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Evaluating the Effects of a Stimulus Equivalence Protocol to Teach Bullying Identification to School-Aged Children

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EVALUATING THE EFFECTS OF A STIMULUS EQUIVALENCE PROTOCOL TO
TEACH BULLYING IDENTIFICATION TO SCHOOL-AGED CHILDREN

By

Courtney Sowle

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Abstract

Evaluating the effects of a stimulus equivalence protocol to teach bullying identification to school-aged children

Courtney Sowle
Master of Arts in Clinical Psychology
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2019

Bullying and its impact on mental health is a major concern in the United States (Arseneault, 2017). Multi-component bullying interventions have resulted in positive outcomes, such as teachers reporting better student behaviors (Crean & Johnson, 2013), increased teacher knowledge about bullying (Bell, Raczynski, & Horne, 2010), and increased student control of high-risk behaviors (Shure, 2001). Considering bullying behavior primarily as being a more complex behavior, one behavior intervention that has shown to be effective in teaching complex behaviors is the stimulus equivalence protocol. The purpose of the present study was to evaluate the effects of a stimulus equivalence protocol on teaching different bullying types to school-age children. A match-to-sample training protocol was utilized to teach relations between bullying type, examples of bullying, and an appropriate intervening response to a bullying type. *In-situ* generalization probes were additionally utilized to assess the participants ability to identify and respond to the various types of bullying. All participants demonstrated the ability to engage in derived relational responding to mastery criteria and reporting bullying to an adult during *in-situ* generalization probes.

Key words: stimulus equivalence, bullying, intervention, school-aged children

Table of Contents

Introduction

Bullying and its impact on mental health is a topic that continues to be a concern (Arseneault, 2017). There are multiple types of bullying (i.e. verbal, physical, and cyber), however, all behaviors seem to exist under the common definition of harmful and repeated actions between peers for the purpose of directly or indirectly hurting another (Arseneault, Bowes, & Shakoor, 2010; Raskauskas & Stoltz, 2007). Almost 30% out of 15,686 middle and high school students reported either moderate or frequent involvement in bullying, with the prevalence rate of traditional bullying (physical and verbal) being 35% and the prevalence rate of cyber bullying being 15% (Centers for Disease Control and Prevention, 2017; Modecki, Minchin, Harbaugh, Guerra, & Runions, 2014; Nansel et al., 2001).

According to Arseneault and Shakoor (2010), being a victim to bullying can result in an increased future risk in symptoms of self-harm, violence, and other psychological symptoms. Likewise, individuals who bully tend to have poorer academic skills, lack of empathy, and often believe that aggression is a socially effective way to solve problems. Engaging in bullying behaviors in childhood has also shown to increase the individual's risk of substance use and criminal behavior (Merrell, Gueldner, Ross, & Isava, 2008). Low psychological well-being, poor social adjustment, psychological distress, and physical illness have been identified and linked to bullying experiences in school-aged children (Rigby, 2003). Gini (2008) examined psychosomatic, emotional, and behavior issues of bullies and victims. According to reports of 565 school children: 11.2% were classified as bullies, 7.1% were classified as victims, and 10.4% were classified as being

bullies and experiencing bullying. The results also showed that bullies and victims of bullying were at a higher risk for conduct issues, hyperactivity, and problems with peers.

With such a large number of school-aged children experiencing bullying, the concern for mental health well-being and the research to educate children how to identify and respond to various types of bullying is needed. The literature illustrates bullying behavior may predict short and long-term behavioral outcomes in a student's life (Gini, 2008; Rigby, 2003). Short term outcomes have been documented as hyperactivity, conduct issues, academic issues, and problems with other peers. Whereas long term effects include increased risk of substance use, self-harm, and other psychological symptoms (Gini, 2008). Therefore, finding the best intervention to combat these predicted outcomes is crucial for current and future children.

Research on Bullying Prevention Packages

Bullying intervention research has focused on the use of multi-component bullying interventions. Bullying intervention research has slowly accumulated since the 1970s, with one of the first publicized and popular research studies being Dan Olweus' bullying intervention (Merrell et al., 2008). According to Bauer, Lozano, and Rivara (2007), The Olweus Bullying Prevention Program (OBPP) focuses on improving peer relationships, promoting safe and positive school environments, and increasing awareness of bullying. Throughout the program, schools work to restructure their school environment to reduce opportunities for bullying behavior and build a sense of community between the adults and children of the school district (Limber, 2011). In order to accomplish these goals, teachers attend a two-day training and receive a full-year of consultation. Limber (2011) found that the OBPP has shown marked reductions in

student's self-reports of bullying and being the victim. O'Moore and Minton (2005) state that although the program shows evidence for reduced bullying behavior, the program fails to increase the level of victim and bystander reports of bullying; an important result to note.

Bully Busters, I Can Problem Solve (ICPS), and Promoting Alternative Thinking Strategies are a few multi-component bullying interventions that have been created and implemented in school settings (Horne, Stoddard, & Bell, 2007). Often times these programs focus on understanding what bullying is and increasing involvement of adults in the child's community. However, there seems to be a gap in the literature about direct implementation of behavioral interventions and their effectiveness. I Can Problem Solve (ICPS) is a cognitive approach that school systems have used to teach students problem solving skills to reduce and prevent future high-risk behaviors, such as bullying. Targeted high-risk behaviors consisted of aggression, inability to wait and cope with frustration, and social withdrawal.

ICPS is taught to teachers through manuals and training during an initial hour and a half workshop facilitated by those competent in ICPS (Shure, 2001). The manuals consisted of games and dialogues to teach problem solving vocabulary to help children later settle problems, thinking concepts that help to describe how people feel, and problem-solving skills involving solutions to problems and consequences of different actions. In a study ran by Shure and Spivack (1982), preschool and kindergarten children participated in ICPS classroom lessons, games, and behavior assessments (i.e. teachers rating student responses to problems) over a two-year period. The results showed that 71% of the trained children showed increased ability to problem solve, compared to only

54% of the controls. These results suggest positive behavior change, however the focus of the intervention seemed to teach students how to control their own high-risk behaviors, rather than what to do if they are being bullied.

Furthermore, the Bully Busters program is a teacher-targeted intervention that aims to reduce the level of aggression often leading to bullying behaviors by increasing teacher awareness and knowledge (Bell, Raczynski, & Horne, 2010). According to Newman-Carlson and Horne (2004), bullying behavior is considered one of the most widely practiced forms of aggressive behavior. Teachers completed three staff training workshops, lasting two hours each week, and discussed seven lessons (Bell et al., 2010). These lessons consisted of (a) increasing awareness, (b) recognizing the bully and victim, (c) taking charge of bullying behavior, (d) assisting victims, I prevention, and (f) coping skills (Newman-Carlson & Horne, 2004). After each module, each teacher was instructed to share the information learned with their students and to start implementing this new information into how the teachers personally dealt with student's aggressive behaviors. Bell et al. (2010) used an abbreviated one-year version of the Bully Busters program and found that teachers reported an increase in knowledge in intervening during bullying situations. However, student behavior was not addressed in this study. Although this program showed evidence for improvements on teacher reports of intervening with bullying, there remains a gap in the literature that suggests that the student, as an individual, is rarely the focus of the intervention.

Some bullying prevention packages have directly targeted behavior change, such as Promoting Alternative Thinking Strategies (PATHS; Crean & Johnson, 2013). PATHS is designed to increase social and emotional character development, while also reducing

aggressive behavior and other behavior in young children. The six volumes of the PATHS program were investigated and implemented among elementary students by their teachers, focusing on the specific domains of self-control, emotional understanding, positive self-esteem, healthy relationships, and interpersonal problem-solving skills. Teachers attended a two-day paid training to go over each lesson section and had weekly implementation consultation with feedback while implementing the lessons into the classroom over the student's elementary school years (three years total). At the end of the program, teachers reported less aggressive behavior and acting out in the students trained with PATH. Although teachers reported less aggression in PATH students, the actual students did not report lower victimization over time.

