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Teaching Children to Tact Their Emotions as a Replacement for Problem Behavior

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by

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Abstract

Title: Teaching Children to Tact Their Emotions as a Replacement for Problem Behavior

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Private events are stimuli and behaviors that occur within one's own skin and are only observable to the person experiencing them. Children diagnosed with autism spectrum disorder (ASD) have difficulty describing their private events, which can lead to difficulty in communicating and bouts of problem behavior. It is important for children diagnosed with ASD to learn to tact private events, such as emotions, to effectively communicate how they are feeling. A popular parenting practice is to teach children to tact their emotions during naturally occurring, teachable moments when they are demonstrating those emotional responses. This study looked to examine the effects of a teaching package designed to teach children to tact their negative emotions while experiencing them. The purpose of the current investigation was twofold. The first purpose was to examine the effects of contriving establishing operations on tacting one's own emotions. The second purpose was to examine the potential collateral effects on problem behavior as the tact repertoire increased. Children with problem behavior maintained by access to tangibles, as determined through a functional analysis, participated in this study.

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Acknowledgement

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Dedication

I dedicate this thesis to my parents, Salvatore and Nancy Nastri as well as my oldest brother, Vinny. Thank you for your continued support throughout this journey.

Introduction

As of 2014, 1 in 59 children were being diagnosed with autism spectrum disorder (ASD; Baio et al., 2016). The Centers for Disease Control and Prevention (CDC) defined autism spectrum disorder (ASD) as "a developmental disability that can cause significant social, communication and behavioral challenges" (2017). Some signs associated with ASD include difficulty understanding other people's feelings, difficulty talking about one's own feelings, difficulty expressing one's needs using words or gestures, and a loss of previously learned skills.

The most well-supported treatment for autism in the research literature is Early Intensive Behavioral Intervention (EIBI), which is derived from the science of applied behavior analysis. EIBI has been demonstrated to be effective at reducing unwanted behaviors and increasing desired behaviors among children with autism, helping up to 47% of recipients achieve normal functioning (Peters-Scheffer, Didden, Korzilius, & Sturmey, 2011). A primary focus of EIBI programs is on the development of language (Sundberg & Partington, 1998). One important language skill is the ability to tact (i.e., label) "private events." According to B. F. Skinner, *private events* are behaviors or stimuli that can only be observed by the person who is experiencing them (1957, p. 130). Examples of private events are thoughts, emotions, and sensations. It is an important skill for all children, typically developing or diagnosed with a developmental disability, to

be able to talk about private events. If a child is in pain or feeling sick, the only person who can observe that sensation is the child who is feeling it. Another person would only know what the child is feeling if there was also some public event that typically co-occurs with unpleasant sensations, such as wincing or gripping the stomach. Similarly, if a child was feeling sad, no one but the child would be able to observe the feeling of sadness. However, another person could infer that the child was feeling sad by observing public events, such as crying, or repeatedly asking for an item.

One reason it may be important to teach children to tact their private events is to help offset the occurrence of problem behavior. Popular parenting sources advise parents to deal with tantrums by labeling the child's emotion and making empathy statements (e.g., "I'm sorry you're feeling frustrated"). The rationale behind this strategy is the notion that tantrums are a form of communication; teaching children to label their emotions will eventually replace problem behavior because they can communicate their feelings with words instead of tantrums (Petters, 2008). There is some preliminary support for this hypothesis in the research literature. Correlational studies in the developmental psychology literature have found that children who are able to recognize and interpret emotions are less likely to engage in tantrums and have better social behavior (Izard, Fine, Schultz, Mostow, Ackerman & Youngstrom, 2001; Giesbrecht, Miller & Mueller, 2010). In the behavioral science literature, problem

behavior is often able to be reduced by reinforcing communicative responses (Sundberg & Partington, 1998).

While it is clearly important for children to be able to talk about what is going on inside them, it is a challenging skill to learn, as evidenced by the difficulty of describing painful sensations as “throbbing,” “sharp” and so on.

