The Effects of the Social Listener Reinforcement Protocol on the Audience Control of

Stereotypy and Social Operants for Students with Developmental Delays

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ABSTRACT

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In a within-subjects alternating treatments design, I tested for the presence of audience control in four participants' frequency of stereotypy in a self-contained special education setting versus a general education setting. Three students with autism, and one student diagnosed with an emotional disability were participants in the study. All students had the capability of observational learning and the cusp social listener reinforcement in their repertoires of verbal behavior. Probes were conducted at random across participants and settings, and showed high frequencies of stereotypy in the self-contained setting and low to no instances of stereotypy in the general education setting. As an extended test of audience control, Experiment 2 identified developmentally delayed nursery school students in an integrated setting and tested the effects of the social listener reinforcement protocol (Reilly-Lawson & Walsh, 2007) on the audience control of social vocal operants. All participants had speaker behavior in repertoire but few conversational units, sequelics, and mands were emitted with typically developing peers in the classroom. Participants also emitted low levels of correct choral responding during group instruction. Following the social listener reinforcement protocol all participants increased social vocal operants with classroom peers and became more integrated in the classroom environment. Correct choral responses increased, as well as sharing and mands, with each other and with typically developing classroom peers.

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DEDICATION

I dedicate this research to those who are open to growth and change. May you always

operate with compassion, giving yourself and others the space and the opportunity to

learn.

Chapter I

The following paper draws the connection between audience control and the success of inclusion for students with Autism Spectrum Disorder, emotional disabilities and developmental disabilities. There is a need to identify measurable cusps fostering successful inclusion on an academic, self-management, and social plane. Audience control is a possible cusp affecting such success, and therefore its research is warranted. In Experiment I, I presented my findings supporting evidence for the presence of the cusp of audience control in three students diagnosed with autism and one diagnosed with an emotional disability as they integrated into a general education setting. In Experiment II, I tested the effects of the social listener reinforcement training protocol (Reilly-Laswon and Walsh, 2007) on the audience control of social vocal operants.

The following section is a list of terms related to the science of behavior analysis and verbal developmental theory. These terms were selected and defined to aid the reader in the comprehension of the research associated with audience control. Following the definition of terms, you will find an introductory chapter reviewing the literature and rationale for this research.

DEFINITION OF TERMS

1) Audience control
Audience control is when different audiences act as a discriminative stimulus for response classes of verbal behavior (Skinner, 1957). The individual changes his behavior based

on the audience present in his environment. According to Skinner (1957) verbal behavior is only punished when the individual is functioning under audience control. Therefore, the individual has not discriminated that with this particular audience the specific behavior will not be reinforced. There are properties of multiple audiences, and an audience may be described as a negative audience or a positive audience. A negative audience is one that punishes verbal behavior, but is only detected in combination with a positive audience. A positive audience is one that reinforces a behavior (Skinner, 1957). The skill to differentiate between audiences, and behave in relation to that audience is called audience control.

2) Conversational Unit

A conversational unit is defined by Greer (2002) as "one full exchange between two people in which the individual emits both a speaker response that is reinforced by the verbal behavior of another person responding as a listener and in turn a listener response by the initial speaker," (p. 91). Therefore the individual responds as both the listener and the speaker, and rotates between the two roles. An example of a conversational unit occurs when a person asks a question, listens for the response, and then responds to the answer to the original question.

3) Repertoire

A repertoire is "a class or category of operants that was learned by an individual and is likely to be emitted given the learned setting events and antecedents," (Greer and Ross, 2008, p. 300). Therefore, given a particular discriminative stimulus, the set of behaviors that a person can relevantly emit is their repertoire of verbal behavior.

4) Verbal Behavior

Verbal behavior is behavior that is reinforced by the mediation of another, however another listener does not need to be present in order for verbal behavior to be executed, as in speaker-as-own-listener behavior and textual responding (Greer, 2002; Skinner 1957). According

to Skinner (1957), verbal behavior can be broken down by units of function and source of reinforcement and is categorized by six operants; mand, tact, intraverbal, autoclitics, echoic, and textual topographies.

5) Observational Learning

The definition of observational learning differs between cognitive psychologists and radical behaviorists, as well as the components that occasion the presence of the capability. Bandura and Walters (1963), in Varni, Lovaas, Koegel, and Everett (1979), describe social learning theory as learning that can occur through mere observation of modeled behavior with accompanying cognitive activities without explicit shaping through extrinsic reinforcement. Bandura (1971) argued that observed behavior is stored and later retrieved using cognitive mediation.

Deguchi (1984) described observational learning as having three features, one-trial learning, delayed performance, and observed consequences. One-trial learning occurs when a behavior is observed and then is immediately, accurately and independently imitated without the use of extrinsic reinforcement, whereas delayed performance is imitated behavior that occurs in the absence of the model. His theory on observed consequence suggests that modeled behavior that is reinforced is more likely to be imitated than un-reinforced models.

The definition of observational learning has since been revised several times. Similar to Deguchi's observed consequences, Varni et al. (1979) argued that observational learning requires the acquisition of the behavior topography as well as the acquisition of stimulus functions. Catania (1992) also noted the importance of observing the consequence; dismissing the notion that observational learning is the same as one-trial learning as defined by Deguchi (1984). Catania (1998) argued that by observing the consequence, an organism might observe a punished

behavior and therefore avoid aversive stimuli. Greer, Singer-Dudek, and Gautreaux (2006) subsequently defined what they consider to be "true observational learning" as the ability to acquire a new operant, higher order operant, or conditioned reinforcer through observing others experience contingencies of reinforcement or punishment (i.e. instruction), but without coming in direct contact with such contingencies themselves.

6) Naming

Another academic milestone and behavioral capability that would increase learner success in a general setting is Naming, which is a bi-directional verbal phenomenon through which a child can emit both listener and speaker responses for an observed tact spoken by another individual (Horne & Lowe, 1996). It is the initial fusion of listener and speaker functions within the individual (Greer & Speckman, 2008; Horne & Lowe, 1996; Skinner, 1957). Horne and Lowe (1996) emphasized the necessity of Naming in order to be truly verbal and has since been identified as higher order verbal operant (Greer & Keohane, 2005), a developmental capability (Greer & Speckman, 2008), a key developmental milestone in language development (Greer, 2008; Greer & Longano, 2010) and in the acquisition of reading and writing skills (Helou-Care, 2008; Reilly-Lawson, 2008).

Naming allows an individual to learn language incidentally and is the source for the exponential growth of language development. After hearing a tact, a child with Naming can not only respond as a listener, but can respond as both a listener and speaker without direct instruction, allowing new vocabulary to be acquired incidentally (Greer & Longano, 2010). Children without the Naming capability require tedious instruction in order to gain new vocabulary. In the general environment, there is little time to deliver direct instruction to all students. Most learning is expected to occur through incidental teaching and indirect contact with contingencies, and therefore Naming is essential.

7) Say-Do Correspondence

Say-do correspondence is the first level of speaker-as-own-listener behavior, is an initial cusp in the joining of listener and speaker behavior (Greer & Ross, 2008), and is an example of verbally governed behavior (Catania, 2007; Deacon & Konarski, 1987). Baer, Williams, Osnes, and Stokes (1984) studied the maintenance of say-do correspondence for nutritious snack choices with children enrolled in day-care using intermittent reinforcement corresponding with the presence of say-do behavior. Following mastery of say-do correspondence with a high rate of reinforcement, the schedule of reinforcement was decreased and correspondence was maintained. Luciano, Herruzo, and Barnes-Holmes (2001) studied the generalization of say-do correspondence and reported an increase in generalization when students symbolically verbalized their decision on a permanent product versus only saying their decision aloud.

8) Joining of Listener and Speaker Behavior

"Contemporary accounts suggest that to be truly verbal the speaker must also be simultaneously behaving as a listener," (Greer & Speckman, 2009). However, a body of research has identified the initial independence of listener and speaker cusps and capabilities in the development of the function of language, prior to the joining of the two at a covert level (Greer, 2008; Greer & Keohane, 2005; Greer & Ross, 2008; Greer & Speckman, 2009; Hayes et al, 2001; Healy et al, 2000; Horne & Lowe, 1996)

Following the development of independent listener and speaker behaviors, the two become joined. Without joined listener and speaker behavior, social behavior never develops, incidental learning of new language cannot be achieved, and self-management behaviors are not emitted. This occurs through the ontogenetic selection of verbal capabilities. "These initially independent response classes become joined as a result of certain outcomes made possible by natural selection and behavioral selection for cultural outcomes" (Greer, 2008, p. 370). There is

survival value in language evolution, and typically the response classes are joined through a natural progression due to the need to communicate. More advanced repertoires of verbal behavior increase efficiency of recruiting desired outcomes and extensions of senses.

When the listener and speaker are joined, one individual may function as both the listener and the speaker, as in speaker-as-own-listener behavior, or have speaker-listener exchanges with others. Speaker-listener exchanges with others includes the cusps of sequelics and conversational units. An individual switches between roles of listener and speaker in this type of verbal exchange (Greer & Ross, 2008). According to Skinner's (1957) theory of verbal behavior, conversational units are comprised of two individuals exchanging from speaker to listener responding, in which both parties function as both a listener and a speaker in a single episode. Therefore, conversational units measure the joining of listener and speaker exchanges (Greer & Ross, 2004). A conversational unit is defined by Greer (2002) as "one full exchange in which the student emits both a speaker response that is reinforced by the verbal behavior of another person responding as a listener and in turn a listener response by the initial speaker," (p. 91). In order for an individual to engage in conversation with another, both parties must be interested in what the other is saying, or must be reinforced by the listener components of such social exchanges.

9) Stereotypy

Stereotypy is defined as repetitive behaviors that are invariant over successive occurrences (Catania, 2007). The behaviors are "repetitive movement cycles which obtain no apparent consequences for the individual who is emitting the responses beyond the movement itself" (Greer, Becker, Saxe & Mirabella, 1985, p 270). While most individuals engage in some form of stereotypical behavior, children with developmental disorders emit higher rates of stereotypy in a topography that is less socially acceptable (Greer et al., 1985). Nail biting, cigarette smoking, hair twirling, and toe tapping are all forms of stereotypy. Hand flapping,

finger twinkling, and rocking are some physical forms of stereotypy often observed with students with disabilities. These movements may or may not be paired with vocal forms of stereotypy such as moaning or repetitive words or phrases.

Stereotypy provides its own reinforcing consequence, thus it has been suggested that these behaviors are maintained by automatic reinforcement (Vaughan & Michael, 1982). Hanley, Iwata, Thompson, and Lindberg (2000) used access to stereotypy as contingent reinforcement for appropriate object manipulation. It was shown that by giving access to stereotypy where it was previously blocked, the amount of time of the students' engagement in appropriate object manipulation increased significantly, thus demonstrating stereotypy as a source of reinforcement (Hanley et al., 2000).

10) Mand

A mand is one of the six speaker verbal operants described by Skinner (1957). He defines the mand as a "response reinforced by a characteristic consequence and is therefore under the control of relevant conditions of deprivation or aversive stimulation. It is characterized by the relationship between response form and the reinforcement delivered by the verbal community (Skinner, 1957). It specifies its reinforcer, which may or may not be present in the speaker's environment (Catania, 2007; Greer, 2002).

11) Tact

A tact is one of the six verbal operants described by Skinner (1957), that is under nonverbal stimulus control and is reinforced by generalized reinforcement (Catania, 2007). An intraverbal is when the antecedent is a verbal stimulus, versus a pure tact (Greer & Ross, 2008). Therefore with a pure tact, the antecedent is something in the physical environment that the speaker makes contact with by "talking about" it (Skinner, 1957).

12) Palilalia

Palilalia is a vocal response in which the speaker uses nonsense repetitive language with no current relation to the physical environment. Palilalia has been characterized as both stereotypy as well as speaker-as-own-listener behavior (Greer & Ross, 2008).

13) Multiple Causation

Multiple causation is an explanation of responses and stimuli having multiple control. A response can be under the control of many different stimuli. Conversely, stimulus may control many different responses (Skinner, 1957). When teaching it is important to vary the antecedents presented when teaching a new operant so that the behavior is said to come under multiple controls (Greer & Ross, 2008).

14) Establishing operation

Establishing operations are conditions that alter the effectiveness of a given reinforcer (Greer & Ross, 2008). Deprivation and aversive conditions are examples of conditions effecting a reinforcer. Research on establishing operations aid in understanding motivating conditions of learning. Establishing operations are part of the learn unit in context (Greer, 2002).

REVIEW OF LITERATURE

"All students must know how to interact with others appropriately in group learning experiences, how to engage in classroom discussion, and how to distinguish between classroom behavior that promotes learning and classroom behavior that disrupts learning… By attending to two important components of the classroom social environment—classroom behavior and social skills—you can dramatically improve the success of your students," (Mastropieri et al, 2007, p. 148). According to Mastropieri (2007), students must discriminate between appropriate and inappropriate behavior, and choose to engage in appropriate behavior with peers in order to

integrate into the social and academic environments of a general education classroom. In order to achieve this integration, the audience must function as a discriminative stimulus for the production of verbal behavior (Keller, 1995; Skinner, 1957).

We speak with the desire to be heard, and the actions of the listener should either reinforce or punish the speaker's future behavior and effect the production of a new vocal response (Skinner, 1957). The emission of verbal operants is dependent on experiencing elicited consequences, often times emitted by an outside audience. We reinforce verbal behavior emitted by reinforcing the desired behavior from the listener, and this social effect is thus learned based on the histories of reinforcement received from our audience. As Skinner stated, "practically all verbal behavior is controlled by an audience," (1957, p. 52) because the source of reinforcement for most verbal behavior is mediated by the listener, or the speaker according to recent research. Some research now supports Skinner's theory, and shows that the listener's senses are extended by the speaker when one is fully verbal (Greer & Longano, 2010; Helou, Lai, & Sterkin, 2007; Reilly-Lawson & Walsh, 2007). Therefore, speaker behavior functions to evoke a sensory experience.

Unlike typically developing individuals, the behavior of individuals with autism is often emitted independent of the audience, increasing the difficulty for a child with autism to fully integrate with his environment. John is John, whether in a library, or at a baseball game, or in his home. This may result in social isolation, thereby decreasing opportunities to develop, learn, and contact reinforcement from others. In order to integrate with any environment and any audience, audience control must be in an individual's repertoire of verbal behavior. One must know how to act in order to reach a desired outcome from others. However, an individual must first desire an outcome. A solution may be to induce audience control as a function of natural social

contingencies, by conditioning reinforcers that allow an individual to access social contingencies.

The research reported herein was derived from incidentally observing the differences in behavior of three participants on the autistic spectrum and one with an emotional disability integrating into a general education classroom from their self-contained special education classroom. The observed change in behavior was quite significant. The frequency of stereotypy across all participants drastically decreased when in the presence of typically developing students who did not emit such overt, socially unacceptable stereotypical behaviors. These participants were not given any instructions prior to entering the general setting pertaining to acting appropriately. The only changed variables that appeared to affect the decrease in stereotypy were the environment and the audience. The participants therefore, discriminated between audiences and appeared to change their behavior accordingly, demonstrating audience control and readiness for success in the general education setting. From these findings, I began to research the role of the audience and possible interventions to induce audience control, and the currently defined behavioral developmental milestones that have produced readiness for success in an inclusion classroom.

INCREASING SUCCESS OF INCLUSION OF STUDENTS WITH DISABILITIES

Mills, Cole, Jenkins, and Dale (1998) tested the effect of differing levels of inclusion on preschoolers with disabilities. The data suggested differential benefits for differing levels of disability. Higher functioning students benefited more from the integrated special education settings, whereas lower functioning students benefited more from special education and mainstream settings. These data helped to identify the risks of a "one-size fits all" policy, and the need for measurable goals identifying readiness for general settings.

Many factors are associated with a child finding success in an inclusive setting. Furthermore, the definition of a child's success is quite variable and has prompted both a philosophical and an empirical debate. The philosophical debate includes educators and theorists viewing inclusion as a fundamental right (Fuchs & Fuchs, 1994). Too often this results in the inclusion of students lacking the prerequisites to learn independently (Marks, Schrader & Levine, 1999). Subsequently, one-to-one aides are sanctioned and students are dependent on prompts and accommodations. This system allows the child to be included but doesn't necessarily foster social development or self-determination (Mithaug, 1998; Wehmeyer, 1998), and furthermore, the environment may become stigmatizing (Pivik, McCornas & Laflamme, 2002). In contrast, advocates of full-inclusion feel that full inclusion is a civil right, that it actually reduces stigma, is more efficient than removing students for specialized services, and promotes equality (Fuchs & Fuchs, 1994).

An empirical debate however, looks for experimental evidence supporting inclusion of students with special needs. Data have suggested that students with and without disabilities benefit socially (Hunt, Soto, Maier, & Doerling, 2003; Peterson & Scriven, 1977; Rafferty, Piscitelli, & Boettcher, 2003), gain more access to the general curriculum and state standards (Hunt et al., 2003; Wehmeyer, 2003), and increase engagement, initiation, and pride (Hunt et al., 2003) in an inclusive setting. In contrast, some feel that data supporting full-inclusion are lacking (Fuchs & Fuchs, 1994), and general education teachers are not prepared for full inclusion (Fisher & Grey, 2001; Marks, Schrader & Levine, 1999).

Lane, Girner, and Pierson (2004) and Lane, Pierson and Girner (2004) (in Mastropieri et al, 2007) surveyed teachers to determine which behaviors were deemed most important and expected of their students with and without disabilities. The teachers surveyed were both general

and special educators. Critical social behaviors were identified from a social skills rating system in the areas of assertion, cooperation, and self-control. Of the three major areas, general and special educators from elementary to middle school level deemed cooperation and self-control skills as most important for school success. Educators have identified self-management and social behaviors, in addition to academic repertoires that are imperative to a student with disabilities seeking success in the general education environment. Many of these behaviors have been behaviorally defined and experimentally induced to enable a student to learn and function more independently.

Behavioral Developmental Milestones

Empirical research has not only provided information on advantages and disadvantages of inclusion, but has also provided a means to assess readiness and induce skills to increase readiness. Empirically tested protocols and tactics have resulted in students learning in new ways when previously, direct instruction was more heavily needed (Greer & Speckman, 2009). Behavioral developmental cusps and capabilities have been experimentally induced that enable a child to learn in larger group settings, and to learn from observing others' behaviors and associated contingencies. Such data provide a much-needed assessment of measurable goals whose achievement is necessary for a student's successful inclusion in addition to evidence-based practices promoting learner success. "There have been few investigations to assist psychologists in programming for successful inclusion," (Wilkinson, 2005, p. 308). Prerequisites, milestones, assessments, and teaching tactics need to be identified for teachers that would enable and foster inclusion success.

Based on Skinner's theory of verbal behavior (1957), recent research in verbal behavior and a research program in advancing verbal repertoires, Greer (2002; Greer & Keohane, 2005;

Greer, 2008; Greer & Ross, 2008) categorized children's development of verbal behavior to help identify competencies that are missing in children having difficulty learning. Greer, et al. (2008) categorized children's development by identifying milestones for each of the following levels of verbal development; pre-listener, listener, speaker, joining of listener and speaker, and reader/writer. Each level contains milestones that are behavioral cusps. Cusps are capabilities that children need in order to come into contact with new contingencies with his environment and learn in new ways. It is important to define the difference between cusps and capabilities to better understand the implications and importance that each milestone holds for a developing learner.

Rosales-Ruiz and Baer (1996) first identified these milestones as behavioral developmental cusps. They defined a cusp as a change in behavior that allows further development within its realm, causes development within its realm to suddenly become easy and allows the individual to come into contact with more complex development and learning opportunities. Without reaching new cusps, further development within its realm is impossible, and learning is slow. An example of a preliminary cusp is having voices as a conditioned reinforcer (Greer & Ross, 2008). Without having voices as a conditioned reinforcer, the probability that voices select out attention in his or her environment is very low thereby making learning auditory discriminations quite difficult if not impossible. Acquiring a new cusp enables an individual to now learn from direct contact with new contingencies (reinforcing and punishing experiences (Hayes, Barnes-Holmes, & Roche, 2001).

There are certain cusps that not only allow an individual to come in direct contact with new contingencies, but also enable an individual to learn in new ways and through indirect contact with contingencies. Greer and Speckman (2009) first identified these cusps as

developmental capabilities. Behavior analysis discusses developmental cusps as higher order or overarching operants (Hayes, Barnes-Holmes, & Roche, 2001; Healy, Barnes-Holmes, & Smeets, 2000; Horne & Lowe, 1996). Not all cusps are capabilities, however all capabilities are cusps. According to Greer and Speckman (2009) there are important distinctions between cusps and capabilities when identifying the outcomes associated with each. A capability gives an individual the tools to learn incidentally from his environment and without direct instruction, whereas a cusp allows an individual to learn from direct instruction that previously would not have resulted in meeting the criteria of acquiring a new operant. Capabilities are crucial to language development, rate of acquisition, and success as a student in our current educational systems.

Many individuals acquire new cusps and capabilities incidentally; however learners who are not on a typical developmental spectrum often have deficits in their repertoire of verbal development and therefore present difficulty learning new operants and functioning in a social environment. A trajectory of verbal milestones helps to identify those cusps and or capabilities that are missing so that they can be experimentally derived. Applied research has developed protocols and tactics that have induced these missing cusps and capabilities, as well as identify possible prerequisites needed in order to increase the probability of successful outcomes (Greer, 2008; Greer & Keohane, 2005; Greer & Ross, 2008; Greer & Speckman 2009).

Academic Milestones for Inclusion

In a general education setting, students often learn in small and large groups such that each student does not always come in contact with direct contingencies and yet learning is expected to occur. Most typically developing students learn in group settings, however cusps and capabilities for students with developmental disabilities are often missing that prohibit this type

of learning. Werts, Caldwell, and Wolery (1996) argued that students with disabilities often acquire some but not all behaviors taught during small group instruction. Accommodations and teaching tactics have demonstrated an increase in academic success in an inclusion setting (Soukup, Wehmeyer, Bashinski, & Bovaird, 2007) and are quite useful strategies, however such strategies often act as a band-aid and fail to change the way students learn. Inducing behavioral developmental capabilities have produced such changes. Specifically, the capabilities of observational learning and Naming enable students to acquire an expanded amount of information and learn in new ways (Greer & Keohane, 2005; Greer & Ross, 2008; Greer & Speckman, 2009; Horne & Lowe, 1996). Naming, with a capital N, versus naming is used in this literature to distinguish between the layperson's use of the term naming, as to name an object, from the capability of Naming in verbal behavior use, as described in the definitions of terms.

Greer, Corwin and Buttigieg (2011) tested the effects of Naming on different methods of teaching. Rate of learning with standard learn unit presentations were compared to model demonstration learn units for students with and without Naming. Model demonstration learn units consisted of the student observing a model of the target response twice, followed by the delivery of standard learn units. Learning was only accelerated for students with Naming; demonstrating Naming's effects on the ways in which students learn.

