervised by county personnel) and employment services (jobs located at actual jobsites outside county facilities but supervised by county personnel).

Prerequisite skills for participation in this study were designed to recruit participants with appropriate communication skills. These communication skills included: 1) verbal ability such that the primary method of communication is speech, 2) hearing ability such that the primary method of instruction is through verbalized instruction, and 3) visual ability such that modeled behaviors would be effective in instructions.

Eight hundred informational letters, which included tear-off permission slips, were distributed through the county Adult Services department of the Board of Mental and Developmental Disabilities to all enrolled consumers. "Consumer" is the official identification term used to
describe participants in any of the board's programs.
Seventy-two affirmative permission slips were returned to
various facility managers. Of those seventy-two potential
trainees, nine were eliminated because they failed to meet
the criteria above. The remaining sixty-three were eligible
for the study. Of those, twenty-six were observed in a
total of thirty-nine task training sessions which utilized
nine different trainers. The data collection occurred over
a six month period.

Eleven male trainees were observed ranging in
chronological age from twenty-seven to sixty years of age.
IQ ranges, based on Full Scale IQ scores, for the eleven
male trainees were between thirty-eight and sixty-five.
Three of the male trainees were enrolled in the agency's
employment services program and were already working in
"real world" employment environments. Their new task
training involved window washing using a window squeegee
process. Other trainees were trained on sheltered workshop
jobs involving various product packaging.

The remaining participants in the study included
fifteen female trainees learning new sheltered workshop
jobs. Their chronological ages ranged from twenty-six to
sixty-seven years of age. IQ ranges, based on Full SCale
IQ, for the fifteen female trainees ranged from thirty-three
to seventy-six. All of the female consumers were enrolled
in the sheltered workshop program. However, two of the
female trainees were going to be promoted to an employment services hotel laundry job shortly after these data were collected.

All assessments of intellectual abilities and verbal, hearing and visual ability were conducted by licensed psychologists as recorded on the official Individual Source Document for Supplemental Information on file with the adult services department. No IQ restrictions were made for this study. Previously stated criteria on communication skills needed for eligibility in this study presented an acceptable sample population.

**Instrumentation**

A tally sheet (See Appendix A) was developed by the researcher to facilitate efficient coding and transcribing of the frequency and type of communications which occurred during the individual training sessions.

The tally sheet layout was determined as a result of a pilot study. The layout required appropriate spaces for participant identification, IQ information, task description, rate of learning scale, work eligibility assessment, coded and transcribed communication, and totals for each type of communication being studied.

Guide sheets with coding categories explained below were used to train coders to classify the audiotaped communications into symbolic coding, appropriate categories according to trainer-generated types of prompts, or other
trainee-generated types of communication (See Appendix B).

In the pilot study, interrater reliability was assessed at 98.9% across categories for directive, verbal instruction, motivational prompt, modeling, and physical assistance. Two coders were trained for the pilot study. One of the coders was a graduate teaching assistant in the communication department at a Midwestern university. The second coder in the pilot study was a former college instructor with a background in the health-care industry. Both coders had experience that provided a sensitivity to the importance of communication in instructional settings.

A two hour training session was held, the coding guide in Appendix B was discussed and numerous examples of each code were provided. Audiotapes from the pilot study were coded using only the prompts listed in Appendix B. The only areas of nonagreement involved the categories of DIRECTIVE and VERBAL INSTRUCTION. It was reiterated that a directive should indicate a complete task or job to be performed. A verbal instruction should indicate a description of how to carry out some detail of the directed task. An example of a directive would be, "Sweep the floor." A directive would be followed, at some point, by a verbal instruction such as, "Push the broom forward...hold the dustpan tightly against the floor...pick up all the dirt, etc."

After the discussion and reiteration of the categories, a sample of fifty communications was coded and transcribed
from the audiotapes. This sample of fifty communications included fifteen from the first trainings observed, twenty from the trainings observed in the middle of the study, and fifteen communications which occurred in the last of the observed trainings. It was this sample that yielded the 98.9% interrater reliability.

For the pilot study, codes included:

- directive (a command to perform a task, i.e., "Sweep the floor."

- verbal instruction (verbalized description of a particular step of the task to be performed, it may be an isolated comment or an unbroken cluster of comments about the same concept, i.e., "Push the broom forward...keep going...keep going...forward."

- modeling (demonstration of the physical movements needed for task completion, i.e., "Push the broom like this." Indicated by one tapping sound on the audiotape.

- physical assistance (demonstration of task by physically guiding trainee through the mechanics of task, i.e., "Push the broom harder" while pushing trainee's hands. Indicated by two tapping sounds on the audiotape.

- symbolic coding (instruction is reworded to associate with a previous task or learned behavior, i.e.,
"This is like...remember when you/I...this reminds me of...

Other categories for trainee-generated communication were added to the prompt and symbolic coding categories by the researcher to accomplish exhaustive categories. These coding procedures have not been found in any available research literature. They include the following trainee communications explained in more detail below:

- S for symbolic coding by trainee
- ? for questions about task
- R for direct repetition of trainer comments
- C for comments about task being trained
- O for comments about nontask topics

Interrater reliability for symbolic coding, directives, verbal instruction, motivational prompt, modeling and physical assistance was calculated using the Holsti (1969) formula for determining the reliability of nominal data. This method used a point-by-point method in which the number of coding decisions on which the two coders agree was divided by the total number of coding decisions (agreements plus disagreements) and multiplied by 100.

The Holsti (1969) formula was also used to calculate reliability on all added trainee-generated training codes. A sample of fifteen trainee-generated communications was selected, some from the beginning of the observed trainings, some from the middle and some from the end. A 98%
reliability was assessed on the trainee-generated codes.

Past research on symbolic coding produced interrater reliability of 89% in studies involving motor reproduction and generalization (Decker, 1984). In Gerst’s (1971) study on symbolic coding and observational learning, interrater reliability was 90% for symbolic codes with high verbal items (modeled movements that can easily be verbalized) and 91% for symbolic codes of low verbal items (modeled movements that are difficult to verbalize).

The prompt categories in Appendix B were used in training manuals for people with mental and developmental disabilities. These categories have been used in studies where they were defined as types of prompts used to train people with mental and developmental disabilities. These studies, while not especially relevant to the topic of this study, emphasized the reliability of the coding categories employed in this study.

In a study of time delay in teaching sight words to students with mental and developmental disabilities, the categories were used as a system of prompts (Gast, Ault, Wolery, Doyle & Belanger, 1988). Wolery, et al. (1988), use a hierarchy of the categories according to their intrusiveness. Least intrusive was a directive, followed by verbal instruction, followed by modeling, followed by physical guidance. Motivational prompts were used when appropriate at any time. Mean percentages of agreement on
coding the categories for four students were 99.5%, 99.9%, 99.5%, and 100%. In a study on time delay and system of least prompts teaching manual sign production to students with varying degrees of mental disability, the reliability estimates were 100% (Bennett, Gast, Wolery & Schuster, 1986). In a comparison study of the time delay and the system of least prompts in teaching tasks with multiple steps, the mean percentages of agreement were 99.6%, 99.8%, 98.2% and 99.3% (Wolery, Ault, Gast, Doyle & Griffen, 1990). Another study sought to determine the effectiveness of gestural (motivational) prompts, verbal (instruction) and physical guidance prompts as a function of type of task. Interrater reliability percentage was 99% (Hourcade, 1988). Thus, this category system has been reliable across many tests.