The aforementioned multi-component bullying interventions have seen some positive outcomes, such as teachers reporting better student behaviors (Crean & Johnson, 2013), increased teacher knowledge about bullying (Bell, Raczynski, & Horne, 2010), and increased student control of high-risk behaviors (Shure, 2001). However, multi-component interventions pose some issues. With these interventions, it is difficult to say exactly what part of the package is the most beneficial to the student. Multi-component interventions do not focus on the individual, which makes it difficult to identify the specific behaviors being identified in these groups. Currently, the research focuses on training teachers to implement these multi-component interventions. Each of the multi-component packages mentioned included, on average, two to three training sessions for the teachers before implementation. Although these bullying packages have had some success, treatment integrity was not measured. In addition, targeting direct bullying behavior may be difficult in research, as most institutional review boards will not approve

research that may cause harm to the potential participants. Bullying researchers, then, must find appropriate ways to present bullying identification and responding to children without causing harm.

Behavior Analytic Interventions on Bullying Behavior

As illustrated above, interventions for bullying have focused on informational and multi-component interventions. A need clearly exists for more behavioral analytic interventions, focusing on the individual and how they can change their behaviors. Behavior analysis focuses on how behavior change can be provoked based upon how the environment is manipulated around an individual. "To explain behavior, which includes thoughts and feelings, we must identify the natural events that produce it" (Chance, 2014, p. 35). Then, to evoke bullying behavior change, it may be more helpful in directly manipulating external variables around the individual. A behavior analytic intervention may also be beneficial because it often focuses on single-case designs, which means that the individual would be targeted. Group designs in the previously mentioned packaged interventions may make it more difficult to examine direct changes of behavior. Bullying happens to the individual, therefore teaching the individual is necessary in endorsing and examining behavior change. Therefore, further research is needed on behavioral approaches to bullying intervention.

To date, little research has been done on the use of behavioral approaches to bullying intervention. Ross and Horner (2009) examined the use of Bullying Prevention in Positive Behavioral Support (BP-PBS). Participants included six students selected by their elementary schools as having high levels of verbal and physical aggression. Faculty were presented with BP-PBS training on the curriculum, then students were trained via

their teachers using PBS and observed during their recess time at school. Training consisted of teaching the students skills in determining what respectful behavior looks like, how to tell someone to stop aggressing, and how to respond if bullied. Researchers then took data on victim and bystander responses to problem behavior by noting if the student initiated a "stop" signal, walked away, or ignored the behavior. Following training, target participants engaged in fewer aggressive behaviors and the number of victim/bystander reports of bullying to a teacher increased.

Stannis et al. (2018) also investigated the efficacy of a behavioral intervention on bullying responses through the use of behavioral skills training (BST) and *in-situ* training, a procedure often used to test generalization of behavioral skills in real-life settings. Participants were taught general bullying definitions and response scenarios. During BST, participants were given the definition of bullying, what bullying behaviors consisted of, and questions regarding their recent bullying experiences. Participants were then instructed how to respond to bullying, given time to practice responding to bullying, and then placed into three to five role-play situations. If participants were unable to meet 100% criterion, they were placed into *in-situ* training until they met criterion. The results show that participants increased their ability to identify and respond to bullying during BST. Participants that needed *in-situ* training were also able to successfully identify and respond to *in-situ* bullying situations. A follow-up was performed and found that each participant showed maintenance of the stills taught during the initial assessment. Social validity was assessed through questionnaires completed by all participants, confederates, and staff. All participants, confederates, and staff reported that the methods use in this

study had high social validity. Each participant specifically reported that using this specific method helped them to feel safe.

Using modeling and rehearsal, Frey et al. (2005) implemented another behavior-based intervention called *Steps to Respect* with six schools, with students ranging from third to sixth grade. This program focuses on improving school policy, providing staff trainings, and implementing group joining and conflict resolution skills into student curriculum. After receiving two-day training sessions, the staff introduced various skill building activities into their classrooms. The students completed bullying discussions, social skills practice, and knowledge games over the course of one school year. Upon completion of the program and observation, the results show that students had a decline in playground bullying behavior and increases in appropriate interactions between students.

Unlike the previously mentioned multi-component interventions, these behavioral interventions produced direct bullying behavior change with participants. There is still a need for more evidence-based interventions for bullying. Due to behavioral interventions often being more individualized, it is understood that a behavioral intervention conducted for each individual child may consume extra resources, such as time and funding. Therefore, future literature should examine more efficient behavioral interventions. Considering bullying behavior primarily as being a more complex behavior, one behavior intervention that has shown to be effective in teaching complex behaviors is the stimulus equivalence protocol.

Stimulus Equivalence

Stimulus equivalence, a phenomenon discovered by Sidman (1971), is defined as the emergence of indirectly trained stimulus relationships following a history of reinforcement for relating the stimuli in finite ways and has been used for over 40 years to teach complex behaviors (Rehfeldt, 2011). Within this paradigm, match-to-sample (MTS) is a procedure often utilized to teach relations through presenting a stimulus as a sample, providing two or more other comparison stimuli (see Figure 1), and then allowing the participant to make a choice between the sample and its correct conditional stimuli relation (Oliveira, Goyos, & Pear, 2012). Stimulus equivalence researchers have stated that, "studies of stimulus equivalence and stimulus relations have shown that when typically developing human beings are taught a few stimulus-stimulus relations, other non-taught stimulus-stimulus relations typically emerge" (Pérez-González, Herszlikowicz, & Williams, 2008, p. 96).

Within Sidman's (1971) initial study, he investigated the effects of teaching derived stimulus equivalence to a child diagnosed with severe intellectual disability. The participant began the study able to match 20 pictures to their comparison stimuli (dictated words) and then name all of the pictures. The individual was then taught to match 20 printed-word comparisons to the same set of dictated samples. Following this instruction, she could accurately match picture comparisons to printed word samples, printed words to picture comparisons, and read all of the printed words without receiving direct instruction. Therefore, proving that an equivalence class had been formed.

Three properties must occur in order to demonstrate that stimulus equivalence has been achieved between stimuli: Reflexivity, symmetry, and transitivity (Aguirre, 2015; Sidman & Tailby, 1982; Tabullo, 2015). Reflexivity consists of A-A relations such as

matching a picture of a toy car to another picture of a toy car and vice versa (see Figure 2; Appendix B). Symmetry is demonstrated when a participant is taught that the spoken word "toy car" refers to a picture of a toy car, an A-B relation, they are then able to dictate the word "toy car" later when presented with a picture of a toy car, a B-A relation. Transitivity is demonstrated after learning that the spoken word "toy car" refers to a picture of a toy car (A-B) as well as the written word "toy car" (A-C), that then a picture of a toy car also refers to the written word "toy car" (B-C) and that the written word "toy car" refers to a picture of a toy car (C-B) without these relations ever being directly paired. Once these three properties have been demonstrated, stimulus equivalence has occurred.