Furthermore Naming provides the foundation for more advanced cusps and capabilities. Helou-Care (2008) tested the effects of Naming on reading comprehension and found that children without Naming but with fluent phonemic responding (150-200 words per minute) had poor comprehension. A child may have phonemic control but lacks the joining of phonemic control and responding to the word as a listener. When phonemic control and Naming are in a child's repertoire, the child can sound out a word, hear it as a listener, and experience the visual

and emotional respondents that occurred in the initial Naming experience of the word, thereby comprehending what was read (Greer & Longano, 2010). After experimentally inducing the Naming capability, Helou-Care (2008) found reading comprehension to be significantly improved.

Testing for the presence of observational learning and Naming and experimentally creating such capabilities when missing seems to be quite a powerful tool to assess a student's readiness for an inclusive setting. Walsh (2009) implemented an observational system of instruction (OSI) (consisting of peer tutoring, peer monitoring, and peer-yoked contingencies) with students with emotional disabilities to successfully induce Naming and observational learning. OSI provides multiple experiences of instruction that are needed for students to learn new operants under group instruction, and can be delivered class-wide. In her second experiment, Walsh (2009) implemented two of the three stages OSI and tested its effects on advanced forms of Naming. Walsh defined advanced Naming as learning through observation without observing any consequences. This capability is necessary for an individual to learn under lecture conditions. Her data showed that advanced Naming under lecture conditions emerged for all participants as a result of the OSI procedure. These findings indicate ways for educators to assess student readiness to learn in large groups and lecture formats, as well as providing a protocol to induce the capability if missing.

Self-Management Milestones for Inclusion

Researchers have identified active meaningful participation as a key component to successful inclusive classrooms (Hunt et al, 2003; Jackson et al., 2000; Soukup et al., 2007; Voltz et al., 2001). How do we then define active meaningful participation? Frequently, students with disabilities fail to find success in mainstream settings due to emitting high rates of

disruptive and off-task behaviors (Koegel, Harrower & Koegel, 1999; Wehmeyer, 1998; Wehmeyer, Agran, & Hughes, 2000; Wilkinson, 2005), having a reliance on an aide (Wehmeyer, 1998), and requiring thick schedules of prosthetic reinforcement (Greer & Ross, 2008). Active meaningful participation may then demand students to be self-regulated, possess problem-solving skills, make choices and act autonomously in order to have the intrinsic motivation to stay on task and learn from members of the classroom. Wehmeyer (1998) and Mithaug (1998) describe these behaviors as having self-determination. Behavior analysts define a large component of this ability as having say-do correspondence (Greer, 2002**).**

Independent functioning in any environment requires the ability to make decisions based on the need to accomplish a goal, and following through on that decision. Say-do correspondence has had positive effects on presence and maintenance of appropriate behaviors and reducing inappropriate behaviors (Baer et al.,1987; Risley & Hart, 1968; Williams & Stokes, 1982). Morrison, Sainato, Benchaaban, and Endo (2002) increased independent performance of on-task behaviors for preschoolers with autism in an inclusive setting using say-do correspondence training during playtime. Therefore, say-do correspondence may be an important cusp indicating readiness for a general education environment.

Token systems or token economies are another management tactic that has increased on-task behaviors and compliance in inclusive settings (Mastropieri & Scruggs, 2007; McLaughlin & Malaby, 1972) and have been utilized in conjunction with self-management systems. Token systems have become more prevalent in the general education setting, however teacher praise is the primary form of reinforcement in classroom management (Vollmer & Hackenberg, 2001). Praise and adult approvals however, do not always function as reinforcers for students with disabilities. In inclusive and general education settings, students with disabilities lacking this

conditioned reinforcer have limited access to reinforcement, decreasing the probability for behavior management and learning of academic repertoires under conditions of teacher praise.

Greer, Singer-Dudek, Longano, and Zrinzo (2008) conditioned praise as a reinforcer through observational conditioning procedures. Students learned new operants and maintained performance tasks under conditions of approvals following the observational conditioning of approvals procedure, when previously other prosthetic reinforcement was needed. Having conditioned reinforcement of approvals is necessary for students to function in general environments that use approvals as a primary means of reinforcement.

Social Milestones for Inclusion

One of the major variables for a student with disabilities in a general education environment is the interaction with typically developing peers. Social interaction does not always take place and is an important piece in the success of the inclusion of a student with disabilities. Social behavior for children includes possessing both play skills and communication skills, and in the behavioral community, for an individual to be social, his repertoire of verbal behavior must include higher-level verbal cusps and capabilities (Greer & Speckman, 2009). The cusps and capabilities associated with successful social inclusion are joint listener and speaker behavior, social listener reinforcement, and having age-appropriate conditioned reinforcers. Empirically tested protocols have experimentally induced such cusps and capabilities, through teaching the function and conditioning the reinforcement that selects out these social behaviors (Greer & Ross, 2008; Greer & Speckman, 2009).

Additionally, researchers have identified methods of teaching the structural components of social behavior such as with scripts (Goldstein & Cisar, 1992) and social stories (Chan & O'Reilly, 2008). However, similar to the band-aid aspect of academic accommodations, teaching

the structural components may increase social interactions but may not give students access to the reinforcement typically developing individuals receive from social behavior. Empirically tested tactics that teach the structure of conversation and social interaction have been successful, however may not condition the reinforcement of being social or teach the function of the verbal operants.

Video modeling is another tactic used to teach social behaviors to students with disabilities. Video modeling is a treatment using videos of an individual engaging in a target behavior for the observer to imitate (LeBlanc, Coates, Daneshvar, Charlop-Christy, & Morris, 2003). Video modeling has functioned to increase conversational speech (Charlop & Milstein, 1989) and pretend play (MacDonal, Sacramone, Mansfield, Wiltz, & Ahearn, 2009) for children with autism. LeBlanc et al. (2003) implemented a video modeling with reinforcement procedure to teach perspective-taking skills to three children with autism. The procedure functioned to increase perspective taking for two of the three children in an untrained task. Nikopoulos and Keenan (2004) used video modeling to increase social initiations and reciprocal play for three children with autism. These videos showed typically developing peers engaging in social interactive play with the experimenter and one toy. Viewing of the videos functioned to increase social initiation and reciprocal play skills. This increase in social behavior may have been a function of observing social contingencies as well as the structural components of social interactive play.

Social Reinforcement and Social Vocal Operants

To further dissect the acquisition of social interaction from a verbal behavioral perspective, the function and reinforcement of social vocal operants must be defined. Skinner defined the different relationships of speaker/listener exchanges between two or more individuals

as sequelics and conversational units (1957). Sequelics occur when an individual acts as a listener and speaker, but once the speaker behavior is emitted, the verbal interaction is discontinued. For example, a speaker may say, "What did you eat for dinner?" The listener then responds as the speaker by saying "I ate sushi." No further speaker behavior is emitted. However, if the speaker's response functions as a reinforcer for the listener, speaker/listener exchanges continue and conversational units are emitted. For example, the initial speaker may respond by saying, "Oh! I ate sushi too!"

Greer et al (2008) suggest that individuals must acquire the listener reinforcement component of social exchanges in order for social exchange and conversational units to be truly present. This behavior is driven by the development in reinforcement recruited from listening to what another has to say. Greer and Keohane (2005) have argued that the presence of conversational units is a critical developmental milestone in the evolution of a child's verbal behavior. The basic component of being social is coming under the contingencies of reinforcement related to the exchange of speaker and listener roles.

Reilly-Lawson and Walsh (2007) tested the effects of observational training in social listener reinforcement games on the frequency of conversational units in non-instructional settings. In the first experiment different games were played using a peer-yoked contingency game board. Experimental phases of observational training included the need to listen to the peer/peers response in order to receive reinforcement and advance in the game. The results showed that as social listener reinforcement increased with each phase, the frequency of conversational units emitted by participants also increased. In the second experiment, empathetic responses were taught using multiple exemplar instruction. Students were taught to respond to questions such as "what happened?" "how do you think he feels?" and "what would you do to

help?" Researchers observed an increase in appropriate responses to the feelings of their peers, as well as an increase in attention to peers (Reilly-Lawson et al, 2007).

Schmelzkopf (2010) studied the relationship between the social reinforcement of praise and the emission of social vocal operants. An observational conditioning procedure was implemented to condition approvals as a reinforcer for preschoolers with developmental disabilities. Following the conditioning of approvals, students increased the number of conversational units emitted. These data indicate the importance of being reinforced as a listener on the prevalence of speaker-listener exchanges.

Tsouri and Greer (2007) also tested the effects of social reinforcement on speaker behavior. Tsouri et al. taught two preschoolers with developmental disabilities echoic tact responses, which were their first instances of speech, using rapid motor imitation under two different social reinforcement conditions. Social reinforcement was defined as delivering praise, attention, and physical interaction. Their findings discussed the importance of using social reinforcement when teaching first instances of vocal verbal behavior, and showed a functional relationship between the number of correct echoics and contingent social reinforcement.

Eby (2011) had related results. Eby's research tested the effects of contingent tokens versus contingent social reinforcement such as adult attention on the emission of verbal operants by preschoolers. The results showed that participants emitted tacts more frequently with contingent social attention. Results also showed that peer-to-peer conversational units were higher when adult attention was withheld, indicating that deprivation of adult attention functions as an establishing operation for increasing the reinforcement value of attention from peers.

It is now evident that when social reinforcement is not present, conversational units do not occur in high frequencies and most often do not occur at all. Individuals in the environment

cease to engage in social interactions with the individual lacking social reinforcement, because they in turn do not receive reinforcement for their initiated social behaviors. Furthermore, if social reinforcement is lacking, the response to a vocal antecedent may be present, but may not function to reinforce the initial speaker's behavior. In such instances, the response may be out of context or disapproving. The audience therefore, fails to function as a discriminative stimulus for verbal behavior, and social integration does not occur. It is therefore imperative to identify the control of the audience on an individual's behavior in order to increase social integration.

AUDIENCE CONTROL

Keller states that a "verbal repertory may be activated by one audience and left untouched by another… and where audience control of speaking fails conspicuously, we have a symptom of psychopathological behavior in which verbal output is, we say, not 'in contact' with the immediate social situation," (Keller, 1995, p. 394). For example, a child with autism may begin talking about trains in the middle of a discussion about animals, where there is no context for his listener. This child may also respond by rapidly flapping his hands, not making eye contact, and giving minimal to no attention to the child talking about animals. Such inappropriate responses can make social interactions and social relationships quite difficult and often times punished. If the speaker does not attend to the listener, then reinforcement for the listener to engage with the speaker is absent, punishing further and future conversation (Keller, 1994; Skinner, 1957).

Applied behavior analysts, cognitive psychologists, and social psychologists have all theorized the role that audience plays on a person's behavior. While the form of verbal behavior used by each school of psychology varies, all agree that people typically respond differently, depending on the presence of an audience, and the type of audience that surrounds them.

Audience Control and Social Psychology

For social psychologists, mere presence effects and social conformity models are terms used to theorize and research audience control. Research on mere presence effects suggest that just the addition of another individual in a person's environment will increase the arousal state of a person and therefore change his behavior (Guerin, 1993). Burnham (1910) first used the term 'mere presence' in discussing the change in subjects' performance in the presence of others versus in an alone condition.

Zanjoc (1965) suggested that the mere presence of another person increases dominant responses through an increase in arousal states. Therefore the presence of an audience will cause a person to perform better with simple tasks but worse with complex tasks (Guerin, 1993). Zanjoc further delineated the theory of mere presence effects by separating directive effects and non-directive effects of the presence of others. He defined directive effects as giving cues, imitation responses, social reinforcement, and competition. Mere presence effects were therefore present when directive effects have been controlled for and removed.

Mere presence effects correlate with the theory of audience control, however the term audience control suggests that a person will differentiate and select appropriate behavior based on the type of audience present. Therefore there is an added variable of discrimination of both audiences and appropriate response sets. To study this phenomenon from a sociological perspective, theories on social facilitation and social conformity must be addressed. Allport (1924) first used the term social facilitation in studying co-working performance. He described social facilitation as an increase in response merely from the sight or sound of others performing the same action (Allport, 1924).

Easterbrook (1959) attempted to explain social facilitation through attention and arousal models. He suggested that an increase in arousal decreases the range of cues that an individual attends to. For simple tasks, task irrelevant cues are ignored and for complex tasks, some task relevant cues are excluded and performance is inhibited. Manstead and Semin (1980) also used an attentional model to explain social facilitation. They suggested that simple tasks are routinized and performance decreases. However with an evaluative audience, controlled processing replaces the automatic processing and performance then increases. For complex tasks, the audience then decreases performance quality. This explanation is similar to a behavior analytic perspective of verbally governed and contingency shaped behavior. Verbally governed behavior is similar to the controlled processing, in which a person's behavior is determined by verbal antecedents or rules. Contingency shaped behavior, or behavior that has been shaped by consequences, is similar to routinized behaviors (Catania, 2007). In either case, more research is needed to determine what conditions occasion each (Guerin, 1993).

Guerin (1993) described "standard social facilitation" as a subject doing as well as possible for the experimenter. "Social conformity" theories incorporate a behavior standard matching theory in which an individual attends to internal standards or external cues for appropriate behaviors. Different psychological perspectives support either the internal standards models or the external cues models. Various theories define these standards of socially valued behaviors as social standards, response sets, and learned self-presentation strategies (Guerin 1993). Regardless of the terminology, all agree that as a result, the unapproved behaviors are filtered prior to the production of the individual's response in the presence of the audience. The individual then increases the frequency of more socially approved behaviors and decreases socially unapproved behaviors.

Audience Control and Cognitive Psychology

Cognitive psychologists describe social conformity using internal standards models. The pre-filtering of responses in the presence of an audience occurs using an internal set of standards that are matched to the individual's response. While a behavior analyst suggests that the behaviors are actually mediated by the audience (listener) a cognitive psychologist does not. The assumption in the cognitive perspective is that a person has an internal representation of the world that is used to interpret his environment. In the cognitive model information is taken in, processed, stored as memory, and retrieved from previously stored memory. In relation to audience control and social facilitation, most cognitive theories are applied to the stage of information processing. The presence of an audience is said to affect how much information is absorbed as well as the kind of information that is absorbed and processed (Guerin, 1993).

Blank (1980) based his information processing theories of social facilitation on Easterbrook (1959) using arousal and social factors. With information processing theories, pre-response filters exclude whole response sets. These excluded sets are based on past experience and stored information, or responses that lead to negative self-presentation. Blank proposed that filtering may take place at the attention stage due to arousal, and at a pre-response stage which is cognitively driven (not arousal driven). He used a word association task to test his theory. He found that word associations are faster in the presence of a neutral audience, but slower if the audience has characteristics requiring response filtering (such as a prestigious audience) (Blank, 1980).

Blank's theories are most similar to modern day cognitive models that use schema to explain social facilitation. Schemas are memory stored as organized units based on previous experiences (Guerin, 1993). The presence of an audience primes social schema, which coincides

with Blank's theory of pre-response filtering. A particular audience will prime socially acceptable or unacceptable behaviors. Axelrod (1973) states that schema are "pre-existing assumptions about the way the world is organized" (p. 1248). The presence of an audience offers new information for the individual to process and fit into a previously formed social schema in order to interpret the situation. To add to this theory of social schema, the concept of self-schemas is addressed (Monteil & Huguet, 1993). Monteil et al. states that it is necessary to consider the autobiographical history of the individual and the self-schemas created in order to fully understand the influence of the social context.

Problems with these models arise in the prediction of which response sets will be filtered or which schema will be primed. None of the models answer the question of why certain schemas are primed, or why certain responses are filtered. Behavior analytic models attempt to answer this question through histories of reinforcement and strengthening of consequences. While cognitive psychology seeks to explain behavior through internal states, applied behavior analysis studies the relationship of the environmental stimulus and the response, however within a context of internal or covert behaviors as well as overt behaviors. Unobserved behaviors were explained through a mutual and reciprocal relationship between response of individual and stimulus function of environment, and the role of context (Menand, 2001; Moore, 2008).

Audience control is explained by the history of reinforcement for behaviors that are socially "approved" and the history of punishment for "unapproved" behaviors (Catania, 2007; Skinner, 1957). It therefore addresses how the behavior standards are learned, and suggests that previously punished or reinforced behaviors will decrease or increase, and that responses are therefore mediated by the presence of a specific audience. Each audience will correlate to a set of behaviors that have been punished and a set of behaviors that have been reinforced, thus the

audience becomes the discriminative stimulus for each set of behaviors. But in order to be reinforced or punished by an audience, an individual needs to contact those contingencies. When the audience does not have the reinforcing or punishing effect, an individual cannot contact those contingencies. As in the case with behaviors in repertoire or operants, many reinforcers and punishers are learned through Pavlovian or operant experiences. In the next section of this paper, further analysis of this behavior analytic perspective on audience control is addressed.

Audience Control and Verbal Behavior

Verbal behavior is behavior that is reinforced through the mediation of others (Greer & Ross, 2002; Skinner, 1957). Thus far, audience control has been defined by the relationship of a speaker and his audience, and the speaker's ability to modify his behavior based on a discrimination of his audience. Audience control is important for a speaker to possess in his repertoire so that the speaker has a higher probability of achieving an intended effect.

According to Skinner, the audience is the discriminative stimulus for verbal behavior. Furthermore, the response of the audience functions as either reinforcement or punishment for verbal behavior emitted by the speaker. In the absence of an audience, the probability of verbal behavior is low because there is then in return an absence of consequation for the speaker's behavior (Skinner, 1957). In the presence of an audience, the speaker's behavior will either be reinforced by the listener's response in a gestural form (a smile, a head nod, widening eyes, etc.) or in a vocal form. Either way these responses emitted by the audience will prompt further verbal exchange.

Yoder (1970) tested the effects of an audience on speaker behavior with male adolescents diagnosed with mental retardation. An attractive female was placed on a TV screen in a room containing a chair and a few magazines. As soon as the subjects were seated the woman on the

screen began talking to the subjects. Some sessions involved the woman not speaking at all, just smiling and nodding. Other sessions had the TV turned on and off contingent upon verbalizations. In the presence of the audience, there were high rates of verbalization for all subjects. All sessions demonstrated that the woman functioned as an audience for vocal verbal behavior, and that this audience served as a discriminative stimulus for speaker behavior to be emitted (Yoder, 1970).

The audience also selects the form of verbal behavior emitted, as different audiences control different groups of responses. The verbal community in which a person is speaking controls the language spoken, the familiarity or formality of the language, the tone used, the tacts and autoclitics chosen, among other response sets. For example, a bilingual person will differentiate which language will be reinforced within the context of the audience. An immigrant will speak his native language in the home, however when speaking to a store clerk will use the language of his new community. If he spoke his native language with the store clerk, he may be ridiculed and misunderstood, finding the verbal exchange to be punishing. Therefore common expressions between the speaker and his audience are emitted because they will reinforce future verbal exchanges (Skinner, 1957).

Precision of audience control grows as verbal behavior is emitted and reinforced (Skinner, 1957). Therefore a larger history of reinforcement will increase discrimination of various audiences and response sets that are reinforced by each type of audience. Physical dimensions of the audience are attended to in order to more easily and appropriately classify new audiences and audience members. Speakers respond to physical characteristics of the audience, which are paired with a response set of appropriate verbal behavior (Silverman, Anderson, Marshall & Baer, 1986). Social classes, age, uniforms, badges, style of clothing, and nationality

are all discriminative stimuli enabling appropriate classification and sophistication of audience control. More specific forms of behavior are affected by stimuli in the presence of specific audiences (Skinner, 1957). Thus, an audience strengthens a repertoire of responses, not just a single response (Skinner, 1957; Spradlin, 1985). This phenomenon is an example of multiple causation (Catania, 2007). Two or more stimuli are acting together to effect a behavior change.

Skinner (1957) suggests that different audiences control different groups of responses and often times there are specific sets of tacts associated with an audience due to a history of being paired with specific stimuli. Police officers are paired with tacts concerning safety, protection and the law. Doctors are often paired with tacts of the body, health, and nutrition. Tacts are also associated with different age groups. Our elders are paired with stories about the past, the history of our families and environments, as well as health and aging. Common expressions and "slang" are understood between these different age groups, and are more commonly emitted in the presence of that specific aged audience.

Researchers have further tested the effects of the type of audience on rates of vocal verbal behavior. Rosenberg, Spradlin, and Mabel (1961) hypothesized that a person with few verbal operants repertoire would increase his rate of vocal behavior in the presence of an audience with more verbal operants in repertoire. It should be noted that this study was conducted using an audience containing only one individual. Their data showed that when a person with a larger repertoire and smaller repertoire of verbal behavior were together, they produced vocal behavior at rates near zero. However, when pairs were matched based on corresponding verbal cusps and capabilities, both types of pairs produced the same high levels of vocal behavior; therefore negating their hypothesis and showing individuals with similar capabilities produce more social interaction than unmatched pairs (Rosenberg et al, 1961; Spradlin, 1985).

Tacts need to be under the control of relevant audiences and therefore social "peer" tacts should be under different audience control than school setting tacts. "Peer" tacts included more slang words and less formal speaker behavior. School settings tacts included words relevant to the classroom, the curriculum, and were more formal. Shauffler and Greer (2006) tested the effects of intensive tact instruction on audience appropriate verbalizations with middle school students. Intensive tact instruction consists of providing 100 additional tact learn units per day. Multiple exemplars of tacts are taught in categories, for which five exemplars of four different tacts for each category are provided. During baseline, audience corrections were given by providing more appropriate ways to express themselves. During the treatment phase of the intensive tact procedure, students emitted inappropriate tacts and autoclitics prior to receiving the correction. Students began tacting stimuli in the classroom that they did not emit during baseline. These tacts were not directly taught during treatment, but students used tacts that were taught to make comparisons with classroom stimuli. Conversational units also increased, however experimenters didn't control for who conversational units were initiated by (the target or non target students). The data suggest that providing a large number of learn units and therefore generalized reinforcement for emitting appropriate tacts increased audience appropriate tacts in and out of the classroom (Schauffler & Greer, 2006).

Possible Prerequisites for Audience Control

Audience control may be a behavioral cusp that increases the successful inclusion of a student with disabilities in a general education environment. Functioning under the contingencies provided by an audience will consequently increase attention to others, social engagement, and social appropriateness. Thus, investigation on how to induce this cusp and identifying possible prerequisites may significantly impact the development of students with disabilities. There are

many cusps and capabilities that may function as prerequisites for acquiring audience control. The covert joining of listener and speaker behavior may be the most basic level of audience control (Greer & Speckman, 2009; Lodhi & Greer 1989). Furthermore see-do correspondence associated with generalized imitation and observational learning need investigation, as these are important developmental capabilities involving the observation of an audience and the contingencies their audience occasions.