Trainee rate of learning was assessed in the field by trainers computing an anticipated normative time required to learn a task. By then comparing this anticipated normative time to the approximate time a specific trainee took to learn the task, a trainee's rate of learning was determined.

IQ scores, as a gauge for degree of mental growth, were indicated on the Individual Source Document for Supplemental Information as IQ Full Scale Scores. Levels of mental retardation and corresponding IQ scores were defined by professional staff (See Appendix C).

While IQ scores vary in their stability as an
indication of intelligence, in scores for people with mental and developmental disabilities, the lower the IQ score the greater the stability (Madge & Tizard, 1980). Goodman and Cameron (1978) studied 289 children with mental and developmental disabilities. After repeated testing, the retest correlation for those who originally scored 80 or above was .32 for boys and .17 for girls; for those who scored between 48 and 79, the retest correlation rose to .70; and for those scoring below 48, the retest correlation was .86. In another study on Stanford-Binet scores with a similar population, less than 8 percent of the sample changed their IQ scores by 10 points or more for a correlation of .85 (Silverstein, 1982). Thus, Full Scale IQ scores for this population are a reasonable indicator of approximate actual intelligence.

Procedure

Data was collected in a natural field setting of sheltered workshops, work enclaves and competitive employment sites. Initial trainings were selected to increase the likelihood of observing unaided cognitive processing and original verbal communication. There was evidence that an observer's presence may alter the behavior of research subjects, even over a long period of time (Grimm, Parsons & Bijou 1972; Paul, 1963 in Patterson, 1982). However, the social competence level of the trainees most likely reduced their attempts to alter their
communication. In past research, however, parents and teachers were able to make their children "look good" on command for researchers (Lobitz and Johnson 1975; Weinrott, Jones and Boler, 1977) and attempts may be made by trainers to make trainees appear more or less competent. However, as Patterson (1982) stated, when abusive mothers were observed, they still hit their children more than nonabusive mothers, regardless of the fact that they were being observed. An observation duration of more than six months provided opportunity for genuine communication situations as opposed to staged situations, thus increasing the internal validity of the study.

Internal validity was increased by the randomization of the 39 observed task trainings. Data was collected on different shifts, at different facilities and job sites over a six month time period. While convenience sampling posed some limitations, twenty-six trainees and nine trainers observed in thirty-nine naturally occurring training situations should have randomly distributed any variance caused by unobserved training communication.

All communication used in the training sessions was tape recorded on a hand held tape recorder. The researcher used a mechanical device (a pen or pencil) to "tap" on the recorder to indicate that modeling or physical assistance occurred. One "tap" signified modeling, and two "taps" signified physical assistance.
The tally sheet, as described above, was used to code taped communication from the recorder. The same two coders utilized in the pilot study classified communication from the tape into categories on the tally sheet. Reliability checks were made throughout the training session to ensure interrater reliability. Thirty-three communications which were randomly selected from the first of the trainings were checked for interrater reliability. Thirty-four communications were likewise selected from the trainings which occurred in the middle of the data collection period. And, thirty-three communications were checked from the last of the observed trainings. Using the Holsti (1969) formula, the interrater reliability on the codes used for this study was 94%.

For statistical analysis, the variable of intelligence, as a possible confound, was taken from agency documents as described above. Trainers were verbally asked by the researcher to assess the rate of learning on a one to five scale and to indicate whether or not the participant would be hired for the job on which they had just been trained.

Data Analysis

As mentioned above in the definition of terms, the unit of analysis for communication was interpreted to mean a thematic utterance. That is, the communication could have consisted of a sentence or phrase concerning some concept of the task being trained, or a it could have consisted of an
unbroken cluster of comments about some concept of the task being trained. A thematic utterance concluded when a different task concept was introduced into the communication or a pause in the communication occurred.

Frequencies provided information about the number of each type of communication used in the training programs. Multiple regression analyses assessed the relationships between all types and number of communications which occurred and a trainee's rate of learning. Using a regression analysis allowed the development of a prediction equation for rate of learning. The independent variables of types of communication were then collapsed into trainee-generated communication and trainer-generated communication for separate multiple regression analysis. IQ was also included in the regression analysis since it may have been a potential confounding variable with rate of learning.

Since work eligibility data was nominal level, Chi Square tests were used. Chi square tests were conducted for number and type of communication on work eligibility. The impact of the communication when collapsed into categories of trainee-generated communication and trainer-generated communication on work eligibility were also analyzed by Chi Square tests. A Likelihood Ratio was computed on each Chi Square test since there were fewer than twenty in each cell.
CHAPTER 3

RESULTS

Sample Demographics

Of the twenty-six consumers observed in the thirty-nine task training, eleven were male and fifteen were female. All but three of the consumers in the sample were enrolled in the sheltered workshop program of a Midwestern county Board of Mental and Developmental Disabilities. Those three consumers not enrolled in the sheltered workshop were enrolled in the employment services program.

With respect to IQ, forty-one percent of the sample was in the thirty-three to forty-three range, thirty-six percent of the sample was in the forty-four to fifty-four range, and twenty-three percent of the sample was in the fifty-five to seventy-six range. The mean IQ for the sample was 48.56 with a standard deviation of 11.66.

RESEARCH QUESTIONS

The first research question examined the frequency and type of communication that occurred during training sessions for people with mental and developmental disabilities. The second research question examined the relationship between the frequency and type of communication used in those trainings and a trainee's rate of learning. The generation of that communication was also examined to see if there was a relationship between trainee-generated communication or
trainer-generated communication and a trainee's rate of learning. The second research question further examined the relationship between the incidence of symbolic coding which occurred in the training sessions and a trainee's rate of learning.

The third and final research question examined the relationship between the frequency and type of communication used in those trainings and a trainee's work eligibility. Also examined was the relationship between the generation of the communication, by the trainer or trainee, and a trainee's work eligibility. The final relationship examined by research question three concerned the incidence of verbal symbolic coding which occurred in the training sessions and a trainee's work eligibility.

**Research Question One**

RQ1. What is the frequency and type of communication that occurs in training people with mental and developmental disabilities?

In order to assess RQ1, descriptive statistics were run on all the data for communication which occurred in the training sessions. The statistical mean reported here refers to the average number of times that a particular type of communication occurred in the training sessions. There was a total of 2152 communications observed in the training sessions overall. The mean for total communications was 55.18 with a minimum of ten communications in one of the
training sessions and a maximum of 124 in another training session.

Training sessions lasted for approximately thirty minutes. However, because training was combined with other trainer responsibilities, "real time" for the length of the session was not a realistic indicator of a trainee's rate of learning. Some training was interrupted after only ten minutes and some training continued for almost an hour. Trainee characteristics also influenced the training time.

Verbal instructions occurred most often (mean 23.03) in all of those trainings, and task-related questions asked by the trainee occurred least often (mean .54). See Table 3.1 for results.

Frequencies indicated the percentage of trainings in which each type of communication occurred. In evaluating the meaningful communication which occurred, that is, after eliminating unintelligible communications, trainee-generated questions were involved in the fewest percentage of trainings (31%). Verbal instructions were involved most frequently in the largest percentage of trainings (100% of the trainings). As opposed to a descending order of occurrence, frequency results are reported below in the order of their meaningfulness to this study. This order will be followed as the results are discussed below.

