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**Teaching Rejecting Response using Wrong-item Format
Embedding into Missing-item Format
for Children with Developmental Disabilities**

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for Children with Developmental Disabilities**

by

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Dedication

To loving God and my Family

**Teaching Rejecting Response using Wrong-item Format
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Mands, of which requesting and rejecting responses are considered subclasses, are the first emerging communication functions that allow children to express their wants and needs. While typically developing children develop speech without specifically designed intervention, many children with autism and developmental disabilities are likely to rely on prelinguistic communication forms that are socially and developmentally inappropriate or unacceptable until symbolic forms of functional communication are taught. A review of the literature on teaching mands indicates that although there is an abundance of research addressing teaching communicative requesting behaviors, rarely have studies attempted to teach communicative rejecting. The purpose of this study was to create rejecting opportunities using the wrong-item format embedded into the missing-

item format, and to teach socially appropriate rejecting response using AAC for four children with autism and developmental disabilities. This study employed a multiple probe design across four participants to examine the effectiveness of the procedure. Results indicated that the wrong-item format embedded into the missing-item format was effective in teaching symbolic forms of rejecting responses using VOCAs and PECS. The results were generalized across two untrained activities and were maintained up to four weeks following the termination of generalization probes for three participants. The implications and limitations of this study, as well as potential topics for future research are also discussed.

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CHAPTER ONE

INTRODUCTION

Mands- of which requesting and rejecting responses are considered subclasses- are the first communicative functions to emerge in typically developing children (Carpenter et al., 1983). Prior to the development of symbolic communication forms such as speech, mands are expressed commonly prelinguistic communication forms such as guiding someone's hand toward an object, pointing to, and reaching for requesting, and throwing, giving back, pushing away, negative vocalizing for rejecting (Halle & Meadan, 2007).

While typically developing children develop speech to meet their wants and needs without specifically designed intervention, until symbolic forms of functional communication to meet their wants and needs are taught, many children with autism and developmental disabilities are likely to rely on prelinguistic communication forms that are socially and developmentally inappropriate or unacceptable (e.g., guiding someone's hands toward an object or pushing an unfamiliar person's hand away) (Keen, Sigafos, & Woodyatt, 2001). These inappropriate and unacceptable behaviors may lead children to be socially stigmatized (Sigafos et al., 2004). Therefore, teaching children to make a request has been a primary target behavior in functional communication intervention because it directly benefits the child by giving them access to a desired item or activity (Michael, 1988). Naturalistic instructional strategies such as incidental teaching to facilitate communicative initiation (Hart & Risley, 1975), time delay procedure to increase spontaneous requesting (Halle, Marshall, & Spradlin, 1979), and natural

environmental training (NET) by an application of Skinner's analysis of verbal behavior to increase mands (Sundberg & Partington, 1998) have largely been developed in the area of communication intervention to teach symbolic forms of requesting behaviors. These procedures and research that supports their use are briefly described below.

Incidental Teaching

Incidental teaching refers to "the interaction between an adult and a single child, which arises naturally in an unstructured environment, such as free play" (p.411, Hart & Risley, 1975). It is "child-selected, meaning the child initiates interaction by requesting assistance from the adult." (p 412, Hart & Risley, 1975). Hart and Risley (1975) investigated the effects of incidental teaching in attempting to teach compound sentences to eleven children, whose mean age was five and with mean IQ of 73. Initially, all children were taught to label when they request items, such as "I want a truck." If they did not know an item's name and instead pointed to the item without verbalization, teachers provided cues (i.e., physical approach, eye contact, or a questioning look) followed by prompts. In the instruction phase, if children requested a truck, the teacher would ask "Why?" or "What for?" and then provide prompts, such as, "I want a truck so I can play with it." This behavior encouraged the children to ask again. The teacher prompted the children whenever they failed to respond. Using incidental teaching with cues and prompts, the usage of compound sentences increased from 2.6 to 8.5 per hour.

Warren and Kaiser (1986) summarized that incidental teaching "incorporates learning principles and relies on techniques such as modeling, shaping, and reinforcement to teach new language in naturalistic conversational settings" (p. 291). Although this procedure appears to be effective in promoting language development, the key feature of

this procedure is that all interactions are child-initiated (i.e., instruction did not occur until the child initiated interaction or requested assistance). If children did not initiate communicative interaction, instructional opportunities would not be sufficient and it would not be beneficial for children who rarely initiate communicative interaction (Mirenda & Iacono, 1988).

Time Delay

Time delay procedure was developed as one of the variations of incidental teaching. For example, Halle, Marshall, and Spradlin (1979) investigated the effects of time delay procedures in increasing requests during meal times by using a multiple baseline across meals (i.e., breakfast and lunch), with replication across children. Six individuals with severe to profound mental retardation living in a state institution participated in this study. In the baseline, the staff called the participants, who then walked to the counter, picked up their tray, and returned to their table. In this situation, a verbal request was not required to receive their trays. In the next phase, researchers incorporated a 15 seconds delay procedure. If the participant walked to the counter, the staff held the participant's tray for 15 seconds or until the participant made a request. If the participant made a complete request such as "Tray, please," a food tray was immediately given to the participants. If the complete request did not occur within the initial 15 seconds, the tray was handed to the participant at the end of the 15 seconds.

If this delay did not increase the incidence of requesting, a time delay and modeling procedure was introduced. In this phase, at the end of 15 seconds, the staff modeled a request "Tray, please." When the participant imitated this model, the tray was given to them. If not, after five seconds, the model was provided again. If the correct

response did not occur after five more seconds, a final model was provided. If none occurred after this final model, the participant was given the tray at the end of the final 15 seconds.

One of the six participants required intensive training due to his minimal progress with both the time delay and modeling procedures. In this intensive training, the delay was increased before the model was provided. In the first trial, the staff called the participant and as soon as the participant arrived at the counter, the experimenter provided the model, saying, "Tray, please" (0 second delay). In the second trial, prior to providing modeling, two seconds elapsed and if the participant did not request, modeling was provided. This delay was continued until the researcher provided a 15 seconds delay. Generalization probe was conducted across different experimenters and different meal times (i.e., supper). The results showed that the requesting behavior increased in five out of six participants using both time delay and modeling procedures. The acquired requesting behavior was maintained in four out of six participants throughout the study. Generalization results revealed that four out of five participants emitted requesting behavior across different experimenters, and three out of four participants emitted requesting behaviors across different experimenters and different meal times.

With incidental teaching and time delay procedures, the requested items are usually visibly present, but out of reach (e.g., Halle, Marshall, & Spradlin, 1979; Hart & Risley, 1975). In fact, the visual presence of a particular item or a verbal prompt such as "What do you want?" would serve as discriminative stimuli. Based on the Skinner's definition of the mand, the mand is controlled by a relevant establishing operation, not dependent on verbal discriminative stimulus (e.g., "What do you want?"). Therefore,

researchers have developed instructional strategies to teach the mand in the absence of an object.

Natural Environment Training

Recent applied behavior analytic research has focused on Skinner's verbal operant in teaching communication skills to children with disabilities. This approach is called Natural Environment Training (NET). This approach incorporates and focuses on applied behavior analytic concepts and terminology, such as the specific verbal operants (e.g., mand, tact, intraverbal) and establishing operations (Sundberg & Michael, 2001; Sundberg & Partington, 1998). Carr and Firth (2005) pointed out that "this marks a notable departure from the traditional psycholinguistic model reflected by the terms used to describe the "receptive" and "expressive" language training employed by the Lovaas approach" (p. 19). According to Sundberg and Partington (1998), one of the essential features of NET is to maintain communication intervention in the presence of stimuli and the establishing operation in effect. This establishing operation was further elaborated on by Michael (1988).

In his article, he noted that these motivational variables are critical when teaching a communicative response, especially mands. Establishing operation was defined as "an environmental event, operation, or stimulus condition that affects an organism by momentarily altering (a) the reinforcing effectiveness of other events and (b) the frequency of that part of the organism's repertoire relevant to those events as consequences" (p. 192, Michael, 1993). The mand is unique among verbal operants because it is the only operant in which the form of the response is controlled by motivational variables rather than stimuli (Michael, 1988).

Michael (1993) differentiated two categories of establishing operations. The first one he described is an unconditioned establishing operation (UEO) and its effect is unlearned. As an example of UEO, caffeine deprivation may be considered as a motivational variable. The following example can be used to clarify this concept. I usually drink three cups of coffee every day, but one day I may have not had even one cup of coffee, so I might really want to drink a cup of coffee, especially a delicious one. Subsequently, I might go to a coffee shop. If the coffee shop were crowded, then I would step into line. While at the cash register, a cashier would say, "Hello, how are you today? What can I get for you?" and I would respond, "Hi, I'll have a tall mocha." Then, I would pay \$3.60 for a tall mocha. While waiting, I may become anxious in anticipation of my coffee. When the barista serves a tall mocha, I would grab the cup of coffee and enjoy it. However, if the barista accidentally serves me a small black coffee, I would say, "Excuse me, this is not what I ordered. I ordered a tall mocha." "Sorry, ma'am." The cashier would look sincerely sorry. He will make a tall mocha and, I would finally get what I ordered and be able to enjoy it. The mocha itself does not make me caffeine deprived. The caffeine deprivation momentarily establishes a mocha as an effective form of reinforcement. In this example, caffeine deprived condition could be considered as an unconditioned establishing operation. Even though I (speaker) really want to drink a cup of coffee, if the cashier (listener) is not present, I cannot order. So, in this situation, the cashier's presence, a discriminative stimulus (S^D), is important because it increases the availability of coffee.

The second type of establishing operation is known as a conditioned establishing operation (CEO). This differs from an unconditioned establishing operation (UEO), in

that a conditioned establishing operation is learned as a result of an individual's learning history. Michael (1993) identified three types of conditioned establishing operations: surrogate, reflective, and transitive conditioned establishing operations. Among these, transitive conditioned establishing operation is specifically related to mands. This has also been known as *blocked-response conditioned establishing operation* (Michael, 1988). This occurs when a known reinforcer cannot be obtained without an additional action or object. Michael explained that "There is a common situation in which a stimulus change establishes another stimulus change as conditioned reinforcement without altering the effectiveness of the relevant unconditioned reinforcement. If the behavior which has previously obtained such conditioned reinforcement now becomes strong we have an evocative relation like that produced by an establishing operation but where the effect depends on an organism's individual history (p.152, Michael, 1982)." For example, consider an individual has a CD player and a CD in order to listen to her favorite music, but headphones are missing. The effectiveness of headphones as a reinforcer to listen to music is momentarily increased at the moment of listening to music. In other words, the missing of headphones evokes the response "Can I get headphones?" as an establishing operation rather than as a discriminative stimulus. That is, the missing headphones do not evoke the request as an S^D because of a correlation with the availability of headphones, but rather as a conditioned establishing operation because of a correlation with the reinforcing effectiveness of headphones.

This *blocked-response conditioned establishing operation* can be either captured or contrived. To capture this, the situation must take advantage of one stimulus that increases the reinforcing value of a second stimulus. This involves capturing the

establishing operation as it naturally occurs (Cipani, 1988; Sundberg & Partington, 1999). However, capturing this EO may provide few learning opportunities because the establishing operation may come and go quickly or occur too infrequently. For this reason, researchers in the field of communication intervention have developed instructional strategies, so-called the missing-item format based on blocked-response conditioned establishing operations (i.e., one item is withdrawn), which incorporates the preference of each individual as well as their learning history, so that teachers need not wait for naturally occurring opportunities to teach mands (Greer & Ross, 2008). The missing-item format as an instructional strategy was briefly described by Cipani (1988). In the missing-item format, an activity that involves at least two items is created, and then an item needed to access a reinforcer is withheld to teach requesting of the missing item which would complete the activity. The effects of this instructional strategy were demonstrated by Hall and Sundberg (1987).

Hall and Sundberg (1987) created the opportunity of teaching requesting behavior using a missing item format. Two deaf adolescents with severe mental retardation participated in the study. The participants were taught four tasks, such as making instant coffee, opening a can of fruit, and wiping up water spilled on the table. For example, to make instant coffee, the experimenter withheld the cup for the coffee. Without a cup, the task could not be completed, so participants were expected to emit requesting signs in order to receive the missing item necessary for making instant coffee. Using a multiple baseline across subjects and behaviors as well as a multi-element design, experimenters investigated the effectiveness between tact prompt and imitative prompt procedures when teaching requesting behavior. In the tact prompt procedure, if the correct mand did not

occur, the experimenter presented the missing item and signed “what’s that?” and the participant tacted the item. Tact training was held prior to the mand baseline. The imitative prompt procedure was similar to tact training. However, during the imitative prompt procedure, the experimenter modeled the manual sign while the missing item was not visually present. If the participants did not imitate the manual sign, a physical prompt was given. Results showed that correct mands consistently occurred only after training was given. Results showed that correct mands consistently occurred only after training was implemented. That is, even though tact training was given prior to the baseline, the correct mand did not occur under mand conditions. This result supports the idea that tact and mand are functionally independent at the time of acquisition. Without direct training the participants labeled each item, but they did not request the needed item even when they knew the label of the needed item. Interestingly, the teachers anecdotally reported that one participant consistently manded for missing items in novel stimulus situations and with novel persons four months after termination of the study.

The importance of teaching rejecting

Aforementioned procedures to teach mands have been exclusively focused on teaching symbolic forms of requesting responses. Teaching rejecting, a subclass of mands, has rarely been explored among teaching mands literature. Although children learned symbolic forms of requesting responses in order to obtain their preferred items, help or attention from others with systematic instructional strategies, without specific instruction they would rely on prelinguistic behaviors to remove aversive situations or objects until symbolic forms of rejecting responses were taught.

Several research pointed out the importance of teaching socially appropriate rejecting behavior for individuals with autism and developmental disabilities (Sigafos et

al., 2004; Sigafoos & Reichle, 1991). First, rejecting allows children to express their preferences or needs to communicative partners. In addition, in their everyday environment, children have situations they wish to escape or avoid. This natural environment provides numerous opportunities to communicate rejecting responses. However, if children are not taught socially appropriate rejecting, they would rely on socially inappropriate or unacceptable forms of rejecting. Additionally, some individuals display subtle behaviors such as looking away from an offered object or accepting it with a grimace to indicate rejecting. For many communicative partners, these behaviors may be too subtle to easily interpret as rejecting. Therefore, such behaviors need to be replaced by more symbolic forms of rejecting. Sigafoos and Reichle (1991) discussed that “many learners with severe disabilities have not been exposed to enough contingencies to establish appropriate rejecting behaviors (p.115).” Therefore, they would rely on subtle prelinguistic rejecting behaviors or problematic behaviors that had been successful in a past.

Given the aforementioned reasons, teaching symbolic forms of communicative rejecting are as important as teaching symbolic forms of communicative requesting (Sigafoos et al., 2004). Despite the importance of teaching rejecting behavior, it has rarely been attempted. The literature review on teaching communicative rejecting behavior from 1980 to 2007 (see Chapter 2) revealed that there have been only ten studies conducted to teach communicative rejecting behavior for individuals with disabilities. These studies were divided into two categories: non-preferred and wrong items. Seven of the ten studies identified an array of highly non-preferred items and presented them to the participants as a means of motivating children to indicate a rejecting response. The

remaining three studies used wrong-item format, which provided items that did not match to initially requested items as a means of motivating children to indicate a rejecting response.

This review identified several potential research topics. First, future research should teach rejecting in less structured situations. In addition, to acquire new forms of rejecting, experiments should provide sufficient instructional opportunities to ensure children receive enough instruction. Another research was suggested that rejecting response could be taught without the repeated presence of highly non-preferred items since the rejecting response could occur to remove non-preferred items, to remove items that do not correspond to the item initially requested or even to remove the preferred items when children are satiated by them.

The missing-item format used to teach primarily requesting responses and the wrong-item format by Duker, Dortmans, and Lodder (1993) and Yamamoto and Mochizuki (1988) give some insights into how the aforementioned suggestions for future research might be accomplished.

The missing-item format is derived from Michael (1982)'s conceptualization regarding blocked-response conditioned establishing operation. For example, when a child requests a straw to drink a juice when presented with a carton of juice, the straw's value is momentarily increased, because the carton of juice cannot be drunk without a straw. An item presented that does not correspond to the item initially requested (i.e., a straw) would be annoying stimulus which would cause the child to want to remove it and to re-request a straw in order to access the final reinforcer (i.e., drink a juice). That is, the presented wrong item would not necessarily be the child's non-preferred item, but at the

moment when the straw was needed, and the child requested the straw in order to access the final reinforcer, the straw's reinforcing value is increased.

Duker, Dortmans, and Lodder (1993), using the wrong item format, provided practical study designs to teach rejecting and re-requesting. In Duker, Dortmans, and Lodder (1993)'s study, all five participants had been taught to request preferred items using manual signs (e.g., I want to string beads). However, the experimenter noticed that the participants often accepted the items that did not correspond to initially requested items or that when the wrong items were provided, the participants often pushed the object from the table, turned around on the chair, and hit the object. These later behaviors were considered socially inappropriate and were interrupted by the experimenter. In addition, three out of five participants did not repeat the initial requesting when the wrong items were provided. Authors interpreted the participants' responses that initial requesting responses were not established as mands, because the participants did not repeat the initial requesting gesture when the wrong items were presented.

However, the results of this study suggest that the participants' motivation to remove the wrong items when provided were because the participants pushed or hit the items. Such behaviors suggest that they understood that the offered item did not correspond to their initially requested items, and the motivation was in effect to remove the offered wrong items. In fact, such behaviors showed that the participants did not have socially appropriate rejecting responses in their functional communication repertoire. In addition, no or low repetition data during the baseline suggests that their lack of communication breakdown repair strategy such as repetition of initial response.

Purpose of the Study

This study extends the literature in the area of communication intervention to teach rejecting behavior when the wrong item is offered within the missing-item format. Based on the literature review of teaching communicative rejecting, several future research topics were suggested. Previous studies on teaching rejecting were exclusively focused on escaping from non-preferred items. Researchers suggested that more research needs to be conducted whether the rejecting response could be taught without presenting highly non-preferred items repeatedly in natural situations, such as engaging in preferred activities since the rejecting response could occur not only to remove non-preferred items but also to remove items that do not correspond to the item initially requested or even to remove the preferred items when children are satiated by them. In addition, during the rejecting training, a number of instructional opportunities should be provided to ensure children have sufficient instruction to acquire new forms of rejecting.

The wrong-item format embedded into the missing-item format allows us to examine the aforementioned potential research topics. The missing-item format was originally used when teaching requesting behavior. This strategy demonstrated the effects of teaching requesting as presenting a number of trials within a relatively short amount of time while engaging participants in ongoing activity. Recently, Carter and Grunsell (2001) and Sigafos et al. (2004) suggested that it is possible for the wrong-item format embedded in the missing-item format to create the opportunity for teaching communicative rejecting behavior. However, there is no study demonstrating the effectiveness of teaching rejecting behavior using this procedure. Additionally, this study also examined whether this procedure was effective in teaching re-requesting response as

a communication breakdown repair strategy. This re-requesting response would allow the participants to access the missing item so that they could complete the given activity.

Based on the literature review and the suggestions for future research, the following research questions were generated.

Research Questions

1. Can children with autism and developmental disabilities be taught communicative rejecting responses when the wrong item is offered in the missing item format?
2. Can children with autism and developmental disabilities be taught communicative re-requesting behaviors when the necessary item is not visually present to complete the activity using the missing item format?
3. Can communicative rejecting and re-requesting responses be generalized to untrained activities?
4. Can communicative rejecting and re-requesting responses be maintained over time?

Significance of the study

Mands are the first emerging functional communication skills among typically developing children. While these children develop symbolic communication skills (i.e., speech) without specific instruction, many children with autism and developmental disabilities require specific instruction to acquire symbolic forms of functional communication skills. Therefore, it is not surprising that a number of instructional strategies have been developed to promote these skills. However, although there is an abundance of research addressing teaching communicative requesting behavior, rarely

has teaching communicative rejecting been done (Sigafoos et al., 2004). Chapter Two reviewed ten studies that taught communicative rejecting behavior. In seven studies, researchers identified participants' nonpreferred food or objects prior to training, then presented a nonpreferred item to a student and asked, "Do you want this?" and provided a prompt target rejecting response (e.g., "say No") (Drasgow et al., 1996; Duker & Jutten, 1997; Hung, 1980; Martin et al., 2005; Neef et al., 1984; Reichle et al., 1984; Yi et al., 2006). Three of the ten studies utilized the wrong-item format to teach rejecting behaviors (Duker, Dortmans, & Lodder, 1993; Sigafoos & Roberts-Pennell, 1999; Yamamoto & Mochizuki, 1988). From this review, some future research topics were generated.

A unique feature of this study was to attempt to teach communicative rejecting behavior using wrong items rather than using highly non-preferred items while children engaged in their preferred activities. In addition, this study focused on teaching rejecting using augmentative and alternative communication (AAC). Considering roughly 50% of children with autism and developmental disabilities remain non-verbal, the development of AAC is necessary. However, a literature review of teaching rejecting revealed that previous studies mostly focused on speaking (e.g., saying "No") for verbal children with disabilities and teaching unaided AAC for non-verbal children with disabilities. These included non-verbal children with disabilities using gestural rejecting such as shaking the head (Drasgow et al., 1996) or hands (Duker & Jutten, 1997). Only two studies examined the effectiveness of aided AAC including pointing to a "No" picture (Martin et al., 2005) and using VOCA (Sigafoos & Pennell, 1999). Due to the increasing trend of population using aided AAC such as Picture Exchange Communication Systems (PECS) or Voice

Output Communication Aids (VOCAs) among children with autism and developmental disabilities, more research should be conducted on teaching symbolic rejecting using PECS or VOCAs. Therefore, this study focused on symbolic forms of rejecting responses (i.e., pressing “No” or handing a “No” picture to the communication partner) using VOCAs and PECS for non-verbal children with autism and developmental disabilities.

Although this procedure for teaching rejecting behavior was suggested by Carter and Grunsell (2001), no study to date has empirically demonstrated the effectiveness of teaching communicative rejecting behavior. In this study, five to six preferred activities involving at least two items were identified prior to the training. The participants were required to complete these activities when all necessary items were present. Then, one item was removed to create the opportunity to teach the requesting response.