A general example in relation to bullying would include reading the words verbal bullying (stimulus A) and being taught to find the definition of verbal bullying (stimulus B). When given the definition of verbal bullying, that same child may be instructed to identify a video where verbal bullying is occurring (stimulus C). After exposure to direct training instructions of these relations, novel relations among the stimuli can be tested, such as the child watching a video of verbal bullying and being able to explain why it is verbal bullying (based upon the definition). Once these relations are observed, it can be understood that these stimuli are included within the same equivalence class. To further explain stimulus equivalence and stimulus relations, Pérez-González et al. (2008) stated that "after learning to relate stimulus A to stimulus B and stimulus B to stimulus C, an individual typically relates A to A, B to B, C to C, B to A, C to B, A to C, and C to A" (p. 97).

Stimulus Equivalence Success in the Classroom

Within the classroom, stimulus equivalence has been shown to be successful in teaching reading, vocabulary, geography, and math skills to typically developing children. DeRose and DeSouza (1996) demonstrated the ability to teach first grade students reading and spelling relations using the stimulus equivalence paradigm. The researchers taught comparisons between dictated-word samples, printed-word comparisons, and pictures. They found that 5 of the 7 participants were able to match words to their corresponding pictures, pictures to words, reading the words out loud, and generalization to novel words following an exclusion procedure.

Pérez-González, Herszilkowicz, and Williams (2008) examined the emergence of indirectly trained stimulus relations following stimulus equivalence training. The study consisted of five typically developing children, aged five to six years old. The use of stimulus equivalence training in their methods was used to teach relations between countries, cities, and parks in Spain. Results showed that the stimulus equivalence training procedure was effective in teaching the emergence of indirectly trained relations, making it the first study to expand stimulus equivalence effectiveness.

Carp and Petursdottir (2015) also examined the emergence of indirectly trained relations in relation to state maps, state birds, and state flowers to six children aged five to seven years old. Using an automated MTS PowerPoint procedure, the children were placed through category pre-training, tact training, intraverbal pretests, equivalence tests (symmetry and transitivity), and intraverbal posttests. A tact can be defined as labeling something (i.e. seeing a bottle and saying bottle) and an intraverbal can be defined as a response to another's verbal behavior (i.e. someone asking what your name is and you responding with your name). The results showed that there was a relationship between

the intraverbal pretests and equivalence tests. Specifically, those that did well on the intraverbal training, did well on the equivalence test. All students demonstrated the emergence of indirectly trained relations, providing further proof that the stimulus equivalence protocol is effective.

To further examine the effectiveness of stimulus equivalence, Ramierez and Rehfeldt (2009) investigated the emergence of symmetry relations while teaching Spanish vocabulary words to typically developing children. The participants, two children aged nine and ten, were taught and tested on random vocabulary (naming the item in a picture; A-B, B-A relations). The results show that that the equivalence training and MTS procedure successfully taught participants all three sets to criterion (animals, furniture, clothing/jewelry). Melchiori (2000) examined the stimulus equivalence protocol across non-reading and reading preschoolers and first grade students. The three stimuli consisted of dictated words, pictures of the word, and the written word. Each student completed the MTS program for symmetry and matching in learning Portuguese words, which was the participant's native language. Much like the other studies discussed, all students learned to read the target words to the criterion level and even made improvement on generalized words.

Likewise, Aguirre and Rehfeldt (2015) evaluated the effectiveness and efficiency of the stimulus equivalence paradigm and the MTS procedure in teaching English and Math relations, taken from the Common Core Standards, to third grade students. Participants consisted of typically developing children from general education classrooms. After completing stimulus equivalence training, participants were effectively and efficiently able to learn indirectly trained relations and master material to criterion in

both English and math posttests after remedial instruction. Following the completion of the study the participants stated that they enjoyed using the MTS procedure, further showing support for the use of this procedure in the current study.

Within the literature, limited research has been done using stimulus equivalence protocols with social behaviors. Due to the established literature in using stimulus equivalence protocols to teach complex academic and communication skills, it seems important to expand its possible utility into social skills. It should also be noted that all of the interventions mentioned previously have been implemented within school settings. The researchers understand that most bullying takes place in the school and on school grounds, however bullying also happens wherever kids gather in the community and when using cell phones or other technology (StopBullying.gov, 2017).

<div align="center">**Purpose**</div>

The purpose of this study was to evaluate the effectiveness of the stimulus equivalence paradigm in teaching three different types of bullying to school-aged children. Within the research, only a small number of studies have utilized stimulus equivalence procedures to teach complex social skills, such as Guercio, Podolska-Schroeder, and Rehfeldt (2003) who found success using stimulus equivalence procedures to teach facial expression and emotion recognition to individuals with traumatic brain injury. Although stimulus equivalence has been utilized to teach various language learning and other education skills, using it to teach bullying identification and responding has not yet been investigated. Most bullying prevention interventions have been implemented in school-type settings, so the current research examined and implemented a bullying intervention in home and community settings. By including MTS

and stimulus equivalence in teaching bullying identification and responding to school-aged children, the present study expands the literature on behaviorally-based and empirically supported teaching protocols.

Methods

Participants and Setting

Participants were three typically developing children, recruited from the researcher's personal social media page on Facebook, via word of mouth to personal contacts of the researcher, and via a flyer posted around a Southern Minnesota University campus. Potential participant guardians who replied with an indication that they would consent for their son or daughter to participate in the study were contacted by a member of the research team to arrange a meeting to obtain informed consent and assent. The participants ranged in age from 6-years-old to 7-years-old and included two males and one female. Caden and Kassie were both 6 years of age and Jason was 7 years of age. Caden and Jason both received a general education in a school setting, whereas Kassie was receiving a home-schooled education. Target stimuli were written in a third-grade reading level using Microsoft Word© readability option, as this was the lowest reading level the stimuli could be presented at and still maintain readable sentence structure. If participants were unable to read any of the words during training or testing, the researcher read the word(s) out loud to the participant.

A shortened version of Chen and Schwartz's (2012) Bullying Survey for ASD was used as a pre-intervention survey to determine bullying experiences and frequency of participants in the last school year (see Appendix C). The survey was filled out by parents and consisted of 20 short questions, that require an answer on a short rating scale

("Never" = 0, "Once or Twice" = 1, "Three or four times" = 2, and "Five or more times" = 3). All participant's parents rated some level of bullying experiences within the last year. Jason's parent reported the highest level of bullying, followed by Kassie, and then Caden. Jason's parent reported high ratings of him experiencing 50% of the bullying items listed on the survey 5 or more times per action in the last school year. Kassie's parent reported her experiencing 40% of the items once or twice within the last school year and Caden's parent reported him experiencing 20% of the items once or twice within the last school year. The highest rated items between all three participants were (a) being picked on by other children, (b) being laughed at, (c) being teased or made fun of by peers, and (d) being called names by peers.

Sessions were approximately 30 minutes in duration and conducted in a home or in a research laboratory room on the Southern Minnesota University campus. Sessions were held two to three days per week and took place in the aforementioned areas with two chairs and a table for the participant and the experimenter. During training, points were provided for correct responses. Correct responses were defined as responding with the correct answer upon first administration of the question. During testing, points were provided on a variable interval 90 s reinforcement schedule for attending and sitting appropriately, which were exchanged for gaining access to small prizes at the end of each session. Prizes consisted of small items such as bubbles, Play Dough, and other small candy items.

Apparatus and Stimulus Materials

Pretests, posttests, and instructional trial blocks were conducted on an automated Microsoft PowerPoint program on a Dell laptop computer using Visual Basic macros.

Target stimuli consisted of various bullying content concerning physical, verbal, and cyber bullying. Three, 4-member stimulus classes consisting of bullying type, definitions, video scenarios, and responses were used for each of the three bullying classes (see Table 1, Appendix A). Stimuli were identified with the following symbols for the bullying types: bullying type (A stimuli), definition of bullying type (B stimuli), video sample of bullying type (C stimuli), and an appropriate response to the bullying (D stimuli). Using a MTS format, the participants were shown a sample stimulus on the top of the screen and three comparison stimuli at the bottom of the screen (see Figure 1, Appendix B). The participants were instructed to click the screen of the laptop, as it was a touch screen computer. All sessions were recorded using a Sony HDR-CX405 video camera.