Skinner states that there are two problems with the privacy of such events. First, it is difficult to analyze the behavior because the investigator cannot readily point to the stimuli to which he must appeal to be able to predict and control behavior. The second problem is that the contingencies which establish verbal behavior under the control of private stimuli are defective. In order to teach the tact, the verbal community characteristically reinforces a response in the presence of a given stimulus. This is only done if the stimulus acts upon the speaker and reinforcing community. Private events do not satisfy those conditions (Skinner, 1957, p. 130-131).

Learning to Tact Private Events

Skinner proposed that there are four ways in which a reinforcing community that has no access to private events may generate verbal behavior about it (Skinner 1957, p. 131). The first is "public accompaniment." Public accompaniment occurs when an observable public stimulus accompanies a private event. For example, a person experiencing a painful sensation (private event) presents with a public event (such as a bruise). The public accompaniment helps a

second person identify that the individual is in pain. The second observer may point to the bruise and say something like, "Ow, that looks like it hurts."

The second way children can learn to tact private events is called "collateral events." This occurs when the person engages in a collateral behavior, such as rubbing one's head (public behavior) when a private stimulus is present (e.g., a headache). The second observer has a history of rubbing his or her own head in the presence of a headache and is thus able to surmise that the individual has a headache. They may say something such as, "Do you have a headache?" The child then repeats the word, "headache" and the second observer provides some form of reinforcement for the child's response, such as making an empathy statement.

The third method is "common properties," wherein private stimuli share some of the features of non-related public stimuli. For example, the individual may use a metaphor to a known event (e.g., "falling asleep") to describe a private sensation (e.g., a tingly sensation) and utter the sentence, "My leg fell asleep."

The last way in which individuals can come to describe private events is "response reduction." Response reduction occurs when a response is learned under public conditions and is later transferred to private conditions (Sundberg & Partington 1998. p. 227). For example, when we teach a child to read we begin by teaching them to read aloud and point to the words as they read them. As the child gets older and the skill of reading strengthens, pointing to the words as they read

will fade until the child is only reading aloud. As this repertoire begins to strengthen, the child will start to read aloud at a lower volume until eventually, the child is reading silently.

Translational Research on Tacting Private Events

The study conducted by Stocco, Thompson & Hart (2014) developed an experimental analogue to study variables influencing tacting of private events. They also sought to further understand the conditions that might bring tacts under the control of private events and to identify variables that distort reports of such events. The participants in this study were undergraduate students. A symbol was printed on one side of each card in the deck. The symbols were considered analogous to private events because they were observed only by the participants in sessions. Images were printed on the opposite side, and these images were considered analogous to public accompaniments. Each symbol was assigned a designated nonsense syllable prior to the start of sessions; these symbols were analogous to private evens because only the participants observed the stimuli. Each symbol was assigned a nonsense syllable prior to each session. These syllables were considered to be the tact of the private event. Experiment 1 investigated the influence of different contingencies of reinforcement across sessions involving strong and weak public-private correspondence. These degrees of correspondence were chosen because it is unlikely that all public-private relations are perfectly correlated, and the strength of those relations are likely to

vary. The results of experiment 1 suggested the possibility of private events acquiring stimulus control of tacting. Across manipulations of contingencies and public-private correspondence, the participant's verbal reports came under the control of symbols accessible only to the participants. Experiment 2 was conducted to investigate potential audience control of tacts of private events. To assess audience control, the authors calculated the difference in reports by taking the absolute value of the difference between the dominant report for each symbol in session with experimenter 1 and the number of those same reports given the same symbol in sessions with experimenter 2. In experiment 3, they manipulated the complexity of the public-private arrangement to explore some conditions under which tacting might be controlled by public versus private stimuli. They considered this to be complex because a private symbol was not presented with the same public accompaniment more than once within a session. Sessions in experiment 3 were arranged similarly to experiment 1. The results might inform practical advice for parents teaching their children to talk about private sensations or feelings. For example, when a child reports that they're feeling sick, parents should consider identifying a highly correlated public accompaniment to inform their consequence delivery.