Joining of Listener and Speaker

There are times when we speak when we are alone. While there are no other people functioning as the audience, we ourselves function as our own audience (Skinner, 1957). Speaker behavior is overt "because it has not yet been "repressed" to the covert level under conditions of limited feed-back," (Skinner, 1957, p. 179). The speaker reacts as listener to his own behavior and provides automatic reinforcement to the self. The self as the audience usually progresses and becomes covert, however when this change does not develop, "the speaker is relatively insensitive to the conditions of the external audience- when, for example, he talks under conditions in which he cannot be heard or can be heard only with difficulty or continues talking even though the external audience has moved away or becomes clearly occupied with other matters. The self-speaker will be relatively insensitive to the language or sublanguages most effective on the other audience: that is, he will refer to people, places, and events with which only he himself is familiar, will use pronouns which have no antecedents, and may omit steps in an argument which are obvious to himself. He will not necessarily speak clearly and may frequently repeat…" (Skinner, 1957, p. 180). This speaker does not have audience control, and does not yet function under the contingencies of another listener.

To understand the development of audience control, we must look at the development of verbal behavior and the rotation of listener and speaker roles. The most basic level of verbal behavior is a pre-listener, someone who is completely dependent on others for survival. At this level visual, tactile, olfactory, gustatory, and auditory responses are explored and developed. The capacity for sameness across these senses is a cusp at the pre-listener level. A listener, while still dependent on others, observes and makes sense of his environment through the sophistication of the auditory observational response. A listener has auditory matching and discrimination, and has hear-do correspondence (Greer & Ross, 2008). In other words, a listener can respond to the behavior of a speaker, without being able to speak (Greer, 2008), and in doing such, the listener mediates the role of the speaker. The speaker uses production responses that function to mediate between the environment and the listener (Greer & Keohane, 2005; Greer & Speckman, 2009) Production responses include the cusps of echoics, mands, tacts, autoclitics, and intraverbals (Skinner, 1957).

 The next stage of verbal behavior, speaker-as-own-listener behavior, occurs in three categories. The first is verbal governance of speaker responses, or say-do correspondence. This cusp is the first level of self-management and significantly increases an individual's independence. Another category of speaker-as-own-listener behavior is Naming, which is a bidirectional capability that allows an individual to learn a new word as a listener and as a speaker incidentally, without direct instruction (Greer & Ross, 2008; Greer, Stolfi, et al., 2005; Greer, Stolfi, & Pistoljevic, 2007; Horne & Lowe, 1996). Naming is an important capability that significantly increases an individual's vocabulary and rate of acquisition for new language.

The third category of speaker-as-own-listener behavior is self-talk (Greer & Ross, 2008; Lodhi & Greer, 1989), which pertains to a basic level of audience control. Self-talk is speaker-as-

own-listener behavior at an overt level. For most, overt self-talk ceases due to the punishing effects of the presence of an audience, demonstrating a level of audience control (Skinner, 1957). Self-talk may continue to occur, but now occurs beneath the skin. When an audience is not present people may continue to speak aloud to themselves, however the contingencies of an audience should result in a progression of self-talk at a covert level. Most children develop this discrimination through natural contingencies in the environment (Greer, 2008). Skinner writes "the control exercised by the self as audience may be reduced if the speaker develops a sharper discrimination between this and other audiences," (p. 395, 1957).

Self-talk is punished and speaking to an audience is reinforced by feedback from that audience (Skinner, 1957). However this feedback must function as a reinforcer. Without audience control, the presence of the audience does not affect overt self-talk. In such cases, individuals inappropriately speak aloud regardless of the presence of an audience. Someone emitting overt self-talk does not function under the punishment or reinforcement from the external audience, and therefore has faulty audience control. Others don't function as a discriminative stimulus, and the listener component of the audience's behavior doesn't function as a reinforcer.

Lodhi and Greer (1989) measured the frequency of conversational units functionally related to audience control. They measured five year old children's self talk during fantasy play which was overt, and showed that self-talk is emitted by children until they are punished for doing so and the behavior becomes covert. Children were videotaped playing alone for 10-minutes with either anthropomorphic toys or non-anthropomorphic toys and frequency of verbal operants were measured. For conversational units, the speaker and the listener were the same person, but roles were based on the toys present. All verbal operants were higher in frequency in

the anthropomorphic condition, and conversational units were only present in the anthropomorphic condition. This data suggested that the anthropomorphic toys functioned as the audience, and showed a form of audience control. The participants discriminated between conditions in which a "listener" was present, in pretend play.

This shift from internal to external audience as an increase of punishing effects of speaking aloud to the self is necessary for socialization and expanding one's repertoire of verbal behavior (Greer & Speckman, 2009). Hugh (2006) compared the consequences for inappropriate self-talk in free play settings for three participants diagnosed with developmental delays. In Experiment I, a tact correction procedure was implemented contingent upon the emission of repetitive self-stimulatory self-talk (or palilalia). During this treatment condition, when the participant emitted palilalia, the experimenter tacted an appropriate behavior of the participant such as "I am coloring" or "I'm reading a book." The student either emitted the echoic, which was reinforced with generalized reinforcement, or didn't in which the behavior of the participant was ignored. For all three participants, there was a decrease in the frequency and range of palilalia in conditions with contingent tact corrections. However, for all participants, palilalia still occurred.

In Experiment II, Hugh (2006) tested whether it was generalized reinforcement that functioned to decrease the inappropriate self-talk, or if an auditory stimulation was needed to simulate the auditory stimulation of the non-functional repetitive speech, much like the reinforcement received from the emission of physical stereotypy. She used a multiple treatment reversal counterbalanced design across three participants. The conditions were the contingent addition or removal of a recording of the participants' palilalia (a recording of his own voice) or the contingent addition or removal of music. Across all conditions, there was a decrease in

palilalia regardless of the auditory stimulus and whether it was added or removed. Hugh's (2006) tactic of contingent removal or production of recordings of music or the children's own self-talk functioned to decrease self-talk in free-play settings; therefore teaching an initial level of discriminating between the presence and absence of an audience.

See-Do Correspondence

When in the presence of a new audience, we often times observe and imitate the behaviors of others in the environment so that we know how to behave appropriately. Imitation may therefore be an important capability in the development of audience control. Most young individuals acquire verbal behavior repertoires from their caretakers under natural environmental contingencies. Individuals observe the behaviors their caretakers emit, and they imitate these behaviors to learn how to interact functionally, independently, and appropriately in their environments (DeCasper & Spence, 1987; Greer & Ross, 2008; Novak & Pelaez, 2003). See and do correspondence is the act of imitative behavior. An organism observes and emits a behavior with point-to-point correspondence to the model. Many researchers have studied and commented on imitative behavior and its importance in the development of social behavior and learning (Baer, Peterson & Sherman, 1967; Bringham & Sherman, 1968; Catania, 2007; Lovaas, Berberich, Perloff, & Schaeffer, 1966; Meltzoff, 1996; Ross & Greer, 2003; Skinner, 1957; Tsouri & Greer, 2003).

Meltzoff (1996) conducted experiments testing social implications of imitation in which adults purposely imitated infants and investigated whether infants showed any interest in observing someone imitating their own behavior. Infants in this study looked significantly longer at the adults who were imitating their behaviors than adults who did not. They smiled more frequently at the imitator as well. The data show that infants recognize that another moves when

they move, and that infants are more reinforced by observing adults imitating their behavior (Meltzoff, 1996). The relationship between the adult and the infant therefore, has social implications.

Baer, Peterson, and Sherman (1967), three profoundly mentally retarded students who lacked the ability to imitate behaviors were used to demonstrate a method of producing an imitative repertoire. Initially, intense shaping was needed to teach the subjects how to emit a behavior identical to the observed behavior. During initial training, vocal and edible reinforcers were delivered upon the subject emitting the exact same behavior as the model. Two and three-step response chains as well as vocal imitation was also taught following the training of one-step imitation responses. As the subjects came under instructional control and as an increasing number of imitative behaviors were learned, novel imitative responses that were not previously reinforced were immediately correctly emitted.

Generalized imitation is identified as the ability to imitate novel actions that were not previously reinforced. As in the study by Baer et al (1967), subjects can learn how to initially emit observed behaviors without shaping and reinforcement tactics. Research in verbal behavior and the development of verbal repertoires suggests that generalized imitation is a developmental capability and higher order operant (Greer & Keohane, 2006; Greer & Ross, 2008; Greer & Speckman, 2009). When generalized imitation is in the child's repertoire, the child can then observe intentionally and unintentionally modeled behaviors and emit these behaviors without direct instruction (Rosales-Ruiz et al, 1997). Therefore with the capability of generalized imitation in his repertoire, he can learn through observing the demonstration of a model, without experiencing direct contingencies for emitting the behavior.

Typically developing individuals are not directly taught to emit each and every behavior in their repertoire. Conversely, they observe the behaviors of their caretakers and learn to emit similar behaviors through experiencing natural environmental contingencies. By having generalized imitation in his repertoire, the child can essentially learn anything under the right contingencies. Many developmentally delayed children however, lack this capability. Teaching someone to imitate through modeling may not always function to evoke generalized imitative responses, or even accuracy in an imitation response that has been directly taught (Horne et al, 2007). The child may visually observe the model tapping his head, and may feel his own hand on his head, but the correspondence between the two is not visual (Catania, 2007). Similarly, Greer and Speckman (2009) discuss the correspondence between observing and producing and see-do behavior for imitation. They state that observing and producing are independent because the behavior involves "(a) seeing someone perform a response, (b) emitting the response, and (c) observing the visual correspondence of one's own response with the response of the other" (2009, p. 7).

For this reason it has been suggested that students learn imitation responses in a mirror in order for the individual to observe whether there is correspondence between one's own response and the response of the other. The individual can then visually observe the topography of the response while observing the consequence of their response (through reinforcement or correction). In a study by Pereira-Delgado, Greer, and Speckman-Collins (2006), two students with developmental disabilities at ages three and four-years-old were taught imitative responses in a mirror so that the students observed their responses, in a multiple-probe design. Learn units on imitation responses that were previously not in repertoire were delivered. Following meeting criteria on imitation sets, unconsequated probe trials were conducted to test for the emergence of

generalized imitation for untaught responses. A functional relationship between teaching imitation in the mirror and generalized imitation was demonstrated.

Du (2011) and Moreno (2012) further tested the effects of imitation instruction in the mirror for preschool children with developmental delays. Du (2011) used a control group, which received the same amount of instruction with face-to-face instruction. The results showed that the mirror instruction facilitated generalized imitation and the face-to-face instruction did not. Therefore the mirror conditioned the duplication of responses whereas the face-to-face instruction only reinforced individual movements. Moreno also found that using the mirror was more effective in inducing generalized imitation of untaught responses. She further tested the effects of mirror instruction on an advanced form of generalized imitation. The dependent variables measuring advanced generalized imitation included adult how-to demonstrations for novel dressing skills, block structure duplication, and transcription tasks. Results showed that following induction of generalized imitation with mirror instruction, the mastery of some forms of advanced generalized imitation was accelerated, facilitating capability of learning through demonstration.

Much research suggests that generalized imitation occurs as early as infancy in humans (Meltzoff, 1996; Poulson & Kymissis, 1988; Pouslon, Kyparissos, Andreatos, Kymissis, & Parnes, 2002). Poulson and Kymissis (1988) showed humans as young as 10-months old have generalized imitation with object use. Conversely, Horne and Erjavec (2007) tested for generalized imitation with typically developing 11-month to 18-month old infants. In two different experiments, the infants did not emit the untaught imitation responses with accuracy demonstrating that generalized imitation was not in their repertoires. Erjavec and Horne (2008), tested for the presence of generalized imitation with 2 and 3 year olds for common and

uncommon imitation responses. Common targets were gestures usually performed with nursery rhymes/games. Uncommon were gestures not typically featured in nursery rhymes/games. The participants produced significantly more correct responses to common imitation responses than uncommon responses. The common gestures were previously observed by children in nursery rhymes and perhaps, the children observed the reinforcement of others emitting these imitative responses, and thereby learned through observing reinforcing contingencies of others.

A more advanced form of see-do behavior is observational learning. Observational learning will aid in learning what behaviors are appropriate in relation to the audience, by observing contingencies received by others. For example, the target student observes a student being reprimanded for talking out of turn, and another student reinforced for raising her hand. If the target student is an observational learner, he will be able to classify hand-raising as an appropriate response with this audience. With only generalized imitation, the target student would be able to imitate the hand-raising response but not necessarily learning this as a means of recruiting reinforcement from that audience. Therefore the target student will learn appropriate behaviors at a much faster rate if observational learning is present.

Observational learning has been studied as both an independent and a dependent variable. As an independent variable, observational learning has been used with peer-tutoring tactics to show that both the tutor and the tutee acquire new operants (Dineen, Clarke, & Risley, 1977; Greer & Polirstok, 1982; Greer et al., 2004). Greer and Singer-Dudek (2008) showed how observational learning can also result in the conditioning of new reinforcers. They conditioned plastic discs and string as a reinforcer for responding. The target student observed a confederate peer receive these discs or strings as reinforcers for responding, while they themselves were denied access. This resulted in conditioning these items as reinforcers for the target student.

Other items such as books have also been conditioned as reinforcers through this method (Singer-Dudek, Oblak & Greer, 2011). Most individuals acquire observational learning incidentally, however many students with developmental disabilities need intensive instruction to achieve this capability. See references in previous section (Successful Inclusion: Academic Success) for protocols to induce observational learning.

Different Forms of Audience Control

The previous discussion of audience control addresses the relationship of speaker-listener exchanges and the audience. The audience affects other forms of behavior as well. The following sections will address the effect an audience has on writer behavior and offers a different way of changing physical behaviors that may be inappropriate under the contingencies of certain audiences.

Audience Control of Writer Behavior

Forms of verbal behavior other than speaker behavior relate to audience control. Writing is another production response that is often times edited in order to best affect the reader. Skinner discusses the literary audience and states that there is a much lower level of editing involved in written behavior versus speaker behavior. This is due to the schedule of feedback a writer receives from his readers. Sometimes the writer never experiences the consequence his writing produced for his reader, and therefore the relationship does not depend on the "maintenance of correspondence" (p. 396, 1957).

Many literary works depend heavily on editing of grammar, punctuation, symbols, and themes. These writing systems were created to achieve best possible comprehension for the audience. Creating these sets of written rules aids in comprehension if both the reader and writer are aware of the rules. A piece without punctuation may make sense to the writer, because he

knows when he intended to pause, or question, or exclaim. Without this punctuation, the reader may not grasp the author's intention and therefore a punishing consequence may be produced. However to transfer this information to the reader, punctuation is put in place so that the intentions of the writer are clear. There are, however, special forms of writing that have been created by literary communities " as tolerant non-punishing audiences," (p. 397, 1957), such that the writer doesn't have to edit his behavior and can express himself more freely. Diary entries, stream of consciousness pieces, and letters are all forms of writing that are not typically punished by an audience or edited as intensely for the audience (Skinner, 1957). Currently in our society, the advent of blogging and emails can be compared to this literary world. Information is put into the universe at higher rates and frequencies using forums that can provide immediate feedback, such that serious editing is not taking place prior to publication, but instead the response from the reader may prompt another blog post; thereby creating a large level of maintenance of correspondence between writer and reader.

When first learning to write, this immediate feedback is needed to teach the function of writing, or how to successfully affect a reader. Madho (1997) implemented a writer immersion protocol to teach the function of writing to students with behavioral disorders. Participants wrote, describing a picture for their reader. The reader had to successfully draw the picture that was described by the writer. Based on the picture drawn by the reader, the writer had to edit his work until the reader accurately drew the picture intended. The dependent variables included the number of components accurately drawn, as well as the number of structural responses of the writer. Prior to the writer immersion procedure, the reader was unable to identify the object or complete the drawing task. The results showed that both structural and functional components of writing increased. Following the procedure the participant's writing significantly improved so

that the intended effect upon the reader, or the audience, was met. Reilly Lawson and Greer (2006) and Helou, Lai, and Sterkin (2007) implemented the writer immersion procedure and tested the effects of writing responses emitted by the naïve reader. The results showed an increase in the number of sentences written; the number of structural as well as the number of functional components also increased.

Skinner (1957) describes audience control as a form of self-editing behavior that occurs within the speaker or writer repertoires. An individual edits his behavior based on the audience present. As described earlier, the tacts and physical behaviors emitted are based on a history of consequences received from a specific audience. In the written repertoire, the writer must tailor his work so that the reader is affected in an intentional way. As with the writer immersion procedure, Jadlowski (2000) conducted research on the written topography and tested the effects of self-editing on writing behaviors of four developmentally disabled students. This study suggested that when the target student acts as a peer editor, the target student's own writing improves significantly more than the student who received the corrections. This study suggests that the teaching of self-editing may be an important procedure in inducing audience control in other topographies as well.

Audience Control of Physical Behaviors

The research on cusps and capabilities has significantly increased the independence of students with developmental disabilities, affecting the ways in which students learn and behave in their environments. However, one of the major issues still interfering with the success of academic, self-management, and social functioning in a general education setting for students with disabilities, particularly autism, is emitting high rates of stereotypy. The presence of stereotypy often functions to interfere with learning and creates social isolation due to its

stigmatizing nature (Lee, Odom, & Loftin, 2007). The occurrence of stereotypy may disrupt learning for the student, as well as for the other students in the classroom. Other students who do not emit such overt inappropriate behavior may find the student to appear awkward, and as a result may avoid social engagement, thwarting social development. It is apparent that decreasing or eliminating the frequency of stereotypy is an important aspect of successful integration.

A body of research has tested methods to decrease stereotypy in individuals with developmental disorders so that more adaptive behaviors and academic repertoires can be learned (Nuzzolo-Gomez, Leonard, Ortiz, Rivera, & Greer, 2002). Conditioning procedures (Greer, 2003; Greer et al., 1985; Nuzzolo-Gomez et al., 2002; Tsai & Greer, 2003), and communication training (Durand & Carr, 1987; Kennedy, Meyer, Knowles, & Shukla, 2000) have treated the presence of stereotypy as a lack of age-appropriate reinforcers and as a communication deficit. The reduction of stereotypy has also been treated as a self-management deficit, through the use of schedules of reinforcement and punishment tactics (Barrett, Matson, Shapiro & Ollendick, 1981; Charlop, Kurtz, & Casey, 1990; Hanley, Iwata, Thompson, & Lindberg, 2000; Dyer, 1987; Harris & Wolchik, 1979; Lovaas, Newsom, & Hickman, 1987; Rapp, Vollmer, Peter, Dozier, & Cotnoir, 2004; Ringdahl et al., 2002; Roscoe, Iwata, & Goh, 1998).

Using such methods, individuals learn to decrease their inappropriate behavior structurally, rather than learning through the function of the behavior or the contingencies the behavior produces. An antecedent intervention was designed by Conroy, Asmus, Sellers, and Ladwig (2005) that included the use of visual cues to indicate activity times when it was acceptable and when it was not acceptable for the student to engage in stereotypic behavior, demonstrating the discrimination of appropriate and inappropriate times to emit a specific

behavior. The teacher used a cue card reading "no stereotypy" or "yes stereotypy" during specific times of the day. This cue functioned to decrease stereotypy at inappropriate times, however the contingencies associated with the presence of stereotypy were through external cues and reinforcers.

Cues and reinforcers were not faded, thereby teaching the student to be dependent on such prompts. The student didn't learn negative social consequences associated with the inappropriate behavior, but was learning to discriminate. He did not learn to behave under the control of contingencies provided by his audience, but instead stereotypy became under the control of a textual prompt. In order to demonstrate audience control as previously defined, the contingencies provided by the audience that are associated with emitting specific behaviors would need to function to increase appropriateness.

Research showing an inverse relationship between stereotypy and social engagement has led to the development of protocols to increase social engagement and initiation between students with disabilities and typically developing peers. Lee et al. (2007) trained typically developing peers to initiate social interactions and promote social engagement and play with students diagnosed with autism through discussion, modeling, and teacher prompted training sessions. The procedure functioned to increase social initiations and interactions in structured and generalized play settings, as well as to decrease time engaged in stereotypic behaviors. The students with autism decreased the frequency of stereotypy when socially engaged and prompted by typically developing peers.

Social initiation training for typically developing peers in an inclusion classroom may function to increase social engagement with students with disabilities, however such behaviors need to be maintained across situations with all students. These data demonstrate a need to

continue research on the teaching of social skills to students with high rates of stereotypy, and expand their repertoire of verbal behavior such that social engagement becomes more reinforcing. Loftin, Lodin, and Lantz (2008) used similar procedures but added a social initiation training and self-management component with three students with autism. Training on social engagement and initiation took place with typically developing peers, as well as with the participants. Participants were also trained to use a self-monitoring procedure in which frequency of social initiations was targeted. The data showed a functional inverse relationship between social interactions and engagement in stereotypy.

The findings of Lee et al., (2007) and Loftin et al., (2008) indicate a need for further research on the relationship of stereotypy and social repertoires of verbal behavior. For typically developing individuals, the presence of stereotypy or inappropriate behavior is mediated by an audience and a desire to be socially accepted or socially engaged. Most typically developing individuals engage in inappropriate overt forms of stereotypy when no audience is present. Behavior is determined to be inappropriate or appropriate depending on the audience (and type of audience) present, as a function of social reinforcement. Therefore, teaching an individual to emit more socially appropriate behaviors instead of emitting stereotypy in the presence of an audience requires conditioning the contingencies of social reinforcement. In order to increase our understanding of this relationship and develop teaching methods to increase social reinforcement and behaving appropriately under the control of an audience, the topic of audience control needs investigating.

REINFORCEMENT AND THE AUDIENCE

While the audience acts as a discriminative stimulus for verbal behavior, Skinner (1957) also suggests that there are audiences that punish verbal behavior. He tacts these as negative

audiences, when the probability of high rates of verbal behavior to be emitted is low due to the lack of responding by the listeners. There is little reinforcement received by the speaker. Examples of negative audiences may be found in libraries, theaters or synagogues. In such environments, high rates of verbal behavior are punished by the audience, and as children, before a large history of consequence has been established, we are taught that in such environments there is little to no talking.

Donley and Greer (1993) tested the effects of setting events controlling social verbal exchanges between students with developmental delays. They tested the effects of the presence of a teacher on the frequency of conversational units emitted by four developmentally delayed students. The experimental conditions consisted of the teacher being absent, alternating the teacher being absent and present as listener/speaker in the environment, and the teacher always being present as listener/speaker in the environment. Results showed that conversational units between peers emerged at high rates when the teacher was not present in the environment and emerged at low rates or were nonexistent when the teacher was present and spoke only in response to student antecedents.

An audience may function as a negative audience, due to an established history of little reinforcement elicited from the listeners in the environment, and may function as such because the environment does not allow for speaker-listener exchanges, as in the example of those found in a library or church. However, some audiences may be negative audiences due to a lack of the cusp of social listener reinforcement in repertoire. Contingencies of reinforcement in listener-speaker exchanges are the basic components of social behavior (Greer & Keohane, 2005). If social listener reinforcement is not present, the individual may not desire to engage with their audience or act appropriately to accrue reinforcement from their audience. Therefore, social

listener reinforcement may be the corresponding contingency needed to occasion emergent stimulus control of the audience.