Trainer-generated communication

Twenty-seven (69%) of the trainings observed reported
### Table 3.1
Variable Descriptives

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trainer-generated</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal instruction</td>
<td>23.03</td>
<td>16.73</td>
</tr>
<tr>
<td>Motivational prompt</td>
<td>7.21</td>
<td>5.38</td>
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<td>Trainer questions</td>
<td>4.87</td>
<td>5.42</td>
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<tr>
<td>Modeling prompt</td>
<td>4.62</td>
<td>4.53</td>
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<tr>
<td>Physical assistance</td>
<td>1.97</td>
<td>3.30</td>
</tr>
<tr>
<td>Directive</td>
<td>0.87</td>
<td>0.52</td>
</tr>
<tr>
<td>Symbolic Coding</td>
<td>0.62</td>
<td>1.31</td>
</tr>
<tr>
<td>Unintelligible/trainer</td>
<td>0.03</td>
<td>0.16</td>
</tr>
<tr>
<td><strong>Trainee-generated</strong></td>
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<td></td>
</tr>
<tr>
<td>Trainee task comm.</td>
<td>8.05</td>
<td>7.31</td>
</tr>
<tr>
<td>Trainee nontask comm.</td>
<td>1.87</td>
<td>4.72</td>
</tr>
<tr>
<td>Trainee repetitions</td>
<td>1.03</td>
<td>2.32</td>
</tr>
<tr>
<td>Trainee questions</td>
<td>0.54</td>
<td>1.05</td>
</tr>
<tr>
<td>Unintelligible/trainee</td>
<td>0.49</td>
<td>1.07</td>
</tr>
<tr>
<td>Symbolic Coding</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Total communications</strong></td>
<td>55.18</td>
<td>32.17</td>
</tr>
</tbody>
</table>
no incidence of symbolic coding (mean .62). Only two (5%) of the trainings included the use of more than two symbolically coded communications. Seven (18%) trainings evidenced the use of one symbolically coded communication and the remaining three (8%) trainings reported the use of two of them.

There were eight (20%) trainings that used no directives (mean .87), that is, no overall description of the task being trained. Twenty-eight (72%) of the trainings included one directive, while three (8%) included two directives.

Twelve (31%) of the trainings involved less than four motivational prompts (mean 7.21), while thirteen (33%) involved between four and eight motivational prompts. Only five (13%) of the trainings indicated the use of between fifteen and nineteen motivational prompts.

Seventeen (44%) trainings utilized less than four modeling prompts (mean 4.62). Fifteen (38%) trainings contained between four and six modeling prompts. Two (5%) of the trainings indicated the more frequent use of modeling prompts, twelve in one training and twenty-six in the other.

Verbal instructions were the most frequently used prompts. Sixteen (41%) trainings involved the use of sixteen or less verbal instructions. Between nineteen and thirty-seven verbal instructions occurred in seventeen (44%) of the trainings. And six (15%) of the trainings involved
the use of between forty-eight and sixty-six verbal instructions.

Verbal questions from the trainer (mean 4.87) as an instructional prompt were less frequent than the verbal instructions in statement form. While six (15%) trainings demonstrated between eleven and twenty-three verbal questions, twenty (51%) trainings indicated the use of less than three. An even third (33.3%) of the trainings showed between four and nine verbal questions.

The prompt requiring the most involvement between a trainer and a trainee, physical assistance (mean 1.97), was absent from twenty-one (54%) of the trainings. Eight (20%) of the trainings had an incidence of one or two physical assistance prompts, with the remaining ten (26%) trainings having between four and seventeen of the involved prompts.

**Trainee-generated communication**

The number of trainee-generated task-related comments (mean 8.05) was widely dispersed. Twenty-one (54%) of the trainings contained five or fewer of these comments. Twelve (31%) indicated the use of between seven and twelve trainee task comments, and six (15%) of the trainings involved between fifteen and thirty-five.

Direct verbatim repetitions of trainer communication (mean 1.03) made by the trainee were infrequently used. Thirty (77%) of the trainings had no incidence of them. Four (10%) of the trainings had three or less and five (13%)
had between four and eleven of the repetitive statements.

Similarly, nontask-related comments by the trainee (mean 1.87) were not common. Twenty-six (67%) of the trainings had none occurring. Ten (26%) had between one and four nontask-related comments from the trainee, and three (8%) of the trainings involved the use of seventeen or eighteen of them.

Trainees asked task-related questions (mean .54) on a very limited basis. In twenty-seven (69%) of the trainings, no trainee-generated questions were asked. In the remaining twelve (31%) trainings, between one and four were asked.

A small number of communications which occurred were rated as unintelligible by the coders. These involved a total of ten (26%) trainings. Nine of these trainings contained between one and five trainee-generated unintelligible communications (mean .49) and one training session involved a trainer-generated unintelligible communication (mean .03).

Research Question Two

RQ2. Is there a relationship between the frequency and type of communication used in training people with mental and developmental disabilities and a trainee's rate of learning?

The multiple regression analysis was computed with independent variables of IQ, physical assistance, trainee verbatim repetitions, trainee nontask comments, verbal
questions from the trainer and unintelligible trainee communications in the equation and rate of learning as the dependent variable. IQ, of course, was a predictor of rate of learning, such that a higher IQ predicted a faster rate of learning. When trainers used more physical assistance prompts and trainees made more nontask-related comments or verbatim repetitions in the trainings, the trainers tended to assign them a slower rate of learning. No other variables entered into the equation. The alpha level was set a priori at p<.05. Multiple R squared was .55. Following repeated attempts to manipulate the variables into different groupings and to change the order in which they entered, the results remained the same and can be seen in Table 3.2.

RQ2a. Is there a relationship between trainee-generated communication and a trainee's rate of learning?

All trainee-generated communication was grouped together as one variable and run in a regression analysis with trainer-generated communication and IQ on the dependent variable of rate of learning. The multiple regression reported no significant relationship between the occurrence of trainee-generated communication in trainings and a trainee's rate of learning. Trainee-generated communication did not enter into the equation. However, IQ entered in the equation and was significant (F=16.00, df=1, 37, p=.00). Multiple R squared was .30.
Table 3.2
Multiple Regression Analysis
for
types of communication on rate of learning

Variables in the Equation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Beta</th>
<th>F</th>
<th>Sig F</th>
<th>R</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ</td>
<td>.32</td>
<td>5.72</td>
<td>.02</td>
<td>.30</td>
<td></td>
</tr>
<tr>
<td>Physical Assistance</td>
<td>-.42</td>
<td>10.70</td>
<td>.00</td>
<td>.14</td>
<td></td>
</tr>
<tr>
<td>Trainee repetitions</td>
<td>-.28</td>
<td>4.00</td>
<td>.05</td>
<td>.02</td>
<td></td>
</tr>
<tr>
<td>Trainee nontask comm.</td>
<td>.33</td>
<td>4.21</td>
<td>.05</td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td>Trainer questions</td>
<td>.20</td>
<td>2.54</td>
<td>.12</td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td>Unintelligible /trainee</td>
<td>-.19</td>
<td>1.49</td>
<td>.23</td>
<td>.02</td>
<td></td>
</tr>
</tbody>
</table>

Overall F= 6.50
Significance=.001
df= 6, 32
RQ2b. Is there a relationship between trainer-generated communication and a trainee's rate of learning?