Dependent Measures

The primary dependent measure was the percentage of correct selection-based responses during all equivalence pretest and posttest probes. The second dependent measure was the percentage correct of selection-based responses during all mixed symmetry and transitivity posttest probes. A correct response consists of selecting one of the three comparison stimuli displayed on the computer screen depending on the sample presented. An incorrect response consists of an incorrect selection of one of the three comparison stimuli displayed on the computer screen dependent on the sample presented. The third dependent measure was the rating scale on the bullying response during *in-situ* generalization pretest and posttest probes. Percent correct out the three scenarios was calculated for each child to determine their understanding of the type of bullying and how to respond. For example, if a child is able to accurately describe what happened/what type of bullying and for finding an adult to tell within two minutes, they received 1 point.

If they were unable to do so, they received zero points. Percentage correct was calculated out of a score of three.

Interobserver Agreement and Procedural Integrity

Interobserver agreement (IOA) was conducted for 35% for all *in-situ* generalization probes by a second independent observer. IOA was calculated on a trial-by-trial basis by dividing agreements by agreements plus disagreements and multiply by 100 to convert into a percentage. IOA was 100% for all three participants. Procedural integrity (PI) was conducted for 35% of all MTS testing and training sessions. Examples of steps included in the PI checklist include: the proper relations PowerPoint was set up prior to participant sitting at the computer, research instructions were explained to participants prior to beginning, and points were provided on a 90s variable interval for sitting and attending appropriately. For MTS testing and training sessions, PI scores were 88% for Kassie (range 80%-100%), 94% for Caden (range 60%-100%), 97% for Jason (range 80%-100%). The average PI was 92% for all participants (range 60%-100%).

Experimental Design

A non-concurrent multiple-probe design across participants was implemented. All participants were placed into three *in-situ* generalization pretest probes. Participants were also given an 18-question equivalence pretest consisting of B-D and D-B relations. After responding to the equivalence pretest became stable, MTS instruction was implemented for intervention. Individual symmetry tests were administered to each participant after attaining criteria (100%) for each A-B, A-C, and A-D relation. Mixed symmetry (B-A, C-A, D-A), transitivity (B-C, D-C, C-B, C-D), and equivalence (B-D, D-B) posttests were then administered following criteria mastery in all symmetry tests. Following posttests,

all participants were tested on equivalence relations (B-D, D-B) and then placed in another set of *in-situ* generalization probes and rated on their responding.

Procedure

   ***In-situ* generalization pretest probe.** Participants were placed into three *in-situ* scenarios, one for each type of bullying, to assess for generalization. Before beginning each live scenario, a short instruction was given to the child (i.e. "We are going to take a break now, go ahead and play with the toys/computer"). Each scenario lasted no longer than 2 minutes or until the participant engages an adult to report the bullying. Each scenario consisted of one individual getting bullied by another (verbally, physically, or cyber), with the participant being a bystander to the bullying (see Table 2, Appendix A). During the generalization probe questions, participants were given verbal praise feedback for their correct responses. Following all of the *in-situ* probes, the participants were told that the situation was a skit and that no one was actually being bullied.

   Equivalence pretest probe. This test consisted of 18 trials that evaluated equivalence of all B-D and D-B relations presented in the study. Each relation was presented three times in a random order to test the participant's knowledge of equivalence relations. No feedback or consequences were provided to the participants during the pretest. Prior to beginning of all training and testing sessions throughout the study, these instructions were given:

   "Thank you for participating in this study. Today, you will be learning about different types of bullying. One box will be presented at the top of the screen, and three boxes will be presented below it for each question on the screen. You will be asked to choose one of the boxes at the bottom of the screen that you think

matches the same type of bullying with the box on the top of the screen. Click the start button to begin. Good luck!"

Training sessions and symmetry tests. Participants were taught A-B relations for each bullying type. This relation was then presented three times per training session at a random order (i.e., 9-trial block). Participants repeated each 9-trial block until they attained mastery criterion of 100% correct for each bullying type across two sessions. After attaining mastery criterion, participants were administered a symmetry test probe of the B-A relations for each bullying type. If they did not attain mastery criterion of 100% correct, they were instructed again on A-B relations and retested on B-A symmetry. After mastery of the B-A symmetry test probe, participants were given instruction on A-C symmetry relations, and then A-D symmetry relations. The same procedure was used during the other relations as used in the B-A symmetry tests. For correct responses, written feedback in the form of the word "Correct" was displayed on the computer screen. For incorrect responses, written feedback in the form of the phrase "Sorry! Try again" was displayed on the computer screen and the trial was repeated until they selected a correct response. A correct repeated trial was not counted as a correct response. Participants were provided a point for questions they answer correctly the first time.

A-B 0s prompt delay (Caden and Kassie only): A 0s prompt delay procedure was implemented during training of A-B relations only if the participant did not meet mastery criterion of 100% after 4-7 trial blocks of A-B training. Procedures consisted of the researcher reading the PowerPoint slide content to the participant and immediately prompting the participant to the correct response. This procedure was conducted for two 9-trial blocks in a row before

going back to a normal A-B training to provide participants the chance to meet mastery criterion.

A-B Error Correction (Caden and Kassie only). Error correction procedures were used during training of A-B relations if the participant still did not meet mastery criterion of 100% after completing at least two complete rounds of a 0s prompt delay procedure. Procedures consisted of the researcher reading the PowerPoint slide content to the participant and immediately prompting the participant to the correct response. After receiving feedback (i.e. "Good Job!" on the screen), participants were re-shown the previous slide and the correct response was restated to the participant (i.e. "Yes, cyber bullying is the use of a computer to send a mean message.") before moving on to the next trial. If participants chose an incorrect response, they were given feedback (i.e. "Try Again!" on the screen). Following feedback, they were returned back to the question slide and immediately prompted to the correct response. After viewing the "Good Job!" slide, participants were represented the question slide and the correct response was reinstated to the participant (i.e. "Yes, cyber bullying is the use of a computer to send a mean message.") before moving to the next question trial.

A-B Blocked Trial (Kassie only). If participants were still not meeting mastery criterion of 100% after the 0s prompt delay and error correction procedures, participants completed a blocked trial procedure (see Table 4). Step one consisted of a 15-trial block of each bullying type (i.e. five trials per each A1-B1, A2-B2, A3-B3; 15 trials total) with the correct responses highlighted and feedback given on correct answers (i.e., "Yes, cyber bullying is the use of a

computer to send a mean message to another person."). Participants had to meet
mastery criterion at 100% across three 5-trial blocks before moving on.
Participants then moved to step two and completed a 15-trial block with feedback,
but no highlight (i.e. five trials per A1-B1, A2-B2, A3-B3; 15 trials total). After
meeting mastery of step two, participants then moved to step three and completed
three 3-trial blocks with feedback until correct responding reached mastery
criteria (i.e., 100% across three 3-trial blocks) before moving onto step four of a
three 3-trial block with no feedback until mastery at 100% correct across three 3-
trial blocks. Once steps 1-4 of the blocked trial procedure were completed,
participants were placed back into a normal A-B training 9-trial block (step five)
until they met mastery criterion of 100% across two 9 trial blocks.