Schmeltzkopf (2010) tested the effects of conditioning approvals as reinforcers on the frequency of social vocal operants. Prior to the conditioning of approvals by observation, students emitted more sequelics than conversational units. Following conditioning of approvals, students increased their frequency of engaging in conversational units with the adult, and therefore continued the verbal interaction and became interested in what others had to say. Students were not only conditioned to function under reinforcement contingencies of approvals, but were also conditioned to function under contingences of adult attention and to act as a listener in a conversation. The presence of the adult and her speaker behavior became conditioned, functioning to increase the students' attention to their adult audience.

Reilly-Lawson et al. (2007) experimentally induced social listener reinforcement through a series of phases teaching the students the reinforcing contingencies associated with listening to their peer's responses. This procedure simultaneously increased students' frequency of engagement in conversational units as well as increasing attention to their peers. Inducing social listener reinforcement may therefore also function to increase appropriate behaviors emitted in the presence of various audiences, or audience control. The individual who is reinforced by his peer's responses to his own behavior will increase the probability of emitting behavior that will occasion such reinforcement. For example, a peer may observe his classmate emitting stereotypy on the playground. The contingency associated with observing stereotypy may be the absence of attention of engagement with that peer. For the classmate emitting stereotypy, this removal of attention from a potential listener (or audience) will only function to punish future stereotypy if the attention from his classmate is functioning as a reinforcer.

RATIONALE AND RESEARCH QUESTIONS

For students with disabilities the presence of stereotypy can disrupt academic engagement for both the student emitting stereotypy and for others in the classroom. Additionally, stereotypy may be stigmatizing, and inhibits social engagement with peers in a general setting. Typically developing individuals also emit inappropriate behaviors and stereotypy at times, however such individuals function under the control of their audience and inhibit inappropriate behaviors in the presence of certain audiences. There is currently a gap in the research testing audience control as a controlling variable for the frequency of stereotypy emitted.

Why does behavior come under the control of an audience? The closest explanation may be coming in contact with reinforcement and punishment from the audience, or having social listener reinforcement in repertoire. The purpose of the current research is to investigate the presence of audience control in repertoires of students with developmental disabilities. Will students with high rates of stereotypy in a self-contained special education classroom emit stereotypy in the presence of students who do not engage in stereotypy, demonstrating audience control? Furthermore, will conditioning social listener reinforcement function for students with developmental delays to change their behavior to be under the control of their audience? This research has significant implications on readiness skills for inclusive settings.

Chapter II

EXPERIMENT I

Method

Participants

Four participants diagnosed with autism participated in the study. The students attended a special education Comprehensive Application of Behavior Analysis to Schooling (CABAS®) classroom in a public elementary school in the suburbs of a large metropolitan area (Greer, 1996; Selinkse, Greer, & Lodhi, 1991). All participants were integrated into a general education setting as part of their Individualized Education Plan for one subject. As part of the CABAS® curriculum, participants were systematically tested for the presence or absence of behavioral cusps and capabilities throughout each academic year. When prerequisite repertoires were in place, new behavioral cusps and capabilities were experimentally induced. The joining of listener and speaker behavior, joint stimulus control for reading and writing repertoires, Naming, observational learning, and social listener reinforcement were all induced for all participants in the study. Additionally to note, all participants in the current research were participants in Reilly-Lawson et al. (2007) in which social listener reinforcement was induced using the social listener reinforcement game. Reinforcers such as computers, books, and toys were also conditioned. They also all had peers in the self-contained classroom and emitted a high frequency of conversational units and 'wh' questions. All participants were chosen for the study due to their high frequency of stereotypy, despite their large community of reinforcers and high frequency of conversational units and 'wh' questions with peers. See Table 2 for a detailed description of each participant.

Participant 1 was a ten-year-old male diagnosed with Autism Spectrum Disorder. He was a listener, speaker, reader, writer, and an emerging self-editor, according to the Pyramid of Developmental Cusps and Capabilities (Greer & Ross, 2008). Participant 1 had many academic skills on grade level, and was integrated into a general education physical education class and the school's choir. He had a large community of reinforcers such as reading books, using the computer, researching weather, and drawing.

Participant 2 was a 12-year-old female diagnosed with Autism Spectrum Disorder. She was a listener, speaker, reader, writer, and an emerging self-editor (Greer & Ross, 2008). Participant 2 was textually responding and spelling on grade level, but was below grade level in math, writing, and grammar. Participant 2 integrated into a general education English Language Arts class and choir. She had a community of reinforcers consisting of reading books, writing stories, playing games, using the computer, and dancing.

Participant 3 was an 11-year-old male diagnosed with an emotional disability. He was a listener, speaker, reader, writer and emerging self-editor (Greer & Ross, 2008) Participant 3 was diagnosed as a selective mute and did not emit any vocal verbal behavior in the classroom two years prior to the time of the study. At the time of the study however, Participant 3 emitted conversational units with peers and adults in all environments. During the time of the study, he textually responded on grade level and grammar skills were also on grade level. He was spelling slightly above grade level, and below grade level for writing and math. Participant 3 integrated into a general education Physical Education class and choir. His community of reinforcers consisted of playing age appropriate games, using the computer, and reading books.

Participant 4 was a ten-year-old male diagnosed with Autism Spectrum Disorder. He was a listener, speaker, reader, and writer (Greer & Ross, 2008). He textually responded on grade

level, and was below grade level on math, writing, and grammar. Participant 4 integrated into a

general education Physical Education class and choir. His community of reinforcers consisted of

playing age appropriate games, listening to music, using the computer, and reading books.

Table 1

Age/Sex/ Diagnosis.	Cusps + Capabilities of Verbal Development	Test Scores
Participant 1. 10 years. Male. Autism.	Listener/Speaker, Joint Listener/Speaker Behavior, Joint Stimulus Control for Reader/Writer behavior, Emergent Self-editor. In repertoire: Generalized Imitation, Naming, Observational learning, Social Listener Reinforcement	Brigance Diagnostic: Inventory of Basic Skills Reading 81%, G.E. = 6.0 Spelling 80%, G.E. = 5.1 Math 21%, G.E. = 2.2 Writing 60%, G.E. = 3.5
Participant 2 10 years. Female. Autism.	Listener/Speaker, Joint Listener/Speaker Behavior, Joint Stimulus Control for Reader/Writer behavior, Emergent Self-editor. In repertoire:	Stanford-Binet Intelligence Scale: Fifth Edition Full Scale IQ 54 Non-Verbal IQ 59 Verbal IQ 54

	Generalized Imitation, Naming, Observational learning, Social Listener Reinforcement	
Participant 3 10 years. Male. Emotional Disability.	Listener/Speaker, Joint Listener/Speaker Behavior, Joint Stimulus Control for Reader/Writer behavior, Emergent Self-editor. In repertoire: Generalized Imitation, Naming, Observational learning, Social Listener Reinforcement	Stanford-Binet Intelligence Scale: Fifth Edition Non-Verbal IQ 82 Vineland-II Adaptive Behavior Scales Adaptive Behavior Composite SS = 71
Participant 4. 10 years. Male. Autism.	Listener/Speaker, Joint Listener/Speaker Behavior, Joint Stimulus Control for Reader/Writer behavior, Emergent Self-editor. In repertoire: Generalized Imitation, Naming, Observational	Stanford-Binet Intelligence Scale: Fifth Edition Full Scale IQ 74 Vineland-II Adaptive Behavior Scales Adaptive Behavior Composite SS = 91

learning, Social

Listener

Reinforcement

Setting

Experiment I took place in a public elementary school in both a self-contained classroom using a CABAS® model and a general education classroom. Data were also collected in the school cafeteria, playground, and choir room. The ratio of students, teachers, and teaching assistants for the self-contained classroom was 6:1:2, and was 24:1 in the general education classroom. See Table 3 for a description of each setting.

During probes with the general education audience, each participant was either included by him or herself or with one other participant from the CABAS® class. When included together, participants were either placed directly next to the other participant or were dispersed separately among the general education students. During independent instructional probes, participants were seated in individual student desks in both the general education and self-contained settings, and were engaged in individual seatwork. During group instructional probes, participants were seated at a horseshoe shaped table with both the general education and self-contained audiences, however with only the head teacher with the general audience and with a teacher and a teaching assistant or two teaching assistants at the table with the self-contained audience. Group instruction activities with both audiences included mini lesson, a discussion, or a group read aloud.

During lunchtime and free play probes that were conducted on the playground, the only perceived changed variable was the audience, or the students immediately surrounding the

participants. During all lunchtime probes, participants were in the school cafeteria during the 5th grade lunch period at a long table with attached benches. With the self-contained audience, participants sat with the two self-contained special education CABAS® classes in the school, and with the school's special education students. In other words, all students with developmental disabilities were seated at one table for the duration of the period. With the general education audience, one or two of the participants sat at a table with the general education class, consisting of approximately 24 students. During the self-contained free-time probes, participants either remained in a classroom with both CABAS® classes with access to games and books, or went to the outside playground with only the CABAS® classes. In the general education free-time probes, one or two participants went outside during the 5th grade recess period with the general education class, or remained in the general education classroom with access to games, books, and the computer.

Table 2

Description of Probe Settings for each Audience

General Education Settings	Self-Contained Settings
Academic Independent: General education 5th grade classroom consisting of approximately 24 students and one head teacher. Desks arranged in a U-shape. Probes took place during language arts.	**Academic Independent:** Self-contained special education classroom consisting of approximately 6 students, one head teacher, and 2 teaching assistants. Desks arranged in a block formation.
Academic Group: General education 5th grade classroom at a horseshoe table consisting of 4 to 6 students and a head teacher. Probes took place during language arts.	**Academic Group:** Self-contained special education classroom at a horseshoe table consisting of 4 to 6 students, a head teacher, and one teaching assistant, or with two teaching assistants.

Curricular Specials: Choir room, in which students stood on bleachers with entire choir consisting of approximately 40 students.

Free Play: playground with all fifth grade classrooms, 3-5 teachers, various playground structures.

Free Play: General education 5th grade classroom. Students had access to computers, books, games, and art supplies.

Lunch Time: Cafeteria consisting of all 5th grade classrooms. Each class sat at their own fold out table with attached benches. Target students sat with the same general education classroom included in during language arts.

Curricular Specials: Physical education in gymnasium with 6 students from self-contained classroom, one head teacher, and one teaching assistant.

Free Play: playground with all fifth grade classrooms, 3-5 teachers, various playground structures.

Free Play: Self-contained classroom with 14 students with developmental disabilities. Took place in either of the 2 self-contained special education classrooms. Students had access to computers, books, toys, games, and art supplies.

Lunch Time: Cafeteria consisting of all 5th grade classrooms. Each class sat at their own fold out table with attached benches. Target students sat with approximately 14 students from self-contained classrooms.

Data Collection and Design

A within-subjects alternating treatments design was used to test a functional relationship between the different audiences and the frequency of stereotypy across settings. Data collection for each participant and setting occurred at random to increase measurement validity. Between one and two participants were chosen to join the general education setting per probe session. Data were collected across four different settings; one to one instruction, group instruction, free time, and lunch time, each with the self-contained and general education audiences.

Data were collected using a data collection form, a timer, and a pen. Each probe session was conducted for five minutes. Data were recorded for 60 continuous five-second intervals. Partial interval recording was used for measuring instances of stereotypy and were recorded as an 'S.' Whole interval recording was used for measuring correct responses, or intervals in which no stereotypy was emitted, and was recorded as a plus (+).

Dependent Variable

The dependent variable measured in Experiment I was the number of five-second intervals out of 60 intervals (for a duration of 5 minutes) in which stereotypy was emitted across various settings. For Participant T, stereotypy was defined as body rocking, head tossing, galloping, and laying on the floor and rocking. For Participant B, stereotypy was defined as finger picking, raising hands close to her ears and the back of her head while making an 'O' shape with her mouth, twitching her face, and lifting both legs while bending her knees. For Participant R, stereotypy was defined as noises produced out of context, and backward head tossing. For Participant M, stereotypy was defined as hand flapping, and finger twitching occasionally accompanied with face gestures.

Independent Variable

The independent variables were the different audience contingencies associated with differed school settings. In the self-contained setting, participants were in a special education classroom with a higher ratio of students to adults and all students in the classroom were diagnosed with either autism spectrum disorder or an emotional disability. Most of the students in the class emitted some form of stereotypy that is considered to be socially inappropriate.

In the general education setting, one or two participants were integrated at a time. Participants were not given any instructions pertaining to acting appropriately in the general education classroom.

Interobserver Agreement

Interobserver agreement was conducted for probe sessions using the Teacher Performance Rate Accuracy procedure (TPRA) (Ingham & Greer, 1992). An independent observer and myself simultaneously recorded occurrences and non-occurrences of the target behavior, in this case occurrences of stereotypy in each five-second interval. I functioned as the classroom teacher and experimenter. The independent observers functioned as a teaching assistants and were trained on accurate data collection prior to the onset of treatment. Agreement was calculated by dividing the number of interval by interval agreements by the total number of agreements plus disagreements and multiplied by 100 (Cooper, Heron, & Heward, 1987).

For Participant 1, IOA was obtained for 28% of probe sessions with a mean of 99.4%, and ranging from 97% to 100% agreement. For Participant 2, IOA was obtained for 32% of probe sessions with a mean of 95.8%, and ranging from 88% to 100% agreement. For Participant 3, IOA was conducted for 35% of probe sessions, with a mean of 94.8%, ranging from 88% to 100%. For Participant 4, IOA was conducted for 22% of probe sessions, with a mean of 97% and ranging from 90% to 100%.

Results

Following probe sessions controlling for different audience contingencies, the data show a functional relationship between the frequency of stereotypy and the audience. The data show that all participants emitted a higher frequency of stereotypy when in the presence of an audience of students with autism spectrum disorder or an emotional disability. When in the presence of a

typically developing audience, participants emitted a low frequency and sometimes zero instances of stereotypy during probe sessions. Table 4 shows the mean of intervals for which stereotypy was emitted across all settings with the self-contained and the general education audiences.

Table 3

Experiment I Mean Number and Range of Intervals with Stereotypy Across Audiences

Participant	Self-Contained	General Education
1	29.7 (8-33)	0.75 (0-4)
2	18 (3-35)	0.2 (0-1)
3	3.4 (0-2)	0.3 (0-2)
4	9.9 (1-40)	0.6 (0-3)

The following tables show the mean number of intervals and range of intervals containing stereotypy across each setting with each audience.

Table 4

Experiment 1 Mean Number and Range of Intervals with Stereotypy Across Settings within Audiences

Participant	Setting	Audience	Mean and Range	
1	Lunch Time	Self Contained	22	(11-33)
		General Education	0	
	Academic Ind.	Self Contained	9.7	(8-12)
		General Education	0	

	Academic Group	Self Contained	14.3	(11-20)
		General Education	0.5	(0-1)
	Free Time	Self Contained	22.3	(14-28)
		General Education	2.5	(1-4)
2	Lunch Time	Self Contained	9.5	(9-10)
		General Education	0.3	(0-1)
	Academic Ind.	Self Contained	3.5	(3-4)
		General Education	0	
	Academic Group	Self Contained	18.8	(11-30)
		General Education	0.2	(0-1)
	Free Time	Self Contained	32	(26-35)
		General Education	0	
3	Lunch Time	Self Contained	5.5	(5-6)
		General Education	0	
	Academic Ind.	Self Contained	0.5	(0-1)
		General Education	0.3	(0-1)
	Academic Group	Self Contained	3	(0-4)
		General Education	0	
	Free Time	Self Contained	5.3	(1-11)
		General Education	1	(0-1)
4	Lunch Time	Self Contained	10	(6-14)
		General Education	1.7	(0-3)
	Academic Ind.	Self Contained	5	(1-10)
		General Education	0.5	(0-1)
	Academic Group	Self Contained	4.7	(2-8)
		General Education	0	
	Free Time	Self Contained	17.5	(6-40)
		General Education	0.3	(0-1)

Figure 1. Mean frequency of stereotypy across audiences within social and academic settings
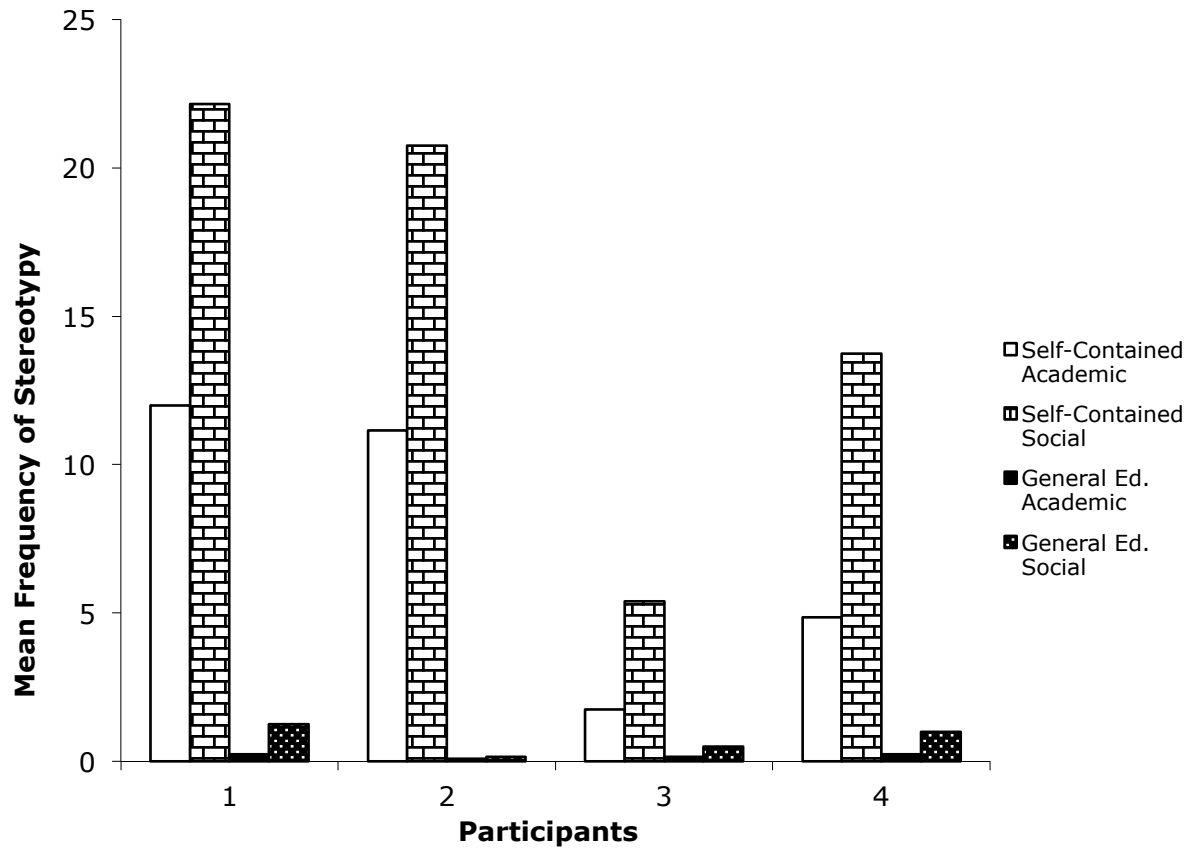
Figure 2. Frequency of stereotypy across audiences for Participant 1 demonstrating sequence of probe sessions.
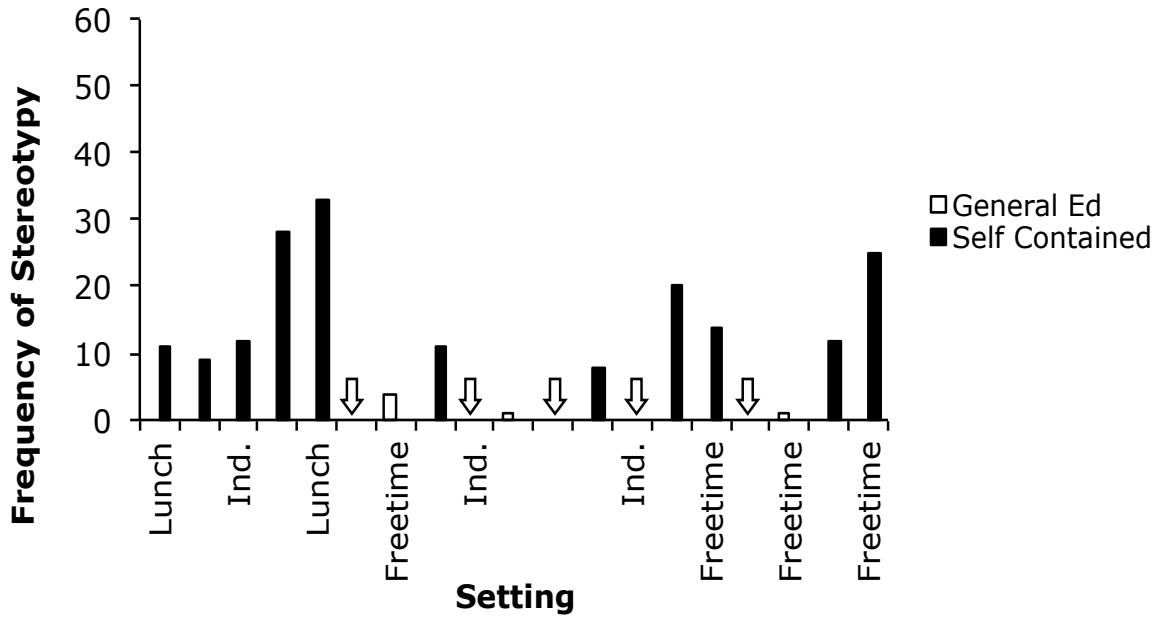
Figure 3. Frequency of stereotypy across audiences for Participant 2 demonstrating sequence of probe sessions.
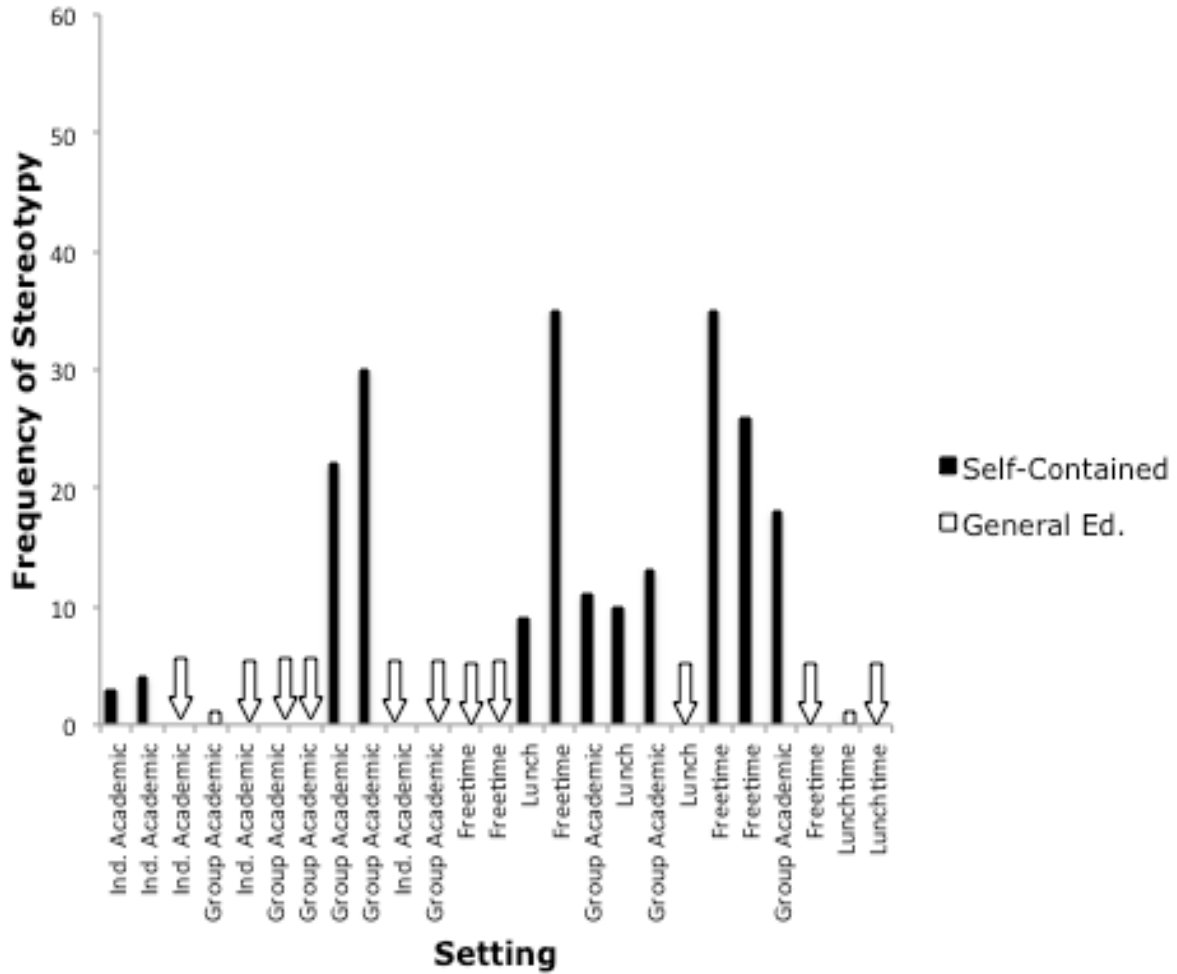
Figure 4. Frequency of stereotypy across audiences for Participant 3 demonstrating sequence of
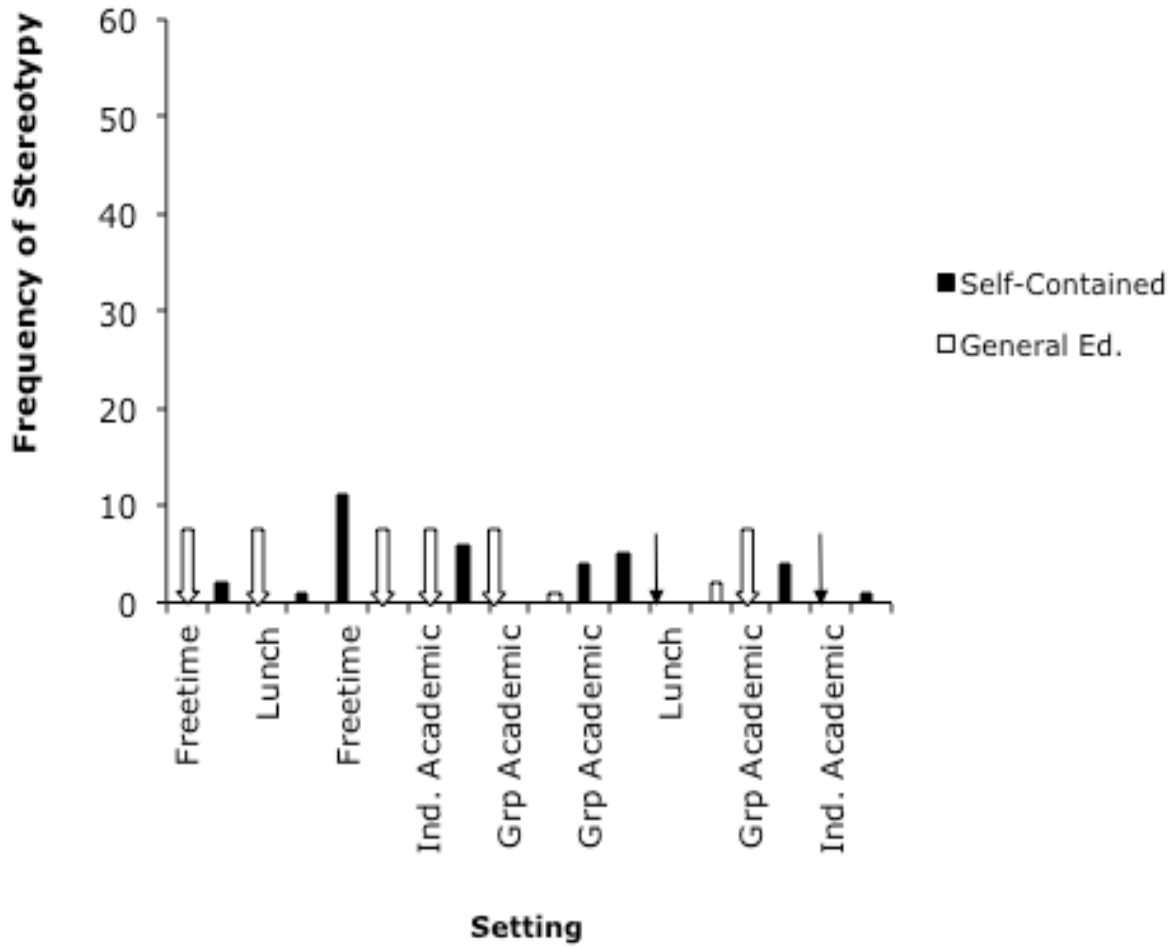
probe sessions.