Teaching Emotions to Children with ASD

Tacting Emotions. There are few published studies that investigated teaching children with autism to tact private events. Studies thus far have

primarily focused on teaching children to tact pictures or videos representing showing facial expressions or situations that thought to be correlated with specific emotions.

McHugh, Bobarnac, and Reed (2011) taught children diagnosed with ASD to tact situation-based emotions. They also aimed to increase the likelihood that the participants would learn a generalized repertoire by using multiple exemplars of emotions during identification training using a multi-component procedure. Three 5-year old male participants were included in this study, each meeting the diagnostic criteria for ASD. A multiple baseline design was used across four situation-based emotions. During baseline, twelve different video stories were shown to the participants. Each video showed a scenario with a puppet emitting one of four emotions (happy, sad, angry and afraid). After viewing the video, the child was given an opportunity to respond to the following: "How will ____ feel when ____?" During training, the instruction was the same as baseline except the instructor would use a vocal model prompt to help the child make the correct response. Massed trials were used until mastery was met and then new targets were introduced. Generalization and maintenance were assessed, and all participants were able to maintain the skill and generalize to novel people. The results of this study verified that children with ASD can be taught to tact emotions thought to correspond to specific scenarios, which then generalize to untrained scenarios.

A study with a similar dependent variable was conducted by Conallen and Reed (2016). They explored a teaching procedure to enable ten 6 –10-year-old children with autism to label the emotions of others. All children communicated using a picture symbol system and had some manual signs in their repertoires. A multiple baseline design was used followed by generalization probes to assess the effectiveness of the procedure across novel settings. Throughout baseline, each participant was presented with 20 trials. During each trial, three situation cards were placed on the table. Situation cards consisted of a simple drawing of a context that could be labeled as producing one of the three emotions being assessed. The participant was given one emotion card and asked to place it with the corresponding situation card. The emotion cards had pictures of a child's face with each of the emotions (happy, sad, or angry). Prompted matching-to-sample was the first teaching phase, where the therapist would tell the participant which emotion card corresponded with one of the three situation cards. During the prompted matching, a gestural and verbal prompt was given to the participants to evoke the correct response. During the next phase, independent match-to-sample, the therapist no longer provided the verbal-gestural prompt. The tacting phase was the next phase implemented. Cards were given depicting non-emotions along with emotion cards and situation cards. The participants were asked to tact the private event represented by the situation card by presenting the emotion card that

matched the situation card. Overall results show that it was possible to teach children with ASD the tacts for emotions in others.

Related skills. Shrandt, Townsend, and Poulson (2009) conducted a study to examine whether procedures previously used to teach other social skills could be extended to teaching empathy skills to children with autism. The purpose of their study was to assess the extent to which a treatment package consisting of the presentation of affective discriminative stimulus compounds, prompt delay, modeling through auditory scripts, manual prompts, behavioral rehearsals, and reinforcement was effective in teaching empathy skills in a pretend play setting. Four children with autism were taught to respond to emotional stimuli containing motor and vocal components, called "affective discriminative stimulus compounds." They were presented in brief vignettes in which the instructor would hold up a doll and pretend to make it say a statement paired with an action (making it bump the table and saying "ouch"). The vignettes fell into three categories: sadness or pain, happiness or excitement, and frustration. The authors operationally defined empathy as a contextually appropriate response to a display of affect by a doll, puppet or person. The authors measured the empathy statements emitted by the participants when presented with the training stimuli and generalization stimuli. A multiple baseline design across participants was used to assess the extent to which the treatment package was effective in teaching empathetic responding to displays of sadness or pain. For one participant, a

multiple baseline across response categories was used to assess the extent to which the treatment package was effective in teaching empathetic responding across three categories. Training sessions consisted of 30 trials presented in random order. Because empathetic responding to displays of sadness or pain increased systematically with the introduction of treatment across all participants, the authors concluded that the treatment was effective.