All trainer-generated communication was grouped together as one variable and run in a regression analysis with trainee-generated communication and IQ on the dependent variable of rate of learning. The multiple regression reported no significant relationship between trainer-generated communication which occurred during training and a trainee's rate of learning. Trainer-generated communication did not enter into the equation. However, IQ entered in the equation and was significant ($F=16.00$, $df=1, 37$, $p=.00$). Multiple R squared was .30.

RQ2c. Is there a relationship between the use of symbolic coding and a trainee's rate of learning?

No significant relationship was found between the use of symbolic coding in trainings and a trainee's rate of learning. In the multiple regression, symbolic coding did not enter into the equation. As was mentioned above and shown in Table 3.2, other variables entered in the equation and were significant ($F=6.50$, $df=6, 32$, $p=.00$). Multiple R squared was .55.

Research Question Three

RQ3. Is there a relationship between the frequency and type of communication used in training people with mental and developmental disabilities and a trainee's work eligibility?
Due to the nominal level measurement of a trainee's work eligibility Chi Square tests were utilized as described in Chapter 2. No significant results emerged from the Chi Square test on the number of directives used in the trainings and a trainee's work eligibility (Likelihood Ratio $x^2 = .24$, df=2, p=.89). See Table 3.3 for results.

Motivational prompts used in training produced no significant results in the Chi Square test on a trainee's work eligibility (Likelihood Ratio $x^2=1.45$, df=3, p=.69). See Table 3.4 for results.

No significant results were found in the Chi Square test on the relation of the number of modeling prompts used in the training on a trainee's work eligibility (Likelihood Ratio $x^2=2.32$, df=3, p=.51). For results see Table 3.5.

Regarding the number of verbal instructions from the trainer, no significant results were found in the Chi Square test of verbal instruction incidence on a trainee's work eligibility (Likelihood Ratio $x^2=1.40$, df=2, p=.50). See Table 3.6 for results.

Verbal questions pertaining to task instructions produced no significant results in a Chi Square test of their impact on a trainee's work eligibility (Likelihood Ratio $x^2=.98$, df=2, p=.61). For results see table 3.7.

The impact of the number of physical assistance prompts used in training on a trainee's work eligibility, as reported in a Chi Square test was not significant for the
Table 3.3

Crosstabs

DIRECTIVES by WORK ELIGIBILITY

<table>
<thead>
<tr>
<th>DIRECTIVES</th>
<th>WORK ELIGIBILITY</th>
<th></th>
<th></th>
<th>Row Total</th>
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<td>(no)</td>
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<td>3</td>
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</tbody>
</table>

<table>
<thead>
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<th>12</th>
<th>39</th>
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</thead>
<tbody>
<tr>
<td>Total</td>
<td>69.2</td>
<td>30.8</td>
<td>100.0</td>
</tr>
</tbody>
</table>

| Likelihood Ratio | .24 | 2 | .89 |

52
Table 3.4
Crosstabs

MOTIVATIONAL PROMPTS by WORK ELIGIBILITY

<table>
<thead>
<tr>
<th>MOTIVATIONAL PROMPTS</th>
<th>Count</th>
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<th>Total</th>
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<td>3</td>
<td>13</td>
</tr>
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<td>3</td>
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<td>4</td>
<td>9</td>
</tr>
<tr>
<td>(15-19 used)</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>5</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>39</td>
</tr>
</tbody>
</table>

Column Total: 69.2 30.8 100.0

Likelihood Ratio: 1.45 3 .69
### Table 3.5

Crosstabs

**MODELING by WORK ELIGIBILITY**

<table>
<thead>
<tr>
<th>WORK ELIGIBILITY</th>
<th>Count</th>
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<th>(no)</th>
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</tr>
</thead>
<tbody>
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<td>3</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12.8</td>
</tr>
<tr>
<td>(11-26 used)</td>
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<td>1</td>
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</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>5.1</td>
</tr>
</tbody>
</table>

| Column           | 27    | 12    | 39   |
| Total           | 69.2  | 30.8  | 100.0 |

| Likelihood Ratio | 2.32  | 3     | .51  |
Table 3.6

Crosstabs

<table>
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<th>VERBAL INSTRUCTIONS</th>
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<th>(no)</th>
<th>Row Total</th>
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<td>16</td>
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<td>17</td>
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<td>12</td>
<td>39</td>
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</tbody>
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<table>
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<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood Ratio</td>
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</tbody>
</table>
Table 3.7
Crosstabs

VERBAL QUESTIONS/TRAINER by WORK ELIGIBILITY

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<th></th>
<th></th>
</tr>
</thead>
<tbody>
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<td>(no)</td>
<td>Row</td>
<td>Total</td>
</tr>
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<td>VEDRBAL QUESTIONS</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0-3 used)</td>
<td>1</td>
<td>14</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>(4-9 used)</td>
<td>2</td>
<td>8</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>(11-23 used)</td>
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<td>5</td>
<td>1</td>
<td>6</td>
</tr>
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<td>Column</td>
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<td>12</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>69.2</td>
<td>30.8</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

value    df    p
Likelihood Ratio  .98    2    .61
the Likelihood Ratio. It did, however, produce significant results for the Mantel-Haenszel test for linear association ($x^2=4.75$, df 1, p=.03). This resulted in a trend where the use of more physical assistance prompts in trainings produced a greater likelihood of a trainee not being hired for the job. For results see Table 3.8.

No significant results emerged from the Chi Square test of trainee-generated task comments on a trainee's work eligibility (Likelihood Ratio $x^2=1.78$, df=2, p=.41). See Table 3.9 for results.

The number of direct verbatim repetitions of any part of trainer-generated verbal instructions used in training, produced no significant impact on a trainee's work eligibility as determined by a Chi Square test (Likelihood Ratio $x^2=.26$, df=2, p=.88). See Table 3.10 for results.

No significant results emerged from the Chi Square test of nontask-related comments made by trainees on their work eligibility (Likelihood Ratio $x^2=2.39$, df=2, p=.30). See Table 3.11 for results.

The incidence of trainees asking task-related questions in trainings produced no significant results on a trainee's work eligibility as evidenced in a Chi Square test (Likelihood Ratio $x^2=.94$, df=1, p=.33). See Table 3.12 for results.
Table 3.8

Crosstabs

PHYSICAL ASSISTANCE by WORK ELIGIBILITY

<table>
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</thead>
<tbody>
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<td>-------</td>
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<td>PHYSICAL ASSISTANCE</td>
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</tr>
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<td>(0 used)</td>
<td>1</td>
</tr>
<tr>
<td>(1-2 used)</td>
<td>2</td>
</tr>
<tr>
<td>(4-17 used)</td>
<td>3</td>
</tr>
<tr>
<td>Column</td>
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</tr>
<tr>
<td>Total</td>
<td>69.2</td>
</tr>
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</table>

value  df  p
Likelihood Ratio  5.24  2  .07
### Table 3.9

Crosstabs

**TRAINEE COMMENTS/TASK** by **WORK ELIGIBILITY**

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<th></th>
<th>Total</th>
</tr>
</thead>
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<tr>
<td></td>
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<td>(no)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0-5 used)</td>
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<td>8</td>
<td>21</td>
</tr>
<tr>
<td>(7-12 used)</td>
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<td>10</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
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<td>6</td>
</tr>
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<td>12</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>69.2</td>
<td>30.8</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
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<tr>
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<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.78</td>
<td>2</td>
<td>.41</td>
</tr>
</tbody>
</table>