In this study, requesting responses were first taught using missing item format during the pre-training session. After these requesting responses were established as mands, the wrong-item format was embedded into the missing-item format to teach communicative rejecting and re-requesting behaviors. That is, the experimenter provided the wrong item when the participant requested the missing item needed to complete the chain of activities; this wrong item then became aversive stimulus so that the participants were motivated to remove the wrong item. However, this rejecting response was not sufficient to complete the activity, because the experimenter did not provide the necessary item if the participant did not re-request the necessary item. This was a unique characteristic of the study. In other types of instructional strategies to teach requesting behavior (e.g., incidental teaching), items are visually present in front of children, but out of reach in order to teach requesting an item. Researchers claimed that the requesting

response in this situation could be partially mands and partially tacts because the item is visually present. If requesting behavior is a mand controlled by establishing operation and specific reinforcement rather than discriminative stimulus, children have to be able to request the item that is not visually present. In this study, the necessary item was not visually present in front of participants. Therefore, the re-requesting response could be manding rather than tacting. In addition, teaching re-requesting response could be conceptualized as a communication repair strategy. Therefore, this study focused on teaching communication rejecting and re-requesting as a communication repair strategy as well.

CHAPTER TWO

A REVIEW OF LITERATURE

Studies in communication intervention seek to develop and extend effective instructional strategies for children with disabilities. Several instructional strategies to increase mands have been developed. However, these strategies have exclusively been focused on teaching requesting behaviors, teaching rejecting has been rarely attempted despite of the importance of socially appropriate rejecting responses. The first section of this chapter reviews the literature on teaching communicative rejecting behaviors. And, then the literature on teaching requesting behaviors using the missing item format is reviewed.

A Review of Literature to teach Rejecting Behaviors

Communicative rejecting behavior is one of the fundamental communication skills that emerge among typically developing children (Carpenter et al., 1983). Everyday people emit communicative rejecting behaviors in a variety of situations. For example, the polite response if offered nonpreferred food or beverage is a simple, “No, thank you.” (i.e., rejecting nonpreferred food). Even though usually I enjoy having coffee, after three cups of coffee, I would say, “No more, please. I have had enough,” if I was asked, “Would you like more?” (i.e., rejecting preferred food). When watching a movie I really wanted to watch, if a friend of mine asked me to go out, I would say, “No, I am afraid not. I really want to go out, though. Can we schedule for later?” (i.e., rejecting preferred activity while engaging another preferred activity). Lastly, if I ordered a mocha at a coffee shop and the barista accidently gave me black coffee, I would say “No, this is not what I ordered. May I please have a mocha?” (i.e., rejecting the wrong item and

requesting the alternative). These different types of rejection behaviors allow us to indicate to others which objects or activities are not preferred or undesired at the time they are offered (Sigafoos & Reichle, 1991).

However, many individuals with disabilities without vocal or other symbolic communication skills are likely to rely on prelinguistic or socially inappropriate behaviors to communicate rejection, such as pushing away, yelling, throwing, or tantrums. These behaviors can be effective, but in some cases, screaming, yelling, hitting, or pushing an object away could be seen as socially unacceptable, socially stigmatizing, or difficult to interpret for others (Sigafoos et al., 2004). If the individual exhibits acceptable, but inconsistent gestures or communicative forms (e.g., shaking a head back and forth or shaking a hand), their use be strengthened and encouraged. If their communications are unacceptable or stigmatizing, those behaviors must be replaced with more acceptable forms (Sigafoos, Green, Butterfield, & Arthur-Kelly, 2006). In this review, communicative rejecting is defined as, “the use of behavior that works through the mediation of a listener and enables the speaker to escape from or avoid objects, activities, or social interactions.” (p.33, Sigafoos et al., 2004).

Over the last 30 years, few studies have attempted to teach communicative rejecting behavior. This review includes studies published between 1980 and 2007. The ten studies identified are broken into two categories based on contexts present in Table 2.1 and 2.2. Studies in the first category taught rejecting behavior using nonpreferred items or foods (e.g., Drasgow, Halle, Ostrosky, & Harbers, 1996; Duker & Jutten, 1997; Hung, 1980; Martin, Drasgow, Halle, & Brucker, 2005; Neef, Walters, & Egel, 1984; Reichle, Rogers, & Barrett, 1984; Yi, Christian, Vittmberga, & Lowenkron, 2006) and

the second category contained studies that taught rejecting behavior using the wrong items format, namely when participants requested a specific item, the wrong item was given to teach rejecting behavior (e.g., Duker, Dortmans, & Lodder, 1993; Sigafoos & Roberts-Pennell, 1999; Yamamoto & Mochizuki, 1988). For each study, Table 2.1 presents the number of participants, their ages, diagnoses of their disabilities, target behaviors as dependent variables, strategies, and the cue and prompts used. Table 2.2 summarizes reported instruction results, generalization, and maintenance.

Overview of Studies by Category

Rejecting for Nonpreferred food or objects

Seven studies investigated the effects of teaching procedures using non-preferred foods or objects (Dragow et al., 1996; Duker & Jutten, 1997; Hung, 1980; Martin et al., 2005; Neef et al., 1984; Reichle et al., 1984; Yi et al., 2006). These studies could be divided into two subclasses in terms of instructional strategies: discrete trial instruction (DTI) and functional communication training (FCT). Four studies used DTI (Duker & Jutten, 1997; Hung, 1980; Neef et al., 1984; Reichle et al., 1984). A discrete trial is “a small unit of instruction (usually lasting only 5-20 seconds) implemented by a teacher who works one-on-one with a child in a distraction-free setting” (p. 86, Smith, 2001). In these studies, researchers identified non-preferred food or toys and then held one in front of the participant and asked, “Do you want this?” and prompted the participant to reject the item (e.g., say “No” or sign “No”). For example, Hung (1980) investigated the effects of modeling (i.e., vocal imitation) and reinforcement when attempting to teach “Yes/No” responses to two autistic children who were eight and ten years old, respectively.

Table 2.1. Participants, design, variables, and strategies to teach Rejecting

Study	No	Age (yr)	Disabilities	Dependent variables	Target rejecting behavior	Strategies	Cue & Prompts
Nonpreferred items							
Drasgow et al. (1996)	1	4.4	Severe DD	Requesting, rejecting	Head shake for "NO"	FCT	Prompt, modeling
Duker & Jutten (1997)	3	32-34	Profound MR	Yes/No	Hand shake for "NO"	DTI	Most to least prompt, 90s repeatedly correction Modeling
Hung (1980)	2	8-10	Autism	Yes/No	Vocal word for "No"	DTI	Modeling
Martin et al. (2005)	1	10	Autism	Rejecting	"NO" icon card	FCT	Differential reinforcement, error correction
Neef et al. (1984)	4	4-6	Autism, severe MR	Labeling, Yes/No	Vocal word "No"	DTI	Prompt
Reichle et al. (1984)	1	15	Severe MR	Requesting, rejecting, commenting	Sign "No"	DTI	Physical prompt
Yi et al. (2006)	3	8-11	Autism	Rejecting, challenging behaviors	Vocal words (No, thank you), Sign "No"	DTI, FCT	Verbal prompt, modeling, time delay, physical prompt
Wrong Item							
Duker et al. (1993)	5	14-31	Severe to profound MR	Requesting, re-requesting	Repeating initial sign	DTI	Correction, 10 times repetition
Sigafoos & Roberts-Pennell (1999)	2	6	Autism	Rejecting	Head shake for "No", Voice-output	DTI	Time delay, least to most prompt
Yamamoto & Mochizuki (1988)	3	10-11	Autism, severe MR	Requesting, rejecting, re-requesting	Vocal words	DTI	Modeling

Note. No= Number of participants, DD=Developmental disabilities, MR=Mental retardation, FCT = Functional Communication Training, DTI= Discrete Trial Instruction

Table 2.2. Summary of reported instruction results, generalization, and maintenance

Study	Reported rejecting instruction results	Generalization results	Maintenance results
Nonpreferred Items			
Drasgow et al. (1996)	Acquire 100% “No” when nonpreferred items were presented	Response did not generalize to nonpreferred activities	No report
Duker & Jutten (1997)	All participants correctly responded over 80%.	During generalization probe, it did not occur. After providing generality training, 1 out of 3 exceeded change level of performance.	Training results maintained in all of them at a 2-month follow-up.
Hung (1980)	Both of them correctly responded YES/NO with 3 trained items.	Generalization occurred for 7-10 untrained nonpreferred items.	No report
Martin et al. (2005)	Pushing away behavior was replaced by touching “NO” icon over 80%	No report	No report
Neef et al. (1984)	All four participants correctly responded average 84%.	All four participants correctly responded average 93.3% for new items.	No report
Reichle et al. (1984)	She reached 100% acquisition criteria within 7 sessions.	Results generalized with teacher and assistants in her classroom	No report
Yi et al. (2006)	During training sessions, the rate of target behavior was variable. It reached 100% for three trained items.	Generalized occur to untrained nonpreferred items.	No report
Wrong Item			
Duker et al. (1993)	Using intensive training, they showed rejecting behaviors in 38.8%.	No report	After withdrawing intensive training, results maintained 3 out of 5 participants.
Sigafoos & Roberts-Pennell (1999)	Both of them correctly responded over 80% within 8-10 sessions.	Generalization occurred to new trainer.	Acquisition results maintained at 2 weeks and at 3 or 4 months.
Yamamoto & Mochizuki (1988)	All participants reached 90% acquisition criteria.	Generalization occurred to other settings	Results maintained in 2 out of 3 participants at a 2-month follow-up.

Prior to training, assessment sessions identified food items that were reinforcing or aversive. Items that the participant repeatedly ate were selected to respond a “Yes” and those the participant pushed away or spat out were selected to respond a “No”. To establish “yes” and “no” as mands, the teacher presented the item and asked, “Do you want this?” If the participant responded correctly to the “yes” food, the teacher then placed the food in the participant’s mouth. If the participant said “No” to “no” food, the teacher immediately took away the food. Incorrect responses were always followed by modeling of the correct response. For training, ten sets of yes/no foods, and six sets of yes/no foods were identified for each participant, respectively. Each set consisted of two yes items and one no item. Yes/No response training was conducted with the first set of food. Generalization effects were tested with untrained items following successful training with the first set. The results showed that both participants acquired yes/no responses during training sessions with first set of food items, and they could respond with the correct response when the untrained items were presented. After the generalization session, maintenance results showed that they responded 90 to 100% accurately.

Duker and Jutten (1997) worked with three persons who had profound mental retardation. At the onset, participants were able to spontaneously use a large number of gestures as requests. Training exemplars for Yes/No responses were identified by teachers’ reports. One session consisted of ten trials: five “Yes” and five “No.” During training, the trainer presented each item and asked, “Do you want this one?” If the participant answered correctly within five seconds, the trainer gave them a sip of a soft drink or a piece of cookie. If the participants did not respond correctly, training was

provided using “most to least prompt” and “repetition of correct response.” The training results showed that all participants acquired the target gestural responses. This result was maintained for two months after termination of the training. However, during the generalization probes across settings and persons, target responses did not occur, so generality training was conducted. During generality training, the same prompt procedures were used to train Yes/No responses. After this training, although correct responses slowly increased among all three participants, only one participant exceeded his previous level of performance (i.e., 50% of correct responses).

Functional communication training (FCT) has been demonstrated as an effective intervention for replacing challenging behavior with communicative mands. While traditionally research on FCT has focused exclusively on challenging behavior, recently its application has been extended to replacing prelinguistic behaviors with more symbolic communicative behaviors not labeled as challenging behaviors. In this review, three studies that taught rejecting responses were identified (Drasgow, Halle, Ostrosky, & Harbers, 1996; Martin, Drasgow, Halle, & Brucker, 2005; Yi, Christian, Vittimberga, & Lowenkron, 2006).

Drasgow, Halle, Ostrosky, and Harbers (1996) worked with one child with severe language delays. She had two types of rejecting repertoires: pushing away and pulling away from an adult. When she was offered a non-preferred item, she pushed it away and when it was time to go to the circle or a structured activity, she pulled away from the adult, screamed, or threw herself to the floor. To teach more socially appropriate rejecting responses, the experimenter provided training to replace her pushing away behavior with shaking her head back and forth more than once. During training sessions, if she pushed

away when an object or piece of food was presented in front of her, the experimenter immediately taught the new replacing response using modeling and physical prompts. She used newly acquired rejecting gesture when the non-preferred items were presented. However, she did not use the rejecting gestures in the untaught situation.

Martin, Drasgow, Halle, and Brucker (2005) worked with one child with autism. His rejecting behaviors included pushing away items, yelling, bear hugging-grabbing, and leaving his seat. As a target behavior, touching a “No” icon to reject non-preferred items was to replace his behavior of pushing away. The results showed that the participant touched the “No” icon to reject the items when non-preferred items were presented, instead of pushing them away. However, indirect target behaviors such as yelling, bear hugging-grabbing, or leaving his seat did not decrease.

Yi, Christian, Vittimberga, and Lowenkron (2006) taught the “No” response using speech or signing to three children with autism. All participants engaged in challenging behaviors such as pinching, slapping, pushing, or biting. A brief analog functional assessment determined that their challenging behaviors served as an escape function. Through parent interviews, ten non-preferred items for each child were identified as aversive stimuli to teach socially appropriate rejecting behavior (i.e., the removal of aversive stimuli). Using a multiple baseline design across participants, mand training was provided to replace the challenging behavior with a “no” response behavior using a most-to-least prompt procedure. Specifically, if a student engaged in challenging behavior during a training session, physical prompts and time delay were used to prevent his behavior. Among the ten non-preferred items, three items were used for training purposes. After mand training with these three items, researchers randomly presented the

items to ensure the results of training were not achieved by order effect. After this phase, generalization effects were tested with seven untrained items. In this phase, if the students did not respond mand when untrained items were presented, mand training was continued until the mand was emitted without displaying challenging behaviors. The results revealed that all three participants correctly responded in 85% or more of the sessions. Collaterally, challenging behaviors were reduced to 0% during the last phase of the study.

Rejecting for Wrong item

Three studies examined the effects of procedures using wrong items (Duker et al., 1993; Sigafos & Roberts-Pennell, 1999; Yamamoto & Mochizuki, 1988). Yamamoto and Mochizuki (1988) investigated the effects of teaching rejecting behavior using the wrong-item format. All three students with autism and severe mental retardation could request items using one or two word sentences in response to a verbal prompt or cue such as, “What do you want?” Two adults, sitting five meters from each other, were involved in each session. One was a director who asked the student which object she wanted, and the other was a supplier who provided the objects that the student asked for. Prior to training, the experimenter identified known objects that students correctly responded to on both receptive and expressive tests, as well as unknown objects to which the students responded incorrectly. During pre-training, the director asked the student to bring one object to her from the supplier. The student then walked to the supplier and requested the object by saying, “Give me (item).” After getting the object, the student was expected to bring the object to the director. If the student brought the correct item, the director gave the student an edible item and said “good.” In this case, an artificial reinforcer was given

(i.e., edible item) that was not related to the item requested. One session consisted of 12 trials. Using modeling and physical prompting, this intensive training lasted until students correctly responded to more than 90% of the requests for two consecutive sessions without verbal or physical prompts. Using a multiple baseline design across students, after the baseline data was collected, intensive training was given for unmatched trials. For example, if the student asked for a pencil, but the supplier provided the wrong object, the student was required to say, “That’s not it” and ask for the pencil again. Using modeling and verbal prompts, this round of intensive training lasted until the student correctly responded to more than 90 % of the requests for two consecutive sessions. Results showed that after intensive training, when unmatched objects were provided, all three students responded 100% correctly. Free-play generalization data revealed that all students spontaneously requested objects and rejected objects if the objects did not correspond what they asked for. Follow-up data also showed that students were able to maintain this positive result over time.

Duker, Dortmans, and Lodder (1993) investigated the effects of intensive training (i.e., correction procedure) to teach manding gestures to five individuals with severe to profound mental retardation. Prior to the study, participants had between 7 and 14 manual signs in their repertoire. In this study, rejection was defined as “repeating the initially made gesture while being confronted with the unmatched referent.” (p. 45). That is, participants needed to repeat the same gesture for re-requesting instead of emitting rejecting response when the experimenter offered the wrong items. During intensive training, matched and unmatched trials were implemented. In matched trials, if a participant gestured, “I want a jigsaw puzzle,” she would be given a jigsaw puzzle. In

unmatched trials, if a participant gestured for same item, clay or another item was given instead of a jigsaw puzzle (i.e., wrong item was given). If the participant accepted the wrong item, the participant was told, “No, you want the jigsaw puzzle” and was guided to repeat the “jigsaw puzzle” gesture ten times. If the participant did not accept the wrong item and repeated correct gesture, the participant was told, “Good, you wanted a jigsaw puzzle” and was given a puzzle for 30 seconds as well as a sip of drink or a piece of cookie. The results showed that overall mean of five participants were 38.8% (range 21.8-70%) during intensive training. During the training phase, mean performance of three participants in this phase was 49.6%.

Sigafoos and Roberts-Pennell (1999) worked with two six-year old boys with autism. Naturalistic observation prior to the experiment revealed that neither had socially acceptable “no” indications in their behavior repertoires. The manner of indicating “no” was operationally defined for each child. For one, a natural head shaking gesture was selected as the rejecting behavior. For the other, pressing the switch of an electronic augmentative communication device was selected to indicate “No, thanks. I want to the other one.” Prior to the experiment, preference assessment identified the most and least preferred items among toys, beverages, and food, so that total six items were identified. Six correct-item trials and six wrong-item trials were conducted using a discrete-trial format. To initiate a trial, the experimenter presented two items, one highly preferred and the other less preferred. This provided the participant with the opportunity to select one from the experimenter. On correct-item trials, the experimenter offered the item that the child selected, while on wrong-item trials, the experimenter offered the other that did not correspond with what the child selected. During the training trials, when the wrong item

was delivered and the child did not indicate a “no” response, the correct rejecting behavior was prompted using the least-to-most prompt. Additionally, a time delay procedure was also used. The results showed that both of participants quickly acquired new rejecting responses. These results generalized with a new trainer and untrained items, and were maintained over time.

Comments on the Form, Function, Context, and Types of Communicative Rejecting

Any communicative event consists of three interrelated components: form (e.g., topographies, or modes of communication), function (e.g., requesting, rejecting, or commenting), and context (e.g., setting, or situation in which the communication occurs) (Brady & Halle, 1997). The ten studies are summarized in terms of form, function, and context. First, several modes of communication were used to indicate rejecting behavior. Three studies used communicative gestures (Drasgow et al., 1996; Duker & Jutten, 1997; Sigafoos & Roberts-Pennell, 1999), four studies used vocal words (Hung, 1980; Neef et al., 1984; Yamamoto & Mochizuki, 1988; Yi et al., 2006), two studies used symbolic communication forms, such as a “NO” icon card (Martin et al., 2005) or a voice output device (Sigafoos & Roberts-Pennell, 1999), and three studies used manual signs (Duker et al., 1993; Reichle et al., 1984; Yi et al., 2006). In terms the function of the newly taught communication, most studies taught multiple functions, including rejecting behaviors. Three studies taught requesting and rejecting (Drasgow et al., 1996; Duker et al., 1997; Yamamoto & Mochizuki, 1988), three studies taught “Yes/No” responses (Hung, 1980; Neef et al., 1984; Duker & Jutten, 1997), two studies focused on teaching rejecting behavior and reducing challenging behaviors (Martin et al., 2005; Yi et al., 2006), one study taught requesting and re-requesting behaviors (Duker et al., 1993), and

one study taught requesting, rejecting, and commenting behaviors (Reichle et al., 1984). In terms of context in which rejecting behaviors were taught, seven studies used non-preferred items or foods to prompt the participant to reject those items (Drasgow et al., 1996; Duker & Jutten, 1997; Hung, 1980; Martin et al., 2005; Neef et al., 1984; Reichle et al., 1984; Yi et al., 2006) and three studies used a wrong-item format (Duker et al., 1993; Sigafos & Roberts-Pennell, 1999; Yamamoto & Mochizuki, 1988).

Rejecting responses established either a generalized rejection or an explicit rejection. That is, a single response such as saying “no” or signing “no” can be established as a generalized rejection in a variety of situations. All studies taught generalized rejecting behaviors except one, Duker et al. (1993). Duker et al. (1993) taught a re-requesting response, instead of a generalized rejecting response such as “No.” No study investigated the use of explicit rejections by people with disabilities.

All studies showed limited transfer across other types of communication skills without intervention, such as labeling an object to requesting one (Neef et al., 1984) or requesting an object to rejecting one (Reichle et al., 1984). Although the participants acquired the name of an item, this action did not guarantee that the participants could request that item when they needed it. In addition, acquiring a rejecting response in one specific situation did not generalize to different situations where it was necessary to indicate rejection (Drasgow et al., 1996). For example, Drasgow and his colleagues taught a “shaking head” gesture to a child to indicate rejection when a non-preferred item was offered. The child acquired this behavior within several sessions, but when he attended his non-preferred activities, he did not use the acquired gesture and instead engaged in challenging behaviors. Therefore, researchers should not expect automatic

generalization from one type of communicative rejecting behaviors to another type of rejection.

The Effectiveness and Generalization of Interventions for Rejecting Behaviors

With respect to strategies teaching rejecting behaviors, eight out of the studies used discrete trial instruction (DTI) and three studies used functional communication training (FCT). The studies that used DTI focused on teaching new forms of rejecting behaviors, such as gestural Yes/No (Duker & Jutten, 1997), vocal Yes/No (Hung, 1980), new manual signs (Duker, Dortmans, & Lodder, 1993), or using a voice output device (Sigafoos & Roberts-Pennell, 1999).