Figure 5. Frequency of stereotypy across audiences for Participant 4 demonstrating sequence of probe sessions.
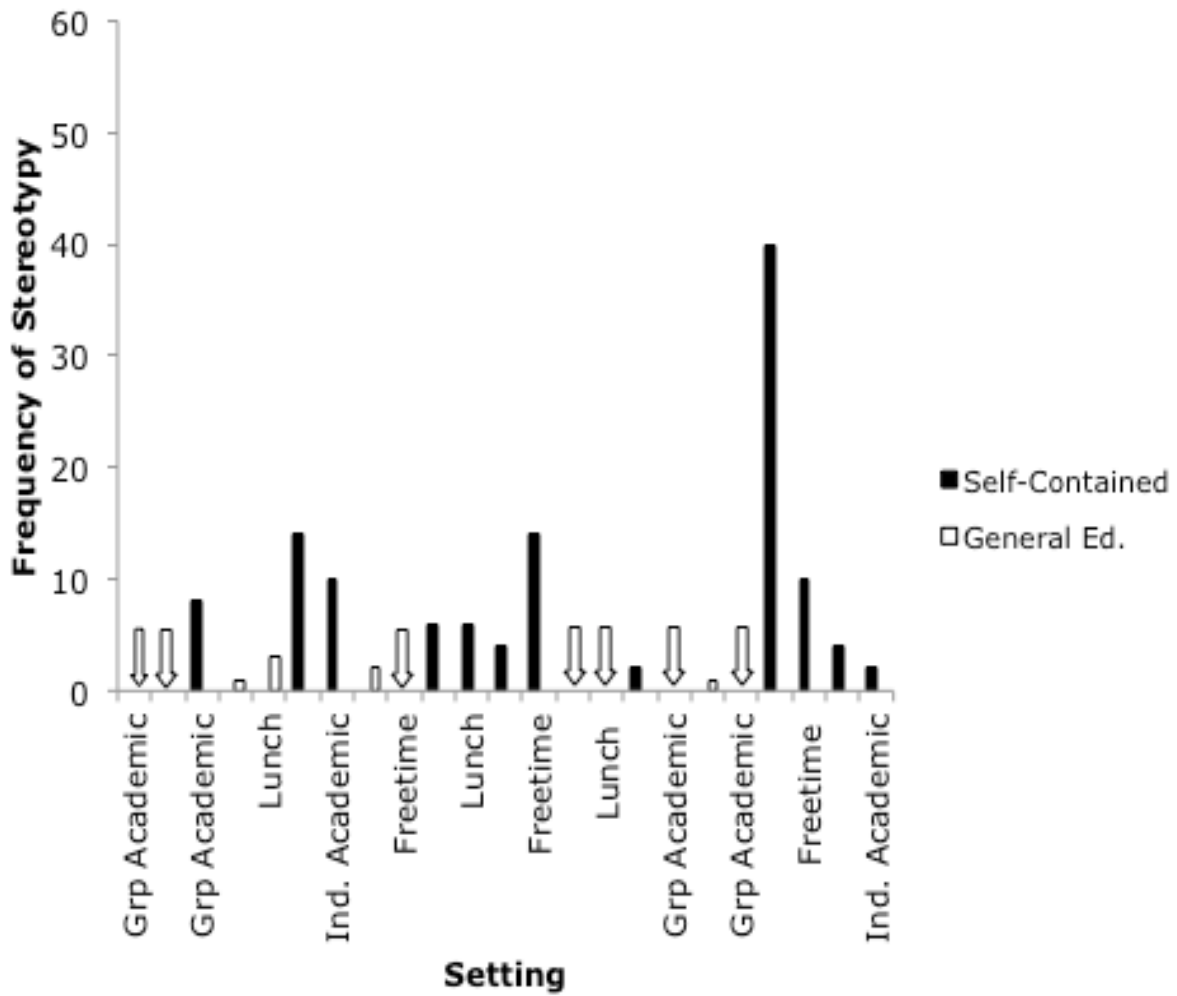
Discussion

The frequency of stereotypy across all participants was significantly different across the self-contained special education audience and the general education audience for all settings probed. In the self-contained setting, participants were in a classroom consisting of students with developmental disabilities and a low ratio of students to adults. All students in this audience emitted high rates of stereotypy throughout the school day. Without delivering any instruction pertaining to appropriate behavior, participants were taken into a general education classroom with typically developing students who did not emit any overt inappropriate stereotypy. When participants were grouped with this typically developing audience in free play and academic settings, the frequency of stereotypy emitted by the participants dramatically decreased, and often times was nonexistent. The only apparent changed variable for participants was the audience. These data show that the participants' stereotypy was under the control of their audience.

The data in Experiment I were quite significant and had major implications for the readiness of the participants' to be included in a general education setting. During sessions with the general education audience students engaged less in stereotypical behaviors, and therefore had an opportunity to increase in social and academic engagement. A limitation of the study was the lack of data testing whether there was an increase in appropriate behaviors. Social vocal operants were not measured across the two settings. An observation of social change that may be anecdotally noted was the difference in frequency of stereotypy when participants were situated with a different self-contained classroom consisting of students with fewer behavioral cusps and capabilities in repertoire. Students in this classroom emitted higher rates of stereotypy than the

classroom belonging to the participants. Frequently both self-contained classrooms combined for free play, celebrations, lunch, and for some academic instruction. Participants were casually observed to emit even higher rates of stereotypy when in the presence of the audience also emitting high rates of stereotypy. A limitation is the lack of data testing these casual observations. The observation of this more discrete audience control was made following the onset of the data collection. Therefore the difference of the audiences in both self-contained settings was not controlled for.

In years prior to this study, all participants were together in a CABAS® classroom (Greer, 1996), in which behavioral cusps and capabilities were systematically tested for. When a cusp or capability was missing and prerequisite repertoires were in place, protocols were implemented to induce new cusps and capabilities to accelerate rate of acquisition for new operants while enabling students to learn in new ways. Records show upon entering the CABAS® program, participants had limited speaker behavior, did not have speaker-as-own-listener repertoires, or the integration of speaker and listener behavior that may constitute becoming verbal. Such cusps were experimentally induced, along with the capabilities of Naming and observational learning and conditioning of new reinforcers. To increase conversational units between peers and teach empathy to students, a social listener reinforcement protocol was implemented (Reilly-Lawson et al., 2007). The four participants in the current research were also participants in the seminal research on social listener reinforcement by Reilly-Lawson et al (2007). This protocol functioned to increase conversational units and increased the attention of peers.

In Experiment I, when participants were included in the general education setting, they were in the group of typically developing peers and ceased to emit stereotypy or disruptive

behaviors. Anecdotally observed, they immediately followed the rules of the classroom by raising their hands following the directions of the general ed. teacher. Participants began manding to have it be their turn in the general education setting, demonstrating reinforcement through engagement with the typically developing audience. It appears that social reinforcement may be the source for functioning under the control of the audience. Hence, participants suppressed stereotypical behaviors due to a new access to experiencing contingencies from the audience. In this case, a history of contingencies may have been negative punishment when peers withdraw attention contingent with the presence of stereotypy, and therefore stereotypy was suppressed. Perhaps stereotypy was suppressed because the attention of peers was reinforcing for social engagement, and the emission of stereotypy might punish that attention. From these findings, I inferred that audience control may be most closely related to conditioning the attention of peers, as through the social listener reinforcement protocol.

Participants in the present research were also participants in the Reilly-Lawson et al. (2007) studies on social listener reinforcement (SLR). Reilly-Lawson et al. reported students' increase in attention to their peers and an increase in conversational units between peers following the SLR protocol. The prevalence of conversational units with peers demonstrates a conditioned reinforcement of social behavior, when social behavior consists of episodes of verbal interactions. The students were not simply taught scripts of speaker behavior to emit in response to specific listener behavior, but were conditioned to listen to what an individual is saying and as a result want to say something in response. In order to function under the control of an audience, an individual must be reinforced by listening to the comments and thoughts of others, and care how people behave in response to their own behavior.

Many students with Autistic Spectrum Disorder are lacking this type of social reinforcement and therefore do not modify their behavior under the control of their audience. One might tend to teach such students to follow a script (Chan et al, 2008; Goldstein et al., 1992), an algorithm (Conroy et al., 2005), or use video modeling (Charlop et al., 1989; LeBlanc et al., 2003; MacDonal et al., 2009) which are alternative approaches to decrease stereotypy and increase vocal operants. However, the verbal behavior developmental theory proposes that to increase the individuals verbal functioning and independence, the individual needs to acquire this control of appropriate behaviors by accessing the same contingencies that typically control such behaviors. Under this theory, the function of the behavior should be induced, rather than teaching structural components of the behavior, and in this case teaching the function involves inducing access to social reinforcement contingencies.

The data in Experiment I showed that the prevalence of stereotypy was under audience control for all participants. Having audience control in repertoire may enable students with developmental disabilities to increase success in general ed. settings through increasing their social integration while also increasing academic engaged time rather than emitting inappropriate or maladaptive behaviors. Experiment II was conducted to test a possible treatment to induce this cusp, and specifically tested the effects of social listener reinforcement on audience control. Reilly-Lawson et al. (2007) tested the effects of the SLR protocol on social vocal operants, however effects of different audiences were not measured.

Schmeltzkopf (2010) implemented two different procedures, both of which successfully conditioned approvals and the attention of an adult as a reinforcer for preschool aged students. The procedure conditioned adult attention because it was an adult who delivered approvals with both intensive tact procedures and observational conditioning procedures. Many students with

developmental disabilities only interact with adults because adults are their only source of reinforcement, however it would appear that typically, younger children are under audience control of the peers and adults. With the SLR procedure implemented by Reilly-Lawson et al., participants had to accrue information from their peers in order to receive reinforcement, possibly conditioning the attention of the peer audience.

To isolate the effects of social listener reinforcement on audience control, participants in Experiment II had all possible prerequisite cusps that seem to occasion audience control. Participants therefore had speaker-as-own-listener behavior in the forms of say-do, self-talk, and Naming, as well as generalized imitation and the emergence of observational learning in repertoire. Social vocal operants were also measured to test the effects of the SLR protocol on audience control of verbal behavior.

Chapter III

EXPERIMENT II

Method

Participants

Four participants from a preschool classroom participated in the study. The preschool

was a private preschool in New York City, which included religion as a primary focus in the

daily curriculum. Three of the four participants had an Individualized Family Service Plan

(IFSP), and the classroom consisted of 11 students who were listeners and speakers, and one

student who was an emerging listener. Participants for the study were chosen based on pre-probe

data measuring the frequency of social vocal operants. Participants emitted low levels of

sequelics, conversational units, mands, sharing, and had several missed social vocal

opportunities with each other and with typically developing classroom peers. The presence of

audience control in the classroom had shown a divide between peers with and without social

listener reinforcement. It was initially observed that students with high frequencies of social

vocal operants interacted almost exclusively with each other, while students who emitted few to

no social vocal operants, and who did not have accurate mands in repertoire either played on

their own or amongst each other. Therefore there was a divide in the classroom of two different

audiences. In addition to low levels of social vocal operants, all participants emitted low

frequencies of choral responding.

Participant B was a three-year-old male listener and speaker according to the Pyramid of

Developmental Cusps and Capabilities (Greer & Ross, 2008). See Table 6 for a list of cusps and

capabilities in repertoire. Participant B was mandated to have a 1:1 SEIT in the classroom for the

full day due to his assaultive behaviors, tantrum behaviors, as well as missing pre-requisite operants needed to function independently in a preschool environment. Such prerequisites consisted of social listener reinforcement, say-do correspondence, and basic listener literacy. Goals for the school year included following a routine, waiting turns and taking turns, accurate mands and tacts, and attending during whole class instruction. Additionally there was a need to induce social listener reinforcement, as most communication initiated by Participant B was towards an adult in the classroom. Participant B had a community of reinforcers in the classroom consisting of coloring, blocks, manipulatives (or materials commonly used for teaching early concrete mathematic skills), and puzzles.

Participant D was a 3-year-old male showing signs of having a developmental delay but did not have an IFSP. This may have been due to a parental request. He was a listener and speaker (Greer & Ross, 2008), had conditioned reinforcers such as blocks, books, puzzles, play dough, and dramatic play however was lacking social listener reinforcement. He interacted with classroom stimuli but typically played independently or emitted parallel play. He also was the only student in the classroom who was not toilet trained and relied on direct reinforcement from his teachers to complete classroom routine activities.

Participant E was a 3-year-old male listener and speaker. He received speech services outside of the classroom. Deficits in his speaker repertoire were unreliable echoic responding, and lack of the speaker half of Naming and observational learning. Such deficits resulted in faulty sentence structure and word patterning, as well as low frequencies of conversational units. Participant E was also missing social listener reinforcement from his repertoire of verbal behavior. He had a community of reinforcers consisting of the sand table, blocks, books, play dough and dramatic play however lacked conversational units with peers.

Participant J was a 3-year-old female listener and speaker. She received occupational therapy outside of the classroom. Participant J had Naming in repertoire but lacked observational learning. She emitted intraverbals in a 1:1 setting with an adult, however not in a group setting or with peers. Participant J had a community of reinforcers consisting of coloring, play dough, puzzles, books, and the sand table. She often engaged in parallel play and limited conversation with adults. Participant J often times did not respond as a speaker to her peers' speaker behavior, but had imitation of peers and listener literacy with peers in repertoire.

Table 5

Description of Participants

Participant	Age/ Gender	Cusps/Capabilities	Toilet Trained?	IFSP?
B	3yrs Male	Conditioned reinforcement for voices	Y	Y
		Visual Tracking		
		Capacity for sameness across senses		
		Discrimination of common objects, colors, shapes, numbers		
		Tacts of common objects and colors		
		Generalized Imitation		
		Say-Do Correspondence		
		Instructional control in a 1:1 setting		
		Intraverbal responding		
D	3 yrs Male	Conditioned reinforcement for voices	N	N
		Visual Tracking		
		Capacity for sameness across senses		
		Listener literacy		
		Discrimination of common objects, colors, shapes		
		Tacts of common objects, shapes, colors		

		Generalized Imitation		
		Say-Do Correspondence		
		Listener Half of Naming		
		Instructional Control (1:1 and group)		
		Intraverbal responding		
		Pt to Pt echoics		
E	3yrs	Conditioned reinforcement for voices	Y	Y
	Male	Visual Tracking		
		Capacity for sameness		
		Listener Literacy		
		Discrimination of common objects, colors, shapes		
		Tacts of common objects, colors, shapes		
		Generalized Imitation		
		Say-Do Correspondence		
		Listener Half of Naming		
		Instructional Control (1:1 and group)		
		Intraverbal responding		
J	3yrs	Conditioned reinforcement for voices	Y	Y
	Female	Visual Tracking		
		Capacity for sameness		
		Listener Literacy		
		Discrimination of common objects, colors, shapes		
		Tacts of common objects, colors, shapes		
		Generalized Imitation		
		Say-Do Correspondence		
		Listener Half of Naming		
		Instructional Control (1:1 and group)		
		Intraverbal responding		

Setting

Experiment II took place in a private preschool in New York City. The preschool was a chabad early learning center, incorporating the education of the Torah and Jewish tradition as well as secular academic studies. All treatment sessions took place in the library of the school or hallway directly outside of the classroom. Probe sessions took place in the integrated classroom. The ratio of students, teachers, and teaching assistants for the integrated classroom was 12 students, one head teacher, and two teaching assistants. Probe data were collected in the classroom on the rug for group instruction, and at the two rectangular tables during snack and lunchtime for the meal setting. The classroom also contained a bathroom, a sink for the students, cubbies for each student, a quiet area, a sensory table, an area for arts and crafts, a block area which contained the rug, a dramatic play area, a small circular table for manipulatives, and a loft which was used as a library and reading area.

Meal times occurred three times a day, with a snack in the mid morning, lunchtime, and a snack in the afternoon. During meal times, the meal helper set the table, and food and a water pitcher were placed in the center of the table. Students were encouraged to pass around the food and water, and to take a portion from the communal plates, bowls, or pitcher. Each student had a chair with his or her name on it. Chair locations were switched around daily to encourage conversation with different students.

Data Collection and Design

A non-concurrent multiple probe design with a delay for the onset of treatment between pairs of participants was used to show a functional relationship between social listener reinforcement and audience control. Pre-experimental probes measuring the frequency of social vocal operants were conducted across settings and participants to test for the audience control of

social engagement. Prior to and following all phases of the SLR protocol, data were collected on the frequency of social vocal operants across settings, choral responding, frequency of mands, and sharing with peers.

Probe data were collected using a data collection form, a timer and a pen. Each probe session was conducted for five minutes. For social vocal operant probes, a data collection form was divided into three sections; mands, sharing, and speaker-listener exchanges. A tally mark was written in each section upon the occurrence of an operant. For the speaker-listener exchange data collection, a tally was marked for who initiated the speaker behavior by placing the tally in one of two columns (self or peer). If the peer initiated the speaker behavior, the target student responded and the exchange ended. This was defined as one peer-initiated sequelic. If the initiated speaker responded twice, this was defined as one conversational unit. If there was a continuation of speaker and listener exchanges between the peer and the target student, each conversational unit was defined as two exchanges between listener and speaker. The speaker behavior was defined as a missed social vocal opportunity if a peer initiated the speaker behavior and the target student did not respond as a speaker. Additionally, data were collected on whether social vocal operants were emitted with treatment partners, other participants undergoing treatment but were not partnered with the target participant, (ie, participants in the study other than the treatment pair), and typically developing classroom peers who were not underdoing treatment at all. Probes were terminated when the timer reached 5 minutes.