59
### Table 3.10

Crosstabs

**TRAINEE REPETITIONS** by **WORK ELIGIBILITY**

<table>
<thead>
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<th></th>
<th></th>
<th>Row Total</th>
</tr>
</thead>
<tbody>
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<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>(0 used)</td>
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<td>21</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>76.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1-3 used)</td>
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<td>1</td>
<td>4</td>
</tr>
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<td></td>
<td></td>
<td>10.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4-11 used)</td>
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<td>2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Column</td>
<td>27</td>
<td>12</td>
<td></td>
<td>39</td>
</tr>
<tr>
<td>Total</td>
<td>69.2</td>
<td>30.8</td>
<td>100.0</td>
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</tr>
</tbody>
</table>

<table>
<thead>
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<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood Ratio</td>
<td>.26</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 3.11
Crosstabs

TRAINEE COMMENTS/NONTASK by WORK ELIGIBILITY

<table>
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<th>Count</th>
<th>WORK ELIGIBILITY</th>
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<th></th>
<th>Row Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRAINEE NONTASK COMMENTS</td>
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<td>(no)</td>
<td>Total</td>
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</tr>
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<td>17</td>
<td>9</td>
<td>26</td>
</tr>
<tr>
<td>(1-4 used)</td>
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<td>7</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>(17-18 used)</td>
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<td></td>
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</tr>
<tr>
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<td>12</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>69.2</td>
<td>30.8</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

value df p

Likelihood Ratio 2.39 2 .30
Table 3.12

Crosstabs

**TRAINEE QUESTIONS by WORK ELIGIBILITY**

<table>
<thead>
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<th>(no)</th>
<th>Row Total</th>
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</thead>
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<td>Total</td>
</tr>
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<td>1</td>
<td>20</td>
<td>7</td>
</tr>
<tr>
<td>(1-4 used)</td>
<td></td>
<td>2</td>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

Column Total: 27 | 12 | 39 | 69.2 | 30.8 | 100.0

Likelihood Ratio: .94 | df: 1 | p: .33
Those remarks coded as unintelligible by the coders were identified as trainee-generated and trainer-generated. Their impact on a trainee's work eligibility was assessed in a Chi Square test on each. Trainee-generated communication was not significant (Likelihood Ratio $x^2=.42$, df=1, $p=.52$). See Table 3.13 for results.

There was only one trainer-generated unintelligible communication. No Chi Square test was computed.

RQ3a. Is there a relationship between trainee-generated communication and a trainee's work eligibility?

When communication was grouped according to trainee or trainer generation, no significant results emerged from the Chi Square test of trainee-generated communication on work eligibility (Likelihood Ratio $x^2=2.62$, df=3, $p=.45$). See Table 3.14 for results.

RQ3b. Is there a relationship between trainer-generated communication and a trainee's work eligibility?

When the communication generated by the trainer was analyzed in a Chi Square test on a trainee's work eligibility, no significance was reported once again (Likelihood Ratio $x^2=4.16$, df=3, $p=.24$). See Table 3.15 for results.
Table 3.13

Crosstabs

TRAINEE UNINTELLIGIBLE COMMENTS by WORK ELIGIBILITY

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<th>Row Total</th>
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<td>20</td>
<td>10</td>
</tr>
<tr>
<td>(1-5 used)</td>
<td>2</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Column</th>
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<th>12</th>
<th>39</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>69.2</td>
<td>30.8</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Likelihood Ratio value \( \chi^2 \) = .42, df = 1, p = .52
Table 3.14

Crosstabs

COMMUNICATION/TRAINEE-GENERATED by WORK ELIGIBILITY

WORK ELIGIBILITY

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<tr>
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<th>Row Total</th>
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<td>2</td>
<td>Total</td>
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<td>14</td>
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<td></td>
<td></td>
<td></td>
<td>35.9</td>
</tr>
<tr>
<td>(6-10 used)</td>
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<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30.8</td>
</tr>
<tr>
<td>(11-21 used)</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12.8</td>
</tr>
<tr>
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<td>8</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Total</td>
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<td>30.8</td>
<td>100.0</td>
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</tbody>
</table>

Likelihood Ratio 2.62 3 .45
Table 3.15

Crosstabs

COMMUNICATION/TRAINER-GENERATED by WORK ELIGIBILITY

WORK ELIGIBILITY

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<td>11</td>
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<td></td>
<td></td>
<td>28.2</td>
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<td>9</td>
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<td>23.1</td>
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</tbody>
</table>

Column 27 12 39
Total 69.2 30.8 100.0

Value df p
Likelihood Ration 4.16 3 .24
RQ3c. Is there a relationship between the use of symbolic coding and a trainee's work eligibility?

No significant results emerged from the Chi Square test of symbolic coding on a trainee's work eligibility (Likelihood Ratio, $\chi^2=3.13$, df=4, $p=.54$). See Table 3.16 for results.

A finding of significant results emerged from the Chi Square test of IQ on a trainee's work eligibility (Likelihood Ratio $\chi^2=8.45$, df=2, $p=.01$). These findings were such that the higher a trainee's IQ, the more likely they were to be hired for the job being trained. See Table 3.17. The correlations between IQ and various types of communication were also examined with only very small correlations reported.

While a minimal number of significant results were found in the multiple regressions and Chi Square tests reported here, a number of results require further clarification and elaboration. This clarification and elaboration will be accomplished in the light of past research with implications for future research.
Table 3.16

Crosstabs

SYMBOLIC CODING by WORK ELIGIBILITY

<table>
<thead>
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<th>(yes) 1</th>
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<th>Row Total</th>
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<td>27</td>
</tr>
<tr>
<td></td>
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<td>1</td>
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<td></td>
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<td>2.6</td>
</tr>
</tbody>
</table>

Column Total: 27, 12, 39
Total: 69.2, 30.8, 100.0

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<th>df</th>
<th>p</th>
</tr>
</thead>
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<td>4</td>
</tr>
</tbody>
</table>
### Table 3.17

Crosstabs

**IQ by WORK ELIGIBILITY**

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<th>Row Total</th>
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<td>2, 2</td>
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<th>Column</th>
<th>27, 12</th>
<th>39</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>69.2, 30.8</td>
<td>100.0</td>
</tr>
</tbody>
</table>

| Likelihood Ratio | 8.45 | 2 | .01 |
CHAPTER 4

DISCUSSION

The thesis presented here assessed the communication used in training sessions for people with mental and developmental disabilities and attempted to discover any relationships that existed between that communication and a trainee's rate of learning and work eligibility. Using Bandura's (1971) social learning theory as a foundation and past research findings for support, a positive impact seemed indicated of both symbolic coding and trainee generation of communication on a trainee's rate of learning. It also appeared that symbolic coding and trainee generation of communication would have a positive impact on a trainee's work eligibility.

Due to the extremely low incidence of symbolic coding evidenced in the field study employed for this research, results remain inconclusive. This inconclusiveness was also evidenced in the findings on meaningful trainee-generated communication which seemed to contradict findings from previous research studies. Further examination of the factors involved in this study will provide information for the clarification and elaboration of those inconclusive results and contradictory findings. As part of this examination, results of statistical analyses for each research question posed here will be reviewed as they are
framed by past research. Then, limitations which may have influenced these results and findings will be addressed. Finally, indications for possible future research will be discussed so that the needs of this important segment of society, people with mental and developmental disabilities, may be better served.