Most research on FCT has exclusively focused on its application to challenging behaviors. Recently, this strategy has been applied to replace prelinguistic behaviors not labeled challenging behaviors with more symbolic communicative behaviors. Martin et al. (2005) examined the effectiveness of FCT in replacing a pushing away behavior with touching a “NO” icon when non-preferred items were presented. The researcher directly targeted his pushing away behavior as the target training behavior. That is, when the non-preferred items were presented, researchers prompted the participant to touch the “No” icon. In addition, they examined the indirect effectiveness of touching “No” icon to other types of challenging behaviors including yelling, bear hugging-grabbing, and leaving. The results showed that the pushing away behavior was replaced with touching the “No” icon to reject the non-preferred items, but he continued to exhibit the other types of challenging behaviors. The researchers interpreted that other types of challenging behavior required less response effort than touching the “No” icon or that the newly acquired response was not functionally equivalent to the challenging behavior. On the

contrary, Yi et al. (2006) taught participants to successfully replace challenging behaviors (such as pinching, slapping, biting, crying, covering their ears, or flapping their hands) with a vocalization of, “No, thanks” or signing “No.” All studies showed that participants acquired the target rejecting responses during the training sessions. However, these results did not generalize across different types of rejecting responses. Therefore, it is still unclear whether each type of communicative rejecting behavior in specific context would generalize across different contexts where a rejecting response may be necessary.

For example, Martin et al. (2005) showed that the participant’s pushing away behavior was replaced with touching “no” icon when the nonpreferred items were presented. However, other challenging behaviors did not decrease. Researchers found that “pushing away” might serve to reject items, while his other challenging behaviors might serve as an escape from the situation or some aspect of it. Therefore, his challenging behavior did not decrease collaterally by touching the “No” icon. In another study, Drasgow et al. (1996) taught the participant to protest by shaking her head “no” when unpreferred items were presented. However, there was no evidence of generalized use in another rejecting situation in which she was accompanied to an unpreferred activity. This evidence showed that a single specific type of rejecting behavior in a single context did not generalize to a different environment. Researchers suggested that the participant might perceive differently in each of the two situations. She pushed away non-preferred items when they were presented to her, but pulled away or threw herself to the floor when she was headed to a non-preferred activity. The researchers interpreted that training situations for new rejecting forms were restricted to narrow environmental situations, so the generalized responses were not likely to occur. To solve this issue, they recommended

a general-case instruction and milieu teaching techniques. Researcher recommended providing sufficient stimulus exemplars to promote generalization across tasks, across people, and across settings (Stokes & Baer, 1977), although little research was actively designed to promote generalization.

Finally, in several studies a sip of a soft drink or a piece of a cookie was given to the participant after a correct response (Duker, Dortmans, & Lodder, 1993). For example, in Duker and Jutten (1997), “In order to control for reinforcement density, following each third and ninth trial of the session the individual was given a sip of soft drink or a piece of a cookie” (p. 62). Reichle, Rogers, and Barrett (1984) pointed out that in communication intervention, reciprocal mismatch occurred between responses and reinforcers. For example, when a teacher holds up an object such as a pencil and asks, “What do you want?,” and the participant says, “a pencil,” the teacher will then give the learner an M & M to teach requesting behavior. In this situation, the discriminative stimulus is matched with a request, while the reinforcer (i.e., M & M) is not consistent with the requesting (i.e., pencil). If communicative rejecting behavior is a mand, removing wrong item, or removing non-preferred items themselves should be reinforcers. If naturally occurring motivational states (such as preferred or non-preferred items) were used immediately after lunch to teach rejecting behaviors, acquisition or generalization was enhanced when learners acquired a response (Drasgow, Halle, & Sigafos, 1999).

A Review of Literature using Missing-Item Format

Developing mands has been the primary target behavior in communication intervention studies for several reasons. First, mands are the first communicative functions to emerge in typically developing children. Second, developing mand

repertoires allow children to access reinforcers when they need them (Tirapelle & Cipani, 1991). Successfully using mands allow children to access conditioned and unconditioned reinforcers, as well as establish speaker and listener roles to further verbal development. Recently, motivational variables have been incorporated to develop communication intervention for children with disabilities (Sigafos, 1997).

Michael (1982) defined an establishing operation as “any change in the environment which alters the effectiveness of some object or events reinforcement and simultaneously alters the momentary frequency of the behavior that has been followed by that reinforcement” (pp. 150-151). For example, when playing solitaire on a laptop, both the laptop and mouse are necessary. If an individual receives the laptop, but not the mouse, she would need to request the mouse to play solitaire. In this situation, the laptop is a motivating operation likely to establish a mouse as an effective type of reinforcement, thereby creating the need to request the missing mouse.

Several instructional strategies have been developed to teach mand. Among them, missing-item format has developed as a variation of incidental teaching instructional strategy (Cipani, 1988). This strategy is easily embedded in naturally occurring activities. This section looks at six studies in which the presence of an object in a behavior chain leads to a terminal reinforcer. In studies where conditioned reinforcers were removed from the activity chain, the presence of other items associated with the condition reinforcer may have provided supplementary stimulation. For example, events leading up to watching a DVD using a portable DVD player include grabbing the DVD player, getting a DVD, opening the portable DVD player, putting the DVD into the DVD player, pressing the “play” button, and enjoying the movie. If the DVD is missing, it would act as

a conditioned reinforcer because of its necessary to watch a movie. If the DVD is unavailable, the person will likely request a DVD to complete the activity.

When learning requesting behaviors, participants are usually first taught how to complete a chain of activities. The chain usually consists of several steps, such as preparing food or enjoying activities, and ends with the consumption of a product (e.g., eating the prepared snack) or doing an activity (e.g., painting with watercolors). After learning how to complete the activity, the next step is to remove a necessary object before the participant begins the activity.

Table 2.3. Summary of Participants' Characteristics using the Missing-Item Format

Studies	Subject name	Age (yr)	Main disabilities	Dual diagnosis	Type of mand	Mode	
Hall & Sundberg (1987)	Male	16	Profound deaf, severe MR	No report	Requesting	Manual sign	
	Female	17					
Romer et al. (1994)	Julie	27	Moderate to severe MR	No report	Requesting	Manual sign	
	Mike	37					
	Bill	30					
	Tom	30					
Sigafos et al. (1995)	Experiment 1	Ellen	Significant intellectual delay	Cerebral Palsy	Requesting	Photographs	
		Amy		Cerebral Palsy			
		Curt		No report			
	Experiment 2	Emma	7	Severe intellectual disabilities	Cerebral Palsy	Requesting	Color photographs
		Susan	6		No report		
	Sigafos et al. (1989)	Carol	36	Severe MR	Down syndrome	Requesting	Line drawing Graphic symbol card Drawing
Dan		28	Profound MR	No report			
Larry		?	Profound MR	No report			
Sigafos et al. (1990)	Paul	23	Severe MR	Down syndrome	Requesting	"Want" symbol, line drawing	
	Dave	37	Severe MR				
Tirapelle & Cipani (1991)	Allen	6	Severe MR	Down syndrome	Requesting	Vocal	
	Sary	5	Moderate to mild MR	Cerebral Palsy		Vocal & Sign	

Table 2.4. Summary of tasks, experimental design, and results Using the Missing-Item Format

Studies	Subject name	Tasks	Prompt strategies	Results	Generalization	Follow-up
Hall & Sundberg (1987)	Male	Making instant soup, opening a can of fruit, wiping up water, vending machine	Tact vs. Imitative	Participants acquired requesting responses	Untrained items	No report
	Female	Making instant soup, opening a can of fruit, making instant coffee, coloring a large picture				
Romer et al. (1994)	Julie	Latchhook, eating dinner, exercise, making juice	Time delay, modeling, prompt	Participants acquired requesting responses	Untrained object	Maintained
	Mike	Paint by number, vending machine, setting table, eating dinner				
	Bill	Setting table, eating dinner				
	Tom	Setting table, eating dinner, vending machine, leading for work				
Sigafoos et al. (1995)	Ellen	Tape player-tape	Time delay, least to most prompt, error correction	Participants acquired requesting	Untrained objects	Maintained
Experiment 1	Amy	Mirror-hair brush				
	Curt	Wooden block with small hole-string				
Experiment 2	Emma	Painting	Time delay, least to most prompt	Participants acquired requesting	Untrained objects	Maintained
	Susan					
Sigafoos et al. (1989)	Carol	Applesauce-spoon, pop-opener	Time delay, modeling, least to most prompt	Tact training led mand responses	No report	No report
	Dan	Applesauce-spoon, pop-opener, juice-straw				
	Larry					
Sigafoos et al. (1990)	Paul	Applesauce-spoon, bottle of water with a cap-opener, juice-cup	Time delay, modeling, least to most prompt	Tact training led mand responses	No report	No report
	Dave	Applesauce-spoon, bottle of water with a cap-opener, juice-straw				
Tirapelle & Cipani (1991)	Allen Sary	Making cereal	Prompt	Participants requested	Not occur w/o training	Maintained

Overview of Studies

Missing-item format involves withholding one or more item needed to complete or engage in preferred activities (Cipani, 1988). Hall and Sundberg (1987) explained how to contrive the moment of teaching requesting behavior using a missing item format. Two deaf adolescents with severe mental retardation participated in this study. The participants were taught six tasks such as making instant coffee, opening a can of fruit, and wiping up water spilled on the table. For example, to make instant coffee, the experimenter withheld the cup for the coffee. Without a cup, the task could not be completed, so participants were expected to emit requesting signs to get the missing item for making instant coffee. Using a multiple baseline across subjects and behaviors, as well as a multi-element design, experimenters investigated the differences in effectiveness between tact prompt and imitative prompt procedures when teaching requesting behavior. In the tact prompt procedure, if the correct mand did not occur, the experimenter presented the missing item, and signed, “what’s that?” and the participant was expected to tact the item. Tact training was held prior to the mand baseline. The imitative prompt procedure was similar to tact training. However, during the imitative prompt procedure, the experimenter modeled the manual sign while the missing item was not visually presented. If the participants did not imitate the manual sign, physical prompt was given. Results showed that correct mands consistently occurred only after training was implemented. This result supported the hypothesis that tact and mand is functionally independent at the time of acquisition. Teachers anecdotally reported that one participant kept consistently manding for missing items in novel stimulus situations and with novel persons four months after termination of the study.

Sigafoos, Doss, and Reichle (1989) conducted a study with three adults with severe to profound mental retardation. The goal was to learn mands and tacts using graphic symbols. Given that some audiences are not familiar with sign language, graphic symbols were developed. Training materials consisted of preferred foods or beverages, as well as the correct utensil required to access applesauce, yogurt, or pudding (spoon) or to drink juice (straw). Each participant learned to tact and mand with three sets of training materials. Using multiple baseline design across object/utensil sets, all participants were first taught to tact and then mand food/beverage items. During the tact probes, the experimenter presented the actual food, beverage, or utensil item and asked, "What is this?" If the participant did not answer correctly, the experimenter either physically guided the participant's finger to the correct symbol or modeled a correct pointing response. During the mand probes, the food or beverage was placed out of reach on the table. If the participant pointed to the "juice" symbol, juice was given. That initiated another ten second trial in which the straw was the required utensil for manding a straw. The results showed that acquisition of tact occasionally emerged as mands without direct mand intervention.

In the next study, Sigafoos, Reichle, Doss, Hall, and Pettitt (1990) investigated a spontaneous transfer of stimulus control whether acquisition of tact led to mand. The participants were two adults with severe mental retardation and down syndrome who attended a center-based day habilitative program. Three object/utensil sets were used such as applesauce/plastic spoon, bottle of water with a metal cap/a standard bottle opener, and carton of juice/straw. Prior to intervention, experimenters taught the generalized request response to "want." Using an ABA design, a multiple-baseline design

across object sets was embedded within object sets. In the first phase, the experimenter placed a piece of food or beverage on the table. If a participant pointed to the “want” symbol, the food or beverage was delivered contingent upon the response. The utensil needed to enjoy the food or beverage was not visible. In the second phase, a tact (utensils) baseline was conducted. The experimenter held up one of the utensils and asked, “What is this?” A correct answer elicited social praise (e.g., “That’s right, it’s a spoon.”). In the next phase, the mand baseline was conducted again. The results showed that two of the three mands emerged without direct training.

Tirapelle and Cipani (1991) trained two children with mental retardation to request for missing items needed to complete tasks. Initially, three tasks (i.e., making a cereal, brushing teeth, and writing with paper and pencil) were selected for training and generalization. Making cereal was used during the training sessions to train them. The experimenter brought the child to the snack area where the bowl, cereal, and milk were available, and asked the child to make cereal. Although the child poured cereal and milk into the bowl, the child needed a spoon to eat the cereal. Therefore, the child had to request a “spoon” from the experimenter. This missing item format created requesting and teaching opportunities for the child and teacher. A missing item was randomly chosen every session. Three sets of generalization measures were collected across different, novel adults, across different tasks (i.e., brushing teeth, writing with paper and pencil), and across different distances between the adults and children. Post-intervention measures were conducted: (a) multiple requests, (b) following instructions of teacher/therapist requests, and (c) wrong item requests. One month after the termination of the intervention, a follow-up measure was conducted in the snack setting. The results

showed that both participants requested the missing item during training sessions, and these results were maintained for one additional month. However, generalization across the two different tasks was not observed unless generalization training was conducted for these tasks. Similarly, generalization across different distance proximities did not occur without specific programming. However, post-intervention data was promising. When the experimenter gave a small amount of food, the participants made additional requests. Additionally, if the experimenter gave a wrong item, both participants re-requested the necessary item 100% of the time.

Sigafoos, Couzens, Pennell, Shaw, and Dudfield (1995) assessed the emergence of discriminated requesting when teaching selection-based communication skills (i.e., line drawing pictures) using a missing-item format. This is an important issue when the requesting response involves pointing to photographs, line drawings, or some other graphic symbol, because with these selection-based systems, the response topography is always the same, namely pointing. Three children with severe developmental disabilities participated in experiment one. The teacher identified three tasks for each child (i.e., a wooden block with a small hole through it and a short length of string, a mirror and hair brush, a tape player and music cassette). Photographs were taken of both objects from the identified pair. For example, the mirror was given to the child and then the child is presented with photographs of a brush, cassette tape, and a cup. The child is then expected to point to the “brush” photograph. Using a multiple-probe baseline design, participants were taught a requesting response. In phase one, for example, the experimenter gave string to one child, and she was taught to request the block. Least-to-most prompt and error correction procedures were involved during the intervention.

However, in phase two, if the experimenter gave a block to one child, then she needed to request string without a prompt. In phase three, the experimenter randomly gave the item so that children needed to request missing item to do each task. Seven weeks later they collected follow-up data. The results showed that two out of three participants acquired the requesting skills and maintained requesting missing item. However, one participant did not master skill acquisition, because he had difficulty matching real objects to photographs. The researchers suggested that a matching-to-sample skill as a pre-requisite skill was necessary to teach discriminated requesting. Experiment two, an extension of the first experiment, involved two children with severe intellectual disabilities. In this phase, a painting task involving at least three items (i.e., paper, water, brush, and paint) was used to teach requesting behavior. In this version of the experiment, two or three items were missing so that the participants needed to request multiple items. The results showed that training a request for one missing item from a set of three was sufficient to induce requests without intervention for the other two missing items.

Comments on Studies using Missing-Item format

The missing-item format has been successfully used to teach communication skills for individuals with moderate to profound intellectual disabilities, as well as sensory impairments such as hearing impairment (e.g., Hall & Sundberg, 1987). Six studies sought to validate the effectiveness of the missing-item format by demonstrating the acquisition rate of requesting responses of missing objects. These studies found that the missing-item format was successful in facilitating acquisition of communication skills with individuals using speech, augmentative, and alternative communication systems.

However, all of the studies examined in this review exclusively targeted the pragmatic function of requesting.

Researchers have pointed out that research was needed to evaluate the efficacy of the missing-item format in teaching other functions (e.g., Carter & Grunsell, 2001). Sigafos and Roberts-Pennell (1999) provided insight into how to accomplish this by using the wrong-item format. An opportunity to teach rejecting response could be created by offering a participant an item that was not requested (i.e., the wrong item). Sigafos and Roberts-Pennell (1999) used the procedure in a discrete trial format, but it may be possible to apply it to teach rejecting responses of a wrong item in the middle of the missing-item format.

It is recognized that generalization from teaching to non-teaching conditions is particularly difficult for individuals with severe intellectual disabilities. Failure of researchers to demonstrate meaningful generalizations may result in communication that is only exhibited in teaching conditions. Maintenance of acquired skills may present a significant problem for individuals with severe intellectual disabilities. Despite short-term effectiveness, an intervention ultimately fails if it cannot be maintained over the long-term. Maintenance was demonstrated in a few of the studies examined in this review (Romer, Cullinan, & Schoenberg, 1994; Sigafos et al., 1995; Tirapelle & Cipani, 1991), but no maintenance data was reported in others (Hall & Sundberg, 1987; Sigafos et al., 1989; Sigafos et al., 1990).

Conclusion and Summary

The first section reviewed studies that investigated the effects of procedures attempting to teach communicative rejecting behaviors for individuals with

developmental disabilities. The second section examined studies that used missing-item format. Several issues come up based on the ten studies teaching rejecting responses. First, the results of the studies revealed that discrete trial instruction (DTI) could successfully lead to acquisition of communicative rejecting behaviors when participants were given non-preferred or wrong items. Secondly, there was limited evidence of generalization to non-trained items and different contexts where it was necessary to reject. Only four out of the ten studies reported maintenance data.

Although several instructional strategies have historically been shown to improve requesting behaviors in communication intervention areas, interventions for teaching rejecting have rarely been done. In the reviewed studies, discrete trial instruction (DTI) was used most frequently to teach generalized rejecting communicative behavior, although Yamamoto and Mochizuki (1988) taught rejecting behaviors presenting wrong items in a social behavior chain, and Sigafos and Roberts-Pennell (1999) taught a generalized rejecting response in a choice-making context.

To date, the missing-item format has been utilized to contrive establishing operations. Carter and Grunsell (2001) commented that research using this procedure for individuals with disabilities has only focused on teaching requesting behaviors. Future research must focus on teaching different functions rather than just communicative requesting behaviors, such as communicative rejecting behaviors. This suggestion could be accomplished by providing the wrong item when the necessary item is requested to complete a preferred activity. That is, when the child wants to listen to her preferred music, she has a portable CD player, and a CD, but she does not have headphones. She can be taught to point a “headphones” picture to make a request. When she requests

headphones by pointing to the picture, the experimenter could offer the wrong item to create the opportunity to teach a generalized rejecting response. In this situation, the child can learn the generalized rejecting response to remove the undesired item, as well re-requesting the necessary item to listen to music (i.e., headphones).

Although wrong-item format is used to teach rejecting behavior, researchers have suggested that this format needs to apply to less structured situations (Sigafos & Roberts-Pennell, 1999). Sigafos and Roberts-Pennell (1999) have offered insight into how this might be done by using a discrete trial format adaptable to more naturally-occurring situations. Using this as a guide, this study attempts to teach communicative rejecting behavior using wrong items embedded into a missing-item format.

As described in Chapter 3, during pre-training session, five to six activities were taught to teach requesting behaviors using the missing-item format. These pre-training activities established the objects needed for chain completion as conditioned reinforcers. After the chain completion of each activity, it would be possible to manipulate conditioned establishing operations by removing items essential for chain completion. This procedure establishes the momentary effectiveness of the missing objects as reinforcers. For example, in Hall and Sundberg's study (1987), the chain of each activity itself led to a strong reinforcer. That is, if the participants made and then drank instant coffee, they also repeated the mands when there was a short delay before the presentation of a reinforcer.

In present study, wrong-item format was embedded into this missing-item format. In it, the experimenter provided the wrong item when the participant requested the missing item needed to complete the chain of activities. This wrong item would then

become the aversive stimulus that he needed to reject the wrong item and re-requested the necessary item, so that the activity may be successfully completed. Rejecting and re-requesting behavior led to playing with activities or consuming final products (the final reinforcer). The literature review in Chapter Two reveals that three studies utilized the wrong-item format to teach rejecting behaviors. However, no study has used the procedure in the present study to teach a generalized rejecting and re-requesting responses.

For example, in Duker, Dortmans, and Lodder (1993), if the participant requested, “I want to have a jigsaw puzzle,” clay was given. To complete this task, the participant needed to re-request the first item. If the participant did not re-request the item, the experimenter physically guided the participant to repeat the initial gesture ten times. If the participant did re-request the item, verbal praise as well as a sip of a soft drink or a piece of a cookie was given. Sigafos and Roberts-Pennell (1999) also used the wrong item format to teach a generalized rejecting response in a choice-making format. The experimenter presented two items to the participant. If the participant reached for one item, the experimenter provided the other item so the participant had to emit rejecting behavior. If the participant rejected the offered item, he could get the other item without making a re-request. While Yamamoto and Mochizuki (1988) showed positive results, generalization, and maintenance, several issues should be pointed out. First, researchers claimed they taught mands controlled by establishing operations. While that could be partially true, they used edible items as reinforcers. If students brought a pencil after they were asked for it, the director provided a small amount of an edible item.

The unique feature of present study is that the completion of each task itself leads to the natural reinforcer. First, systematic preference assessments identify several preferred activities. Chain completion sessions run with these activities. This completion of each chain of tasks is important because it establishes the objects needed for chain completion as conditioned reinforcers. After this, it would be possible to manipulate conditioned motivating operations by removing items essential to chain completion. This procedure establishes the momentary effectiveness of the missing objects as reinforcer. Participants are taught to request missing items during pre-training sessions. After acquisition of this behavior, the study creates the opportunity to teach rejecting responses by providing the wrong item when the participant requests the missing item. This study extends the previous literature to teach rejecting response and request the alternatives using the wrong-item format embedded into the missing-item format.

CHAPTER THREE

METHODS

This chapter describes the methods utilized in the present study. First, the participant characteristics and settings are outlined. Second, the chapter describes stimulus materials and the definition of target responses. Third, experimental design is discussed. Fourth, the chapter describes the research procedures, including pre-training, baseline, training procedures for teaching rejecting and re-requesting response, generalization, and maintenance. Lastly, the procedures for measuring interobserver agreement and procedural integrity are delineated.