The social listener reinforcement protocol consists of a sum of games, tutoring and multiple exemplar instruction phases that progress from simple to more complex. The five phases of the SLR protocol were (1) "I Spy," (2) "Twenty Questions," (3) Peer Tutoring, (4) Group Instruction, and (5) Empathy. Criterion was achieved when the student emitted 90%

correct responding for target responses for each phase. Data were collected in each phase of the SLR protocol using a pen and a data collection form. Correct responses during each phase are described below. Correct responses were marked as a plus (+) and incorrect responses were marked as a minus (-). Sessions were concluded when one team reached the top of the game board during peer-yoked contingency phases. For the empathy phase a session consisted of twenty-four learn units. Criterion was achieved when the participants emitted 22/24 or better correct responding across two consecutive sessions for each set of pictures.

Instructional Materials

Materials used for the treatment of this study differed with each phase, however throughout the first four phases, a game board was used. The game board had two vertical paths, one for the students, and one for the experimenter. Each vertical path contained 10 squares. The participants chose the game piece used for each team. Game pieces were toy sea animals such as a whale, a dolphin, a turtle, a sea lion, a shark, or a diver. Each had Velcro on its back to attach to and move up the game board. During the "I Spy" phase, a blind-fold was used to cover the participant's eyes and 3D items from the classroom were used as target stimuli. Examples of some of the items used were toy animals, crayons, scissors, blocks, and toy foods. During twenty questions, peer tutoring, and group peer tutoring phases. Stimuli sets were determined based on tact probes. Each tact learned by the participant was already in their partner's tact repertoires. Therefore during each phase, two sets of pictures were used. Set 1 consisted of tacts Participant A had in repertoire but Participant B did not. Set 2 consisted of tacts Participant B had in repertoire but A did not. Lists of stimuli sets are listed in Table 7.

Table 6

Instructional stimuli for each game phase.

Game Phase	Participant B	Participant D	Participant E	Participant J
I Spy	(various 3D small items found in the classroom selected at random)			
Twenty	Shaky eggs	Avocado	Figs	Clarinet
Questions	Trumpet	Kiwi	Mango	Saxophone
	Recorder	Beets	Kiwi	Violin
	Saxophone	Grapefruit	Zucchini	Bongos
	xylophone	Figs	Garlic	Flute
Peer Tutoring	Hexagon	Iguana	Daisy	Sting Ray
with Game	Pentagon	Tarantula	Rose	Hermit Crab
Board	Oval	Leopard	Sunflower	Killer Whale
	Rectangle	Flamingo	Palm tree	Manatee
	Half Circle	Otter	Cat tails	Sea Lion
Group Peer	Subway Station		Stop	
Tutoring	Bus Stop		Walk	
	Police Station		Don't walk	
	Statue of Liberty		Exit	
	Empire St. Bldg		Cross Walk	

Dependent Variables

The dependent variables measured were the frequency of social vocal operants emitted across free-play and mealtime settings, mands, sharing, and choral responding learn units during group instruction.

Social Vocal Operants*:* Data were collected on the following social vocal operants: sequelics, conversational units, and missed social vocal opportunities. Data were also taken on whether the peer or the target student initiated the sequelic or conversational unit.

Sequelic*:* A sequelic was defined as one speaker/listener exchange in which speaker behavior was emitted, along with a vocal response to that speaker behavior. The speaker/listener

exchange ends after one speaker response from each individual in the verbal exchange. An example of a sequelic is as follows:

A: "What did you eat for lunch today?"

B: "A turkey sandwich"

Conversational Units: A conversational unit was defined as a speaker/listener exchange in which participants rotated between listener and speaker roles, and the reinforcer is the verbal behavior of the other. An example of one conversational unit is as follows:

A: "I like apples."

B: "Me too. I like red apples."

A: "I only like green ones."

B: "Oh, I like both."

Missed Social Vocal Opportunities: Missed social vocal opportunities were defined as a peer initiating a speaker/listener exchange with a participant, to which the participant did not emit any vocal response.

Mands: Mand data were recorded as a plus for an appropriate vocal mand and a minus for an inappropriate mand. Appropriate mands were recorded as a plus when the target student asked for a desired item. For example, "Can I play with the car" or "I want the car, please." Inappropriate mands were defined as the target student grabbing a desired item, saying "give me the car" followed by grabbing, pushing another child out of the way to obtain the desired item, or destructive behavior towards a desired item.

Choral Responding: Choral responding during group instruction consisted of an academic period of the day when the class sat in a circle and were to echo the teacher as a whole class. Typically, the whole class sat in a circle on the rug facing the teacher and her instructional

stimuli and would repeat a word in English or Hebrew for the students to echo. A choral response was recorded as a plus if the participant echoed the teacher with the class. A minus was recorded if the participant did not echo the teacher, and the participant was then prompted to echo the teacher, but the correction was never delivered in unison with the class.

Sharing: Sharing was defined as when the participant concurrently played with an item or handed over an item that another peer manded for. Therefore the peer manded for an item and the participant gave the item to the peer without intervention from a teacher prompting the exchange.

Social Listener Reinforcement Protocol: Independent Variables

The independent variable was a replication of the SLR game treatment package (Greer & Ross, 2008) implemented by Reilly-Lawson et al. (2007). The 2007 version of the game was for participants in an elementary setting and was therefore modified to meet the needs of preschool aged participants. The game board was presented to two participants at a time. Participants were asked who their favorite sea animals were prior to the implementation of the treatment. The participants then chose an animal that needed to be saved which was placed in a bubble on the game board. The participants also chose the hero animal or scuba diver that was going to save the captured animal. The experimenter's game piece was the animal or scuba diver who captured the animal that needed to be rescued. The experimenter's game piece was the villain and the team of two participants used the hero game piece. The game board consisted of two different paths, one for the heroes and one for the villain. Each path consisted of ten spaces. When a game piece reached the top of the game board that team was deemed the winner, the trapped animal was set free and a reinforcer was delivered in the form of stickers. The participants sat together across from the game board and the experimenter.

Prior to each game play session, the experimenter presented the rules to the participant pair. The experimenter said, "In order to win, you and your partner need to reach the top of the game board. In order to move your piece up, the person I ask a question to must answer my question using words. In order to find the answer to my question, you must ask your partner only one question and your partner must respond to your question. If you answer my question incorrectly, I get to move my piece up on the game board." Participants were to emit a vocal response only when presented with a vocal antecedent. In other words, the participant who was not presented with the vocal antecedent could not respond. Participants were required to ask each other one question and together emit a speaker/listener exchange in order to emit a correct response and move up the game board. Only one question and one response between participants were allowed per vocal antecedent delivered by the experimenter. If the participant who was presented with the question (or vocal antecedent) emitted a correct response, both participants received vocal praise and moved their game piece up the board. If that participant emitted an incorrect response, the experimenter moved her villain game piece up one space on the game board and the correct response was modeled by the experimenter and then echoed by the participants. Examples of speaker/listener exchanges are provided for each phase below.

I Spy

During the "I Spy" game, the experimenter held up an item that could be viewed only by Participant A. Participant B was blindfolded. The experimenter then asked Participant B a question about the item viewed by Participant A. Participant B then had to ask a question to Participant A to obtain the answer to the experimenter's question, emitting one speaker/listener exchange between partners. Following receiving the information from Participant A, Participant B answered the experimenter's question.

Experimenter: "What shape am I holding?"

Participant B to A: (blindfolded) "What shape is it?"

Participant A to B: "It's a hexagon"

Participant B to experimenter: "It's a hexagon!"

Incorrect responses occurred if Participant A answered the question for Participant B, if Participant B asked an inappropriate question, if Participant B did not listen to Participant A's response, or if Participant A gave an incorrect response. Therefore correct responses depended on appropriate speaker/listener exchanges between participants. This phase was designed as a way of teaching participants how to obtain reinforcement through interaction with a listener.

Twenty Questions

Prior to the "Twenty Questions" game, participants were probed for tacts of groups of four pictures. Set A tacts Participant A had in repertoire but Participant B did not. Set B tacts Participant B had in repertoire but Participant A did not. The experimenter held up a picture visible by both participants. Participant A asked Participant B, "What is it?" for Set B tacts. Participant B then told Participant A the correct tact for the picture. Participant A was to repeat the tact in order to emit a correct response and move up on the game board.

Experimenter: "What kind of fruit is this?"

Participant A to B: "What is it?"

Participant B to A: "It's an avocado."

Participant A to experimenter: "It's an avocado."

For incorrect responses, the teacher moved up the game board, a vocal correction was delivered, and the participant who was asked the original question echoed the correct response. The experimenter reminded participants to ask each other for help in order to obtain the correct

response. Each participant was only required to echo correct tacts delivered by his or her partner. This phase was designed to teach participants how to obtain reinforcement through speaker/listener exchanges and obtaining new information from their peer.

Peer Tutoring with Game Board

During this phase, participants engaged in peer tutoring in which they taught one another one set of five different stimuli. Four different multiple exemplars were presented for each of the five stimuli. Participants alternated between tutor and tutee roles. Tutors had mastered stimuli they were teaching to their peer prior to tutoring sessions. Each tutoring session consisted of the delivery of 20 learn units, in which the sets of five stimuli were presented four times each. Tutors reinforced or corrected tutee responses. Reinforcement was delivered in the form of vocal praise. Corrections consisted of the tutor providing the correct response, which is echoed by the tutee. The game piece was advanced when the tutee emitted a correct response. The experimenter's game piece moved up when the tutee emitted an incorrect response. An example of peer tutoring with a correct response is as follows:

Participant A (tutor): (holds up a picture of a clarinet)

Participant B (tutee): "clarinet"

Participant A: "great job!"

An example of an incorrect response is as follows:

Participant B (tutor): (holds up a picture of a saxophone)

Participant A (tutee): "trumpet"

Participant B: "saxophone"

Participant A: "saxophone"

The peer tutoring procedure increases the emission of approvals as well as speaker/listener exchanges with peers. The difference between this phase and the Twenty Questions phase is that in order to move up, the tutee had to independently emit the correct response taught by the tutor. In the previous phase, as long as the correct response was echoed, the game piece was advanced. The peer tutoring with the game board teaches students to access reinforcement through emitting speaker/listener exchanges, obtaining information from peers, and learning new information from their peers.

Group Instruction with Game Board

Two pairs of participants were partnered with each other to form two teams of two. Team 1 was asked by the experimenter, "What is this?" and discussed the answer with their partner. If Team 1 responded correctly, they moved up the game board. If Team 1 responded incorrectly, Team 2 was given the opportunity to respond and move up the game board. If no one responded correctly, no one moved up the game board. The experimenter then asked a question to Team 2. Group instruction reinforces speaker/listener exchanges with peers, and is designed to teach participants to obtain reinforcement through listening for information or delivering information as a speaker.

Multiple Exemplar Instruction of Empathy

Multiple exemplar instruction with learn units was implemented to teach responses to situations of people expressing emotions. Two sets of four pictures of people expressing emotions were taught. Rotated response topographies consisted of the following questions: What happened? How does the person feel? What would you do to help? Questions were rotated across pictures. Sessions consisted of twenty-four learn units each in which questions were rotated across four pictures. Each question for each picture was presented twice. For example, the

experimenter held up a picture of a boy falling off his bike and asked, "What would you do to help?" followed immediately by the experimenter holding up a picture of a girl with a cat and a scratch on her cheek and asking, "What happened?"

Interobserver Agreement

Interobserver agreement was conducted for probe sessions and treatment sessions using the Teacher Performance Rate Accuracy procedure (TPRA) (Ingham & Greer, 1992). An independent observer and myself simultaneously recorded occurrences of the target behavior. The independent observer was a behavior analyst functioning as a SEIT (special education itinerant teacher) in the classroom. Agreement was calculated by dividing the number of agreements by the total number of agreements plus disagreements and multiplied by 100 (Cooper, Heron, & Heward, 1987). The SEIT was trained to conduct the treatment protocol and additionally observed myself running the treatment protocol. Data were simultaneously but independently recorded during both treatment and probe sessions and then compared data following the session.

For Participant B, IOA was obtained for 37% of probe sessions with a mean of 90.4%, and ranging from 80% to 97% agreement. For Participant D, IOA was obtained for 33% of probe sessions with a mean of 89.9%, and ranging from 84% to 100% agreement. For Participant E, IOA was conducted for 27% of probe sessions, with a mean of 92.5%, ranging from 86% to 100%. For Participant J, IOA was conducted for 24% of probe sessions, with a mean of 93% and ranging from 89% to 100%.

For treatment sessions, for Participant B, IOA was obtained for 37% of sessions with 100% accuracy. Participant D had IOA obtained for 33% of treatment sessions with a mean of

98% accuracy and ranging from 96% to 100%. For Participant E, IOA was obtained for 23% of treatment sessions with 100% agreement. For Participant J, IOA was obtained for 28% of treatment sessions with 99% agreement and ranging from 98% to 100%.

Results

Prior to the implementation of the social listener reinforcement game phases, the classroom consisted of two different audiences, one with social listener reinforcement in repertoire, and one without. Following all phases of the social listener reinforcement game, post probe data show an increase in the number of social vocal operants emitted towards peers and initiated by peers, eliminating the delineation of two audiences in the classroom. The following two tables show the data for the correct responses to learn unit presentations during game phases and empathy phases. Table 7 shows the mean percent of correct responses for learn unit presentations and range across each phase of the social listener reinforcement game including the peer yoked contingency game board for all participants. Across participants, the range of correct responses to learn unit presentations was 67% to 100% and took no more than four sessions to meet criterion for each phase. Table 8 shows the mean number of correct responses to 24 learn unit presentations and range for empathy sets across participants. Empathy phases took more sessions to meet mastery criterion than SLR game phases.

Table 7

Mean Percentage of Correct Responses to Learn Unit Presentations for Social Listener Reinforcement Game Phases.

	Phase 1		Phase 2		Phase 3		Phase 4	
	Mean	Range	Mean	Range	Mean	Range	Mean	Range
Participant B	80.33%	70-91	85.5%	80-91	100	100	88%	85-91
Participant D	79%	67-91	85%	70-100	79%	67-91	89.5%	84-95

| Participant E | 81.8% | 67-100 | 90% | 80-100 | 86.7% | 80-100 | 87.5% | 85-90 |
| Participant J | 80% | 70-90 | 100% | 100 | 80.7% | 67-95 | 92.5% | 85-100 |

Table 8

Mean Number of Correct Responses to Learn Unit Presentations for Empathy Phases

	Set 1		Set 2	
	Mean	Range	Mean	Range
Participant B	16.4	4-24	18.8	10-24
Participant D	16.3	9-23	16.3	10-23
Participant E	18.8	9-24	18.8	14-23
Participant J	19.4	15-23	21	18-23

The following tables show the pre-experimental and post-experimental probe data for all dependent variables measured. Table 9 shows the mean number of social vocal operants prior to and following treatment for all participants during five-minute probe sessions. For all participants, there was an increase in sequelics and conversational units in post-experimental probe sessions for both self and peer initiated exchanges. For all participants missed social vocal opportunities either decreased or stayed the same.

Table 9

Means of Social Vocal Operants

		Free play		Meals	
		PRE	POST	PRE	POST
Participant B	Sequelics S.I.	0.67	2	0.33	1
	Sequelics P.I.	0.33	3.33	0.67	1
	C.U.'s S.I.	1.33	5.33	0.67	2
	C.U.'s P.I.	0.33	4.33	0	6.33
	Missed Social	1.33	0.33	2.33	0.33

	Vocal Opportunities				
Participant D	Sequelics S.I.	0.33	1.33	0.67	2.33
	Sequelics P.I.	0	2.33	0.33	2.67
	C.U.'s S.I.	0.33	1.67	0.67	2.67
	C.U.'s P.I.	0	5	0	3.67
	Missed Social Vocal Opportunities	1.33	0.33	0.33	0.33
Participant E	Sequelics S.I.	0.67	0.67	1.67	2
	Sequelics P.I.	0.33	1	1	2.67
	C.U.'s S.I.	0	2	1.33	5.33
	C.U.'s P.I.	0	3	0.33	5.33
	Missed Social Vocal Opportunities	0.33	0.33	1.33	1
Participant J	Sequelics S.I.	0.33	1.67	0	3.33
	Sequelics P.I.	0.67	1.67	0.67	4
	C.U.'s S.I.	0	3.67	0	5
	C.U.'s P.I.	0	3.33	0	3.67
	Missed Social Vocal Opportunities	0	0	1.33	0

Table 10 shows the mean number of self-initiated and peer-initiated social vocal operants for all settings and participants prior to and following social listener reinforcement protocol. Social vocal operants emitted by all participants increased for both peer-initiated and self-initiated exchanges in post-experimental probe sessions.

Table 10

Mean Number of Social Vocal Operants

	Self Initiated		Peer Initiated	
	PRE	POST	PRE	POST
Participant B	0.75	2.6	0.65	3.75
Participant D	0.5	2	0.08	3.42
Participant E	0.92	2.5	0.42	3
Participant J	0.08	3.42	0.34	3.17

Table 11 shows the mean number of mands, incorrect mands, and sharing behavior across both settings pre and post social listener reinforcement protocol during five-minute probe sessions. There was an increase in mands, a decrease in incorrect mands, and an increase in sharing for all participants in post experimental probe sessions. Additionally, there was a greater increase in mands during freeplay than during meal time experimental post probe sessions.

Table 11

Mean Number of Mands and Sharing

		Correct Mands		Incorrect Mands		Sharing	
		PRE	POST	PRE	POST	PRE	POST
Participant B	Freeplay	0	2.67	2	0	0	3
	Meals	1.33	3.67	0.67	0.33	0	0.67
Participant D	Freeplay	1	4.33	3.67	0.67	0	4.33
	Meals	1.67	3.33	1.67	0.67	0	1
Participant E	Freeplay	1.67	4	0.67	0	1.33	2.67
	Meals	1.33	3	1.33	0.33	0.33	2

Participant J	Freeplay	0	4.33	0.33	0	0	3.33
	Meals	1	3.33	0	0	0	1.67

Table 12 shows the mean percent of correct responses to choral responses during five-minute probe sessions pre and post social listener reinforcement game phases. All participants increased in accurate choral responses during post experimental probe sessions.

Table 12

Mean Percent of Choral Responding

	PRE	POST
Participant B	0%	71.33%
Participant D	14%	78.33%
Participant E	22.67%	80.33%
Participant J	16.67%	68.33%