Research Question One

The first research question inquired into the frequency and type of communication that occurred during training sessions for people with mental and developmental disabilities. As expected, most of the training sessions involved the use of an overall description of the task being trained. However, some of the trainings did not include any type of description of the task being trained. That is, a number of trainees were given verbal instructions on how to perform some particular behavior without knowing how that behavior applied to the job being trained. This type of training, strictly behavioristic, requires minimal cognitive processing and according to Bandura (1971) is less effective as an observational training technique than those techniques requiring more cognitive processes.

The high level of "expectancy for failure" commonly found in this population indicates a need for the use of motivational prompts, according to Zigler (1973). People with mental and developmental disabilities require positive reinforcement as they accomplish even the most simple of
tasks. While many of the trainings included more than eight motivational prompts, an equal number of trainings included three or less. Bandura (1971) explained the critical nature of the personal need for success when he defined the motivational dimension of observational learning as including an evaluative reaction initiated by self-satisfaction. Consequently, trainees who were given instructions about a particular behavior and asked to reproduce that behavior with very limited positive feedback, would be expected to perform less well than those trainees who were given more feedback (i.e., motivational prompts).

In addition to motivational prompts, training manuals (Connis et al., 1981; Patton et al., 1986) appear to encourage modeling as an integral part of observational learning for people with mental and developmental disabilities. Thus, it was surprising to see that almost half of the trainings observed in this study included three or fewer modeling prompts. Foss et al. (1989) found that modeling was effective in teaching interpersonal skills to mildly retarded high school students. When the modeling was combined with more involved cognitive processes, however, it was most effective. Thus, nearly half of the trainees observed in the present study were given a minimum opportunity to learn through the recommended observational learning technique of modeling.

Verbal instructions were the prompts which occurred
most frequently in the trainings. All of the observed trainings included at least three and as many as sixty-six of these specific task instructions. Some trainers phrased their verbal instructions in the form of questions. This attempt to encourage problem-solving skills by asking the trainee to verbalize consequential behaviors was supported by Hughes and Rusch (1989). They discovered that more involved cognitive processing resulted in greater generalizability in studies related to employment environments. Since half of the trainings in the present study involved no trainer-generated questions, it is assumed that half of the trainees were afforded a very limited opportunity to cognitively process their task.

Cognitive processes are also limited during physical assistance prompts, the prompt requiring the most involvement between trainer and trainee. Trainers indicated frustration with trainees who required physical assistance and as Connis et al., (1981) and Patton et al., (1986) reiterated, it is the prompt of last resort. While evidenced in less than half of the trainings, trainers who were required to use physical assistance with their trainees would most likely label those trainees as slower learners.

Trainee-generated communication included task-related comments or questions, verbatim repetitions of some part of the trainer's communication, and nontask-related comments. Three of these types of trainee-generated communications
were rarely found, they included; verbatim repetitions, nontask-related comments, and trainee-generated questions. While there was a very low incidence of trainee-generated communication, Bandura's (1971) insistence that more involved cognitive processing facilitates observational learning would seem to lead to a prediction that the use of trainee-generated communication would facilitate observational learning. The use of trainee-generated communication in this study did not appear to increase cognitive processing. This subject is addressed more fully in the discussion below.

**Research Question Two**

Results of the multiple regression analysis of the frequency and type of communication which occurred in training sessions on a trainee's rate of learning provided evidence that trainers tended to assign slower rates of learning to trainees who required more physical assistance prompts and verbalized more nontask-related comments. The use of physical assistance as a predictor of slower learning is reinforced by Connis et al., (1981) and Patton et al., (1986) when they describe it as the most involved of the system of least prompts. Trainees who require more physical assistance are perceived to be unable to learn behaviors in what are more commonly considered "normal" methods. As mentioned above, this situation often precipitates a feeling of frustration on the part of the trainer and may result in
a trainer rating a trainee as a slower learner.

The incidence of trainee-generated communication did not seem to create a positive impact on a trainee's rate of learning. This appears to contradict Bandura's (1971) emphasis on the importance of using more involved cognitive processes to increase the effectiveness of observational learning. Hakel and Decker (1986) reiterated this emphasis when they found that trainees who generated their own verbalized codes for a particular behavior retained and performed that behavior more accurately than trainees who had trainers verbalize codes. They stated that forming the codes required more cognitive processing and, thus, produced more accuracy.

The study presented here seemed to indicate just the reverse. Perhaps trainers may have related a trainee's demeanor to their rate of learning. That is, trainees who were quiet and docile were perceived to be "learning" more effectively than those trainees who generated any type of communication. Milgram and Noce (1968) found that verbalizing irrelevant communications reduced task performance in people with mental disabilities. Trainers may not listen to what a trainee verbalizes and may consider all trainee-generated communications to be noise. After all, when incorporated into a mechanical, behavioristic training session, trainee-generated communication could become bothersome and interfere with training the task at
hand. This type of situation may then cause a trainer to rate the trainee who verbalizes any communication as a slower learner.

Another trainee-generated communication, task-related comments, were most often in response to trainer-generated questions. This may indicate that while the communication was trainee-generated it was still a mechanical, behavioristic procedure requiring little additional cognitive processing. Questions were often generated as: "Hold the broom with both hands...both hands...hold it with both hands. How many hands on the broom?" This mechanical response, while coded as a trainee-generated task-related comment, would not involve the depth of thought processing Hogan et al. (1986) addressed in their research on trainee versus trainer generation of communication.

Additionally, the high level of "expectancy for failure" which typically occurs in this population, resulted in Zigler's (1973) identification of a self-fulfilling prophecy in which anticipated failure lead to actual failure. The reduction in self-confidence induced by repeated failure, may affect trainee-generated communication overall. Trainees who were inclined to generate communication would not be secure enough to actually verbalize it and the incidence of trainee-generated communication would be less of a predictor of rate of learning.
Trainer-generated communication did not significantly impact a trainee's rate of learning in the multiple regression analysis. As described above, trainer-generated questions about the task were usually very mechanical and required the specific programmed responses associated with operant conditioning. While coded as questions, they did not initiate the cognitive processes that Gast et al. (1988) recommended in their research on efforts to increase task generalizability. Hogan, Hakel & Decker's (1986) study involving hospital supervisors, demonstrated the effectiveness of trainers asking questions which required trainees to generate personally relevant codes.

Therefore, the lack of genuine thought-provoking questions, the restricted use of motivational prompts discussed above, and the overwhelming use of mechanical verbal instructions, appeared to form a category of trainer-generated communication that severely limited cognitive processes. As such, it would certainly be less impactfull on a trainee's rate of learning than the trainer-generated communication described by past researchers which was designed to enhance cognitive processing.

Due to the scarcity of symbolic coding which occurred in the training sessions observed, no significant impact could be detected of symbolic coding on trainee's rate of learning. This is discussed more thoroughly in the section
on study limitations.

Research Question Three

Chi Square tests were used to analyze the impact of frequency and type of communication that occurred in training sessions for people with mental and developmental disabilities on a trainee's work eligibility. For many of the same reasons described above, the independent variables appeared to have little, if any, impact on a trainer's perception of whether or not a trainee would be hired for the job being trained. In the Mantel-Haenszel test for linear association, which is typically computed in Chi Square tests, physical assistance did produce significant results. This seems to indicate that trainees who require more physical assistance prompts would be less likely to be hired. An important consideration here is the perception that physical assistance, as a prompt, is only used when other prompts are not sufficient.