Participants

Five students with autism and speech impairment began the study. Four of the five completed the study. One formal assessment (*Adaptive Behavior Assessment System*® — *Second Edition, 2003*) results were available. *Adaptive Behavior Assessment System*® — *Second Edition, Teacher form (2003)* is a standardized assessment scale to assess adaptive skills in children ages 5-21. The participants were rated on nine domains: communication, community use, functional academics, school living, health and safety, leisure, self-care, self-direction, and social. The adaptive domains and General Adaptive Composite have a mean of 100 and standard deviation of 15. Descriptive classifications range from very superior to extremely low: 130 or more=very superior to 70 or less = extremely low. When administered in Teacher form, internal consistency was calculated to be from .97 to .99. Test-retest reliability was conducted with 569 children (.90). Interrater reliability was .82.

Dan was a seven year-old African-American boy with autism and speech impairment when the study began. According to the *Adaptive Behavior Assessment System*® — *Second Edition (2003)*, his level of adaptive functioning was “extremely low” in all nine subdomains (i.e., communication, community use, functional academics, school living, health and safety, leisure, self-care, self-direction, and social). His overall score of *Childhood Autism Rating Scale (CARS, 1986)* was 35, indicating the presence of the types of autism in the mild to moderate range. Specifically, he fell within the moderate range in the area of verbal communication. His requesting-related IEP goals were “Dan will request missing items needed for a task to do an activity when given some of the items necessary to do the activity by scanning to the correct page of the needed item and pressing the button of the item.” His rejecting responses included staring at the teacher with a grimace, making a negative vocalization, dropping it on the floor, and quietly crying. He displayed self-stimulatory behaviors such as playing with the strap attached to his communication device. Regarding behavioral problems, pinching adults and peers was observed. English was the primary language spoken at school and at home.

Rob was an eight year-old Caucasian boy with autism and speech impairment when the study began. According to the *Adaptive Behavior Assessment System*® — *Second Edition (2003)*, his level of adaptive functioning was “extremely low”. His overall score on the *CARS* was 43, indicating the presence of the types of autism in the significant developmental disruption range. He fell within the moderate to severe range on verbal communication. Rob’s requesting-related IEP goals were “He will request items or actions by using simple sentences (i.e., I want + item or action) using pictures on the first occasion.” His rejecting responses included pushing, throwing objects, whining,

and hitting his knees while saying “Naa” in a high pitched voice. When the study began, he used diapers at school and at home. He displayed self-stimulatory behaviors such as placing his finger tips directly in front of his eyes, looking in the mirror and dancing, and looking at his shadow. He took “Trileptal” for seizure during the course of the study. English was his primary language at home and at school.

Dave was a nine and half year-old Caucasian boy with autism and speech impairment when the study began. He was nonverbal and spoke no intelligible words. According to the *Adaptive Behavior Assessment System*® — *Second Edition (2003)*, his level of adaptive functioning was “extremely low”. His requesting-related IEP goals included “Dave will use his augmentative device to request attention” and “Dave will request help with augmentative device 1 or 2 for specific situations with one verbal prompt.” In terms of rejecting responses, he exhibited the most severe rejecting responses of all the participants. When a demand was made, he closed his eyes, covered his ears with both hands, flopped to the ground, kicked objects, hit objects or persons with his arms, or hit his head against objects. English was his primary language and it was spoken both at home and at school.

Jay was a six and a half year-old African-American boy with autism and speech impairment when the study began. He was nonverbal and spoke no intelligible words. According to the *Adaptive Behavior Assessment System*® — *Second Edition (2003)*, his level of adaptive functioning was extremely low in all three domains (i.e., conceptual, social, and practical). His overall score on the CARS was 48.5, indicating the presence of patterns of significant developmental disruptions. His requesting-related IEP goal was “Jay will ask for what he wants when no reinforcer is present and when asked “what do

you want?” using sign or visual pictures”. To communicate, he used pictures attached to a Velcro board. His requesting responses were observed mostly during snack time. When the teacher provided choice making opportunities (e.g., when the teacher presented cookies, crackers, or fruit snacks, and asked “What do you want?”), Jay found the picture he wanted on the Velcro board, and then handed it to his teacher. However, his requesting repertoire was limited to several snack items. Often, when a missing item was needed to complete a task, he was unable to request the missing item due to his limited vocabulary. His rejecting responses included grabbing and hitting objects, handing back the object, putting the item aside, and putting unwanted or non-preferred food into the mouth of the student who sat next to him. He displayed stereotypic behaviors including hand or finger hitting, and body rocking. Regarding behavior problems, elopement was observed. English was the primary language spoken at school and at home.

Sally was a six year-old Caucasian girl with pervasive developmental disabilities – nonspecified (PDD-NOS). She was nonverbal and spoke no intelligible words. She exhibited stereotypic behaviors such as flapping strings, belts, snake toys, or other long items. These behaviors could be observed at home on a daily basis. Sally communicated through the use of gestures, bringing the objects used in an activity (e.g., bringing a swimsuit to indicate an interest in swimming) and using sign language for five preferred items: candy, ice cream, movie, string, and a ball. During informal observation and experiments, only two signs (i.e., ice cream and candy) were observed for requesting. Her rejecting behaviors included throwing chalk on the floor and running away when she was given chalk to draw a picture on a chalkboard, staring at the experimenter when a bowl of ice cream was given without a spoon, and handing back items. Her mother reported that

Sally's only challenging behaviors involved played with her tongue and spitting saliva on the table. English was the primary language spoken at school and at home. Sally was not introduced the training sessions to teach rejecting responses because her requesting responses of the missing items did not reach the pre-determined criteria for terminating the pre-training for requesting. In previous research done by Sigafoos et al. (1995), one of the participants had a similar difficulty. It reported that some individuals with severe disabilities might have a difficulty with photo-real object matching.

Settings

Dan, Rob, Dave, and Jay attended the same self-contained special education classroom at an inclusive elementary school. This classroom included one certified special education teacher, and two teaching assistants. Four other children diagnosed with autism and speech impairment were also present in this classroom. Sessions were conducted in the corner of their classroom with partitions used when necessary to reduce distractions. The partitioned area was commonly used for daily fifteen minute one-on-one direct teacher-student instruction. The experimenter conducted all trials on a one-on-one basis. The participant and the experimenter sat at a table in the classroom. The experimenter acted as primary data collector and also administered procedures during all phases of the study.

Stimulus materials

Stimulus materials consisted of four to six activities, depending on each participant. To identify the activities for pre-training, training, generalization and maintenance sessions, the experimenter conducted structured interviews and single stimulus assessment.

Structured Interview

The Reinforcer Assessment for Individuals with Severe Disabilities (RAISD; Fisher, Piazza, Bowman, & Amari, 1996; See Appendix A) was administered to teachers to identify preferred activities involving at least two items. RAISD was originally developed as a structured interview used by caregivers to generate a list of child-preferred stimuli in the general domains of visual, audible, olfactory, edible, social, tactile, and toys. The major goal was to identify as many potential reinforcers as possible. Teachers were asked to nominate several preferred activities involving at least two items. To facilitate the list's creation, several examples were provided: shaving cream and bubble wrap, a locked box with a key, a favorite carton box juice with a straw, a portable CD player with a CD, and headphones, a whiteboard with a marker, a puzzle, a coloring book with crayons, bread and peanut butter, and a Nintendo game with a controller. After gathering as many activities as possible, the participants' preferences were directly observed using single-stimulus preference assessment.

Single stimulus presentation

Using a procedure described by Pace, Ivancic, Edwards, Iwata, and Page (1985), each activity was presented once per session across eight sessions for a total of eight presentations of each activity. Prior to each session, the experimenter provided an opportunity for participants to interact with activities for ten seconds. A trial began when the components for each activity were present in front of the participant. If the participant approached the items within five seconds, he was able to interact with it for at least ten to fifteen seconds or he was allowed to consume it. For example, if watching a movie was identified as a preferred activity, the DVD player and DVD was put in front of the

participant. If the participant approached the DVD player, he was allowed to watch it for at least ten to fifteen seconds. If he did not approach it within five seconds or if he approached it within five seconds but the interaction did not last at least five seconds, the activity was taken away. Responses were measured as approach (+) or non-approach (-). Approach was defined as moving toward the stimulus within five seconds and playing with it for at least five seconds or until consuming edible reinforcers. Non-approach was defined as the absence of any approaching response within five seconds or if the interaction did not last at least five seconds. After the activity was presented eight times, the cumulative score for each activity was averaged and multiplied by 100%. Based on this assessment, the five or six highest-ranking activities were selected for this study.

Stimulus materials

Six sets of activities were identified for Dan. Set 1 consisted of Whac-A-Mole board and a plastic hammer. Set 2 was bubble solution and a wand. Set 3 consisted of a cup of juice with a tight lid and a straw. Set 4 was a DVD player and DVD (i.e., *Toy Story*). Set 5 consisted of marbles and a plastic slide for marble play. Finally, Set 6 consisted of a locked box with a key. The box contained his favorite fruit snack.

Six activities were identified for Rob. Set 1 included Playdoh and Playdoh tools. Set 2 consisted of a DVD player and his favorite DVD (i.e., *Barney*). Set 3 consisted of a locked box with a key. The box contained his favorite beef jerky. Set 4 was a Velcro dart board and balls. Set 5 consisted of a bowl of applesauce and a spoon. Finally, Set 6 consisted of marbles and a plastic slide for marble play. However, set 5 was removed after the ninth session during the pre-training, because he did not consume the

applesauce, but rather pushed it away or put the spoon into the apple sauce and did not eat it.

For Dave, five sets of activities were identified. Set 1 consisted of a cup containing Diet Coke with a straw. Set 2 was a DVD player and his favorite DVD (i.e., *Toy Story*). Set 3 consisted of bubble solution and a wand. Finally, set 5 consisted of marbles and a plastic slide for marble play. Set 4 consisted of a locked box with a key. His favorite snack (e.g., fruit snacks or Skittles) was placed inside the box. However, set 5 was removed after the tenth sessions during the pre-training phase, because once the marble tower was present, Dave engaged in challenging behaviors such as covering his ears, throwing himself to the ground, and hitting the chair.

Five activities were identified for Jay. Set 1 consisted of a cup of juice with a tight lid and a straw. Set 2 was a DVD player and DVD. Set 3 consisted of a locked box with a key. His favorite snack (e.g., fruit snacks or Gold Fish) was placed in the box. Set 4 consisted of bubble solution and a wand. Set 5 consisted of marbles and a plastic slide for marble play. However, set 5 was removed during the pre-training, because Jay constantly broke the stacked blocks for the plastic slide. One of his teaching assistants suggested that Jay's destruction of the stacked blocks was a form of play, because this action caused the staff to pay attention to him. Therefore, the marbles were not necessary to enjoy this activity and the activity consisted of one item and thus could not be used. After the second session, only four activities were used for Jay.

Communication system

Dan used a VOCA called *Vantage* (available from *Prentke Romich Company*). The first screen showed forty-five picture icons including “Yes”, “No”, “Want”, “TV”,

“Cup”, and “Tool”. For example, in order to request “straw” (one of the missing items), Dan needed to press the “Cup” icon on the first page, and then “straw” on the second. When the “Straw” icon was pressed, it produced a recording of a boy’s voice saying “Straw”. After pressing the “Straw” icon, the screen automatically returned to the first page.

Rob used a VOCA called *Tech Speak* (available from *Advanced Multimedia Devices, Inc*). This is an augmentative and alternative communication device designed to aid communication through direct selection. There are thirty-two square pictures on the board, each sized 1.25 x 1.25 inches. Among the messages, target requesting, and rejecting responses were included such as “I don’t want”, “Ball”, “Playdoh”, “Barney”, “Key”, and “Marble”. The remaining messages included his favorite edible reinforcers, help, and action words (e.g., tie shoes). For Rob, pressing a “missing object picture” button was selected as a target requesting responses. Pressing “I don’t want” was the target rejecting response.

Dave used an entry-level augmentative alternative communication system called *Springboard* (available from *Prentke Romich Company*). Similarly to Dan’s device, to access a missing item Dave needed to press a category icon from the pictures on the first screen and select the missing item picture from the next screen. For example, during the “Watching a DVD” activity, he needed to press the “Play” icon from the first screen, and then the “DVD” icon on the next page. “Yes” and “No” icons were placed at the corner of the first screen.

Jay used a picture exchange system for communication. These pictures were derived from *BoardMaker*. The pictures measured 2.5 x 2.5 inches and were placed on a

9.25 x 7.25 inch three ring board. For requesting the missing items during the pre-training phase, Jay initially used “Cheap Talk 8”, but after twenty-seven sessions he began to use PECS for requesting responses. This change was made based on his response pattern and stereotypic behavior while using “Cheap Talk 8”. When he used “Cheap Talk 8”, he pointed to point other pictures and then forcefully pointed to the target picture until he found the picture he wanted. Therefore, the communication mode was switched from “Cheap Talk 8” to PECS in order to more clearly measure his requesting response. The same pictures were used for PECS. Initially, the “Cheap Talk 8” included seven pictures including “Yes”, “No”, “Key”, “Straw”, “DVD”, “Bubble wand”, and “Marble”. After mode switching during pre-training for requesting responses, one missing item picture and two distracters were placed on the front board. Two Velcro strips were attached to the front page of this board. For example, when teaching requesting using the “drinking juice” activity, three pictures were placed on the front board, a picture of the target (i.e., straw) and two distracters. During the phase 1 of teaching rejecting and re-requesting sessions, five pictures were placed on the front board including a “No” picture, two target pictures, and two distracters. But, the communication board’s arrangement was not effective for teaching rejecting. Thus, the communication board arrangement was changed in phase 2 during training. In that phase, only one missing item picture, the “No” picture, and two distracters were placed.

Definition of Target Responses

During the chain completion assessment, a task was considered Completion if the participant initiated the first action of each activity within five seconds after the materials were presented in front of him and if he used the final product in the manner for which it

was intended. Noncompletion was recorded if the participant did not initiate the activity within five seconds after the verbal prompt was given and did not finish all necessary steps to complete each task (See p.62-63 for the chain completion assessment needed actions to complete each activity). During the pre-training and training phases, requesting was defined as pressing the correct missing item icon or handing the missing item picture to the experimenter within ten seconds after a verbal prompt to engage in the activity. In the training phase, rejecting was defined for Dan, Rob, and Dave as pressing target rejecting icon when the item did not correspond to the requested item within ten seconds. For Jay, rejecting was defined as handing the “No” picture to the experimenter within ten seconds when the experimenter asked “Is it what you need?” and presented the wrong item. For Dan, Rob, and Dave, re-requesting was defined as pressing the missing item icons within ten seconds after emitting the target rejecting response. For Jay, re-requesting response was defined as handing the missing item picture to the experimenter within ten seconds after re-presenting his communication board.

Experimental design

The study used a single-subject research design to measure the effects of training to teach rejecting and re-requesting response. A multiple-probe design across participants was used to investigate the effects of the training, which was to teach rejecting and re-requesting responses while embedding the wrong-item format into the missing-item format (Horner & Baer, 1978). This design allowed the researcher to examine the individual performance of participants using previous performances (baseline measures) as a control. In this study, baseline data were intermittently collected for each participant before training all participants. After stable baseline data was established for participants,

the first participant was trained to teach rejecting and re-requesting responses. For the remaining participants, baseline data were intermittently collected until the first participant emitted correct responses in over 70 % of his trials. If the first participant emitted a 70 % rejecting and re-requesting response during two consecutive sessions, and the baseline data were stable for the second participant, training began in the same manner for the second participant. Finally, when the participant displayed over 70 % rejecting and re-requesting responses, this procedure was repeated for the remaining two participants. If the participants emitted target responses of 100% in three consecutive sessions, the training was terminated. Generalization probes were conducted during baseline and after the termination of the training session using two untrained activities. This generalization data showed whether the effects of the training would generalize to untrained sets of activities for the participants.

This study employed a multiple-probe design across participants, one of the variations of a multiple baseline design. This design has several advantages. First, the goal of this study is for participants to acquire new responses for rejecting and re-requesting. Once the participants acquire new responses, they are unlikely to forget them. Secondly, the effectiveness of the intervention can be evaluated across several participants. Thirdly, in a multiple baseline design, data points are taken at every session in each tier of the multiple baselines. The lower tiers receive intervention later in the experimental sequence and a large amount of data is typically collected without intervention. Therefore, one of the drawbacks to a multiple baseline design is the prolonged baseline condition for those in the lower tiers of the design. To minimize this

drawback, a multiple-probe baseline design was used to collect baseline data intermittently (Kennedy, 2005).

Procedures

Prior to the training for rejecting and re-requesting responses, participants participated in the following pre-session trials: chain completion sessions and pre-training sessions for requesting missing items. The experimenter approached each participant and showed him a pictorial schedule indicating that it was time for the session to begin. Then, he was taken to the classroom corner with a table and two chairs). Each trial consisted of placing the components for one activity on the table in front of the participant. Each trial lasted approximately thirty seconds to one minute, depending on the characteristic of each activity. All trials were conducted by the experimenter, who ended each training session by saying that time was up. The participant then was taken back to his seat or released to check their schedule in the classroom. To check their schedule, they were led to the wall that held their schedule pictures.

PRE-TRAINING

The Chain Completion Assessment

Prior to the pre-training session for requesting responses, the four participants demonstrated whether they could complete five or six identified activities with all the necessary items. The experimenter provided assistance in completing the chains if the participants needed help to continue the activity, but participants were required to independently initiate the first action for each activity. Each participant was required to achieve a “completion” in two consecutive trials to terminate the chain completion trials. The activities, objects, and actions involved in each trial were unique and individually

identified for each participant. For example, after identifying five or six activities for each participant, the needed actions to complete each task were as follows:

Drinking juice or Diet Coke. This activity involved a plastic cup of juice or Diet Coke, a tight lid with a small straw hole, and a straw. The actions consisted of (a) picking up the straw and (b) inserting the end of straw into the lid's hole. The straw was later used to train the requesting response.

Opening a box with a key. This activity involved a metal box with a key to lock/unlock the box. The actions consisted of (a) picking up the key and (b) inserting the key into the lock. Due to the difficulty of unlocking the box, the experimenter provided help in turning the key to unlock the box, remove the key, and open the box. When the first two steps were completed by the participants, it was considered "completion" of this task. Inside each box, the participant would find a preferred item or snack. The key was used to train the requesting response.

Playing with bubbles. This activity involved a bottle of bubble solution and a wand. The actions consisted of (a) picking up the bubble wand, (b) inserting the end of the wand into the bottle, and (c) removing the wand. The experimenter blew on the end of the wand to produce bubbles. The bubble wand was used to train requesting for the missing item.

Playing with Marbles. This activity involved stacked blocks used to make a slide and several marbles. The actions consisted of (a) picking up a marble, and (b) putting it at the top of the slide. The marbles were used to train the requesting response.

Playing with Play-Doh. This activity involved a jar of Play-Doh and Play-Doh tools. The actions consisted of (a) opening the lid of the jar, (b) picking up the Play-Doh,

and (c) making shapes using tools. The jar of Play-Doh was used to train the requesting response.

Playing with Velcro dart. This activity involved a Velcro dart-board and three Velcro balls. The actions consisted of (a) picking up a Velcro ball and (b) throwing it at the dart-board. Three balls were used to train the requesting response.

Playing with Whac-A-Mole. This activity involved a Whac-A-Mole board game and a plastic hammer. The top of the board displayed four animal heads. A switch on the side of the board, operated by two AA batteries, turned on the light and played music. While the music played, the light randomly turned on and off as the four heads moved up and down. The actions consisted of (a) picking up the plastic hammer and (b) hitting an animal head when the light was on. When the participant picked up the hammer, the experimenter turned on the switch. The plastic hammer was used to train the requesting response.

Watching a DVD. This activity involved a DVD player and a preferred DVD. The actions consisted of (a) picking up the DVD, (b) putting it into the DVD player, and (c) closing the lid of the DVD player. The preferred DVD was used to train the requesting response.

Chain completion assessment held because the missing-item format would be effective when the participants were familiar with the relationship between the given item and the missing item (Sigafos & Mirenda, 2002). For example, to watch a DVD, the participant needs a DVD player and a DVD. If participants did not know the relationship of the two items was such that they would need to put a DVD inside the portable DVD

player, withholding the DVD would not be an effective teaching tool, whereas requiring participants to request the missing item would be effective.

Selection of missing item in each activity

An item for teaching requesting responses was selected to complete the final activity (i.e., the final reinforcer). Brady, Saunders, and Spradlin (1994) suggested that learners may be more motivated to request the missing item if it is necessary to access the final reinforcer. Therefore, if watching a DVD was selected as a training activity, a DVD was used for requesting response training, because it was closer than other items (i.e., a portable DVD player) to the terminal reinforcer (i.e., watching the movie) and therefore would be more powerful motivation to make a request.

Selection of the wrong items

Prior to the study, it was determined which items could be used in unmated trials. Wrong items were selected from common items with which the participants were already familiar. It should be noted that these wrong items were never reported or observed to be used as reinforcers. For example, a pair of scissors, glue, pens, a plastic fork, a plastic cup, a toothbrush, an item of clothing, a napkin, and a sock were used.

Pre-training session for requesting missing item

Prior to the baseline, five or six activities were identified for pre-training sessions. After each participant completed the chain completion sessions, the experimenter taught communicative requesting behaviors (i.e., learning to ask for a missing item necessary to complete each activity). The experimenter trained requesting responses the first time each task was presented at trial. One session involved four to twelve trials depending on how many error correction procedures were run. Pre-training ended when each participant

requested the missing item 100% of the time for two consecutive sessions. Training procedures were different based on each participant's device and communication mode. Table 3.1 presents activities and items for pre-training, training, and generalization probes for each participant.