Mixed symmetry test. Participants were evaluated on the symmetry of B-A, C-A,
and D-A relations. Each relation was tested three times in random order. Mastery
criterion was 100% for all symmetry relations. No feedback or consequences were
provided during this test for correct and incorrect responding. Points were provided on a
VI 90 s reinforcement schedule for attending and sitting appropriately which were
exchanged for gaining access to prizes at the end of the session.

Transitivity test. Participants were evaluated on the transitive relations of B-C,
C-B, C-D, and D-C relations. Each relation was presented three times in random order.
This test consisted of a 36-trial block and was repeated until mastery criterion was met at
100%. No feedback or consequences were provided during this test for correct and
incorrect responding. Points were provided on a VI 90 s reinforcement schedule for

attending and sitting appropriately which were exchanged for gaining access to prizes at the end of the session.

Remedial Training. Remedial training was implemented if participants did not score 100% on the mixed symmetry or transitivity testing. Remedial training consisted of 9 trials of A-B, A-C, and A-D relations. Feedback and consequences were provided during this training. Remedial training was repeated if 100% mastery was not attained.

Equivalence posttest. The posttest was administered the same way as the equivalence pretest B-D and D-B relations to test equivalence. This test was repeated until mastery criterion was met at 100%. No feedback or consequences were provided during this test for correct and incorrect responding. Points were provided on a VI 90 s reinforcement schedule for attending and sitting appropriately which were exchanged for gaining access to prizes at the end of the session. Similar instructions to the pretest were given for the posttest.

***In-situ* generalization posttest probe.** Participants were placed into three *in-situ* generalization posttest probes, one for each version of bullying, to assess for generalization. Before beginning each live scenario, a short instruction was given to the child (i.e. "We are going to take a break now, go ahead and play with the toys/computer"). Each scenario lasted no more than 2 minutes or until the participant engaged an adult and reported the bullying. Each scenario consisted of one individual getting bullied by another (verbally, physically, or cyber), with the participant being a bystander to the bullying (see Table 2, Appendix A). During the generalization probes, participants will be given verbal praise feedback for their correct responses. Following all

of the scenarios, the participants were told that the situation was a skit and that no one was actually being bullied.

        In-situ **generalization training.** If participants did not respond to the bullying situation after two rounds of all three probes, they received *in-situ* training with a verbal prompt (i.e. "It looks like someone was bullied in here, what do we do when someone is getting bullied?"). Participants were then placed into the next bullying scenario to check for correct responding. Participants were placed into all three bullying probes until they correctly responded to the bullying and told an adult for all three probes consecutively.

        Follow-up. A follow-up/maintenance probe was conducted at two weeks for Jason and Caden, and three weeks for Kassie (due to availability). During the follow-up, participants completed one testing of the equivalence (B-D, D-B) relations. No feedback or consequences were provided to the participant during the testing. Points were provided on a VI 90s reinforcement schedule and could be turned in at the end of the follow-up for small prizes. Following equivalence testing, participants were placed again into three *in-situ* probes to test the maintenance of the skills they had learned. *In-situ* probes during the follow-up were ran the same way as the other *in-situ* generalization probes previously done in the study.

Results

        All participant pretest and posttest scores are showed in Figure 3. Table 3 represents the total number of instruction trial blocks it took for all participants to meet criteria for all B-A, C-A, D-A symmetry tests.

Equivalence Pretest Probes

Caden's average score on the equivalence pretest probes was 44.3%, with scores ranging between 38% to 50% across three equivalence pretest probes. Kassie's average score on the equivalence pretest probes was 29.3%, with scores ranging between 28% to 33% across four equivalence pretest probes. Jason's average score on the equivalence pretest probes was 37.4%, with scores ranging between 29% to 47% across five equivalence pretest probes. Slides were read aloud to all participants, as they all verbally asked for help reading the content.

Symmetry Test Probes

Caden symmetry probe results. Caden attained mastery criteria for B-A symmetry training after 14 A-B trial blocks (range 22%-100%). Caden needed both the 0s prompt delay (four 9-trial blocks) and error correction procedures (two 9-trial blocks) during A-B training before meeting the mastery criterion. Mastery for C-A relations was met after eight A-C trial-blocks. Mastery for D-A relations was met after three A-C trial blocks (see Table 3 for complete trial numbers).

Kassie symmetry probe results. Kassie took the longest to master the A-B relation trial block at 47 total trial blocks (range 22%-100%). Kassie attained mastery criterion for B-A symmetry trial blocks (range 88%-100%) after being placed into all three of the previously mentioned training modifications (i.e. 0s prompt delay, error correction, and blocked trial procedures). After seven A-B training trial blocks under 50%, a 0s prompt delay procedure was implemented for two 9-trial blocks before Kassie was placed back into a normal A-B trial block. After three 0s prompt delay sessions (six 9-trial blocks), responding was still under 50% and so Kassie was placed into an error correction procedure for three 9-trial blocks. Kassie's percent of correct responding increased to

55%, but then decreased again. Therefore, she was placed into a blocked trial procedure. The first blocked trial procedure (step one) was implemented in two 15-trial blocks which consisted of presenting each A1-B1, A2-B2, and A3-B3 five times consecutively without having to meet mastery before moving on to the next step. Kassie completed two 5-trial blocks with highlight and feedback (step one) at 100%, followed by two 5-trial blocks with only feedback (step two) at 66% and 77%, followed by two 3-trial blocks with feedback (step three) at 55% and 33% correct. The blocked trial procedure was reintroduced but waited for Kassie's correct responding to meet mastery criteria of 100% across three consecutive trial blocks before progressing to the next blocked trial (see Table 4)).

After reintroducing the blocked trial procedure, Kassie met mastery criteria of step one at three 5- trial blocks with highlight and feedback. She met mastery of step two at eight 5 trial-blocks with feedback only. Kassie then met mastery of step three after five 3-trial blocks with feedback. Kassie then met mastery of step four after three 3-trial blocks with no highlight or feedback. She then met mastery of step five after two 9-trial blocks of regular A-B trial block (see Table 3). Kassie met mastery for C-A relations after six trial blocks of A-C relations (range 88%-100%) and one trial block of C-A relations (range 88%-100%). Mastery was met for D-A relations after seven trial blocks of A-D relations (range 88%-100%) and one trial block of D-A relations (ranging 88%-100%).

Jason symmetry probe results. Jason was the quickest participant to meet mastery of B-A relations with only eight A-B trial blocks (range 11%-100%). Mastery criteria was met for C-A relations after two trial blocks of A-C relations at 100%. Mastery

criteria for D-A relations was additionally met after two trial blocks of A-D relations at 100%. No modifications to his training procedures were needed for him to master out of symmetry relation probes (see Table 3 for complete trial block numbers).

Mixed Symmetry, Transitivity, and Equivalence Post-test Results

Caden results. Caden's mean percentage correct for all mixed symmetry, transitivity, and equivalence posttests were 78.4%, 100%, 100%, respectively. Caden met mastery criteria for mixed symmetry probes after nine mixed symmetry trial blocks (range 59%-100%). Remedial training was implemented three times during mixed symmetry testing when responding would fall below a previously higher score. Specifically, remedial training was implemented after his initial administration, after his sixth administration, and after his eighth administration due to a drop in correct responding from the previous trial block. Mastery for transitivity was met immediately with only one transitivity trial block implemented. Mastery for equivalence post-test probes were met after scoring 100% across three trial blocks of equivalence testing.

Kassie results. Kassie's mean percentage correct for all mixed symmetry, transitivity, and equivalence posttests were 100%, 97%, 98.5% respectively. She met criteria for mixed symmetry after the first administration and met criteria for transitivity after two trial blocks. Kassie met criteria of 100% across three consecutive trial blocks of post-equivalence probes after four trial blocks.