Behavioral Approach to Reducing Problem Behavior

While there has been research on teaching children with ASD to tact other's emotions, there is little to no research on teaching children with ASD to tact their *own* emotions. Many of these individuals exhibit problem behavior due to the inability to communicate. A 2003 review of the functional analysis literature found that 82% of published functional analyses identified a social function for problem behavior (Hanley, 2003). Moreover, one of the most common and effective interventions for reducing problem behavior is Functional Communication Training (FCT; Carr & Durand, 1985; Tiger, Hanley & Bruzek, 2008). FCT is a procedure in which the reinforcer for a problem behavior is first identified. A communicative response (e.g., asking for a break, pressing a button to get someone's attention) is prompted and reinforced while the problem behavior is placed on extinction (i.e., the functional reinforcer is withheld contingent on problem behavior).

One notable difference between the FCT approach and the tacting emotions approach is that FCT is designed to teach individuals to ask for what they want (e.g., attention from a caregiver, a break from a task). In other words, there is an *establishing operation* (motivation) for the specific reinforcer that is produced by the problem behavior. An establishing operation serves to increase the momentary likelihood that a behavior will occur and increases the momentary value of the consequence for that behavior (Michael, 1993). In the tacting emotions approach, a communicative response is taught, but the response would not necessarily help the child get what he or she wanted. One notable exception would be if the child were engaging in problem behavior to get attention. Prompting an emotion tact and making an empathy statement are forms of attention and therefore this intervention may be contraindicated for individuals for whom attention functions as a reinforcer.

When working in a clinical setting, problem behavior often arises when children are denied access to a preferred tangible item, or it is time to be done playing with it. If problem behavior occurred in these instances, extinction would involve disallowing the child to access the item that evoked the problem behavior. A functionally equivalent alternative response should result in access to the same reinforcement produced by the problem behavior; specifically, the child should ask for the item. However, it is not always possible to give children the items they ask for (e.g., battery died on iPad, out of ice cream). Even when the preferred item

is available, it may not be desirable to let the child have it because it could interfere with other activities, such as instruction, participating in circle time, or playing with peers.

Researchers have attempted to address this problem by examining the utility of reinforcement schedule thinning (Hagopian, Boelter & Jarmolowicz, 2011), providing alternative reinforcement (Rooker, Jessel, Kurtz & Hagopian, 2013) and delay and denial tolerance training (Ghaemmaghami, Hanley, & Jessel, 2016). For example, Ghaemmaghami, Hanley, & Jessel (2016) evaluated the direct effect of a response contingency during delayed reinforcement. The authors began with an open-ended functional assessment and observation as described in Hanley (2014). A functional analysis was conducted and rapidly alternated between test and control sessions. Prior to the start of each session, the participants were exposed to their reinforcer for one minute. Sessions began once the experimenter removed the reinforcer from the participant. The experimenter taught each participant a functional communication response (FCR) which was reinforced on a fixed ratio (FR) 1 schedule in which each instance of the FCR resulted in 30 s of reinforcement. All problem behavior was placed on extinction. Next, the experimenters conducted tolerance response training, which consisted of teaching the participants to emit a tolerance response of "okay' when the mand was not reinforced, and they were told "not right now" or other delay cues. Next, they introduced the contingency-based progressive delay (CBPD), which

consisted of 60% of trials resulting in a delay and 40% of trials resulting in immediate reinforcement. During the delay trials, the FCR resulted in a delay signal and either a single prompt or multiple prompts to engage in an alternative activity or comply with mands. During these trials, the participant was required to emit the tolerance response or either engage in additional specific responses or refrain from engaging in problem behavior or collateral responses to terminate the delay.

Austin and Tiger (2015) evaluated the effects of providing alternative reinforcers during delays after FCT. The authors taught the participants to say, "excuse me" to gain the adults attention and then "may I play ___" which resulted in 30 s of reinforcement, ignoring all instances problem behavior. During the delay fading with alternative reinforcers condition, the participant emitted the communication response but was told they had to wait and given attention until the end of the designated interval. Once the time elapsed, the participant was given the reinforcer. The condition was identical during the delay to alternative reinforcers. Delay fading without alternative reinforcement was ineffective in the current study, but when the alternative reinforcement was available, the authors increased the delays without problem behavior. The CBPD resulted in lower rates of problem behavior and collateral responses.