Procedure for Prompting

To initiate a trial, the experimenter placed the all necessary items, except one, for the activity on the table in front of the participant along with the participant's own communication device or picture communication boards. With the item placed in front of him, the participant was verbally prompted to engage in the activity (e.g., "Drink the juice"). After this initial prompting, the experimenter waited for ten seconds. If the participant did not indicate the target requesting response, the correct requesting response was prompted. Progressive time delay and gestural prompting were used for those who used VOCAs (i.e., Dan, Rob, and Dave). For Dan, Rob, and Dave, if the correct requesting response did not occur initially within two seconds after giving the initial verbal prompt to engage in the activity, the experimenter held the missing item in front of the participant, and provided the gestural prompt (e.g., pointing toward the category picture to access the missing item picture) to say "What do you need?" These prompts were used because they were established as the prompt procedure in their classroom. Prompting began initially after a two-second delay, which was increased to five and then ten seconds. After conferring with the participants' teacher, physical prompts such as guiding their finger to the correct picture were not used. In addition, error correction was implemented when the participant pressed an incorrect missing item picture. In these

instances, the experimenter held the missing item and asked “What is this?” and provided a gestural prompt toward the missing item picture.

For Jay who used PECS, when the correct requesting did not occur, progressive time delay and tapping prompts (i.e., tapping the target picture after asking “What do you need?”) were used. If the correct requesting response did not occur initially within two seconds after presented with the initial verbal prompt to engage in the activity, the experimenter held the missing item in front of the participant, and provided the tapping prompt (e.g., tapping toward the missing item picture) to say “What do you need?” These prompts were used because they were established as the prompt procedure in their classroom. Prompting began initially after a two-second delay, which was increased to five and then ten seconds. As soon as the target requesting response occurred, the experimenter provided the requested missing item by saying “You need this” whether the target response was prompted or not. In addition, error prevention procedures were used for Jay when he attempted to select one of the “distracter” pictures. If he attempted to grab the incorrect picture, the experimenter blocked his hand and tapped the missing item picture.

TRAINING FOR REJECTING & RE-REQUESTING

Baseline

Each session involved two types of trials: *matched* and *unmatched trials*. In matched trials, the experimenter provided the item requested by the participant. In unmatched trials, the experimenter provided the participant with an item that did not correspond to that which the participant requested. One session consisted of six or eight trials, including three or four matched trials, and three or four unmatched trials.

Occasionally, additional trials were conducted during one session. The order of matched and unmatched trials was randomly presented to ensure that the correct rejecting responses were controlled by the offer of the wrong item. In addition, if only unmatched trials ran during the rejecting response training session, it could frustrate the participant and might lead to a decrease in requesting response. By randomly presenting matched and unmatched trials within a single session, the participants were motivated to keep requesting the missing item.

In matched trials, the procedure was the same to teach the requesting response. If the participants did not emit target requesting responses, the same prompting procedure was used during pre-training sessions for requesting.

In unmatched trials, the experimenter placed all necessary items, except one, for an activity on the table in front of the participant and prompted the participant to engage in the task. If the missing item was requested, the experimenter mistakenly offered the participant the wrong item. For example, if the participant requests straw during the “drinking juice” activity the experimenter would instead offer a pair of scissors. When the wrong item was offered, the experimenter held the wrong item in front of the participant at eye level and within reach, while looking expectantly at the participant. The experimenter continued to offer the wrong item for up to ten seconds to determine whether the participant emitted their specific target rejecting responses or not. If the participant emitted the target rejecting response within ten seconds after the wrong item was offered, the experimenter immediately removed the wrong item. After their target rejecting response, if the participant re-requested the necessary item within ten seconds, the experimenter offered the re-requested item. If the participant did not emit the

rejecting response within ten seconds, the experimenter withdrew the wrong item and the trial ended.

For example, in an unmatched trial for the “watching DVD” activity, only a DVD player was present on the table. The, experimenter would prompt “Watch a DVD.” If the participant requested “DVD”, the experimenter offered the unmatched item (e.g., glue) so the participant would need to reject the unmatched item and re-request the missing item to complete the activity. If the participant emitted their target rejecting response (e.g., pressing the “No” button) within ten seconds, the experimenter withdrew the wrong item and waited ten seconds to see whether the participant re-requested the DVD. If the participant re-requested the DVD within ten seconds, they were given the DVD and were allowed to watch the DVD for at least 15 to 20 seconds. The experimenter then removed all items and began a new trial.

During the baseline, if the participant did not request the necessary missing item within ten seconds after when the experimenter gave the verbal prompt to engage in the task, the experimenter asked “What do you need?” with gestural or tapping prompts. If the participant requested the missing item, then the missing item was delivered. If the participants emitted incorrect responses, the experimenter provided prompts for the correct requesting response. The percentage of requesting response during matched and unmatched trials can be found in Figure 4.4 and 4.5 in the Results section.

Table 3.1 *Activities and Items for Requesting Training, Rejecting/Re-requesting Training, and Generalization Probes*

Participant	Requesting Training		Rejecting /Re-requesting	
	Activities	Missing object	Training	Generalization
Dan	Whac-A-Mole	Hammer		
	Playing marble	Marble		
	Opening box	Key		
	Watching DVD	DVD		
	Blowing bubble	Bubble stick		
	Drinking juice	Straw		
Rob	Watching DVD	DVD		
	Playing marble	Marble		
	Opening box	Key		
	Playing Playdoh	Playdoh		
	Velcro Dart	Ball		
Dave	Opening box	Key		
	Watching DVD	DVD		
	Drinking Coke	Straw		
	Blowing bubble	Bubble stick		
Jay	Drinking juice	Straw		
	Opening box	Key		
	Blowing bubble	Bubble stick		
	Watching DVD	DVD		

Note. Shading indicates activities used during each phase

Training

Each session involved two types of trials: *matched* and *unmatched trials*. In matched trials, the experimenter provided the item requested by the participant. In unmatched trials, the experimenter provided a wrong item that did not correspond with what the participant requested. Each session consisted of six to eight trials, three to four matched trials and three to four unmatched trials. The order of matched and unmatched trials was randomly presented.

To initiate a trial, the experimenter placed all necessary items, except one, for the activity on the table in front of the participant along with the participant's own communication devices or picture communication boards. With the item placed in front of him, the participant was verbally prompted to engage in the activity (e.g., "Drink the juice"). After this initial prompting, the experimenter waited for ten second.

During matched trials, when the participant requested the missing item, the requested item was given. If the participant rejected the necessary item, the experimenter would say "Yes, you need it" if necessary, and provide physical prompts to complete the activity (In fact, this never happened. When the necessary item was provided, the participant took it and completed the activity in order to access the final reinforcer). If the participants did not emit target requesting responses, the same prompting procedure was used during pre-training sessions for requesting.

During unmatched trials, procedures were identical to those used during the baseline sessions, except that if the participant did not emit the target rejecting response when the wrong item was offered, the experimenter prompted the correct response using progressive time delay and gestural prompts for the students who used VOCAs (Dan, Rob, and Dave). For these three participants, if the target rejecting response did not occur initially within two seconds after presented with the wrong item, the experimenter held the wrong item in front of the participant, and provided the gestural prompt (e.g., pointing toward the "No" button as asking "Is it what you asked for?"). Prompting began initially after a two-second delay, which was increased to five and then ten seconds. In addition, when the participant reached for the wrong item, the experimenter asked "Is it what you asked for?" while holding the wrong item in front of the participant at eye level with a

gestural prompt (i.e., pointing toward “No” button). As soon as the participant pressed the “No” button, the experimenter withdrew the wrong item. If the participant pressed the incorrect button, error correction was implemented. In these instances, the experimenter held the wrong item and asked “Is it what you asked for?” with a gestural prompt.

For Jay who used PECS, phase 1 of unmatched trials were identical to the baseline session, except that if he did not emit the target rejecting response when the wrong item was offered, the experimenter prompted the correct response using progressive time delay and the tapping prompt. If the target rejecting response did not occur initially within two seconds after presented with the wrong item, the experimenter held the wrong item in front of the participant, and provided the tapping prompt (e.g., tapping toward the “No” picture as asking “Is it what you asked for?). Prompting began initially after a two-second delay, which was increased to five and then ten seconds. In addition, when the participant reached for the wrong item and tried to take the wrong item, the experimenter asked “Is it what you asked for?” while holding the wrong item in front of the participant at eye level accompanied with a tapping prompt. As soon as the participant handed the “No” picture to the experimenter, the experimenter withdrew the wrong item. If the participant grabbed a picture other than the target rejecting picture (i.e., “No” picture), error prevention was implemented. For example, when Jay selected the wrong picture, the experimenter blocked his hand and tapped the “No” picture again.

Phase 2 was identical to Phase 1, except for one. Only one missing item picture was placed on Jay’s communication board (see p.58’s Figure 3.4-1 for the arrangement of his communication). If the participant emitted the target rejecting response, the wrong

item was immediately removed. If Jay did not emit a target rejecting response, the same prompting procedures were implemented as in Phase 1.

For Dan, Rob, and Dave, the experimenter waited ten seconds for a re-requesting response after the wrong item was removed. If the participant re-requested the missing item within that time, he was given the missing item. If the participant failed to re-request the missing item within ten seconds, the experimenter used the same procedure from pre-training sessions for teaching requesting. If the participant emitted the correct re-requesting response, the experimenter gave the missing item to the participant and allowed him to access it for at least 15 to 20 seconds.

In Jay's case, after the wrong item was removed, his communication board was taken in order to attach the missing item, and re-presented in front of Jay. After re-presenting the communication board, if Jay re-requested the missing item within ten seconds, the missing item was provided. If the participant failed to re-request the missing item within ten seconds, the experimenter used the same procedure during pre-training sessions for teaching requesting. If the participant emitted the correct re-requesting response, the experimenter gave the missing item to the participant and allowed him to access it for at least 15 to 20 seconds.

Intensive training. One participant, Jay, required intensive training after the initial four sessions for rejecting training sessions, because his target rejecting did not increase. To initiate a trial, the experimenter placed the picture communication board and all necessary items, except one, for the activity on the table in front of the participant. With the item placed in front of him, Jay was verbally prompted to engage in the activity (e.g., "Drink the juice"). After Jay handed in the missing item picture, all pictures were

removed from his communication board except the “No” picture. This was done to provide an errorless learning opportunity. The experimenter then presented the wrong item and asked “Is this what you asked for?” and then the tapping prompt (i.e., tapping the “No” picture) was delivered. As soon as Jay handed the “No” picture to the experimenter, the wrong item was removed. After removing the wrong item, to provide a re-requesting opportunity, his communication board was taken by the experimenter who attached the missing item picture and two distracter pictures. When Jay handed the missing item picture to the experimenter after his communication board was re-presented, the requested item was provided that would allow him to complete the task. Twenty trials (i.e., ten trials for each training activity) were conducted in this manner.

Generalization

During baseline sessions and the following training sessions, the experimenter conducted generalization probes to determine if rejecting and re-requesting responses generalize to untrained activities. This probe used two untrained activities. The procedures for conducting generalization probes were the same as in the baseline procedure: one session consisted of four trials, two matched and two unmatched, and the same activity was presented twice. Occasionally, additional trials were conducted during one session. In the unmatched trials, the trial ended if the participant did not make an appropriate rejecting and re-requesting response. No prompt was delivered.

Maintenance

The first maintenance probe was conducted two weeks after the generalization probe. The experimenter visited the participants’ school and measured the maintenance of the requesting and rejecting responses over time. The maintenance sessions’ procedures

were the same as those used for the baseline. The maintenance sessions were conducted at least three times up to four weeks after the termination of generalization probes for Dan, Rob, and Jay, and up to five weeks after the termination of the generalization probe for Dave.

Measurement

Inter-observer reliability

Most sessions were videotaped. Inter-observer reliability was assessed in over 30 % of the pre-training, baseline, rejecting training sessions, generalization probes, and maintenance sessions using the videotapes. The experimenter was the primary observer and a graduate student in the college of education served as a reliability observer. For reliability checks, the primary observer (e.g., experimenter) and reliability observer recorded the occurrence or non-occurrence of the target responses for each participant. Sessions were randomly selected for reliability and observer training preceded reliability checks. Both observers reached agreement if they both scored the response as either occurring or not occurring. There was disagreement if one observer recorded the occurrence of a requesting, rejecting, or re-requesting response while the other recorded a non-occurrence. Therefore, either an agreement or a disagreement was scored for each assessment session. Inter-observer agreement was calculated by taking the number of agreements divided by the total number of agreements plus disagreements across all reliability checks, multiplied by 100%.

Table 3.2 *Interobserver Agreement for Jay, Dan, Rob, and Dave with Total Percentage of Sessions Coded for each Participant*

Phase	Jay	Dan	Rob	Dave
Pre-training	100 %	100 %	96.66 %	100 %
% of sessions calculated	31.8%	40%	40%	33.3%
Baseline	100 %	100%	100%	94% (R: 88-100%)
% of sessions calculated	42.9 %	33.3%	50%	50%
Generalization during baseline	100 %	100%	100%	100%
% of sessions calculated	50 %	33.3%	50%	50%
Training	94 % (R: 86-100%)	96% (R: 88-100%)	96% (R: 84-100%)	100%
% of sessions calculated	36.4 %	30%	36.4%	37.5%
Generalization	75%	88% (R:75-100%)	100%	100%
% of sessions calculated	33.3 %	33.3%	50%	50%
Maintenance	100%	100%	100%	100%
% of sessions calculated	33.3 %	33.3%	33.3%	33.3%

Note. R = Range

Procedural Integrity

Procedural integrity was conducted to ensure that the procedures for training sessions were implemented as planned. An independent observer used procedural integrity checklists for each phase of the study to code whether the experimenter followed correct procedures (see Appendix B). Evaluation of procedural integrity was conducted by randomly selecting the average 26% (range 18-50%) of baseline, training, generalization, and maintenance of rejecting training phase. The observer was told what to look for and how to use the checklist. Following this instruction, observers watched a video and complete the checklist. Each item in the checklist was coded as “Yes” for

observed, “No” for not observed, and “N/A” for not applicable. For each trial, the number of yes responses was divided by the total number of yes and no steps to calculate the percentage of correct procedural implementation. The mean was determined for each phase of the study: baseline, generalization during baseline, training, generalization, and maintenance. The average percentage of procedural integrity for all participants was 99% (range 95 – 100%).

Table 3.3 *Procedural integrity for all participants, including percentage of sessions calculated for each participant*

Phase	Dan	Rob	Dave	Jay
Baseline	100%	100%	98%	100%
% of sessions calculated	33.3%	33.3%	33.3%	28.6%
Generalization during baseline	100%	100%	100%	100%
% of sessions calculated	50%	50%	50%	50%
Training	98%	95%	97%	100%
% of sessions calculated	20%	18.1%	25%	27.3%
Generalization	100%	100%	100%	100%
% of sessions calculated	33.3%	25%	25%	33.3%
Maintenance	98%	98%	100%	100%
% of sessions calculated	33.3%	33.3%	33.3%	33.3%

CHAPTER FOUR

RESULTS

This chapter describes the results of the study in several sections. The first two sections present the results of preference assessment and chain completion assessment. The third section presents the results of pre-training for requesting the missing items. After the pre-training for requesting the missing items, the four participants were taught rejecting responses using a multi probe baseline design. Each session consisted of matched trials and unmatched trials. The fourth section presents the results of the initial requesting, rejecting, and re-requesting responses in the baseline, training, generalization, and maintenance phases during unmatched trials. In the final section, the percentage of requesting responses in the baseline, training, generalization, and maintenance phases during matched trials is present.

Preference Assessment

Figure 4.1 shows the results of single stimulus preference assessment for Dan, Rob, Dave, and Jay. To identify five to six training activities, the experimenter initially held a structured interview with the participant's teacher to gather information about each participant's preferred items or activities as many as possible. Through teacher interview, eight to ten activities were identified. These activities were presented in eight sessions using a single stimulus preference assessment method. The percentage of approach responses indicated in Figure 4.1 shows that each participant showed a different preference for each stimulus. However, they showed a high preference for several presented activities or items.

For Dan, ten activities were presented including playing Whac-A-Mole, bubbles, a fishing game, fruit snacks, chocolate chips, juice, watching a DVD, listening to a CD, a coloring book with crayons, and marbles. Dan showed a clear preference for the Whac-A-Mole (M=100%), bubbles (M=100%), watching a DVD (M=100%), fruit snacks (M=100%), marbles (M=100%), and juice (M=100%). He showed a moderate preference for the fishing game (M=62.5%), the music CD (M=50%), and chocolate chips (M=37.5%). However, he did not approach the coloring book and crayons. Therefore, highly preferred six activities were selected for use in Dan's pre-training phase, including playing Whac-A-Mole, making bubbles, watching his favorite movie, having fruit snacks, playing with marbles, and drinking juice.

Rob's preferences were assessed for apple sauce, beef jerky, a DVD (Barney), a fishing game, playdoh, the Whac-A-Mole, puzzles, a coloring book with crayons, velcro darts, and marbles. Rob also showed a clear preference for a DVD (M=100%), beef jerky (M=100%), playdoh (M=100%), velcro darts (M=100%), marbles (M=100%), and apple sauce (M=87.5 %). He also showed somewhat high preference for the coloring book with crayons (87.5%), the fishing game (M=75%), and puzzles (M=75%). He showed a moderate preference for the Whac-A-Mole (M=50%). Six highly preferred activities were selected for use in the pre-training phase, including watching Rob's favorite DVD (i.e., Barney), having beef jerky, playing with playdoh, playing with velcro darts, playing with marbles, and having apple sauce.

For Dave, preference was assessed for velcro darts, Diet Coke, stringing beads, bubbles, a DVD, marbles, the Whac-A-Mole, and fruit snacks. Dave showed a clear preference for Diet Coke (M=100%), bubbles (M=100%), a DVD (M=100%), marbles

(M=100%), and fruit snacks (M=100%) by approaching them during every trial of the preference assessment. He showed a moderate preference for velcro darts (M=75%), stringing beads (M=62.5%); and a low preference for the Whac-A-Mole (M=25%). Therefore, five activities were selected for use during Dave's pre-training phase, including drinking Diet Coke, making bubbles, watching his favorite movie (i.e., Toy story), playing with marbles, and having fruit snacks.

Activities assessed for Jay were the Whac-A-Mole, marbles, velcro darts, a fishing game, a DVD, bubbles, fruit snacks, and juice. Jay showed a high preference for marbles (M=100%), a DVD (M=100%), juice (M=100%), bubbles (M=100%), and fruit snacks (M=100%). He showed a moderate preference for velcro darts (M=62.5%) and the Whac-A-Mole (M=50%). However, he did not play the fishing game (M=0%). Therefore, five activities were selected for use in the pre-training phase: watching a DVD, drinking juice, making bubbles, having fruit snacks, and playing with marbles.

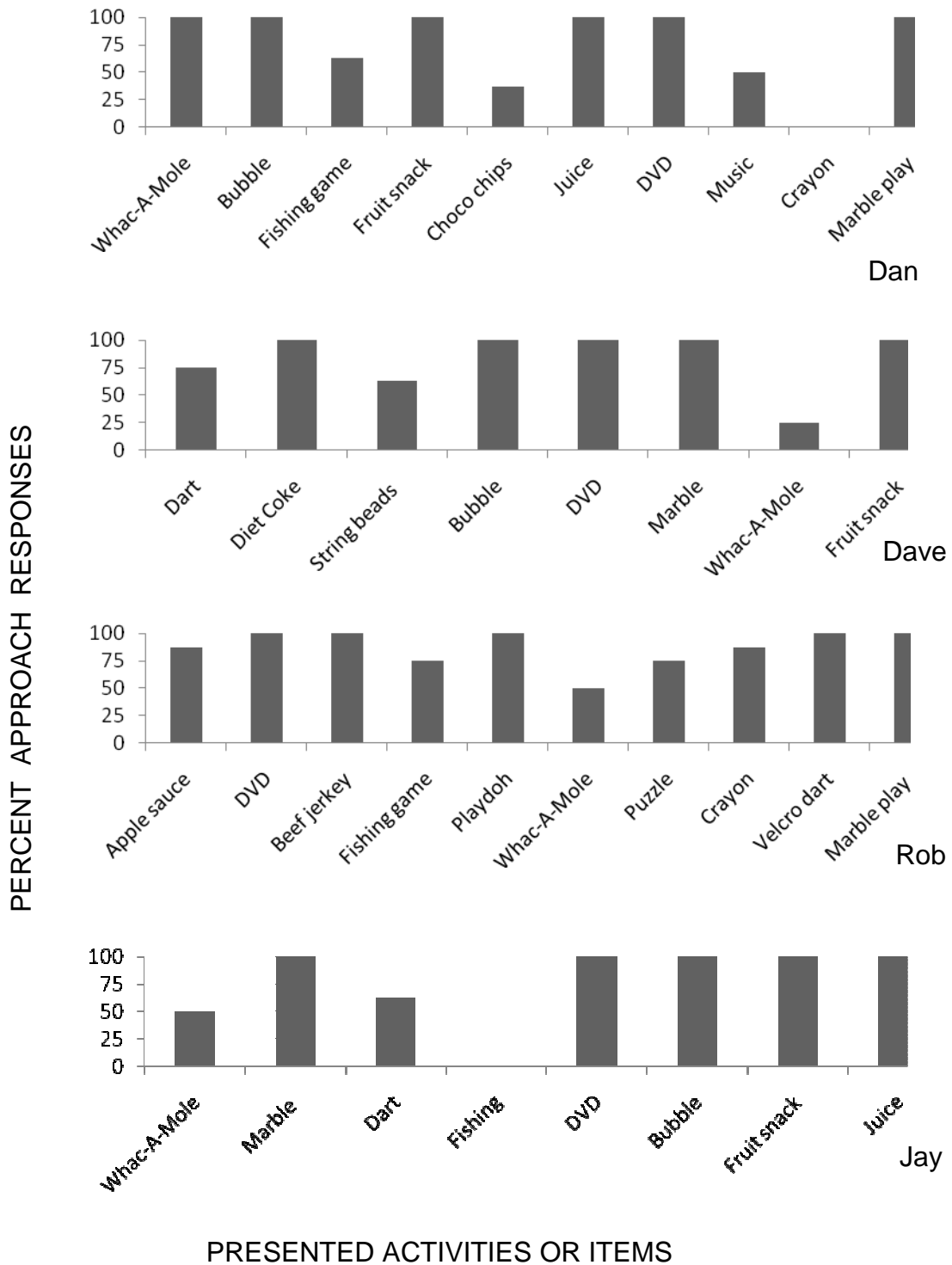


Figure 4.1 Percentage of approach responses to each stimulus by each of the four participants.