Jason's results. Jason's mean percentage correct for all mixed symmetry, transitivity, and equivalence posttests were 90.2%, 100%, 83.5% respectively. Jason met mastery criteria for mixed symmetry after four trial blocks of mixed symmetry probes and two trial blocks of remedial training when responding would fall lower than a

previously attained score. Specifically, remedial training was implemented after his initial administration and third administration of mixed symmetry due to a drop in responding percentage from the previous trial block. Mastery for transitivity was met immediately at 100%. Jason then met mastery of 100% across three consecutive trial blocks for equivalence posttest probes after four trial-blocks.

In-Situ Posttest Probe Results

Caden's results. Caden attained mastery criterion of 100% (3/3 scenarios) across one *in-situ* generalization probe after four in-situ probes (range 0%-100%). During the first two probes of *in-situ*, the participant did not respond to any of the bullying scenarios in two minutes. *In-situ* training was implemented, after two trial blocks of no responding, for cyber bullying. After receiving *in-situ* training for the cyber bullying condition, Caden was able to successfully respond to the bullying scenario in less than two minutes for the remaining physical and verbal bullying scenarios. Caden then met mastery criteria for *in-situ* posttest probes (i.e. scored 100% across each bullying type consecutively).

Kassie's results. Kassie attained mastery criterion of 100% (3/3 scenarios) across one *in-situ* generalization probe after four in-situ probes (range 0%-100%). During the first two probes of *in-situ*, the participant did not respond to any of the bullying scenario in two minutes. *In-situ* training was implemented after two trial blocks of no responding for cyber bullying and verbal bullying scenarios. After receiving in-situ training for those two conditions, Kassie was able to successfully respond to the bullying scenario in less than two minutes for the remaining physical bullying scenario and then meet mastery criteria for *in-situ* posttest probes.

Jason's results. Jason attained mastery criterion of 100% (3/3 scenarios) across one *in-situ* generalization probe after two in-situ probes. However, unplanned feedback was given to Jason after his first cyber bullying scenario (i.e. researchers told Jason that when we see that someone is bullied, we need to go tell an adult"). Jason was able to correctly respond to the bullying scenarios for verbal and physical bullying trials after receiving feedback. He then met mastery criteria for the next administered *in-situ* posttest probe.

Follow-Up Results

At the two-week follow up, all participants scored 100% correct on equivalence relations (BD-DB) and 100% for responding appropriately to *in-situ* probes. Both participants responded correctly to the *in-situ* probes by finding an adult (i.e. the researcher) and reporting the bullying for all three types of bullying taught.

Discussion

Stimulus Equivalence Paradigm

The MTS instruction and stimulus equivalence protocols were shown to be effective in establishing derived stimulus relations for Caden, Kassie, and Jason by the end of the study. All participants attained mastery criteria of all symmetry, mixed symmetry, transitivity, equivalence posttests, and *in-situ* probes. A variety of training modifications (0s prompt delay, error correction, and blocked trial procedures) were necessary for Caden and Kassie to meet mastery criteria for B-A symmetry relation probes. Jason did not need any training modifications to reach mastery criteria for symmetry probes. At least two sessions of remedial training were necessary for Jason and Caden to meet mastery criteria for mixed symmetry relations. Kassie met mastery criteria

for mixed symmetry without remedial training. Caden and Jason met mastery criteria for transitivity relations at the first administration, however Kassie needed two attempts before meeting mastery criteria. Jason and Kassie met mastery criteria for equivalence posttest after four trial-blocks. Caden met mastery criteria for equivalence posttest at the first three administrations. *In-situ* training or feedback was necessary for all participants to reach mastery criteria for *in-situ* posttest probes. Follow-up results show good maintenance of skills at the two-week period, with all participants meeting mastery criteria for equivalence relations and *in-situ* probes upon the first administration.

The previously mentioned results add to the literature on stimulus equivalence success in teaching various skills to typically developing school-aged children (Aguirre & Rehfeldt, 2015; Carp & Petursdottir, 2015; Melchiori, 2000; Pérez-González, Herszilkowicz, & Williams, 2008; Ramirez & Rehfeldt, 2009). The aforementioned studies utilized stimulus equivalence to teach academic skills (i.e. vocabulary, math, literacy) and found great success in using MTS protocols to increase the amount of derived relational responding in participants. Pérez-González, Herszlikowicz, & Williams (2008) noted that "studies of stimulus equivalence and stimulus relations have shown that when typically developing human beings are taught a few stimulus-stimulus relations, other non-taught stimulus-stimulus relations typically emerge" (p. 96). The current study extends these findings and found success in using stimulus equivalence and MTS protocols to increase the amount of derived relational responding from pre-test to follow-up in school-aged children.

Within the literature, very few studies have been conducted examining the use of stimulus equivalence protocols to teach social skills. Guercio, Podolska-Schroeder, and

Rehfeldt (2003) has been noted as one of the few studies using stimulus equivalence protocols to teach a complex social skill. Within this study, MTS procedures were used to teach adult participants diagnosed with traumatic brain injury to identify basic emotions using various facial structure pictures. The results of this study show success in using stimulus equivalence protocols and MTS protocols to teach individuals diagnosed with traumatic brain injury to recognize facial expressions and linked emotions from pre-test to post-test. The current results then add to the literature that stimulus equivalence protocols can be effective in teaching complex social skills, like facial recognition and bullying identification and responding, to a variety of individuals.

Within the current study, participants took the longest to attain mastery criteria for the B-A (bullying type-definition) symmetry probe. This result was similar to results in the previously mentioned study conducted by Aguirre and Rehfeldt (2015). Due to A-B relations consisting of more words within each sample and comparison stimuli and it being a novel teaching procedure, this may be the reason that participants have been found to take the longest to reach mastery criteria. For the current study, two of the participants (Kassie and Caden) were unable to read all of the words fluently on the MTS slides, which could have additionally attributed to the increase in A-B trial blocks needed to meet mastery criteria. Training modifications (0s prompt delay, error correction, and blocked trial procedures) were necessary for Kassie and Caden to reach mastery criteria of A-B symmetry relations, which could be attributed to their inability to fluently read all words presented on the MTS training and testing slides.

Behavioral Interventions for Bullying

According to Newman-Carlson and Horne (2004), bullying behavior is considered one of the most widely practiced forms of aggressive behavior. With students spending a majority of their childhood and adolescence in the school system, where many bullying behaviors are seen, it is important to determine effective strategies and tools that can be utilized to teach bullying identification and responding to school-aged children. The present study shows the effectiveness of utilizing a behavioral intervention to teach bullying identification and responding skills, such as previously conducted behavioral interventions (Frey et al., 2005; Ross & Horner, 2009; Stannis et al., 2018). Participants in the current study showed the ability to identify and responding to various bullying types from pretest to posttest *in-situ* probes, with maintenance of skills occurring at the follow-up. Within the in-situ training conducted by Stannis et al. (2018) researchers modeled the correct response, instructed the participant to practice the correct response, and then provided praise and corrective feedback. They found similar results as the current study in that *in-situ* training aided in the success of students to identify and respond to bullying scenarios. Much like the current study, participants also showed maintenance of bullying identification and responding skills during follow-up probes (Stannis et al., 2018).

Limitations and Future Directions

One limitation to the current study included the reading fluency of two of the participants. Prior to the study starting, fluency for reading the MTS slides was not assessed. All participants showed the ability to read a majority of the words prior to starting. However, Kassie and Caden were unable to fluently read all the words on the MTS slides, resulting in the researcher to read aloud each MTS training and testing

PowerPoint slide. Kassie and Caden took the longest to meet mastery criteria for A-B relations, which may be attributed to the fluency issue. Additionally, due to the researcher reading aloud all slides, it may have been more effective to audio record all of the slides to create more consistency within the study.