Figure 6. Percentage of correct responses to learn unit presentations for all phases of the social listener reinforcement game.
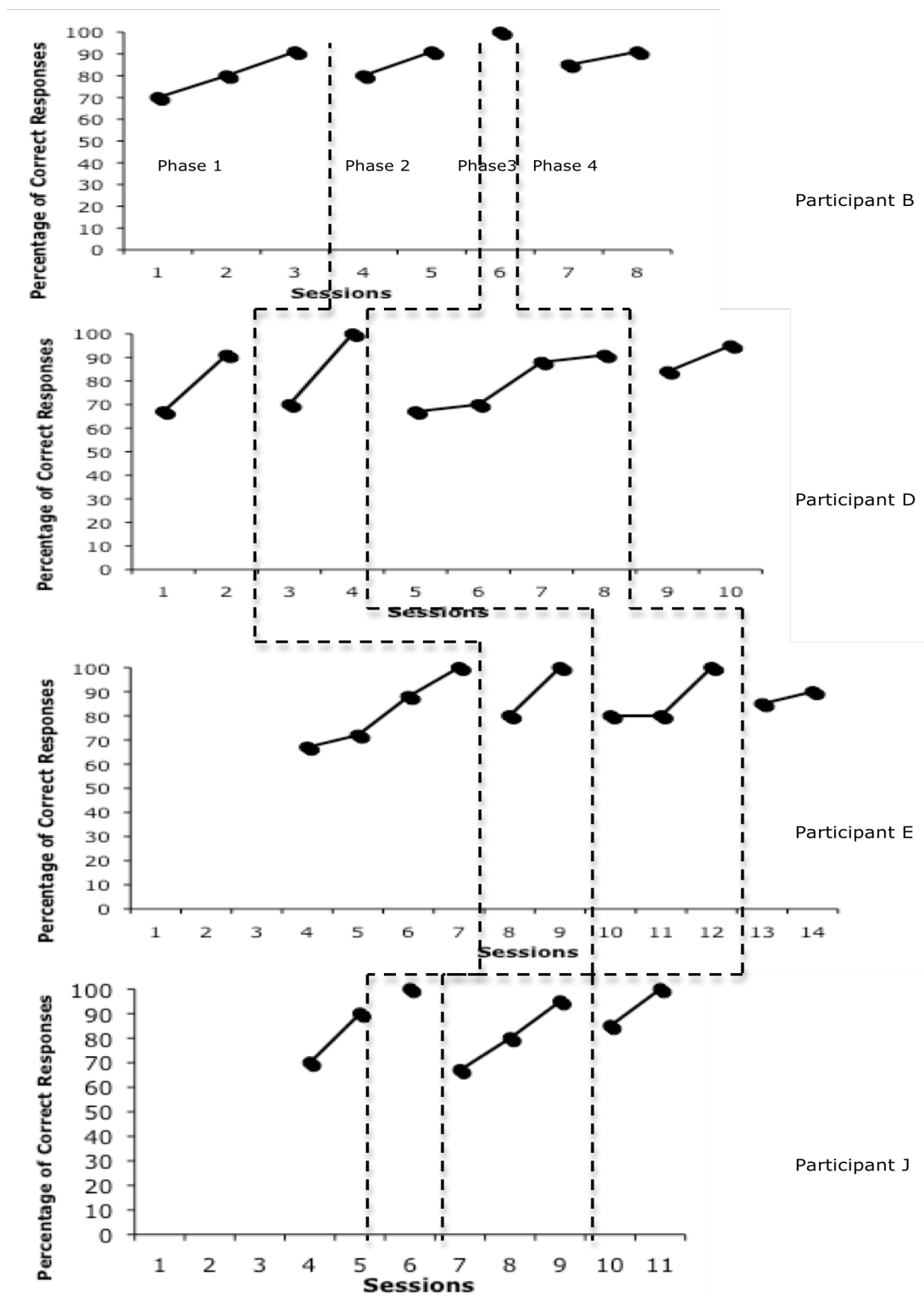
Figure 7. Correct responses to learn unit presentations for empathy phases.
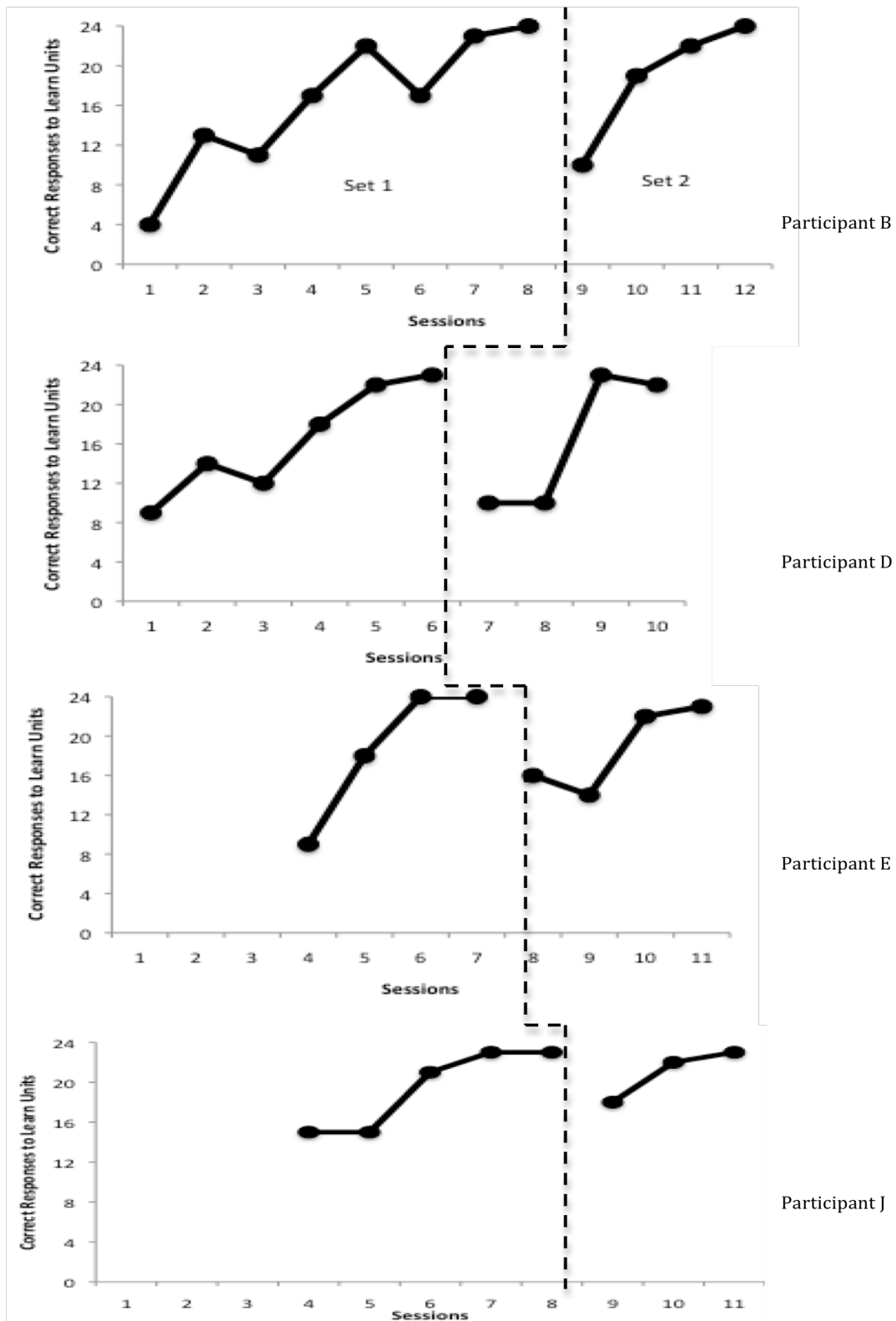
Figure 8. Mean number of social vocal operants per five-minute experimental probe sessions across all probe sessions pre and post social listener reinforcement game.
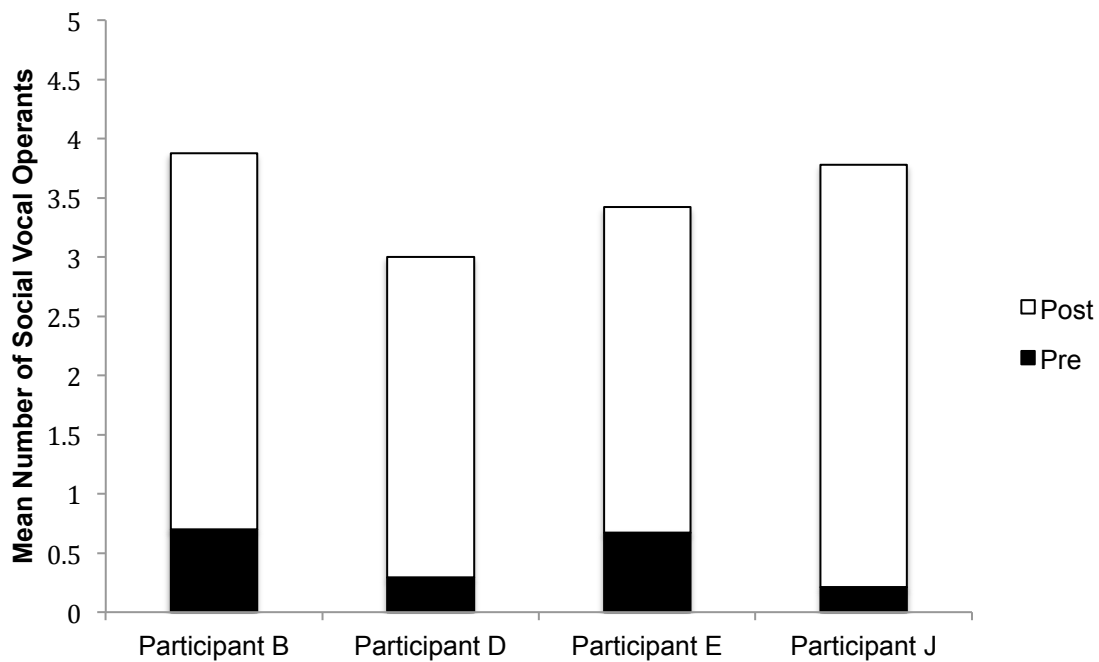
*Figur*e 9. Frequency of social vocal operants emitted with typically developing classroom peers, with the treatment partner, and with the participants in the study other than the target participants treatment partner, for all probe sessions pre and post social listener reinforcement game during 15-minute probes.
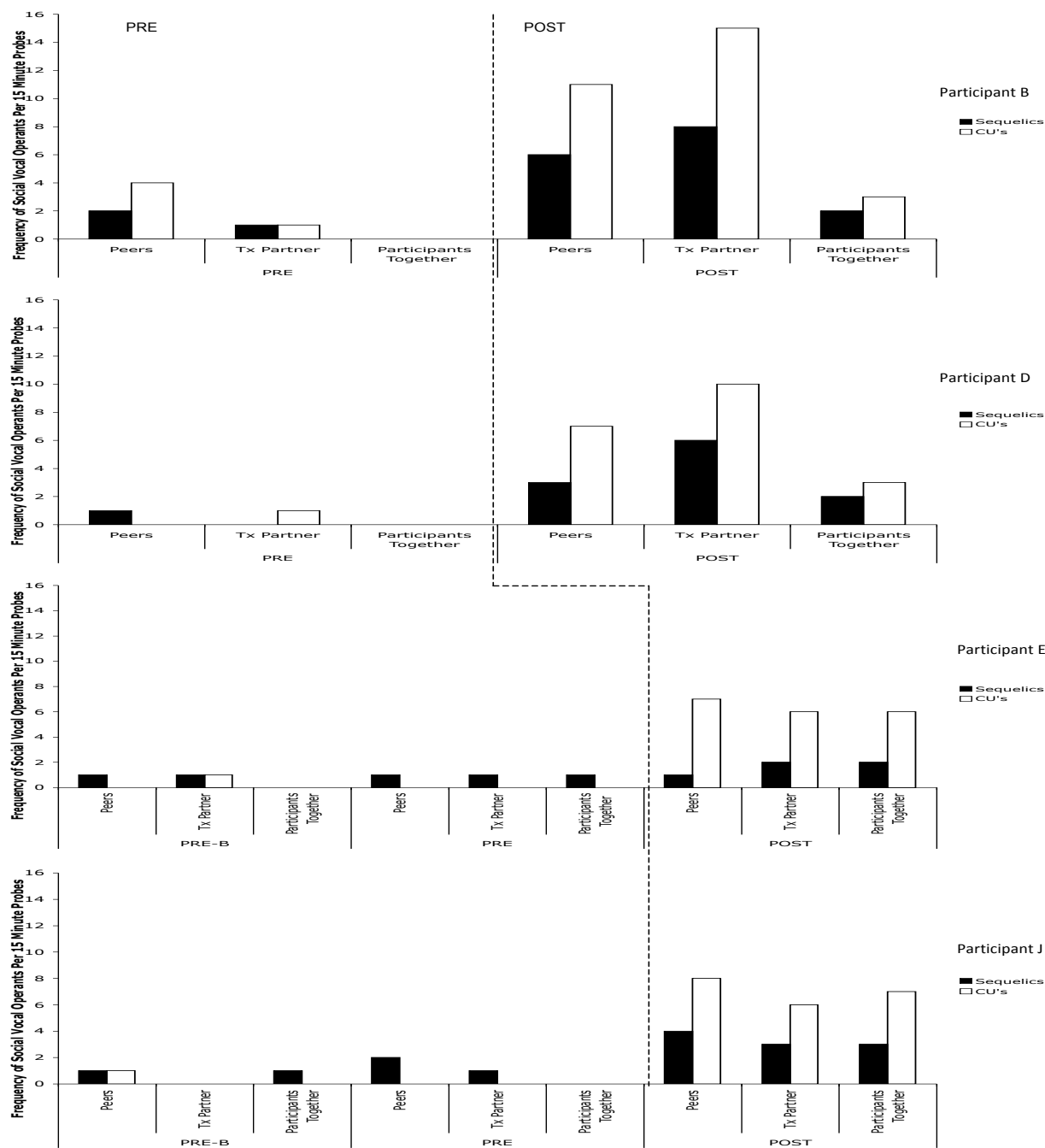
Figure 10. Frequency of self-initiated and peer-initiated social vocal operants pre and post social

listener reinforcement game during 5-minute probe sessions in the free play setting.
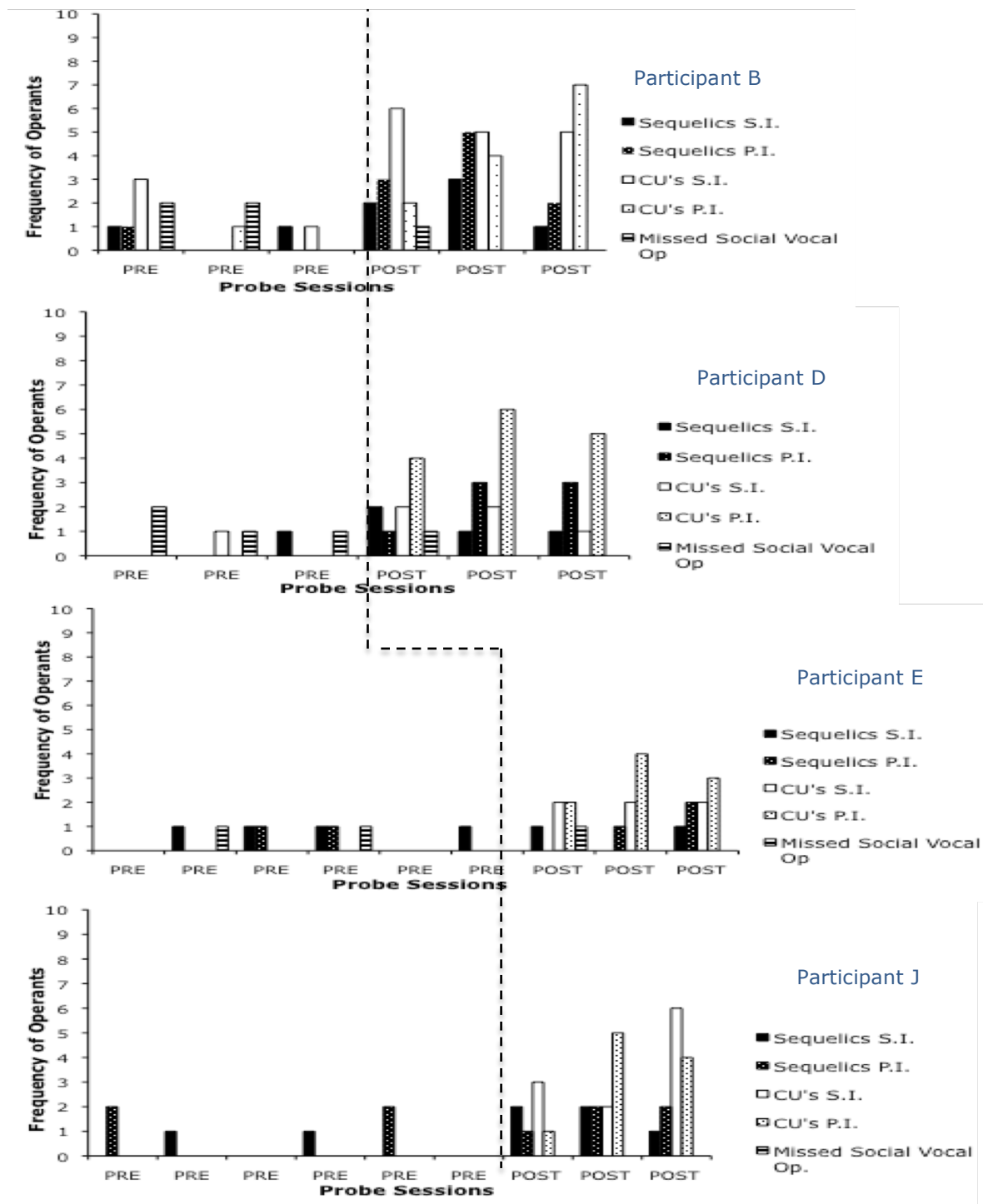
Figure 11. Frequency of self-initiated and peer-initiated social vocal operants pre and post social

listener reinforcement game during 5-minute probe sessions during mealtimes.

Figure 12. Frequency of mands, incorrect mands, and sharing pre and post social listener

reinforcement game during free play five-minute probe sessions.

Figure 13. Frequency of mands, incorrect mands, and sharing pre and post social listener

reinforcement game during mealtime five-minute probe sessions.

Figure 14. Percentage of correct responses to choral responding learn unit opportunities during

five-minute academic probe sessions pre and post social listener reinforcement game.

Discussion

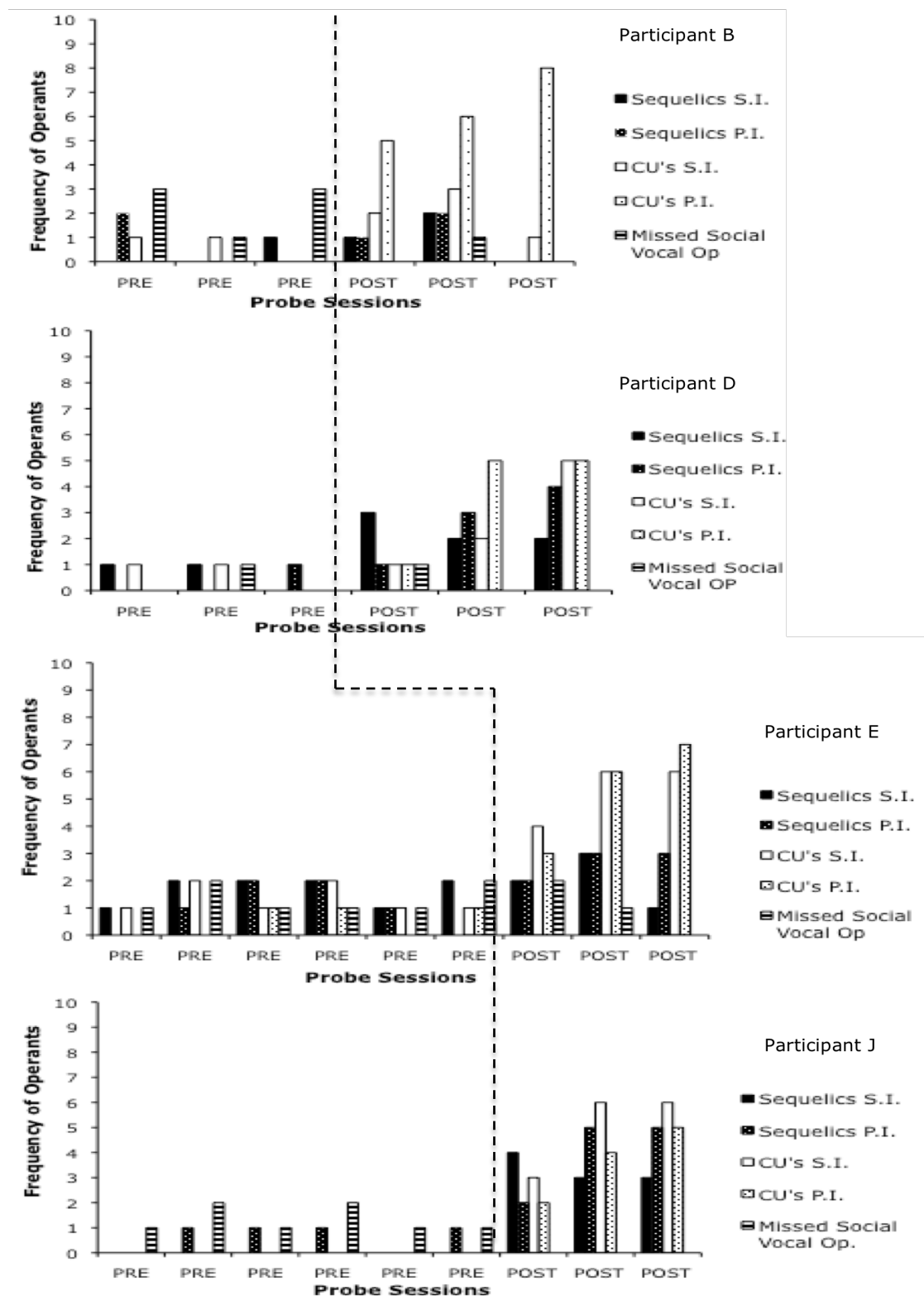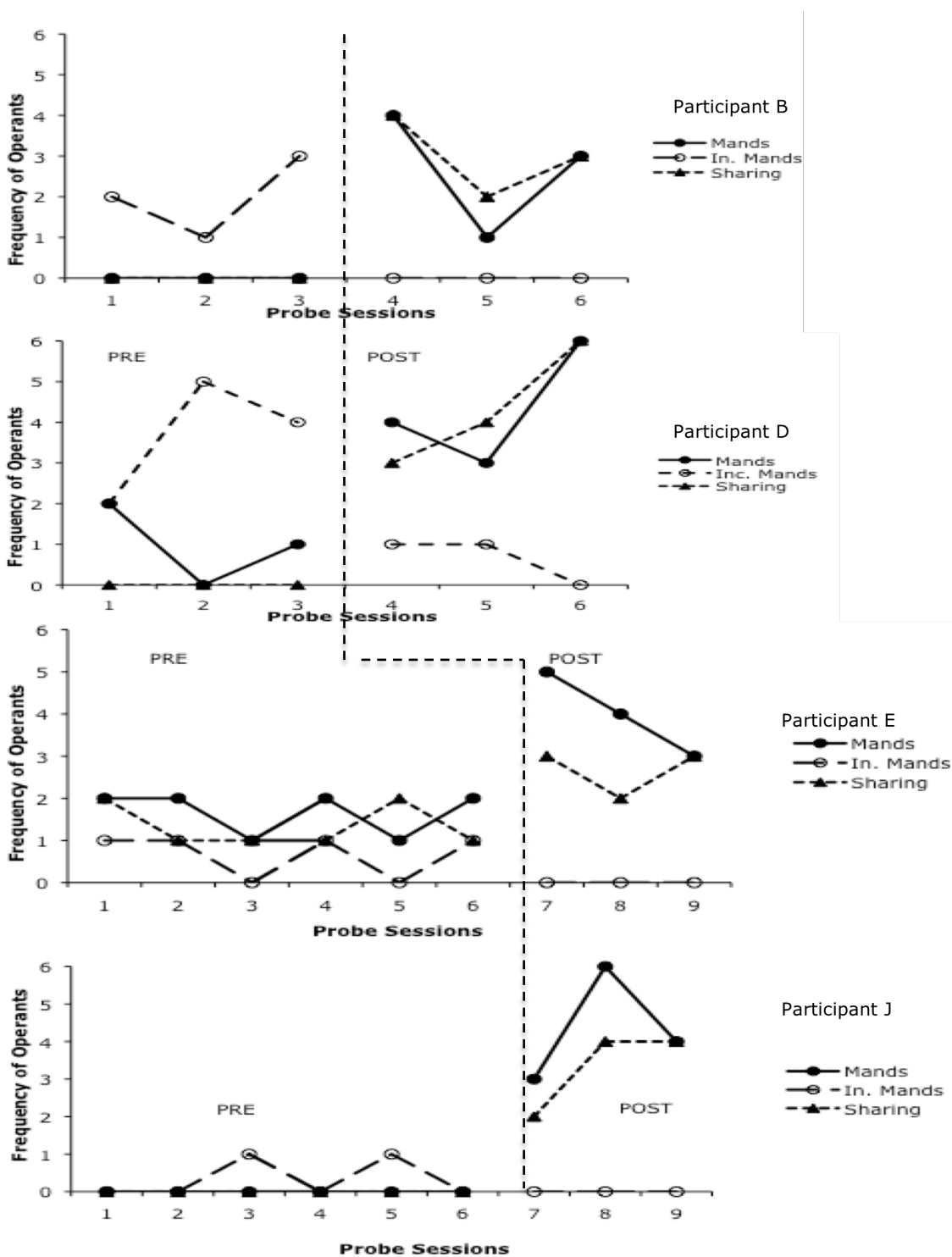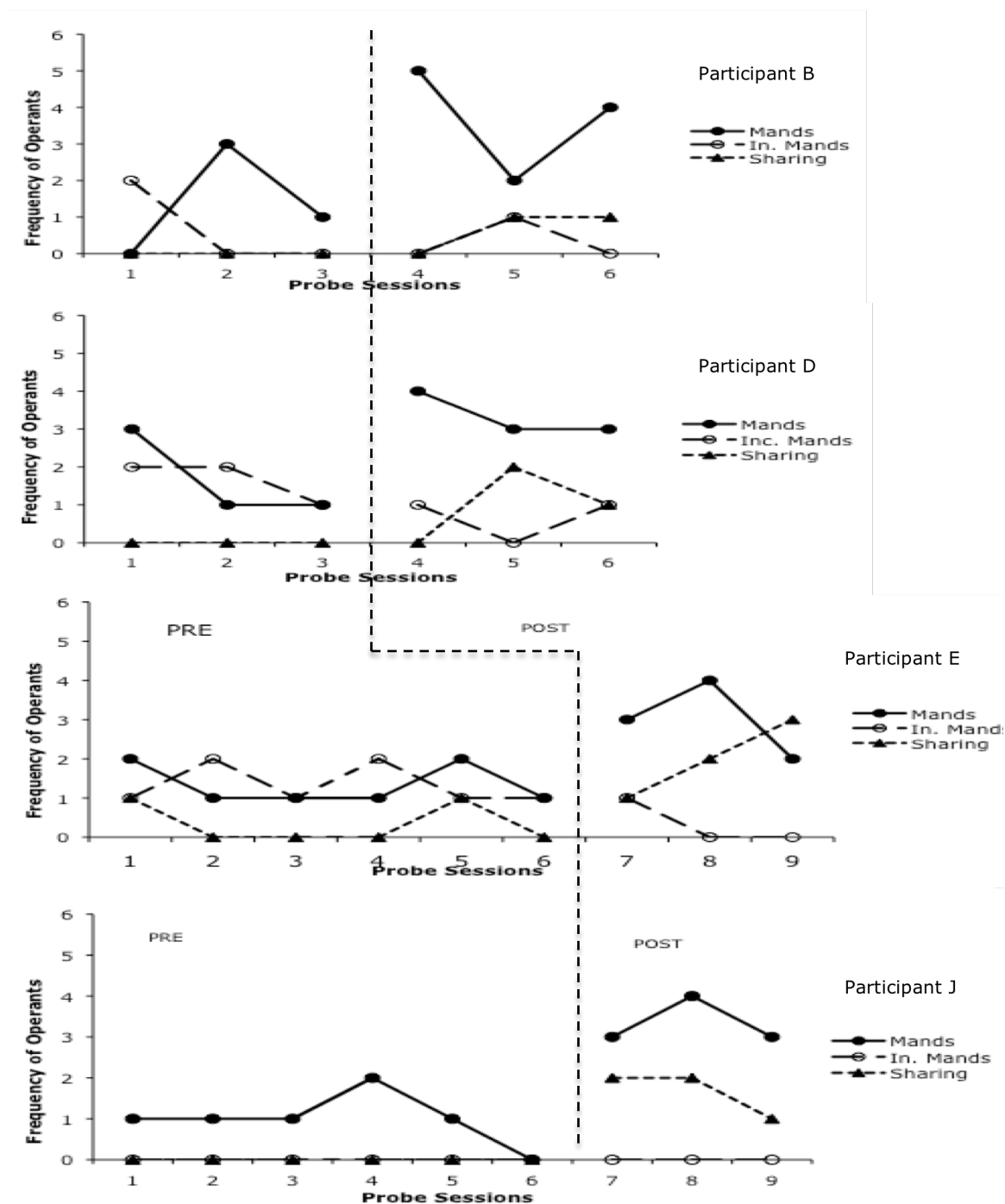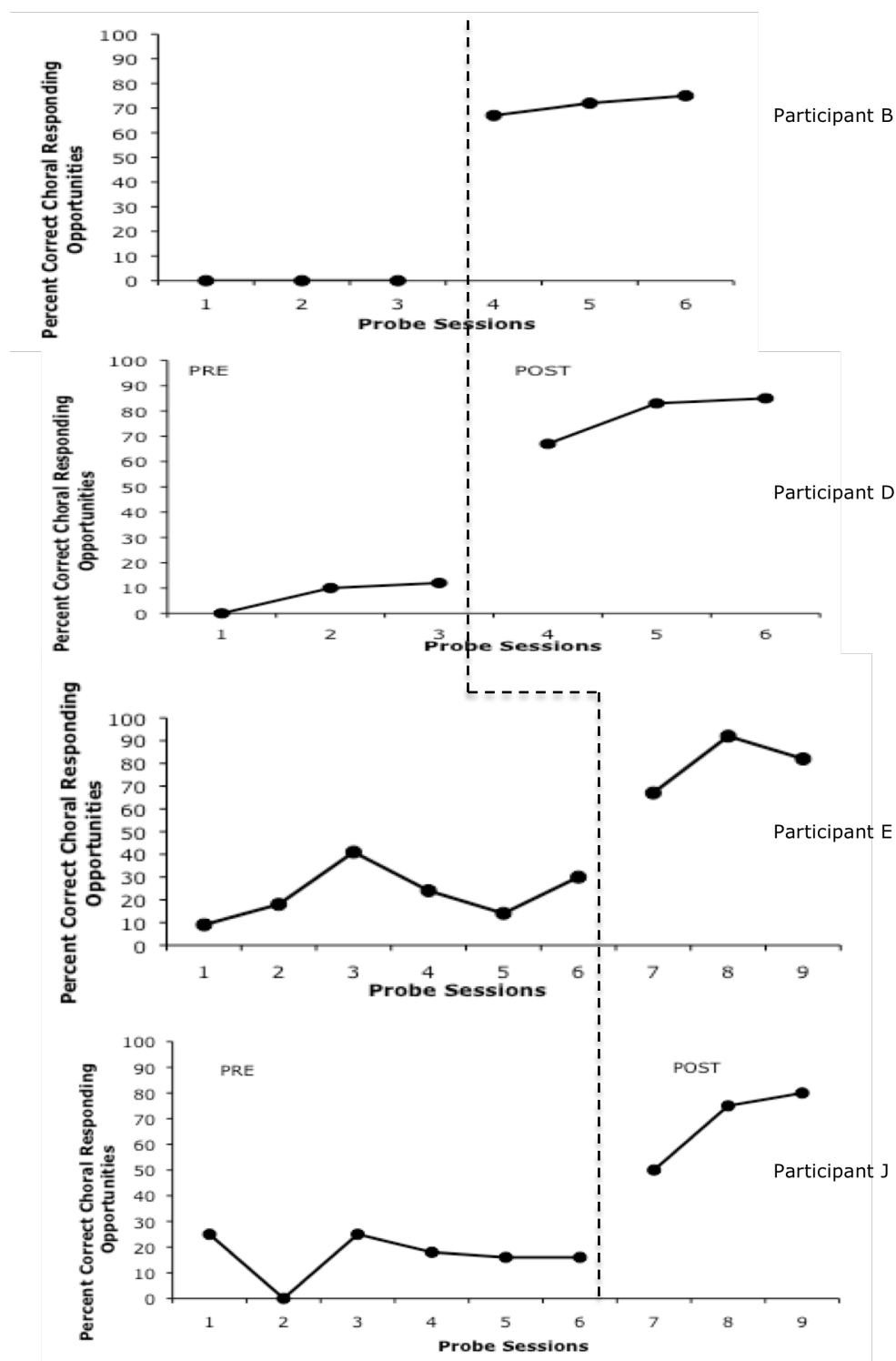In the second experiment, I tested the effects of the social listener reinforcement protocol on the audience control of preschool students with developmental delays. The social listener reinforcement protocol functioned to increase social interaction between the participants as well as between the participants and classroom peers across various dependent variables measured. Prior to the onset of treatment, all participants emitted low frequencies of social vocal operants. Frequency was low for self-initiated as well as for peer-initiated social vocal exchanges. During treatment, participants were conditioned to gain access to reinforcement delivered through peer social interactions. A peer-yoked contingency was implemented such that the participants only advanced towards winning a game if they participated in a speaker-listener exchange with their peer. The participant and peer advanced together as a team, linking simultaneous team reinforcement to social vocal behavior. As the game progressed, participants were not only reinforced for emitting speaker-listener exchanges, but additionally for receiving new information from their peers, learning new information from their peers, and teaching new information to their peers. Following reaching criteria for all game phases, all participants' increased social interaction measured during experimental probe sessions.