Chain Completion Assessment

Figure 4.2 reports the results of the chain completion assessment. Five to six pre-training activities were identified after finishing preference assessment was completed. The experimenter then conducted a chain completion assessment. For example, in order to watch a DVD, it is necessary to have a DVD player and a DVD. During the assessment, when a DVD player is presented, the experimenter provides direction to engage in the activity by saying “Watch a DVD”. The participant should know that a DVD is necessary if he wants to watch DVD. If the DVD is removed, it is possible that DVD could be established as a momentary reinforcer to access the ultimate reinforcer, in this case, watching a favorite movie. All activities used during the pre-training phase involved two items. For example, in order to drink juice, the participant was present with straw and a plastic cup containing juice with a tight lid and a small straw hole. The experimenter then prompted the participant to “Drink juice”. If the participant picked up the straw and inserted it into the lid, he was considered to have completed this chain of the task. When the participant completed each activity in two consecutive trials, the chain completion trial was terminated.

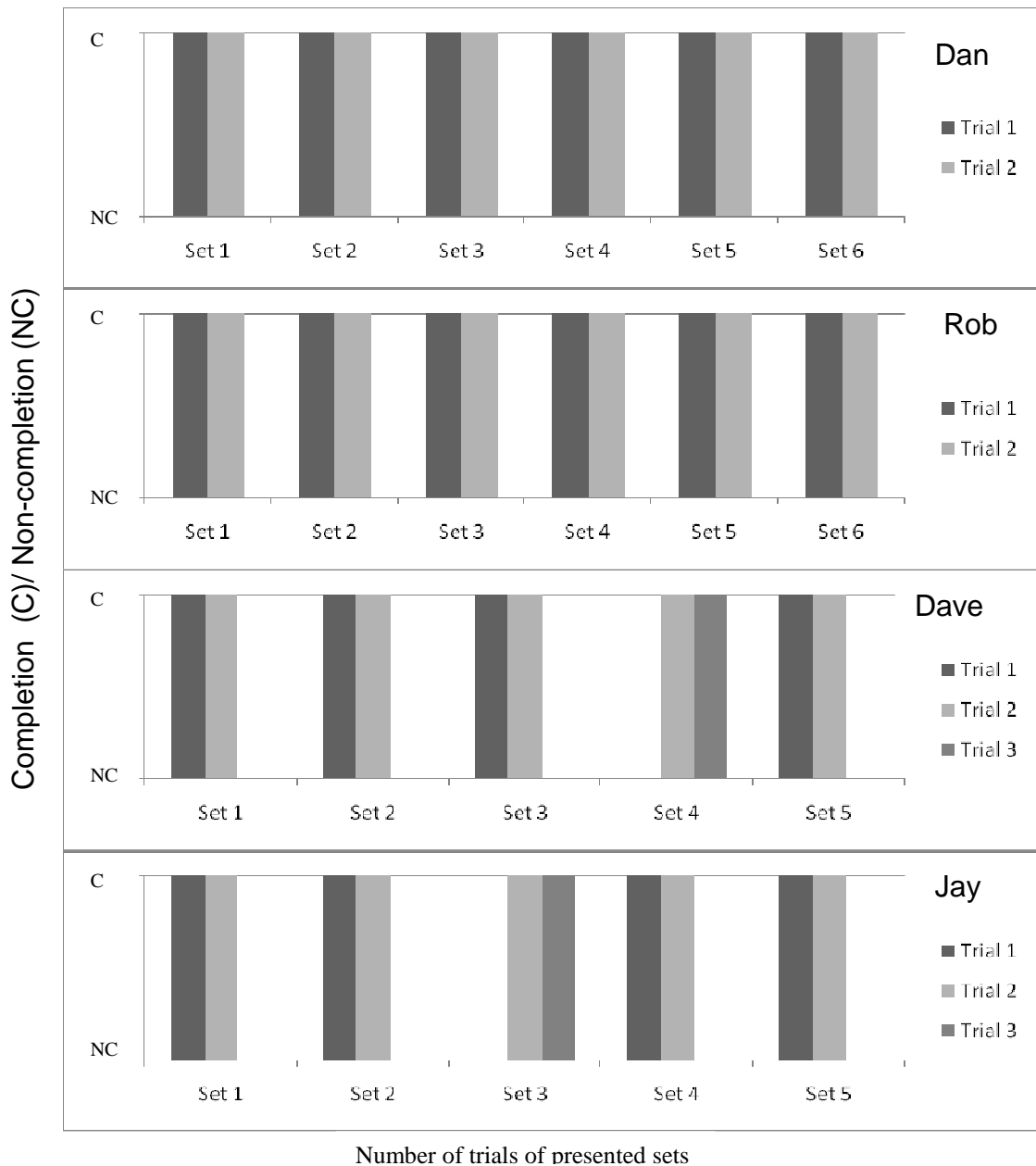
Dan was presented with six sets of activities. Set 1 was playing with Whac-A-Mole, set 2 was making bubbles, set 3 was drinking juice, set 4 was watching a DVD operated by a portable DVD player, set 5 was playing marbles with a plastic slide, and set 6 was opening a box with a key. His favorite fruit snack was placed in a locked metal box. Dan completed 100% of each activity for two consecutive trials.

Rob also completed 100% of each activity for two consecutive trials. Six activities were presented to Rob. Set 1 was playing with playdoh and playdoh tools, set 2 was

watching a DVD operated by a portable DVD player, set 3 was opening a box, set 4 was playing with velcro darts, set 5 was having apple sauce with a spoon, and set 6 was playing with marbles and a plastic slide.

Dave was presented with five sets of activities. Set 1 was drinking Diet Coke, set 2 was watching his favorite DVD, set 3 was making bubbles with a bubble wand, set 4 was opening a box with a key, and set 5 was playing with marbles. He completed 100% of all sets of activities in two consecutive trials, except set 4. In the first trial, when presented with a locked box and a key, he constantly tried to open the box with his hands. In this case, the experimenter provided both verbal and physical assistance. He completed this activity in the next two consecutive trials.

Five sets of activities were presented to Jay. Set 1 was drinking juice with a straw, set 2 was watching a DVD, set 3 was opening a locked box with a key, set 4 was making bubbles with a bubble wand, and set 5 was playing marbles with a plastic slide. Jay also completed 100% of all activities, except set 3, opening a locked box with a key. In the first trial, when presented with a locked box and a key, Jay picked up the key, but did not use it to try to open the box. In this case, the experimenter provided verbal and physical assistance. When he picked up the key and inserted the key into the key lock, he was considered to have completed this chain of the task. Jay completed this activity in the next two consecutive trials.



Note. C indicates Completion, NC indicates Noncompletion. For Dan, set 1=playing with Whac-A-Mole, set 2=making bubbles, set 3=drinking juice, set 4=watching a DVD, set 5=playing with marbles, set 6=opening a box. For Rob, set 1= playing with playdoh, set 2= watching a DVD, set 3=opening a box, set 4=playing with Velcro darts, set 5=having apple sauce, set 6=playing with marbles. For Dave, set 1=drinking Diet Coke, set 2=watching a DVD, set 3=opening a box, set 4=making bubbles, set 5=playing with marbles. For Jay, set 1= drinking juice, set 2=watching a DVD, set 3=making bubbles, set 4=opening a box, set 5= playing with marbles.

Figure 4.2. Completion (C) and Noncompletion (NC) of Dan, Rob, Dave, and Jay

Pre-training for requesting the missing items

Figures 4.3– 4.4 illustrate the percentage of correct requesting responses during the pre-training by each of the four participants. Figure 4.3 shows the results for Dan (upper panel), Rob (middle panel), and Dave (lower panel) who used VOCAs. Figure 4.4 shows the results for Jay, who used PECS. Black circles represent the percentage of correct requesting responses when the paired-stimulus item was present along with verbal direction to engage in activities. Dan participated in a total of 15 sessions (114 trials), Rob participated in 15 sessions (90 trials), Dave participated in 18 sessions (91 trials), and Jay participated in 44 sessions (206 trials) until they reached the pre-determined criteria (i.e., 100% in two consecutive sessions).

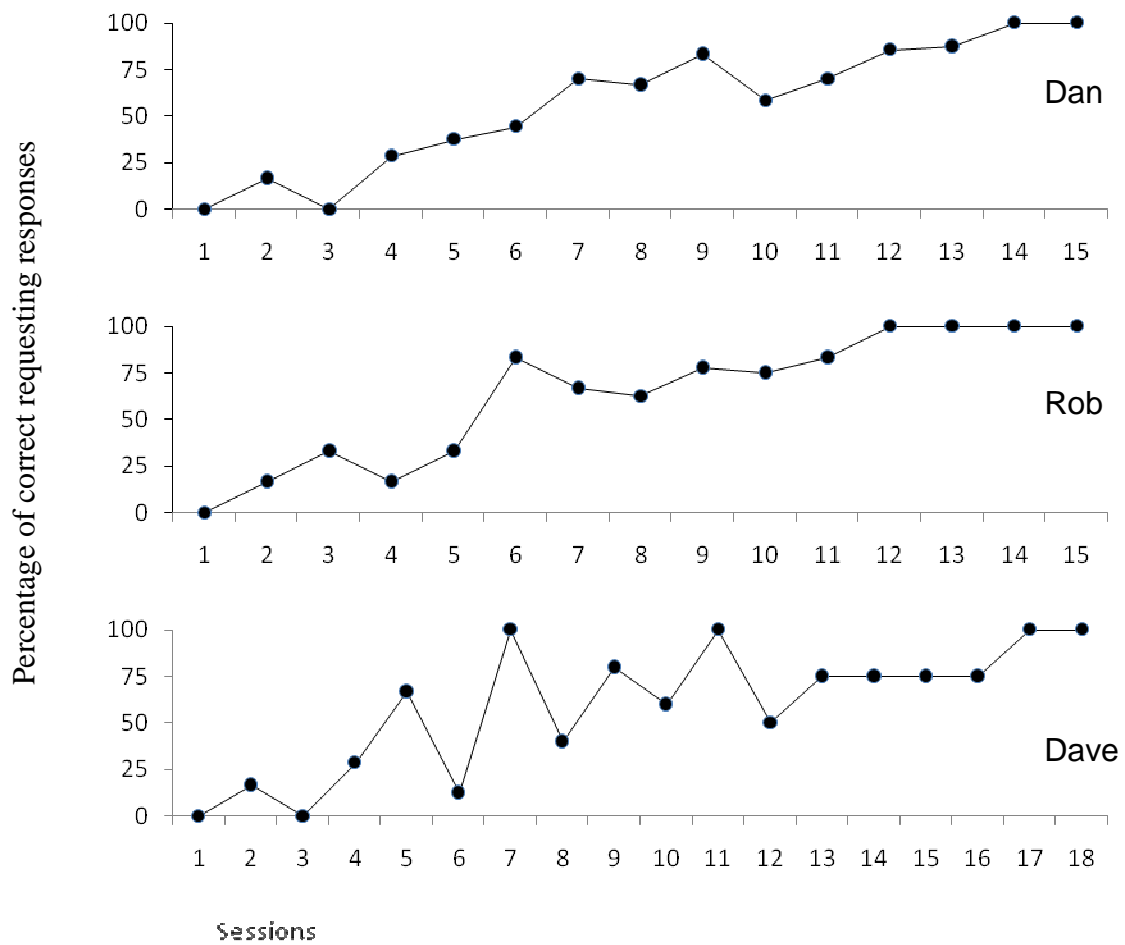


Figure 4.3 Percentage of requesting the missing items across sessions for Dan, Rob, and Dave (VOCA)

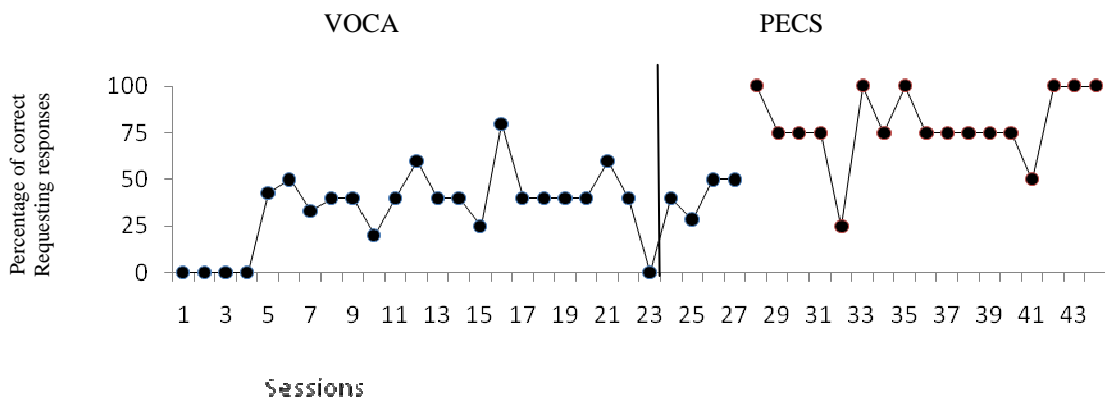


Figure 4.4 Percentage of requesting the missing items across sessions for Jay (PECS)

After the pre-training for requesting the missing items, rejecting responses were taught with four participants using a multi-probe baseline design. Each session consisted of matched trials and unmatched trials. Figure 4.5 graphically presents the results of initial requesting, rejecting, and re-requesting responses in the baseline, training, generalization, and maintenance phases during unmatched trials. Figure 4.6 also graphically presents the percentage of requesting responses in baseline, training, generalization, and maintenance phases during matched trials.

Training for Rejecting, and Re-requesting during Unmatched Trials

Figure 4.5 shows the percentage of correct requesting, rejecting and re-requesting responses across the baseline, training, generalization for untrained activities, and maintenance phases during unmatched trials for Dan, Rob, Dave, and Jay.

Baseline

During the baseline phase of unmatched trials, Dan requested the missing items 100% correctly in three of the baseline sessions. When the wrong item was given, Dan took it and shook it while grimacing at the experimenter, or making negative sounds. During three baseline sessions, Dan never emitted the target rejecting and re-requesting response during any baseline session.

Rob did request the missing items 100% of the time in three of the baseline sessions. When given the wrong item, he accepted it and looked at it, pushed it away, or made negative vocalization. Rob never emitted the target rejecting and re-requesting response during any baseline session.

Dave's correct requesting response was relatively high, yet varied across the baseline sessions (M=75 %, range 25% to 100%). In the first session, Dave did request

the missing items 100 %. However, in the second session, his requesting responses decreased drastically from 100% to 25%. During baseline, if the participant did not emit the target requesting response, the experimenter prompted the target response using the same procedure used in the pre-training session. After the second session, Dave quickly retrieved the previously acquired requesting responses, and the percentage of correct requesting responses prior to starting the training phase was 100%. In terms of rejecting responses, he accepted the wrong item and held it while looking at the wall or off somewhere in the distance. Dave did not emit the target rejecting and re-requesting response during any baseline session.

Jay did not fail to request the missing item during any baseline session, and the percentage of correct requesting response was 100%. In terms of rejecting responses, Jay displayed a relatively variety of response topographies when compared to other participants. In the fifth session, he once emitted target rejecting and re-requesting responses. In that trial, he took the wrong item, gave it back to the experimenter, and handed the target rejecting picture to the experimenter, and then within five seconds he handed the missing item picture to the experimenter. However, during the next two baseline sessions, these target responses were not repeated. The mean percentages of correct target rejecting and re-requesting responses were 3.6 % (range 0% to 25%), respectively.

Training

Figure 4.5 shows the percentage of correct requesting, rejecting and re-requesting responses in training phase during unmatched trials for Dan, Rob, Dave, and Jay.

Dan exhibited the correct requesting response a mean percentage of 100% of the time throughout ten training sessions. After the first training session for rejecting the wrong items, Dan exhibited an immediate increase in the percentage of correct rejecting responses, from 0% to 50%. Dan exhibited the correct rejecting response a mean percentage of 65% of the time. During ten training sessions, Dan's mean percentage of target re-requesting response was 77.5% (range 0-100%).

Rob also emitted the correct requesting response a mean percentage of 100% throughout eleven training sessions. After two training sessions for rejecting, Rob exhibited a gradual increase in the percentage of correct rejecting responses, from 0% to 33.3%. The mean percent of correct rejecting response during training phase was 63.6% (range 0-100%). Rob correctly exhibited the target re-requesting response, on average, 93.9% of the time. In the first training session, he immediately emitted target re-requesting response 100% after the experimenter prompted the target rejecting response.

Dave also did not fail to emit the correct requesting responses during his eight training sessions. For Dave, the percentage of correct rejecting responses during the training increased to an average of 54.8 % (range 0-100%). Over eight training sessions, Dave's mean percent of target re-requesting responses increased to 92.3% (range 50-100%).

Jay exhibited the correct requesting response a mean percentage of 100% during eleven training sessions. During his first four training sessions, Jay did not emit an independent rejecting response. When the experimenter provided tapping prompts while asking "Is it what you need?" Jay ignored the prompts and tried to grab the second available missing item picture twice, because the same two missing item pictures were

attached on his communication board. When he did this, the experimenter blocked him from grabbing the second missing item picture and tapped the “No” picture again. After this blocking occurred, he increased his use of challenging behaviors, such as body rocking and screaming. To focus on teaching the rejecting response, the experimenter implemented an errorless teaching procedure. That is, after he initially requested the missing items, only the “No” picture was present on his communication board when the experimenter asked “Is it what you need?” while the tapping prompt was provided. After 20 trials of intensive training, Jay reached the pre-determined acquisition criteria within seven sessions in phase 2. The percentage of correct rejecting response during the training in phase 2 increased to 78.6 % (range 25-100%). Jay also exhibited an immediate increase in the percentage of re-requesting responses from 0% to 50 % during the first training session. During the 11 training sessions, Jay’s mean percentage of correct re-requesting responses was 84.1% (range 50% to 100%).

In summary, in terms of initial requesting responses, all four participants exhibited 100% correct responses during training sessions. In terms of rejecting responses, Dan, Rob, Dave, and Jay reached the predetermined correct rejecting response criteria (i.e., 100% correct rejecting and re-requesting response in three consecutive sessions) within 10, 11, 8, and 11 sessions, respectively. In terms of re-requesting responses, all participants showed an immediate increase in correct re-requesting responses within first two sessions.

Generalization

Figure 4.5 shows the percentage of target requesting, rejecting and re-requesting responses during generalization probes conducted both before and after the training sessions during unmatched trials.

Prior to the training phase, two generalization probes were conducted with two untrained activities for each of the four participants. Dan requested the missing items correctly 100%, but failed to emit the target rejecting and re-requesting responses. Rob requested the missing items correctly 75% (range 50 to 100%), but similarly did not exhibit the target rejecting and re-requesting responses. Dave requested the missing items correctly 100% (range 100% to 100%), but failed to emit the target rejecting and re-requesting responses. Jay's mean percentage of correct requesting responses was 50% (range 50% to 50%), and he did not emit the target rejecting and re-requesting responses during the two generalization sessions during the baseline.

Generalization probes were conducted after the termination of training sessions to examine the generalization effects across untrained activities. Dan participated in six generalization sessions, Rob in four, Dave in four, and Jay in three. Dan exhibited the correct requesting response a mean percentage of 100% during his six sessions. He exhibited a 91.7% mean percentage of both correct rejecting responses, and of target re-requesting responses (range 50-100%).

Rob also emitted the correct requesting response a mean percentage of 100% for four generalization sessions. He emitted a 100% mean percentage of correct rejecting responses and an 83.3 % of target re-requesting responses (range 66.6-100%).

Dave also did not fail to emit the correct requesting responses during four sessions. He emitted an 100 % mean percentage of correct rejecting responses and an 87.5 % of target re-requesting responses (range 50-100%).

Jay exhibited the correct requesting response a mean percentage of 66.7% (range 50% to 100%) during his three generalization sessions. Jay emitted a 66.7% mean percentage of both correct rejecting responses and target re-requesting responses (range 50-100%).

Maintenance

Figure 4.5 shows the percentage of requesting, rejecting and re-requesting responses during maintenance sessions. Maintenance sessions were conducted for Dan, Rob, and Jay at two, three, and four weeks after the termination of the generalization probes. For Dave, maintenance sessions were conducted at two, three, and five weeks after the termination of generalization probes. Correct responses were maintained for most participants up to five weeks after the termination of the generalization probes.

However, the percentage of correct responses varied. Dan and Rob's requesting, rejecting, and re-requesting responses maintained 100% at two, three, and four weeks. Dave's performance maintained 100% at two, and three weeks after the termination of generalization probe. However, at fifth week, his percentage of correct requesting, rejecting, and re-requesting responses declined to 75%. At two week maintenance probe, Jay did request the missing items, rejected the wrong items, and re-requested the correct items 100%. However, after three weeks, his performance of correct re-requesting response decreased from 100% to 33.3%. While the percentage of initial requesting and rejecting responses was 100%, respectively, the percentage of re-requesting responses

was 33.3%. At four week, the percentage of requesting and rejecting responses was 75%, respectively, while the percentage of re-requesting responses was 50%.