Another limitation to note, was the unplanned feedback given to Jason during his post-in-situ probes. After his first cyber bullying probe, with no response, the researcher provided feedback in the manner of "when someone gets bullied, we need to tell an adult". Following the feedback, Jason was able to respond to each bullying scenario and report it to the researcher. It should be noted that during this probe, Jason reported the bullying to the adult confederate who had gotten bullied. With adult confederates being used, it may have been confusing on who he should be reporting the bullying to. In relation, utilizing adult confederates instead of child-aged confederates could have resulted in the in-situ probes being artificial. Additionally, throughout the study, participants were taught how to respond to bullying when they are individually bullied and not how to respond as a bystander. Which adds another limitation because participants experienced bullying scenarios as bystanders during in-situ probes. Bullying researchers, then, must continue to find appropriate ways to present bullying identification and responding to children without causing harm. Additionally, there remains a need for researchers to investigate if stimulus equivalence is actually more effective and efficient than other behavioral skills training protocols, like those utilized by Stannis et al. (2018). Future researchers should additionally examine the long-term maintenance of skills to determine if children are increasing their bullying reports following the study. In relation, distributing *Chen & Schwartz (2012) Bullying Survey*

(see Appendix C) at a six-month or one-year follow-up would allow future researchers to further measure maintenance. Lastly, examining the social validity of utilizing stimulus equivalence protocols with children, in comparison to other interventions, is another good direction for future research.

In conclusion, this study is one of few that has utilized a stimulus equivalence protocol to teach complex social skills and one of the first to use it in teaching bullying identification and responding to school-aged children. The results of the current study present that stimulus equivalence and behavioral interventions can be effective and efficient in teaching social skills to typically developed children. With such a large percentage of school-aged children experiencing bullying (Centers for Disease Control and Prevention, 2017; Modecki, Minchin, Harbaugh, Guerra, and Runions, 2014; Nansel et al., 2001), future research should then continue to examine the effectiveness of utilizing stimulus equivalence and other behavioral interventions to teach children various social skills that may be important for functional development.

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Appendix A: Study Tables

Table 1

Equivalence training sets and scenarios

	Set 1	Set 2	Set 3
A	Verbal Bullying	Physical Bullying	Cyber Bullying
	Definition of VB	Definition of PB	Definition of CB
B	The use of words in a negative way to hurt someone else's feelings.	The use of one's body to hurt another person.	The use of a computer to send a mean message to another person.
	Video of VB	Video of PB	Video of CB
C	Two girls are coloring together during recess. The bully turns to the victim and says, "Hey loser, your picture s ugly." And proceeds to laugh at her.	While standing in the lunch line, a group of kids comes up to another girl and starts poking her in the back. When the one girl doesn't respond to the poking. They escalate the situation and push the girl onto the ground.	A boy is online playing games on his parent's computer. While he is playing games, a message pops up on her computer from another girl at school. The message says, "You smell bad and no one wants to play with you."
	VB Response	PB Response	CB Response
D	Say, "Please don't call me that." And go tell an adult.	Say, "Ouch, please don't do that, it hurts." And go tell an adult.	Don't respond to the message and tell an adult that someone was being mean to you online.

Table 2

In-situ generalizations and instruction

Type of Bullying	Live Generalization	Instruction prior
Verbal Bullying	While playing, the participant sees another group of individuals playing together. One of the individuals calls the other individual a name and continues to be mean to him. Participant is a bystander.	"Okay, we are going to take a break now. Go ahead and go play with the toys."
Physical Bullying	While playing, the participant sees another group of individuals playing together. One of the individuals pushes the other and *softly* hits the other individual. Participant is a bystander.	"Okay, we are going to take a break now. Go ahead and go play with the toys."
Cyber Bullying	Participant is instructed to play on computer with confederate individual. While playing, the confederate notices a message that was sent to him/her and points it out to the participant. Participant is a bystander.	"Okay, we are going to take a break now. Go ahead and play with *confederate individual* on the computer."

Table 3

Number of instructional trial blocks to criterion for participants.

Participant	A-B	A-C	A-D
Caden	14	8	3
Kassie	47	6	7
Jason	8	2	2

Table 4

Explanation of A-B blocked trial procedure

|	Name	Description	Total trials
Step 1	5-trial block with feedback and highlight	A1-B1 (5 trials) A2-B2(5 trials) A3-B3 (5 trials)	15 trials
Step 2	5-trial block with feedback	A1-B1 (5 trials) A2-B2(5 trials) A3-B3 (5 trials)	15 trials
Step 3	3-trial block with feedback	A1-B1 (3 trials) A2-B2(3 trials) A3-B3 (3 trials)	9 trials
Step 4	3-trial block with No feedback	A1-B1 (3 trials) A2-B2(3 trials) A3-B3 (3 trials)	9 trials
Step 5	Regular A-B trial block	*Randomly assorted* A1-B1 (3 trials) A2-B2(3 trials) A3-B3 (3 trials)	9 trials

Appendix B: Study Figures
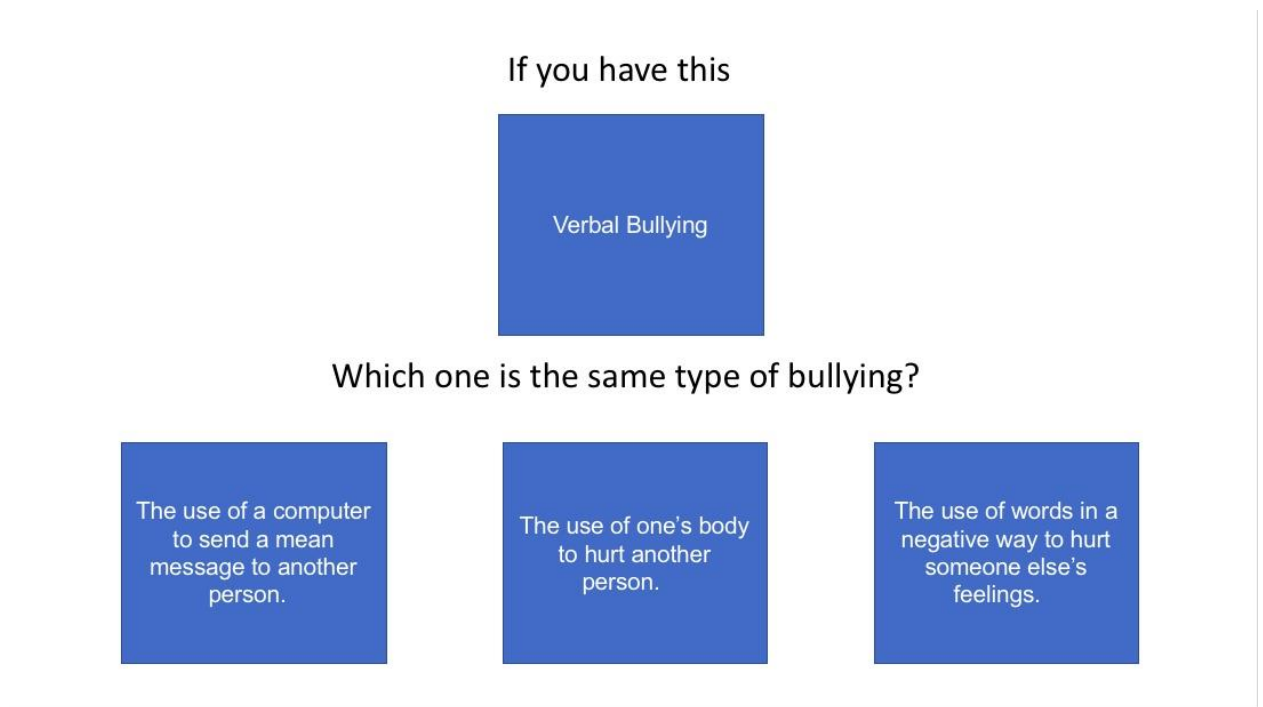
Figure 1. A sample of the matching-to-sample procedure that was used for the current study.
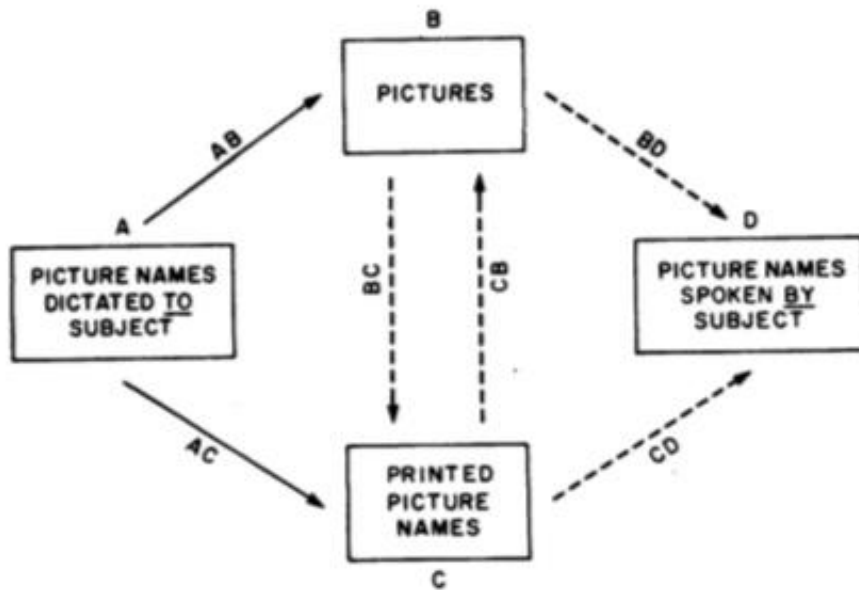
Figure 2. Sidman & Tailby's (1982) example of a basic equivalence paradigm. "Boxes A,