Of interest in the Hanley, Jin, Vanselow, & Hanratty (2014) and Ghaemmaghami, Hanley, & Jessel (2016) studies are that the tolerance response

"okay" following denied access was not a functional communication response. This suggests that other types of non-functional responses, such as emotion tacts, may be able to be substituted in the procedure. Given that many children with autism lack the skills to communicate to others what they are feeling, and the difficulty of teaching emotion tacts, denying access to tangible items may be an optimal time to teach the skill. It is likely that problem behavior is a "collateral response" (Skinner, 1957, p. 131) that co-occurs with feelings of anger or distress.

It is important for children with ASD to learn to tact their private events to effectively communicate with their parents, caregivers, friends and anyone else in their environment. The purpose of the proposed investigation was to examine the effects of a teaching package on spontaneous emission of emotion tacts among children with ASD. A second purpose was to determine whether problem behavior did, in fact, decrease as emotion tacting increased.

Method

Participants

Participants included two children diagnosed with ASD and one typically developing child. They were recruited from a university-based clinic providing intensive behavioral intervention and by word of mouth. To be included in this study, participants were required to have a strong tact repertoire (either spoken or signed). Specifically, they had a score in the Level 2 range (18-20 months) or higher on the *Verbal Behavior Milestone Assessment and Placement Program*

(VB-MAPP; Sundberg, 2008). In addition, they must have been able to ask for their most preferred items and readily imitate any words or phrases up to three syllables. Participants were also included if they engaged in minor problem behavior, such as negative vocalizations or whining when interrupted from or denied access to a preferred item or activity, and their problem behavior was determined to be maintained by positive reinforcement in the form of access to preferred items or activities. Due to the possibility of strengthening unwanted behavior with the experimental procedures, children with severe problem behavior, such as self-injury or intense aggression, were excluded from this study.

Olivia was a 3-year-old girl diagnosed with ASD by her pediatrician. A Licensed psychologist conducted the ADOS-2 (The Autism Diagnostic Observation Schedule) (Gotham, Risi, Pickles & Lord, 2006) and scored Level 3, requiring substantial support. She was receiving 35 hours of intensive behavioral intervention per week, did not attend school and was not involved in extracurricular activities. Olivia scored a 109 on her most recent VB-MAPP assessment. She spoke using two- to three-word phrases to request preferred items and activities. Olivia was able to tact at least ten noun-verb combinations and mand for at least five missing items. Olivia was able to follow at least ten noun-verb combinations when asked. Olivia was referred for this study by her case manager, who reported that she engaged in negative vocalizations, flopping and

property destruction when interrupted from or denied access to a preferred item or activity.

Carter was a 4-year-old boy diagnosed with ASD and a language impairment. Following the administration of the ADOS, he scored within the moderate range of severity (level 2). Carter was receiving 40 hours of intensive behavioral intervention per week and did not attend school. He scored a 130.5 on his most recent VB-MAPP assessment. He spoken in full sentences and consistently requested for preferred items and activities. Carter engaged in negative vocalizations and flopping when he was interrupted from or denied access to a highly preferred item.

Elliot was a 2-year old typically-developing boy. He attended a daycare full-time and spoke in full sentences Elliot consistently requested for items or activities he preferred. Elliot was included in this study because parents reported that he engaged in high rates of problem behavior when he was interrupted or denied access to a highly preferred item or activity. Elliot engaged in negative vocalizations, flopping, property destruction, aggression, disrobing, spitting and vocal protest.

Olivia and Carter's sessions were conducted in a treatment room at a university-based autism treatment center located in the Southeastern United States, as well as in the bedroom of their homes. Elliot's sessions were conducted in his bedroom of his home. Materials included moderate to highly preferred

items, neutral items such as paperclips, erasers, and pencils, and edibles to be used as reinforcers. Additional materials included a video camera for recording sessions, data sheets, and pens.