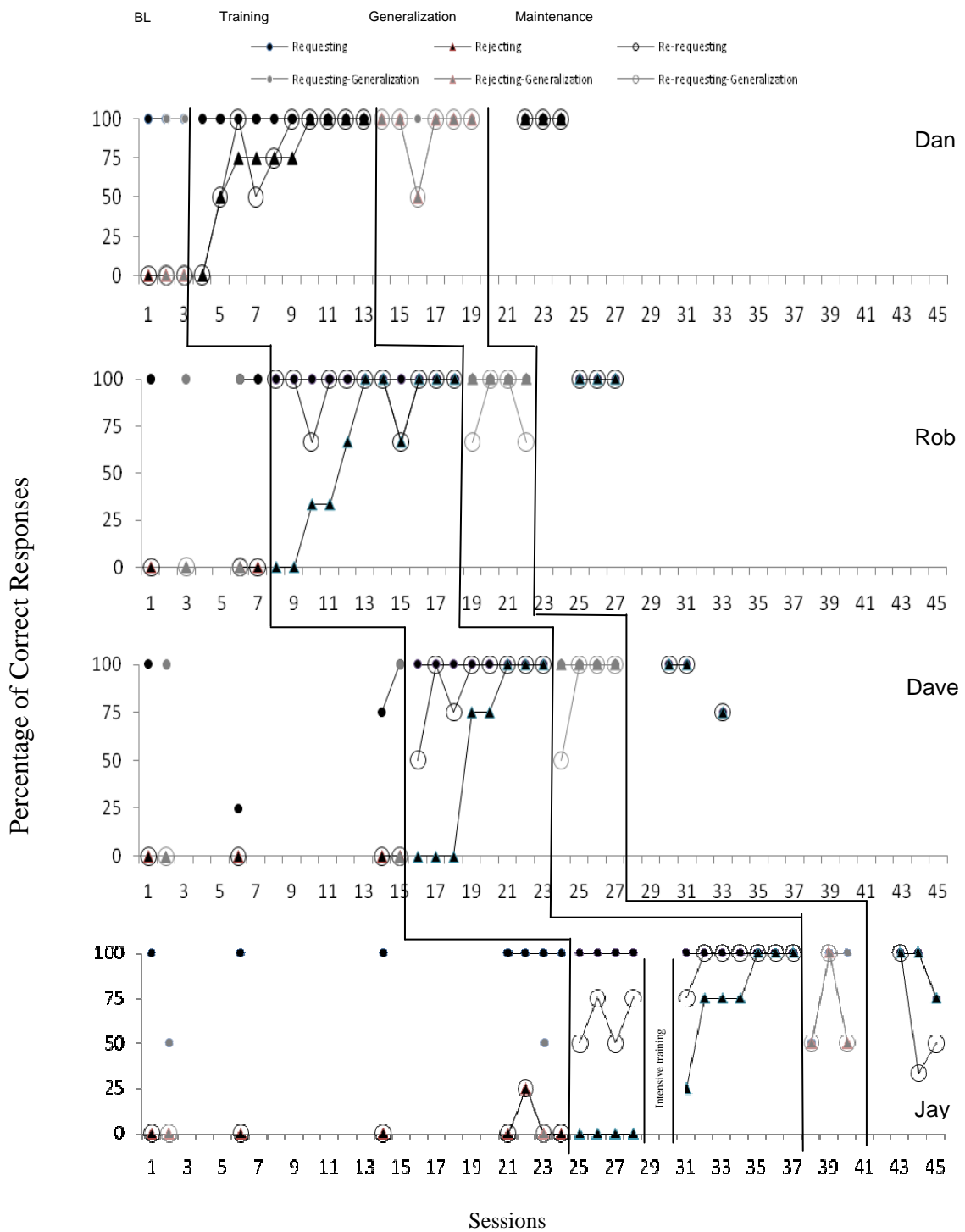


Figure 4.5. Percentage of correct requesting, rejecting, and re-requesting responses across baseline, training, generalization, and maintenance phases during unmatched trials for Dan, Rob, Dave and Jay.

Requesting during the matched trials

Figure 4.6 shows the percentage of correct requesting responses during the matched trials for the four participants. Most participants emitted the correct requesting responses during the baseline, training, generalization, and maintenance phases. However, the percentage of correct responses varied, especially during the baseline phase.

During the baseline, the percentage of correct requesting responses of Dan was 91.7% (range 75% to 100%) while Rob did request the missing items 100% of the time. The percentage of correct requesting responses of Dave was 50 % (range 0 to 100%), and Jay did request the missing items 100% of the time.

During the training phase, Dan did request the missing items 100 % correctly (range 100 to 100 %). Rob's a mean percentage of requesting responses was 90.9 % (range 66.6 to 100%). Dave did request the missing items 100% of the time. Jay's mean percentage of requesting responses was 90.9 % (range 50 to 100 %).

The generalization phase within the baseline consisted of two sessions for each participant. Dan's mean percentage of correct requesting responses was 75% (range 50 % to 100%). Rob, Dave, and Jay's mean percentage of correct requesting responses was also 75% (ranges 50% to 100%), respectively. During the post-training generalization phase, Dan's mean percentage of correct requesting responses was 91.7 % (range 50 to 100 %), while Rob, Dave, and Jay's mean percentage of correct requesting responses were each 100 %.

During the maintenance phase, Dan and Rob both exhibited a mean percentage of requesting responses for the missing items 100 %. Dave and Jay both exhibited a mean percentage of requesting responses was 83.3 % (range 75% to 100%).

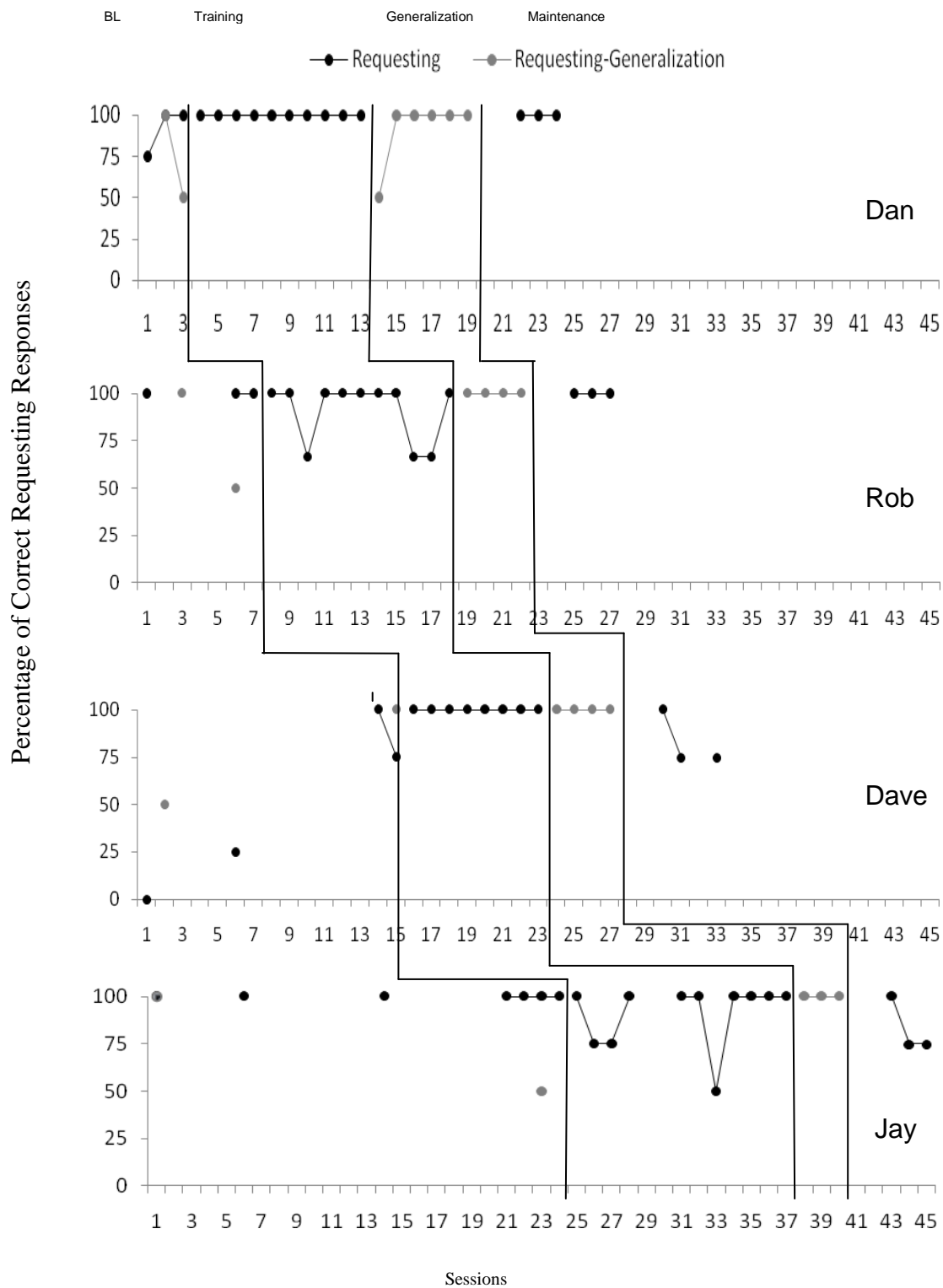


Figure 4.6 Percentage of requesting responses across baseline, training, generalization and maintenance phases during matched trials for Dan, Rob, Dave and Jay

CHAPTER FIVE

DISCUSSION

The purpose of this study was to examine the effects of the wrong-item format embedded into the missing-item format to teach communicative rejecting responses and to teach re-requesting responses for communication breakdown repair strategy to four children with autism and severe language delays, and to examine the generalization and maintenance effects of this procedure. In order to investigate the effectiveness of the procedure in teaching rejecting responses, requesting responses were first taught using the missing-item format. After this phase, rejecting responses were taught by offering the wrong items. A discussion of the results, limitations, implications, and suggestions for future research follow.

Discussion of Results

This section discusses the results of (a) acquisition of requesting responses to obtain missing items, (b) acquisition of rejecting responses, (c) acquisition of re-requesting responses, (d) generalization, and (e) maintenance of acquired requesting, rejecting and re-requesting responses for four children with autism and severe language delays.

Acquisition of Requesting the Missing Items

Much like previous research, the results of this phase appeared that the missing-item format was a promising technique to teach requesting responses. The number of trials necessary for each participant to reach the criterion for Dan, Rob, Dave, and Jay was 114, 90, 91, and 206, respectively. Previous studies have demonstrated that the missing-item format could also be effective to teach manual sign or vocal requesting

(Hall & Sundberg, 1987; Tirapelle & Cipani, 1991); or to teach requesting using graphic symbols (Sigafos et al., 1995; Sigafos et al., 1989, 1990). It would appear that the progressive time delay, gestural or tapping prompts, and error correction or error prevention procedures were effective in teaching requesting the missing items using VOCAs and PECS.

During this phase, the experimenter taught participants to request the missing items necessary to complete preferred activities using their own communication devices. Dan and Dave used Vantage and SpringBoard devices, which are digitalized voice output communication devices. Rob used a 32-message voice output communication device, which is a direct selection-based augmentative and alternative communication device. Jay used PECS for requesting items. It appeared as if they already confidently used their devices. However, throughout interviews and natural observation, it became clear that the participants were passive and prompt-dependent when using devices for mands. This is quite common and many people with severe disabilities have been described as prompt-dependent (e.g., Reichle & Sigafos, 1991). The participants in this study used their AAC device for requesting within a limited context, mostly snack time, and rarely used them to make a spontaneous request outside of snack time, and never used them to indicate rejecting. In addition, because of their limited vocabulary, the experimenter needed to add target words for this study to each participant's device after consulting with their teacher and speech therapist. Their teacher also reported that she never taught the participants to use most of target words, and they were not observed used target words.

Even though the results of this phase demonstrated that the missing-item format was effective to teach requesting, this interpretation should be drawn with caution. This

stems from the fact that baseline data was not collected. If future research incorporates an experimental design, baseline data would help to more convincingly demonstrate the effectiveness of the missing-item format to promote requesting responses using VOCAs and PECS.

In addition, it should be noted the change of Jay's communication mode during the pre-training phase. During school day, he received training to use both PECS and VOCA for requesting. After consulting with his teacher, VOCA was chosen for this study. However, during the pre-training, even though he forcefully pointed at the target picture with his finger, he frequently pointed to other pictures prior to or after pointing at the target picture. It seemed as if he enjoyed listening to the voice when he pointed to the pictures. Therefore, the experimenter had to turn off the volume during the training sessions. After the 27th session, the experimenter changed Jay's communication mode due to the lower percentage of correct responses, as well as the continuity of his response patterns. A recent study that compared two types of AAC (i.e., PECS vs. VOCA) showed that some children showed the preference of PECS over the VOCA (Son, Sigafos, O'Reilly, & Lancioni, 2006). Jay also provides reason to believe that several factors should be considered when choosing an AAC, such as the individual child's behavior pattern and individual preference.

Acquisition of Rejecting Responses

The training phase was conducted after the pre-training phase. This phase embedded the wrong-item format (i.e., providing a wrong item that did not correspond with the requested item) into the missing-item format to create the need for the participant to indicate rejecting (e.g., "no" or "I don't want"). A single-subject, multiple

probe design across the four participants was employed. The results of the training indicated that three out of four participants quickly acquired the target rejecting and re-requesting responses.

Baseline data indicated that Dan, Rob, and Dave did not emit the target rejecting and re-requesting responses. That is, although their own devices were in front of them, the participants did not use them to reject the wrong items while they used their devices to request the missing items. Although Jay, who used PECS, emitted the target rejecting and re-requesting response in one baseline trial, overall the percentage of his target rejecting and re-requesting responses was only 3.6 %. Much like previous studies (e.g., Duker, Dortmans, & Lodder, 1993; Sigafos & Roberts-Pennell, 1999) participants in this study displayed communicative acts without the use of the VOCA or PECS when the wrong items were present. For example, Dan took the wrong items and sometime showed visible distress by wringing his hands, by putting the item aside, by making a negative sound while grimacing, or by looking at the ceiling while looking frustrated. Dave's most communicative acts were staring at the wall, pushing the wrong item away, or staring at his communication device while holding the wrong item. Rob's communicative acts included shaking the item, pushing it away, or making a negative sound such as "ee-hee." Jay's topographies were more varied than the other participants. He took the wrong item and gave it back to the experimenter, and twice he put the wrong item aside and handed the target re-requesting picture to the experimenter. He exhibited other behaviors, such as putting the wrong item aside and rocking his body, taking the wrong item and hitting it on the table, and hitting the item with his fingers. Conversely, when the correct missing items were given during the matched trials, all participants completed the presented

activities. For example, when they requested the straw to drink a juice, and the straw was provided, they took it and put it in the straw hole immediately without engaging in any behaviors shown during unmatched trials.

For many people, such prelinguistic, unconventional communicative forms may be too subtle to be easily interpreted as rejecting responses (Sigafoos et al., 2004). Interestingly, although all of the participants already used aided AAC (i.e., VOCAs and PECS) to obtain their preferred foods or toys, all participants heavily relied on subtle prelinguistic behaviors when they attempted to remove undesired objects. Their teacher reported that she never attempted to teach rejecting responses using the participants' own AAC devices. It is likely that such subtle communication behaviors shown by the participants were reinforced by past and current communication partners. For example, when teachers or parents offered a non-preferred or undesired item and the participant took it with grimace while squirming, the teacher may have asked "What's wrong? Isn't it what you want?" or "Don't you want it?" If the students became agitated, the teacher may have removed the item while saying "you probably don't like it." Hodgdon (1999) found that many adults including teachers or parents did not teach students rejecting responses because they feared losing control. Whatever many adults think, children express their rejection of nonpreferred, undesired items or activities using whatever communication forms may have worked in the past.

In fact, Duker, Dortmans, and Lodder (1993), in a previous study using the wrong item format, reported similar behaviors when the wrong items were provided. That is, when the participants requested the specific items and when the wrong items were presented, they pushed the objects from the table, turned around in the chair, and hit the

object. The researchers considered these behaviors socially inappropriate. Therefore, they interrupted these behaviors and only taught repeating initial requesting to gain initially requested items. If the researchers considered those rejecting responses (i.e., pushing the objects, hitting the object) as socially inappropriate, they could teach socially appropriate rejecting responses in an effort to replace such behaviors with socially appropriate rejecting, rather than just teaching repetition.

That the participants displayed those behaviors demonstrates their motivation to reject the wrong items (i.e., when the participants requested the specific items, those items' reinforcing value would be increased, and at that moment, if the wrong items were present, they became momentarily annoying to the participants. Therefore they tried to remove the wrong items by pushing or hitting them). Previously, the participants never learned socially appropriate rejecting responses (e.g., "No", or "I don't want") to remove the wrong items, and therefore they engaged in behaviors that had previously worked.

In an everyday environment, individuals would have a number of opportunities to gain necessary or preferred objects and activities. In the same vein, they would have a number of opportunities that they wish to escape or avoid. Although there is an abundance of research addressing teaching communicative requesting, teaching communicative rejecting has been rarely studied (Sigafoos et al., 2004). That means that although many individuals with language delay learn socially appropriate symbolic behaviors to gain or obtain preferred objects, activities, and actions, without systematic learning they would likely relied on prelinguistic and socially inappropriate forms of rejecting. Such behaviors may be too subtle or problematic to interpret as rejecting by

others. Therefore, teaching socially appropriate rejecting is as important as teaching socially appropriate requesting.

This study extended the previous research by focusing on teaching rejecting responses in order to replace subtle communicative acts to reject the wrong items. The behaviors shown by the participants would like be too subtle to be interpreted as rejecting. Therefore, in this study, training was held in order to replace subtle rejecting behaviors with more symbolic forms of rejecting (i.e., pressing “No” or “I don’t want” using their VOCAs, or handing the “No” picture to the communicative partner) after the baseline. It took an average of ten sessions for Dan, Ryan, and Dave to reach the pre-determined criteria (i.e., 100% correct responses for three consecutive sessions). Jay, who used PECS, required more training sessions than the other three participants to reach the desired criteria. There is no obvious explanation as to why Jay required more training sessions than three other participants. However, this discrepancy might be explained by response efficiency. By the end of the training phase, the three participants who used VOCAs did not reach for the wrong item, but instead pressed the target rejecting response (i.e., pressing “No” or pressing “I don’t want that”) as soon as the wrong item was present in front of them. This quick acquisition of pressing “NO” likely occurred because it required less physical effort than picking up the wrong item and holding it while exhibiting adverse behaviors until the wrong item was removed. That is, this response was more effective in removing the undesired item (Horner & Day, 1991). However, Jay, who used PECS, had to pick up the “No” picture and hand it to the experimenter. This action required more physical effort than pressing the “No” on the VOCAs.

Another possible explanation could be due to the arrangement of communication board and prompting procedures. Jay exhibited zero target rejecting response in the first four training sessions. During this phase, his communication board contained the same two missing item pictures, a “NO” picture, and two distracters (see p. 68 for Jay’s board during the “drinking juice” activity). During this phase of training, when Jay handed the missing item picture to the experimenter, the wrong item was given. In order to teach the target rejecting response, the experimenter asked “Is this you need?” while tapping the “No” picture. He followed the experimenter’s tapping prompts. However, for several trials, Jay simply ignored the experimenter’s tapping prompt and instead tried to pick up the second missing item picture. Given the definition of target rejecting and re-requesting responses, this repetition to obtain the missing item without emitting target rejecting response the wrong item was not reinforced. When he picked up the second missing item picture, the experimenter blocked his response and again provided the tapping prompt. On this occasion, he handed the “No” picture to the experimenter and then re-requested the missing item in 50% of the trials for the first session. As trials continued, his behavior topographies became more varied and intense. By the eighth trial of the fourth session, he exhibited challenging behaviors not previously seen, such as intensified body rocking, loud laughing, and hitting his communication board on the table.

This could be explained by response class. During pre-training sessions, Jay acquired handing the missing item pictures to the experimenter as a requesting response. His initial requesting was maintained when it was intermittently reinforced during later training phases. However, during the rejecting training sessions, his initial correct requesting was not honored, even repetition behaviors were blocked, and more

demanding was present. Therefore, it seemed that functionally equivalent other members of responses, such as extreme body rocking and laughing re-emerged in order to access reinforcers.

After the initial four sessions, the experimenter ran intensive training trials (i.e., consisting of 20 trials) in order to teach a rejecting response with errorless manner. In this phase, only “No” picture was placed on his communication board, and the wrong item was removed as soon as he handed the “No” picture to the experimenter. After an intensive errorless teaching phase, the adaptation was also made to his communication board (i.e., only one missing item picture, the “No” picture and two distracters were placed on Jay’s communication board. In fact, this adaptation was more practical, because the same pictures would not be always available on his communication board and when the wrong item was given, handing “No” picture to his communicative partner would allow him to clearly express rejection. After adapting his communication board, Jay’s target rejecting and re-requesting responses increased. Further research may need to clarify the reason for the difference in acquisition rates and whether they’re due to different communication modes or specific prompt procedures.

Acquisition of Re-requesting Responses

After the first session, the remaining three participants (Dave, Dan, and Rob) showed an immediate increase in re-requesting responses. After exhibiting the target rejecting response, participants were required to re-request the missing items. This response allowed them to complete the activities in order access the final reinforcer. When the initial requesting responses were not honored, it seemed that they did not know what to do in order to repair the communication breakdown.

Two previous studies using the wrong item format to teach rejecting responses, Duker, Dortmans, and Lodder (1993) and Yamamoto and Mochizuki (1988), discussed about current mand training. They argued that when individuals requested specific items, they should “accept only referents that match the verbal or gesture made, and conversely, must reject referents that do not match... Accepting consequences that do not match the responses made leaves the functional characteristic of the emitted responses doubtful (p.40)” They discussed that “failure to emit different responses would indicate that manding as a class of verbal behavior had not been established (p. 41)”. However, in this study, it seemed that even though individuals established requesting responses as a mand, when the wrong items were given, they did not know what to do. It appears that requesting was established as a mand, but the main issue is the lack of communication breakdown repair strategy. That is, when the wrong items were given, they just accepted as making negative sounds, hit the objects, or stared the wall, because they did not have socially appropriate rejecting repertoire in their response class. In addition, they even rarely repeat initial requesting. It showed their lack of communication breakdown repair strategy using VOCAs and PECS. A recent study done by Seely (2006) in which assessed generalization of repair strategies across various breakdown conditions showed similar results. In that study, all participants had the hardest time to repair using VOCAs when the wrong items were given. The current study demonstrated that once the participants learned that they needed to repeat in order to access the missing item, they quickly repaired communication breakdown as repeating the initial requesting using VOCAs and PECS. The results are not surprising because target re-requesting responses were the same as the initial requesting responses for the missing items.

Generalization across untrained activities

After all participants reached the pre-determined criteria (i.e., 100% for three consecutive sessions), the experimenter conducted a generalization probe. In this probe, two untrained activities were used to examine their generalization effects. The results of generalization across untrained activities after the training phase indicated that all participants generalized their acquired “rejecting” response across two untrained activities, although the effects of generalization for Jay varied.