B, and C represent stimuli, and Box D represents oral naming responses. Arrows point

from sample to comparison stimuli and represent sets of conditional relations. Solid

arrows represent conditional relations that are explicitly taught to the subjects. Broken

arrows represent conditional or oral naming relations that emerge after others have been
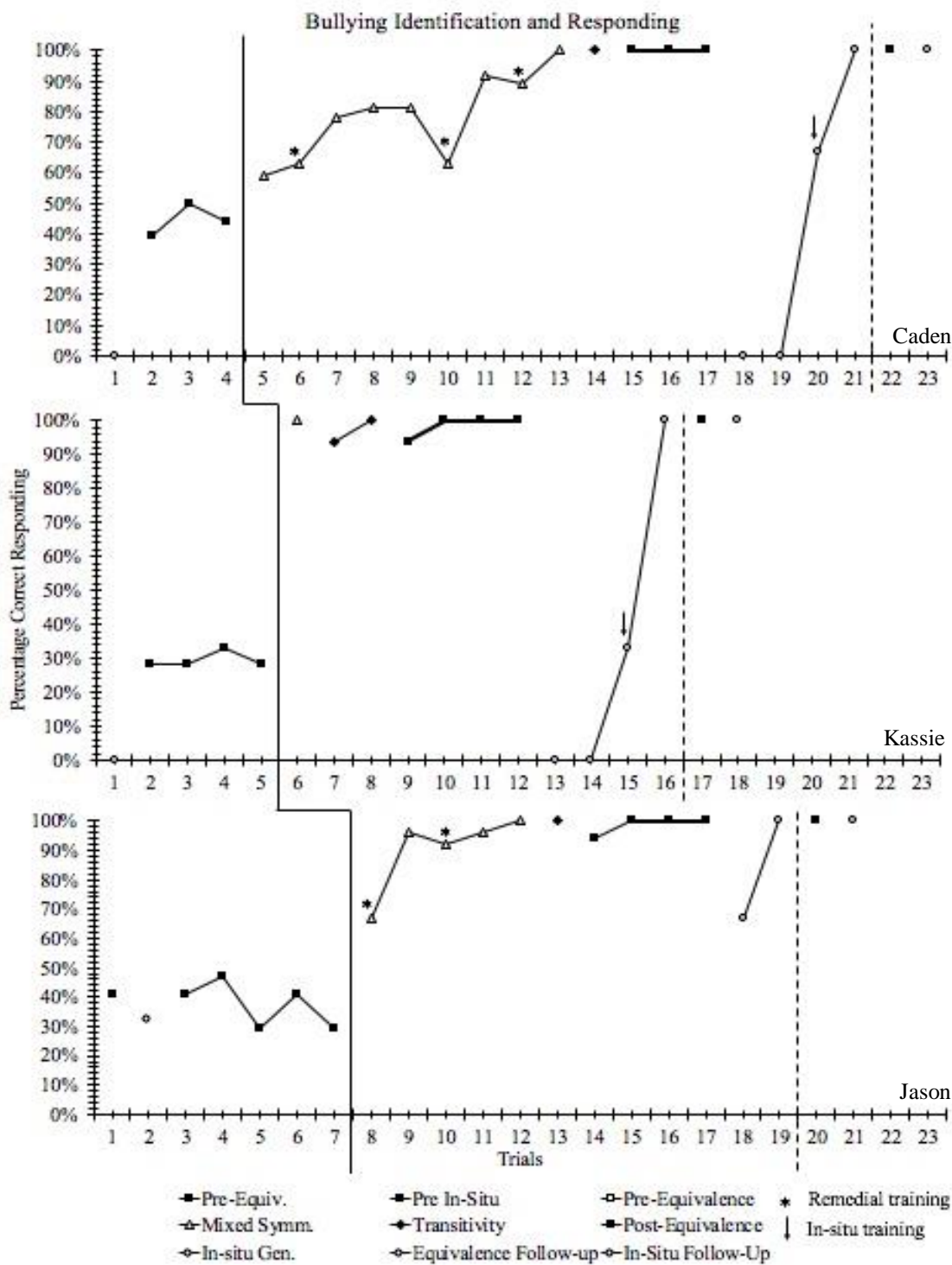
explicitly taught (p. 7)."

**F*igure 3.* Percentage of correct responding for in-situ generalization pretest probes, equivalence pretests, mixed symmetry, transitivity, equivalence posttests, in-situ generalization posttest probes, and follow up testing.

Appendix C: Bullying Survey

Parent Version Bullying Survey

	Never	Once or twice	Three or four times	Five or more times
In this school year, my child has experienced the following:				
1. Being picked on by other children	0	1	2	3
2. Being excluded from groups	0	1	2	3
3. Being laughed at	0	1	2	3
4. Being hit or kicked by other children	0	1	2	3
5. Being threaten with physical harm	0	1	2	3
6. Being teased or made fun of by peers	0	1	2	3
7. Being called names by peers	0	1	2	3
8. Having peers who say negatives things about him or her to other children	0	1	2	3
9. Having personal property destroyed /stolen	0	1	2	3
10. Having rumors spread about him or her	0	1	2	3

Note. This survey is adapted from Chen and Schwartz's (2012) *Bullying Survey for ASD*