The SLR protocol functioned to increase initiation of social vocal operants from both peers and the participants. Prior to SLR protocol not only were participants failing to initiate conversation, but classroom peers were also not initiating conversation with the participants. Furthermore, sharing behavior was occurring at low frequencies prior to SLR protocol. Perhaps this was due to a history of punishment for "unapproved" behaviors such as breaking block structures, hitting, not responding to speaker behavior, responding to speaker behavior with physically assaultive behavior, and grabbing. Following SLR protocol, the frequency of initiation

of social vocal operants for both peers and participants and the frequency of sharing increased across all participants. Peers accessing reinforcement from the participants as well as the participants accessing reinforcement from the peers may explain such an increase.

The frequency of social vocal operants between participant and treatment partner, between target participant and participants other than the treatment partner, and between participant and typically developing classroom peers was measured discretely. For Participants B and D, the SLR protocol functioned to increase social vocal behavior with each other and with typically developing peers, but has less of an effect with other participants in the study who had not yet completed the protocol. For Participants E and J, the increase occurred across all audiences. However, participants E and J started treatment after Participants B and D finished the first phase of treatment. Therefore during post experimental probes for B and D, Participants E and J had not yet finished the protocol and may not have acquired enough access to social reinforcement at the time of such probes to have an effect on engaging in social behavior.

In addition to sharing, mands increased and incorrect mands decreased as a function of the SLR protocol. Participants had access to reinforcement from delivering desired items and sharing desired items with peers. The data show that it became more reinforcing to ask for or relinquish a toy than to emit destructive and assaultive behavior. A limitation of the dependent variable measurement was the lack of data delineating turn taking from one-time sharing of a toy. Shared behavior was defined as both continuous turn taking and one-time sharing of a toy. In future research it would be interesting to test for the frequency of turn taking versus sharing an item once, as it aligns with the rotation of listener to speaker behavior in conversational units versus sequelics. Turn-taking and conversational units both involved a continuation of exchange between two people, showing reinforcement through the exchange.

Accordingly, there was more of an increase of conversational units than sequelics during post-experimental probes. This may be due to an increase to access of social reinforcement as both a listener and a speaker. During SLR protocol participants rotated from both listener to speaker to listener, and from speaker to listener to speaker. When emitting a sequelic, the individual functions as the listener and then speaker or speaker and then listener. The rotation discontinues after only one turn with each of the topographies, and therefore reinforcement via this social behavior ceases. The game reinforced a continuation of such rotations and in a more general sense, reinforced social interaction, thereby explaining the larger increase in conversational units over sequelics.

Missed social vocal opportunities decreased as well. While the SLR protocol reinforced the rotation of listener and speaker exchanges, it did not teach the participants how to speak. New tacts were indeed learned during treatment, but participants all had speaker behavior in repertoire prior to the onset of treatment. All participants except Participant J emitted at least one conversational unit in pre-experimental probes, and all participants emitted at least one sequelic in pre-experimental probes. Rather than teaching speaker behavior, the SLR protocol reinforced the rotation of listener and speaker behavior with peers. The presence of missed social vocal opportunities observed in pre-experimental probes may be explained by the lack of audience control in the participant's repertoire. Participants did not recognize the audience and more specifically did not have much access to receiving reinforcement from their audience. The decrease in missed social vocal opportunities may demonstrate an awareness of the audience and an increase in access to receiving reinforcement from such peers.

Correct responding to choral responding was measured in pre-experimental and post-experimental probes. Choral responding is a teaching tactic that requires the student to listen to

the teacher's speaker behavior and either echo the teacher or respond in a sequelic with point to point correspondence and simultaneously with classroom peers. With choral responding, the individual must function as a part of the classroom audience, observing when to respond and to respond as a listener to the teacher's speaker behavior. When audience control is not in repertoire, the student doesn't have access to receiving reinforcement from their audience. Therefore the audience is not being observed in a socially functional way. During pre-experimental probes, the participants were functioning as a negative audience. According to Skinner (1957), a negative audience produces low levels of verbal behavior. Along with low frequencies of social vocal behavior, mands, and sharing, mean percent of correct choral responding was also low. Data for post-experimental probes show an increase in social vocal behavior, mands, sharing, and also correct choral responding demonstrating functioning as a positive audience. Participants gained new access to reinforcement from the classroom audience, which perhaps relates to participant's functioning as part of the audience.

Chapter IV

GENERAL DISCUSSION

Overview

I conducted two experiments to test the effects of the audience on various social behaviors, and to investigate possible determinants for acquiring audience control of social behaviors. In my first experiment, I observed the audience control of stereotypy across typically developing peers and peers on the autistic spectrum who also emitted stereotypy. This demonstration of audience control of stereotypy may be explained by the participants' contacting reinforcement or punishment from their audience. The purpose of Experiment II was to test the effects of conditioning social reinforcement for the target developmentally delayed participants with typically developing peers on the audience control of classroom social behavior. Following the social listener reinforcement protocol, the participants increased social interaction with their typically developing peers who previously did not function to reinforce listener and speaker exchanges. Thus, in the second experiment we found that conditioning social reinforcement for the audience allowed the participants to come into contact with audience reinforcement or punishment, when they could not prior to treatment.

In the first study, the dependent measure was the presence or absence of stereotypy across a self-contained and a typically developing classroom audience. Like most of the participants, the self-contained classroom audience consisted of peers on the autistic spectrum. This audience emitted high rates of stereotypy and in this audience, stereotypy may be considered to be socially acceptable behavior. However in the classroom made up of typically developing peers, stereotypy of this sort is not emitted and is not socially acceptable. It seemed

that the most plausible explanation for the decrease and oftentimes omission of socially unacceptable behavior was the participants having access to social reinforcement from their peers. They had a desire to be a part of the audience, to socially interact, and to be "accepted" by their peers.

As a function of SLR, the target participants acquired audience control. In addition, following the conditioning of social reinforcement in Experiment II, the target participants became a reinforcing audience for the peers. In pre-experimental probes, participants didn't socially or academically interact with the classroom audience. In post-experimental probes, participants initiated social interaction, responded when peers initiated and participated in class-wide academic lessons as a function of the conditioning of social listener reinforcement. Experiment II demonstrated the positive effects of the social listener reinforcement protocol on the audience control of social behavior and classroom integration.

Major Findings And Possible Explanations

The combination of both experiments provides an operant analysis of social learning. The findings suggest that by conditioning social listener reinforcement, individuals gain access to social reinforcement and therefore gain the motivation to interact with their audience. In the first experiment, the participants were seemingly motivated to interact with their audience. They omitted the behavior that was absent from their typically developing peers, a behavior that has reinforcing properties, but emitted such behaviors at high frequencies in the presence of an audience that also engages in these behaviors. This suggests that social reinforcement from their peers was more reinforcing than emitting stereotypy. This also possibly suggests a history of punishment associated with emitting stereotypy in the presence of typically developing peers.

Similarly, conditioning procedures have previously been used in research to decrease the presence of stereotypy (Greer, 2003; Greer et al., 1985; Nuzzolo-Gomez et al., 2002; Tsai & Greer, 2003). Most of this research was conducted with participants with fewer cusps and capabilities in their repertoire of verbal behavior and who were also younger in age. The participants in Experiment I had also partaken in the same stimulus-stimulus pairing procedures (as in the previous research) for toys, books, and puzzles to decrease stereotypy. At the time of the current research, the participants were conditioned to engage in age appropriate free-time activities however the presence of stereotypy during these activities had resurfaced. This is possibly due to the absence of audience punishment of stereotypy by their self-contained peers.

The success of the conditioning procedures to decrease stereotypy suggested the effectiveness of conditioning access to reinforcement from more sophisticated verbal behavior, (i.e. social interaction with an audience) as a means to decrease stereotypy. It was therefore likely that a competing reinforcer contributed to the audience control of stereotypy. It is the observation of the differing frequencies of stereotypy that gave a more obvious account of audience control and the reinforcement associated with audience control.

Consequently, conditioning social listener reinforcement gave the participants in the second experiment access to reinforcement from listening to their peers and engaging in speaker-listener exchanges. Prior to the onset of treatment, typically developing classroom peers demonstrated audience control of social behavior. Classroom peers emitted low frequencies of initiating social vocal exchanges with the participants who did not have access to social listener reinforcement and high frequencies of initiating social vocal exchange with other typically developing classroom peers who did have access to social listener reinforcement. This

observation designated negative and positive audiences within the classroom environment. The classroom peers learned that little to no reinforcement would be received when speaking to the participants, because the participants did not engage in conversation. Often times the participants were observed to walk away, talk to a teacher, or simply not respond. Following attempts to share toys, participants would break block structures or emit assaultive behaviors towards their peers. Such responding contributed to a history of punishment as well as a lack of reinforcement.

Following the SLR protocol, the participants engaged in conversation with peers as well as initiated conversation and sharing. Seemingly, peers increased their initiation of conversation with the participants due to the increase in social reinforcement received. Prior to the conditioning procedure, the rotation of speaker and listener suggested that the reinforcement for listening to others was missing. That is, the initiator of the interaction did not respond in turn first as a listener of their peer's response and then as a speaker. The SLR protocol was an attempt to condition speaker behavior as reinforcement for the listener, so that the listener takes interest in what the speaker has to say. The increase of conversational units and decrease of sequelics emitted by participants following treatment is evidence that this rotation became a conditioned response, and that the reinforcement value of listening to the speaker increased.

Greer and Speckman (2009) describe the need for a shift from an internal to an external audience when expanding one's repertoire of verbal behavior, and specifically pertaining to socialization. It should also be proposed that there is also a need for a shift in behavior specific to the type of external audience present, or have audience control in repertoire. Hugh's (2006) tactic of contingent removal or production of recordings of music or the children's own self-talk functioned to decrease self-talk in free-play settings; therefore teaching an initial level of discriminating between the presence and absence of an audience. In Experiment I of the current

research, the presence or absence of a specific type of audience functioned to change the frequency of stereotypy emitted by participants. Furthermore, Experiment II showed that audience control affects the frequency and type of social operants emitted, thereby affecting socialization of the participants. The combination of the results of both experiments provides support for the theory that audience control is also a necessary for expanding one's repertoire of verbal behavior.

Skinner described audience control as a form of self-editing behavior. Madho's (1997) writer immersion protocol taught functional writing and editing skills by providing the writer with immediate feedback from the reader. The writer's behavior increased as a function of receiving a reinforcing or punishing consequence from the reader, so that the writing successfully affected the reader. In the present research, it was shown that having access to the reinforcing or punishing contingencies provided by the audience is necessary to increase the social behavior of the participants. Participants also increased accurate mands and sharing behavior, when previously assaultive behavior was often times emitted. This behavioral shift may be compared to self-editing behaviors. Having access to social contingencies functioned to increase the self-editing of the way in which participants responded to a peer desiring an item he possessed as well as the way in which the participant obtained a desired item.

The increase in participating and in accuracy of choral responding shows an increase in academic performance through functioning as a positive audience member. Following the induction of social listener reinforcement, the participants began listening to the teacher's tacts during instruction and responding as a part of an audience with the classroom. It is another example of rotating from listener to speaker behavior, and responding as a speaker simultaneously with the whole audience. Similar to Greer and Longano's (2010) discussion of

the VBDT, which suggests that the source of reinforcement for most verbal behavior emitted is mediated by the listener or speaker, with social listener reinforcement in repertoire, the participants gained access to reinforcement through choral responding with the classroom audience.

The increase in accurate choral responses may also be due to the presence of observational learning in repertoire. Part of the SLR protocol involved peer tutoring phases. Peer tutoring has functioned to induce observational learning (Greer, Dudek-Singer, & Gautreaux, 2006) and may have been induced during Experiment II, however it was not tested for. When observational learning is in repertoire, an individual learns new operants through observing the contingencies experienced by others. Perhaps having audience control is not only having access to experiencing reinforcing and punishing consequences received by peers, but may also involve observing those contingencies on others.

Limitations

There were several limitations found in both experiments. In Experiment I, neither social interaction nor academic performance was measured. The only dependent variable measured was the frequency of stereotypy in the presence of each audience. In future research, it would be important to observe the difference in academic and social behavior as a function of they type of audience present. Similarly, Rosenberg, Spradlin, and Mabel (1961) found that when verbal repertoires of audience members are matched, higher rates of verbal exchanges occur for both groups with few as well as many verbal cusps and capabilities in repertoire. The Experiment I participants also emitted even higher rates of stereotypy amongst a third audience in a different self-contained classroom consisting of peers with even higher rates of stereotypy and fewer cusps and capabilities in repertoire. There were however no data supporting these findings.

High frequencies of conversational units with Experiment I participants in both environments would have showed conditioned reinforcement for social listener exchanges. It was speculated that this was the source of reinforcement for audience control due to an analysis of cusps and capabilities in repertoire that most closely matched the observed effect, however these data would have showed that social listener reinforcement was in fact in the participants' repertoire.

A major limitation with Experiment II was the lack of data showing frequencies of social behaviors with the typically developing peers in the classroom. Only the social vocal interactions, sharing, and manding frequencies were measured for the participants with each other and with the typically developing classroom peers. However having data for the peers amongst each other, or typical comparisons, would show a clear differentiation of the two classroom audiences, and then the blend of the two audiences post induction of social listener reinforcement.

Future Research

Following conditioning social listener reinforcement through the SLR protocol, participants increased social vocal operants and initiation of social exchanges. Lee et al (2007) used social initiation trainings with typically developing peers to decrease stereotypy of participants. This showed the inverse relationship of stereotypy and social interaction, however these training procedures did not function to increase initiation of social interaction for the participants. Therefore a trained typically developing peer is needed to reach the intended effect. Loftin (2008) used social initiation trainings and self-monitoring procedures to increase initiation of social interaction and decrease stereotypy of students in integrated settings, however students

needed to monitor their own behavior in order to maintain effects. Scripts (Chan et al, 2008; Goldstein et al., 1992), algorithms (Conroy et al., 2005), and video modeling (Charlop et al., 1989; LeBlanc et al., 2003) are additional procedures for increasing social interaction however none produce the natural contingencies associated with typical social behavior.

With typically developing individuals, social behavior is maintained by reinforcement of the interaction. The SLR protocol increases social interaction through conditioning the listener response and perhaps conditioning the actual exchange between listener and speaker behavior. For future research, it would be interesting to compare the SLR protocol to video modeling or scripts, which are the two most common practices for teaching social behavior among special educators and behavior analysts. It is important to compare the difference in varied speaker responses of participants, frequency of initiation of social interaction without additional social interaction trainings, as well as maintenance of social interactions.

Additionally, future research should include inducing social listener reinforcement for participants with high rates of stereotypy. In Experiment I, it was proposed that the source of reinforcement for audience control of stereotypy was social listener reinforcement. Participants in Experiment I already had social listener reinforcement in repertoire, and consequently had audience control for frequency of stereotypy. While the findings of Experiment II show that social listener reinforcement is needed for individuals to function as positive audience members, it would be interesting to directly show the effect of SLR on audience control for stereotypy.

Conclusion

The combination of the two experiments suggests that the source of reinforcement for audience control is social listener reinforcement. Additionally the results show the effect of

audience control on integrating students into a typically developing audience. It has been proposed that the success of integrating students is dependent on classroom behavior and social skills. Having audience control in repertoire, students distinguish between behaviors that generate reinforcement from peers and therefore increase socially "appropriate" behaviors. Following the SLR protocol, participants increased academic performance through increased choral responding, decreased assaultive and destructive behaviors through increased sharing and accurate mands, and increased social interaction. Additionally, classroom peers increased their initiation of social interaction with participants. Therefore, the participants all significantly increased their success in the integrated classroom setting.

These findings have major implications for increasing the success of integrated students. In order to be truly integrated, students need to achieve academic success, have positive social interaction, and self-management in repertoire. This research suggests that audience control positively contributes to all three components. There is a great need for research-based procedures that increase the independent functioning of integrated students, without the use of prompts. Typically, accessing social contingencies controls such behaviors. Having a procedure that conditions this access allows more individuals to have the opportunity to receive reinforcement from social interactions and also increases the opportunity to learn from others.

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