One factor to facilitate this generalization could be the wrong items used. Even though wrong items including different colored pens, glue, a pair of scissors, a toothbrush, a plastic spoon and a piece of clothing were randomly presented during the training and generalization phases in order to prevent one specific item from being associated with the rejecting response, these items remained the same during both phases. These stimuli may facilitate generalization of rejecting response across untrained activities. However, it could not be the main reason. For example, Rob’s teacher anecdotally reported that after the 7th training session, Rob used his “I don’t want” button when a non-preferred snack item was given during his afternoon snack time in the classroom. It seemed that his newly acquired rejecting response was functionally used in order to remove non-preferred food, which is untrained item. That is, Rob had learned the rejecting response could be used not only to remove the wrong items that, but also to remove any aversive stimulus. However, this study did not systematically examine the generalization effects across different types of rejecting situations. Future research should address this issue.

Jay's variable generalization data is also notable. Although he showed an increase in correct responses, Jay's requesting, rejecting, and re-requesting responses during generalization phases varied across sessions. These results might be explained by a change of activity preference. Previous research has shown that activity preference is a critical factor in teaching requesting behaviors (Roberts-Pennell & Sigafos, 1999). Tada and Kato (2005) also demonstrated that the rate of verbal requests varied based on task preference. During the generalization phase, Jay was presented two activities: making bubbles and watching a DVD. However, in the first generalization session, when presented with the bubbles, he ignored it and his communication board, and instead engaged in stereotypic behaviors such as body rocking and hand hitting. In the second generalization session, Jay was once again presented with making bubbles during the first trial. In this trial, Jay handed in the "No" picture to the experimenter. In the third generalization session, Jay again handed in the "No" picture when presented with the making bubbles activity.

Unlike the making bubbles activity, when presented with the opportunity to watch DVD, he showed the excitement and requested the missing item within 2-3 seconds. It seemed that Jay's preference to engage in certain activities (i.e., making bubbles) had decreased. Given this, it would seem that by handing over the "No" picture when presented with the making bubbles activity, he was rejecting the making bubbles activity itself, because he no longer wanted to engage in this activity. That is, spontaneous rejecting occurred to remove his nonpreferred activity. However, because a correct rejecting response was only scored when the wrong item was provided, this rejecting response was not measured by this study. Therefore, it is difficult to determine what

actually resulted in the fluctuation of the generalization: a activity preference change or lack of generalization to the making bubble activity.

In fact, during the pre-training phase for requesting the missing items, all participants exhibited some preference change. Through single stimulus preference assessment, five activities were initially identified for Dave and Jay, while six were identified for Dan and Rob. However, for Dave, Rob, and Jay, one activity was removed during the pre-training phase. Dave's teacher reported that he enjoyed playing with marbles and during the preference assessment he approached the marble activity and played with it. However, in the tenth pre-training session, he covered his ears with both hands and suddenly threw himself on the floor, kicking the table and throwing the chair when presented with the marbles. After discussing this with his teacher, the experimenter determined that he was likely bored with the game. Therefore, this activity was removed. Additionally, applesauce was identified as Rob's favorite food. Throughout the preference assessment, he consumed the applesauce whenever he was presented with a bowl of applesauce and a spoon. However, during the pre-training sessions, he occasionally pushed the bowl of applesauce away or if he accepted it, he would not consume it and instead played with the spoon. Therefore, this activity was removed. This demonstrates that the participants' preferences were not fixed and could change through the course of experiment. Therefore, preference assessment should be conducted on a regular basis; especially given that preference is an important factor when teaching requesting.

Maintenance

The maintenance phase produced satisfactory, but variable data. Dan, Rob, and Dave maintained the acquired rejecting and re-requesting responses up to four weeks after the termination of the training. However, Jay's rejecting and re-requesting responses varied and declined over time. During third week of the maintenance probe, he correctly requested the missing item (i.e., a straw for drinking juice), rejected the wrong item, and re-requested the missing item again. However, he did not consume the juice. During second trial for the same activity, Jay handed the "No" picture to the experimenter immediately after he was presented with the "drinking juice" activity. However, during the rejecting training phase, Jay consumed the entire amount of juice (i.e., about 25ml) whenever it was present. Given this, it seemed that he genuinely did not want to drink any more juice.

Much like the generalization phase, spontaneous rejecting occurred. It should be noted that Jay's use of re-requesting responses decreased throughout the maintenance phase. During the third and fourth week of the maintenance phase, his re-requesting responses decreased, and his stereotypic behaviors including body rocking and hand hitting increased. Once, after rejecting the wrong item, the experimenter took his board away, attached the missing item picture, and presented it again and asked "What do you need?" in order to provide an opportunity for him to exhibit the target re-requesting response. However, during the third and fourth maintenance sessions, Jay ignored the communication board and either began to engage stereotypic behaviors or he picked up the wrong picture without looking at the board and handed the wrong picture to the experimenter. Taking away the communication board from Jay may have signaled the

end of the activity, thereby giving him an opportunity to engage in stereotypic behaviors. However, during the training sessions, he re-requested the missing items when communication board was re-presented in the same manner, although he had also engaged in stereotypic behaviors. Therefore, it seems that a combination of decreased activity preference and stereotypic behaviors influenced his decrease in re-requesting behaviors.

Limitations

The results of this study provided evidence that the wrong-item format with progressive time delay and prompt procedures embedded into the missing-item format was effective to teach rejecting responses to children with autism and severe language delays. However, the study has several limitations.

First, this study was limited to rejecting the wrong item, which did not correspond to the items initially requested. Although the effects of generalization across two untrained activities were examined, generalization of rejecting responses across different types of rejecting, such as rejecting non-preferred food or toys or rejecting non-preferred activities or events across different persons was not assessed. During the course of the study, the participants' teacher anecdotally reported that Dan and Rob used target rejecting response to indicate a rejection of a non-preferred snack item, and Jay was also reported to have emitted spontaneous target rejecting. These spontaneous rejections, however, were not systematically assessed under the scope of this study. Future research should examine newly acquired rejecting response's generalization effects across different types of rejecting situations and across different persons, activities, and settings.

Second, the study is limited in terms of the selection of the wrong items. In this study, rejecting responses were specifically targeted to remove items that did not correspond to the initially requesting items (e.g., when the participants requested a straw to drink juice, the wrong item, a pair of scissors, was given). These wrong items were selected from everyday items, used in their classroom and at home. For example, a plastic fork was selected because participants used it during their lunchtime. A pair of scissors and glue were selected because participants used these during art and craft activities. Therefore, participants were familiar with these items. In addition, any single item was not used as a reinforcer. However, the preference of the wrong items was not systematically examined prior to the study. Even though it is highly unlikely, if the wrong items were of a higher reinforcement value than the training activity, the participants might not necessarily reject the wrong items. Future research needs to conduct more systematic assessment to more carefully select wrong items. It would be better to ensure that identified preferred activities were more preferred than offered wrong items.

Another possible limitation involves the fifth participant, Sally. Sally was dropped from the study due to her lack of acquisition rate, which might indicate that the missing item format using PECS is not appropriate for all children without the matching-to-sample skill. Previous research has also shown that individuals who have difficulty matching real objects to photographs showed a low acquisition rate of requesting the missing items using photos (Sigafos, Couzens, Pennell, Shaw, & Dudfield, 1995). A limitation of the present research was that object-photo matching was not systematically assessed independently prior to teaching requesting. Future studies should conduct such an assessment prior to starting the study.

In addition, the participants in this study were familiar with the VOCAs and PECS prior to study. They had been trained to request and label items using the prompting procedures in this study. Therefore, the same rate of acquisition trend would not be expected for those without prior experience using VOCA or PECS.

Implications

Children with autism and developmental disabilities were trained to use communicative requesting and rejecting behaviors in the classroom. For this reason, teachers also could easily implement this procedure in classrooms where children spend much of their time. The wrong-item format could be easily embedded into the missing item format to create and teach rejecting responses. This study provided an example of how rejecting opportunities also could be created when children engaged in their preferred activities. The missing-item format has been shown to increase requesting in individuals engaged in independent living skills like making instant coffee (e.g., Hall & Sundberg, 1987), in self-care skills like brushing one's teeth (Tirapelle & Cipani, 1991) or in leisure skills, such as painting (Sigafos, Couzens, Pennell, Shaw, & Dudfield, 1995). Therefore, the wrong-item format embedded into the missing-item format could be used to create teaching rejecting opportunities using any activities, such as those involved in independent living skills, self-care skills, and leisure skills. Teachers should realize that creating teaching opportunities is important not only during communication training times but also anytime throughout the regularly scheduled school day.

Furthermore, the procedures used in this study were presented as a discrete trial format which engaged participants in preferred activities. Thus, a number of trials were presented in order to provide sufficient learning opportunities within a relatively short

amount of time. Although the teachers or parents could rely on naturally occurring communication opportunities, sometimes the infrequency of naturally occurring opportunities may not provide sufficient learning opportunities to acquire new behaviors. Therefore, the importance of creating teaching opportunities that would provide frequent learning opportunities to acquire new skills has been emphasized by researchers. Research found that the communication abilities of children with disabilities are greater in those children that have a higher number of communication opportunities (Sigafoos, 1999). Like previous studies (Sigafoos et al., 1995), this study also demonstrated that it could be presented as a discrete trial format, so that the experimenter could create several teaching opportunities within relatively short amount of times rather than waiting for naturally occurring teaching opportunities to teach new skills. Teachers also can easily create teaching opportunities in their classroom by following these procedures.

In addition, this study focused on symbolic forms of rejecting responses (i.e., pressing “No” or handing a “No” picture to the communication partner). Previous studies pointed out that relying on prelinguistic communicative rejecting could be socially and developmentally inappropriate or unacceptable (e.g., pushing an unfamiliar person’s hand away or throwing an offered object). Additionally, some individuals display subtle rejecting behaviors such as looking away from an offered object or accepting it with a grimace. For many communication partners, these behaviors may be too subtle to easily interpret as rejecting. Therefore, learning more formal and symbolic forms of rejecting responses may enhance the participants’ ability to communicate more effectively. Ultimately, this could permit even unfamiliar communication partners to easily understand the needs and wants of the participants (Sigafoos & Drasgow, 2001).

Future Research

Several topics warrant future research. In terms of the assessment used to identify “current” rejecting behaviors and which interventions might be effective, it would be interesting for future studies to investigate whether children with autism and developmental disabilities exhibit different communicative rejecting topographies when placed in different types of rejecting situations. Some children may exhibit different rejecting topographies across different situations, such as when presented with nonpreferred food or toys, when they need to do something they don’t want to do, or when something presented that they don’t like. Based on observations during the course of the study, some of the participants exhibited different rejecting behaviors, while some exhibited similar behaviors across different situations. For example, Dave’s rejecting behaviors consisted mostly of ignoring the item or starting at the wall when the wrong items were present. However, when nonpreferred academic tasks were present during his class, the experimenter observed him covering his ears, closing his eyes, rocking his chair, or kicking the legs of the chair or table. Rob’s rejecting responses for non-preferred snacks were to throw them or to push them away; when presented with a non-preferred activity he emitted high-pitched negative sounds or hit his wrist on the table; and when rejecting the wrong items he shook them, pushed them away, or made negative sounds. Although these rejecting topographies were not exclusive across different rejecting situations, it seemed that each used different topographies to indicate rejection across different situations. Previous research (i.e., Drasgow, Halle, Ostrosky, & Harbers, 1996) suggested that children might not see these different situations as general rejecting occasions. Future study should examine whether children use acquired generalized

rejecting (i.e., “No”) across different rejecting situations when generalized rejecting was taught in one condition to indicate rejecting.

The procedure employed in this study can be extended to teach explicit rejecting. Although this study focused on teaching generalized rejecting (i.e., “No”), this generalized rejecting could be easily extended to teach explicit rejecting of specific items. Future research should develop effective teaching procedures to teach explicit rejecting.

In addition, it would be interesting to extend the study and examine the effectiveness of this procedure in children who use different communication modes. Although this study focused on teaching symbolic forms of rejecting using aided AAC, including VOCAs and PECS, the procedure used in this study could be applied to children who speak or use manual signs.

Summary

The purpose of this study was to create rejecting opportunities using the wrong-item format embedding into the missing-item format, and to teach socially appropriate rejecting responses using AAC for four children with autism and developmental disabilities. A review of the literature on teaching mands indicates that although there is an abundance of research addressing teaching communicative requesting behaviors, rarely have studies attempted to teach communicative rejecting (Sigafoos et al., 2004). Previous studies to teach rejecting responses usually employed the identification of nonpreferred objects or foods, and the repeated presentation of them to teach rejecting responses using gestures, signing, or saying “No.” The procedure used in this study provides structured opportunities for teaching communicative rejecting that could be created while the participant engages in their preferred activities in their classroom.

Moreover, the current study adds to the growing body of research on teaching rejecting responses to children using VOCAs and PECS. Teachers can easily use the wrong-item format embedded into the missing-item format to teach rejecting responses. Requesting behaviors provide students with a means to express their needs, desires, preferred items, preferred activities, or to receive help from others. In the same vein, teaching rejecting behavior is also important because it provides students with a means of removing or terminating undesired objects or activities. However, researchers have largely neglected to undertake studies that seek to teach rejecting responses for children with disabilities. While this study found a promising way to teach rejecting responses using AAC to children with autism and developmental disabilities, it had several limitations. Additional research should be conducted to assess whether these results can be replicated to other participants using different communication modes or with a different level of communication skills.

APPENDICES

Appendix A: RAISD

Appendix B: Procedural Integrity

Appendix A

The Reinforcer Assessment for Individuals with Severe Disabilities (RAISD)

Child's Name: _____

Date: _____

Name of Reporter: _____

The purpose of this structured interview is to get as much specific information as possible from you regarding what you believe would be useful reinforcers for the child. Therefore, this survey asks you questions about categories of stimuli. After you generated a list of preferred stimuli, ask additional probe questions to get more specific information on his/her preferred and the stimulus conditions under which the object or activity is most preferred (e.g., What specific TV shows are his favorite? What does she do when she plays with a mirror? Does she prefer to do this alone or with another person?)

We would like to get some information on _____'s preference for different items and activities.

1. Some children really enjoy looking at things such as a mirror, bright lights, shiny objects, spinning objects, TV, etc. What are the things you think _____ most likes to watch?

2. Some children really enjoy different sounds such as listening sounds such as listening to music, car sounds, whistles, beeps, sirens, clapping, people singing, etc. What are the things you think _____ most likes to listen to?

3. Some children really enjoy different smells such as perfume, flowers, coffee, pine trees, etc. What are the things you think _____ most likes to smell?

4. Some children really certain foods or snacks such as ice cream, pizza, juice, graham crackers, McDonald's TM hamburgers, etc. What are the things you think _____ most likes to eat?

5. Some children really enjoy touching things of different temperatures, cold things like snow or an ice pack, or warm things like a hand warmer or a cup containing hot tea or coffee. What activities like this do you think _____ most enjoys?

6. Some children really enjoy feeling different sensation such as splashing water in a sink, a vibrator against the skin, or the feel of air blow on the face from a fan. What activities like this do you think _____ most enjoys?

7. Some children really enjoy certain toys such as puzzles, toy cars, balloons, comic books, flashlights, bubbles, etc. What are _____'s favorite toys or objects?

8. What are some other items or activities that _____ really enjoys?

Appendix B

**Procedural Integrity: Baseline
Requesting response**

Date: _____ Participant: _____ Session#: _____ Trial# _____
IOA Observer: _____ Activity: _____

		Procedure	
1		Experimenter presents all necessary items except pre-determined one item and a VOCA (or PECS) in front of the participant	Yes / No / NA
2		Experimenter provides the instruction to engage the activity (e.g., watch DVD).	Yes / No / NA
3		At the point where the missing item is needed and the experimenter wait.	Yes / No / NA
4	a	If the participant emits target requesting response, the experimenter presents requested item.	Yes / No / NA
	b	The participant allows to access the task.	Yes / No / NA
5	a	If the participant does not request the necessary item, the experimenter asks "What do you need?" with visual presentation of the item and provides prompts.	Yes / No / NA
	b	If the participant requests the item after prompt, the experimenter provides the requested item.	Yes / No / NA
	c	The participant allows to access the task.	Yes / No / NA

**Procedural Integrity: Baseline
Rejecting and Re-requesting response**

Date: _____ Participant: _____ Session#: _____ Trial# _____
IOA Observer: _____ Activity: _____

		Procedure	
1		Experimenter presents all necessary items except pre-determined one item, and a VOCA (or PECS) in front of the participant	Yes / No / NA
2		Experimenter provides the instruction to engage the activity (e.g., watch DVD).	Yes / No / NA
3	a	At the point where the missing item is needed and the experimenter wait.	Yes / No / NA
	b	If the participant does not request the necessary item, the experimenter asks “What do you need?” with visual presentation of the item and provides prompts.	Yes / No / NA
	c	If the participant requests the item after prompt, the experimenter provides the wrong item.	Yes / No / NA
4		If the participant requests the necessary item, the experimenter offers the wrong item.	Yes / No / NA
5	a	If the participant emits target rejecting response, the experimenter removes the wrong item.	Yes / No / NA
	b	If the participant emits target re-requesting response after emitting target rejecting, the experimenter presents re-requested item.	Yes / No / NA
	c	The participant allows to access the task.	Yes / No / NA
6		If the participant does not emit re-requesting response, all necessary items are removed.	Yes / No / NA
7		If the participant does not emit target rejecting response, all necessary items are removed.	Yes / No / NA

**Procedural Integrity: Training
Requesting response**

Date: _____ Participant: _____ Session#: _____ Trial# _____
IOA Observer: _____ Activity: _____

		Procedure	
1		Experimenter presents all necessary items except pre-determined one item and a VOCA (or PECS) in front of the participant	Yes / No / NA
2		Experimenter provides the instruction to engage the activity (e.g., watch DVD).	Yes / No / NA
3		At the point where the missing item is needed and the experimenter wait.	Yes / No / NA
4	a	If the participant emits target requesting response, the experimenter presents requested item.	Yes / No / NA
	b	The participant allows to access the task.	Yes / No / NA
5	a	If the participant does not request the necessary item, the experimenter asks "What do you need?" with visual presentation of the item and provides prompts.	Yes / No / NA
	b	If the participant requests the item after prompt, the experimenter provides the requested item.	Yes / No / NA
	c	The participant allows to access the task.	Yes / No / NA

**Procedural Integrity: Training
Rejecting and Re-requesting response**

Date: _____ Participant: _____ Session#: _____ Trial# _____
IOA Observer: _____ Activity: _____

		Procedure	
1		Experimenter presents all necessary items except pre-determined one item, and a VOCA (or PECS) in front of the participant.	Yes / No / NA
2		Experimenter provides the instruction to engage the activity (e.g., watch DVD).	Yes / No / NA
3		At the point where the missing item is needed and the experimenter wait.	Yes / No / NA
4	a	If the participant requests the necessary item, the experimenter offers the wrong item.	Yes / No / NA
	b	If the participant does not request the necessary item, the experimenter asks “What do you need?” with visual presentation of the item and provides prompts.	Yes / No / NA
	c	If the participant requests the item after prompt, the experimenter provides the wrong item.	Yes / No / NA
5	a	If the participant emits target rejecting response, the experimenter removes the wrong item.	Yes / No / NA
	b	If the participant emits target re-requesting response, the experimenter presents re-requested item.	Yes / No / NA
	c	The participant allows to access the task.	Yes / No / NA
6	a	If the participant does not point to the “No” icon, the experimenter holds the wrong item and provides prompt.	Yes / No / NA
	b	When the participant emits target rejecting, then removes the wrong item.	Yes / No / NA
7	a	After target rejecting, if the participant points to the necessary item’s picture, the experimenter presents re-requested item.	Yes / No / NA
	b	The participant allows to access the task.	Yes / No / NA
8	a	After target rejecting, if the participant does not request the necessary item after the experimenter asks “What do you need?” with prompt.	Yes / No / NA
	b	The participant points the necessary item’s picture, the experimenter presents re-requested item.	Yes / No / NA
	c	The participant allows to access the task	Yes / No / NA

**Procedural Integrity: Generalization/Maintenance
Requesting response**

Date: _____ Participant: _____ Session#: _____ Trial# _____
IOA Observer: _____ Activity: _____

		Procedure	
1		Experimenter presents all necessary items except pre-determined one item and a VOCA (or PECS) in front of the participant	Yes / No / NA
2		Experimenter provides the instruction to engage the activity (e.g., watch DVD).	Yes / No / NA
3		At the point where the missing item is needed and the experimenter wait.	Yes / No / NA
4	a	If the participant emits target requesting response, the experimenter presents requested item.	Yes / No / NA
	b	The participant allows to access the task.	Yes / No / NA
5	a	If the participant does not request the necessary item, all necessary items are removed	Yes / No / NA
	b	Ended trial	Yes / No / NA

**Procedural Integrity: Generalization / Maintenance
Rejecting and Re-requesting response**

Date: _____ Participant: _____ Session#: _____ Trial# _____
IOA Observer: _____ Activity: _____

		Procedure	
1		Experimenter presents all necessary items except pre-determined one item, and a VOCA (or PECS) in front of the participant.	Yes / No / NA
2		Experimenter provides the instruction to engage the activity (e.g., watch DVD).	Yes / No / NA
3	a	At the point where the missing item is needed and the experimenter wait.	Yes / No / NA
	b	If the participant does not request the necessary item, all necessary items are removed.	Yes / No / NA
	c	Ended trial	Yes / No / NA
4		If the participant requests the necessary item, the experimenter offers the wrong item.	Yes / No / NA
5	a	If the participant points to the "No" icon, the experimenter removes the wrong item.	Yes / No / NA
	b	If the participant emits target re-requesting response, the experimenter presents requested item.	Yes / No / NA
	c	If the participant does not emit target re-requesting response, all necessary items are removed.	Yes / No / NA
	d	Ended trial	Yes / No / NA
6	a	If the participant does not emit target rejecting response, all necessary items are removed.	Yes / No / NA
	b	Ended trial	Yes / No / NA

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