The results of the Chi Square test of trainee-generated communication on a trainee's work eligibility were similar to those of rate of learning. That is, there were no significant impacts of the independent variables. The discussion about the quality of the trainee-generated communication described above and its relationship to rate of learning would also apply to work eligibility. This discussion reiterates the fact that the communication coded as trainee-generated should have involved more cognitive
processes, as advocated by Bandura (1971) and Hogan (1986) for effective observational learning. Instead, trainee-generated communication became another operant conditioning procedure most often used in training sessions for people with mental and developmental disabilities.

Following the discussion presented above for rate of learning, trainer-generated communication and symbolic coding produced no significant results in Chi Square tests on a trainee's work eligibility. The mechanical nature of the trainer-generated communication and the extremely low incidence of symbolic coding reduced the conclusiveness of those results.

IQ, analyzed only as a potential confounding variable, was a significant predictor of a trainee's rate of learning and work eligibility. As expected, this indicated a relationship between IQ and both rate of learning and work eligibility such that the higher a trainee's IQ the more likely they were to be rated as a faster learner and to be hired for the job.

Zeaman and House (1963) indicated that mental age and IQ were not the sole predictors of effective learning. They felt that the learning problems of people with mental and developmental disabilities are due to attention deficiencies. By compensating for inadequacies in the multibehaviorial process of attention, learning can be accomplished. Fisher and Zeaman (1973) stated emphatically
that, as it applies to attention theory, learning rate was not related to intelligence. Milgram and Noce (1968) agreed that verbalizing part of a task improved performance on that task and verbalizing irrelevant communication interfered with performance of a task regardless of mental age. This seems to indicate that even though IQ is a significant predictor of rate of learning and work eligibility, its importance may be diminished by attention to other learning techniques (ie., trainee-generated symbolic coding).

In order to better assess the thesis presented here, some limitations contributing to the lack of significant findings should be addressed. By establishing which procedures worked and which did not, implications for future research may be drawn.

LIMITATIONS

As mentioned in the first three chapters, the extremely low incidence of symbolic coding that occurred in the observed training sessions for people with mental and developmental disabilities created major limitations for this study. While field studies typically increase the external validity of research by increasing the generalizability of the findings, it is imperative that sufficient incidence of the variable at issue occurs for conclusive results in the data analysis. Given the small sample size in the present study, power to detect any effect
of communication on a trainee's rate of learning and work eligibility was minimized.

Small sample size was not the only limitation inherent in this research. Measurement of the dependent variables was also inadequate. Both small sample size and operationalization of the dependent variables will be examined in this section on study limitations.

An effort to address the limitations of the small sample size available for this study must begin with the procedures employed to recruit sample subjects. Initial discussions with board personnel centered on obtaining parental permission to observe the consumers enrolled in the county-sponsored programs. The board staff recommended that the facility in-house mail system be used to distribute the informational letters, which contained a permission slip. The letters were distributed to all consumers with instructions to return affirmative permission slips to the respective facility managers. Those facility managers then attached an Individual Source Document for Supplemental Information to the permission slip and forwarded them to the researcher. Physical impairments such as limited hearing or vision restrictions were indicated in the document assessments.

After reviewing the assessments, the researcher contacted the facility managers for clarification of impairments that appeared not to meet the criteria for this
study. Professional staff determined if the impairments were severe enough to restrict inclusion in the study.

Eight hundred letters were distributed to the board's consumers. Seventy-two permission slips were returned to the researcher. Of those, nine had disabilities that did not meet the criteria established for this study. Some problems inherent in this plan concerned the fact that there was no way to check whether letters were actually received by the parents or guardians. The low response rate prompted inquiries to personal acquaintances about the letter. This confirmed that a number of parents and guardians did not receive the letters. However, upon further investigation, facility managers insisted that all consumers were provided with the letters.

One way to avoid this situation would be to use the United States postal service. The problem here, of course, is the expense involved. Another option to reduce this limitation would be the use of affirmative/negative permission slips. Some incentive could be devised to motivate consumers to return the slips (ie., smiling face stickers to be worn by the consumer or candy or trinkets for rewards). Both of these would provide checks to better assess the distribution of the letters.

Additional sample size limitations involved the specification that observations were to utilize actual employment training. As a result of the economic downturn
facing the midwest manufacturing sector, no new job tasks occurred in the six month data collection period. Subsequently, trainees were drawn from consumers who had not been trained on particular job tasks that were available during the data collection period. This presented a limitation for sample size since many of the potential trainees had already been trained on many of the jobs.

Concerning measurement procedures, limitations were evident for the dependent variables of rate of learning and work eligibility. Rate of learning was assessed by the trainers on a scale of one to five indicating whether the trainee learned much more quickly than anticipated or much more slowly than anticipated. "Anticipated time" was a normative perception on the part of the trainer about the amount of training time they thought a trainee should require to learn a particular task. There was little consistency among trainers and their perception of this measurement.

The dependent variable measures did not control for a number of differences that may have affected their measurement. Job differences could have been reduced by observing trainees being trained on the same task. Trainer differences could be controlled for by utilizing the same trainer and a standardized training format. And, trainee learning differences could be controlled for by selecting a sample with as nearly identical characteristics as possible.
Standardization of these differences would increase the validity and reliability of the results by eliminating as many of the possible confounding variables as possible.

The dependent variable of work eligibility was more simple to understand but the nominal level data it produced required Chi Square analysis. A measurement that allowed a more powerful statistical analysis would more conclusively discover any impact the communication at issue had on a trainee's work eligibility. Some possible considerations include: 1) using a Likert scale to assess how likely a trainee would be to be hired for a job, 2) using training sessions that involved each trainee being trained on a number of different job tasks to determine the percentage of jobs for which they would be hired, and 3) breaking down the task into incremental steps to determine the percentage of the task required to be learned for work eligibility. These data would allow more powerful statistical analysis.

Independent variables were affected by coding scheme limitations. One of these limitations concerned the system of least prompts for trainer-generated codes. This system has typically been used in trainings where these categories of communication were planned by the trainers. That is, the only communication which occurred was some type of prompt that was intentionally used by a trainer in an effort to determine the impact of some other variable.

While mutually inclusive and exhaustive, the system of
least prompts does not account for meaningfulness. For the study presented here, communications required the use of more extensive content analysis to better reflect the degree of cognitive processing they contained. This was discussed above as it concerned trainee-generated task comments and trainer-generated questions.

Another limitation of the coding scheme in this study was the failure to analyze the interaction of the communication. Although the degree of cognitive processing was not assessed, determining which trainer-generated communication precipitated which trainee-generated communication could have been helpful.

While the limitations of this study are many, people with mental and developmental disabilities have not typically been the focus of research on effective training. Because of the pervasive need for training programs that apply to this population, the limitations described above should form a framework for future research.

FUTURE RESEARCH

In order to reduce the impact of the limitations described above, a field experiment should be considered. By assessing the rate of learning in "real time" and controlling for trainer differences, standardization could be facilitated. Different types of training utilized by this population could be compared with trainings that included symbolic coding. That is, field experiments could
assess and compare the effectiveness of operant conditioning techniques, the system of least prompts, silent teaching, trainings that utilize symbolic coding and others.

These field experiments could control for confounding variables described above by focusing on the standardization of trainees, trainers, training procedures and tasks. Trainee confounding variables can be reduced by selecting sample trainees with nearly identical characteristics. Characteristics to be considered include; mental age and IQ, physical ability, and previous training and actual work experience.

In an effort to address this population more specifically, sample characteristics that might further impact learning should be investigated. In particular, methods for determining locus of control, expectancy for failure, and outerdirectedness as they apply to training should be devised. As research variables, statistical analyses of their impact would add to the conclusiveness of the findings on communication used in training.

Future studies could control for trainer and training procedure differences by designing standardized training formats. For field experiments, the impact of the trainer could be examined by holding all variables constant except for the trainer. Perhaps variables such as gender, age, experience, education, etc., may affect the learning that occurs.
Training procedure research seems most important based on the past research. By holding trainee and trainer variables constant, an experiment could discover the impact of symbolic coding. Rate of learning could be examined as a dependent variable. But, studies could also assess the generalizability described in Chapter One as a dependent variable. This generalizability concerns the ability of a trainee to apply previously learned task behaviors to present situations. An experiment could be conducted using symbolic coding of instructions to see if those instructions are more generalizable than instructions devoid of symbolic coding.

In addition, the variable of learning could be assessed to determine if trainee-generated symbolic coding is more effective in facilitating retention and retrieval of previously learned behaviors. Training procedures, including the use of trainee-generated symbolic coding of instructions, could be utilized to train a number of tasks to different trainees. One day/week/month later, trainees could be asked to reproduce the tasks previously learned. Statistical analysis could then be used demonstrate the effectiveness of the training procedures on actual learning.

Further research could analyze identical trainings in which trainee-generated symbolic coding was compared with trainer-generated symbolic coding as described in the above studies.
Summary Implications

Little research is available on the subject of communication which occurs in training sessions for people with mental and developmental disabilities. While the limitations addressed above are many, this study did provide meaningful information on the communication that occurs in these training sessions. Regardless of what is espoused for training programs, these data demonstrate what was actually said and done. For example, trainers are traditionally taught to begin a training session with a brief description (directive) of the task being trained. That description is followed with a modeling prompt which includes some physical assistance. Such was not the case in this study.

Another example involves motivational prompts, trainers are taught to use these prompts liberally. While the average number of communications that occurred in the observed trainings was fifty-five, half of the training sessions reported fewer than three motivational prompts.

There appears to be a difference between the espoused training theory and the training theory in-use. The information provided here may be used to assess this difference. As such, these data chart the direction and character of the observed training sessions as they are framed by past research literature. And, past research literature appears to present a preponderance of evidence
advocating the use of trainee-generated symbolic coding in observational learning situations.

While the significance of the findings in this study may be contradictory and inconclusive, they reinforce the importance of what Bandura referred to as the "incredible potential" of humankind. Most people have the opportunity to discover incredible potential on their own. People with mental and developmental disabilities share somewhat in that opportunity.

The key to this discovery seems imbedded in a system that has its own incredible potential...the potential to provide training that encourages maximum cognitive processing. Symbolic coding, especially when generated by the trainee, appears to accomplish that cognitive processing.

In the past ten years, the competitive employment of people with mental and developmental disabilities has been a federal and state priority. Perhaps, in the next ten years, the development of more effective training programs could also be a priority.
APPENDIX A

NAME________________________ID#_________________ COMMENTS:

DATE__________________________

TRAINER_______________________

TASK___________________________

IQ____________________________

RATE OF LEARNING________________

HIRED FOR JOB____________________

COMMUNICATION OCCURRING IN TRAINING:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

TOTALS:

SC   DIR   VI   VQ   MP   M   PA   EC   ER   EO   EA   EU   RU

90
APPENDIX B/CODING GUIDE

Motivational prompt
- a directive that does not specifically relate to the
  nature of the task to be done (e.g., "Good job.")
- prompt that instructs trainee to move faster or
  attend to the task (e.g., "Stop looking out the
  window.")

Directive
- a command to perform a task (e.g., "Sweep the
  floor.")

Verbal instruction
- description of a particular step or portion of the
  task to be performed through use of detailed task
  analysis, may be an isolated comment or an unbroken
  cluster of comments about the same task concept.
  (e.g., "Push the broom forward." or "Push the broom
  forward...forward...keep going forward...forward.")

Modeling
- a demonstration of the physical movements needed for
  task completion (e.g., "Push the broom like this.")
  INDICATED BY ONE TAPPING SOUND ON THE AUDIOTAPE.

Physical assistance
- trainer demonstrates the task by physically guiding
  the trainee through the mechanics of the task (e.g.,
  "Push the broom," while pushing trainee's hands.)
  INDICATED BY TWO TAPPING SOUNDS ON THE AUDIOTAPE.

Symbolic Coding (S)
- entire task or a component of the task is reworded to
  associate with a previous task or learned behavior
  (e.g., "This is like...Remember when you...This
  reminds me of...")

Trainee Generated (E)
- any question or comment made by the trainee.
  S- symbolic coding
  ?- questions about task
  R- directly repeated trainer comments
  C- any comments about task being trained
  O- any comments not related to the task

Intelligible communication utterance means communications
where the words are understandable. Coders may listen
to taped recordings two times to attempt to make out
the type of communication utterance. If the words are
not distinguishable at that time, it will be
considered unintelligible.
APPENDIX C
COUNTY BOARD OF MENTAL RETARDATION
AND DEVELOPMENTAL DISABILITIES
ADULT SERVICES DEPARTMENT

INDIVIDUAL SOURCE DOCUMENT FOR SUPPLEMENTAL INFORMATION

NAME: ___________________________ D.O.B.: ________________ AGE: ____________

NEW ENROLLEE: ___________ DATE ENTERED FOR ASSESSMENT: ________________

DATE OF ENROLLMENT (INITIAL IHP DATE): __________________________

CHECK THE APPROPRIATE SUBSTANTIATED INFORMATION:

✓ Male □ Female

HANDICAPPING CONDITIONS/CHARACTERISTICS: (See definitions on back)

✓ non verbal □ non ambulatory □ legally blind/blind □ self abusive
✓ severe retardation □ profound retardation □ communication disorder □ seizure disorder
✓ medical risk □ emotional disorder □ takes medication
✓ SDO certified □ IQ Score Full Scale □ takes medication at work
✓ moderate retardation □ self administered □ staff administered

DEPENDENCY ON OTHERS FOR:

□ toileting □ dressing □ mobility □ eating

NEEDS ADAPTIVE EQUIPMENT FOR:

□ toileting □ mobility □ eating □ other

DEMOGRAPHIC DATA:

□ deinstitutionalized □ nursing home/center
✓ private residence: □ ICF/MR
□ Family □ ICFG □ Other
□ boarding □ nursing home/center □ legal guardian
□ independent □ ICF/MR □ SSA

□ group home □ Medicare □ Medicaid
□ POS □ assigned a Case Manager
□ ICF/MR □ SSI □ married
□ Other □ assigned a Case Manager

LEVEL:

I. Employment Services

□ maximum supported employment □ minimum supported employment
□ unemployed □ follow along
□ independent status

II. □

III. □

IV. □

V. Activity Services (Non Workshop) (See definition)
V. Retirement Services (Non Workshop)
V. Activity Services (Workshop)
V. Retirement Services (Workshop)

FORMAL DISCHARGE/TERMINATION DATE ________________

Signature ___________________________ Title ___________________________

Date ___________________________

SEND COPY TO HABILITATION COORDINATOR