Experimental Design

A multi-element design (Kazdin, 1982) was used in the functional analysis to determine participant eligibility for the study. A concurrent multiple-probe across participants design (Horner & Baer, 1978) was used to evaluate the effects of the tact training. This design was selected to ensure that participants would not spend an extended time in baseline conditions, which could result in negative effects (e.g., emotional behavior).

Dependent variable. The dependent variable was the percentage of trials in which the target tact was emitted. A correct response was recorded when, in the EO present condition, the participant said the target emotion (e.g., "I'm mad"). Incorrect responses included no response or emitting any other vocal mand, such as "I want iPad."

Interobserver agreement and treatment integrity. A second trained observer collected data independent of the primary observer during 33% of total trials to assess interobserver agreement (IOA). An agreement was recorded if the primary and secondary observers both scored a correct, prompted, or incorrect response for the same trial. Trial by trial agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying

by 100 to yield a percentage of agreement score. IOA for Olivia was 100%. IOA for the number of intervals in which problem behavior occurred was 98% with a range of 90%-100%. IOA for Elliot was 97.8% (range, 90%-100%). IOA for Carter's sessions was 98% (range, 90%-100%. IOA for intervals in which problem behavior occurred was 86.67% (range, 40%-100%).

A trained observer also collected treatment integrity data for a minimum of 33% sessions to determine how accurately the experimenter implemented the experimental procedures. The observer used a checklist to score the instructor's implementation of the experimental procedures as correct or incorrect. The number of steps performed correctly was divided by the number of steps performed correctly plus incorrectly and multiplied by 100 to yield a percentage correct implementation score. Treatment integrity for all participants was 95.5% (range, 71.4%-100%).

Procedures

Preference assessments. Three multiple stimulus without replacement (MSWO; DeLeon & Iwata, 2000) preference assessments were conducted with each participant.

High-preference items. The first MSWO was conducted with at least ten items identified by the parents or therapists as being highly preferred by the child and likely to evoke problem behavior if denied access to it. The items ranked highest in preference were selected for use in the EO-present condition. Olivia's

highest-preference item was an iPad and was thus used in all baseline and intervention sessions. Carter's highest-preference item was an iPad. Elliott's highest-preference items shifted from trial to trial each session. Therefore, he was allowed to select an item prior to each trial. His high-preference items included blocks, books, dinosaurs, a necklace, cars, and even clothing.

Neutral-preference items. The second MSWO preference assessment was conducted with everyday objects such as paperclips, envelopes, pieces of paper or other items that the child did not attempt to interact with when made available. Items that fell in the middle-rank position were selected for use in the EO-absent condition. Olivia's neutral item was a small container. Elliot's neutral item was a blank yellow post-it note. Carter's neutral item was a paperclip.

Edible preference assessment. A third MSWO preference assessment was conducted using edibles to identify a highly preferred source of alternative reinforcement. Olivia's top two preferred edibles were Cheetos and Oreos. Carter's top two preferred edibles were Cheeze-Itz™. and popcorn. Elliott's top two preferred edibles were M&Ms™ and jellybeans. However, he manded for other items throughout the study. During treatment sessions, he received whichever edible he manded for following correct responses. Edibles included raisins, chocolate, jellybeans, gummy candies, cookies, Cheeze-Itz™, popcorn, and goldfish™.

Pre-experimental assessment. Trials were conducted in which participants had access to their highest-preferred item identified by the MSWO preference assessment. Exposure duration varied for each trial (e.g., 10 s, 30 s, and 60 s). After the interval elapsed, the therapist then removed the item and recorded whether negative affect or vocalizations occurred. Each exposure was presented five times in randomized order or until the data clearly indicated whether the exposure evoked problem behavior. The shortest interval that evoked problem behavior was used to determine the duration of each trial during the subsequent treatment evaluation sessions. Ten s was selected for Elliot and 30 s was selected for Olivia and Carter.

In addition, the experimenter recorded "sad" or "mad" after each trial to determine which emotion tact to teach during the intervention stage. A wide body of research indicates that specific facial expressions universally correspond to emotions (Matsumoto & Hwang, 2011). "Sad" was defined as frowning (i.e., the corners of the lips are pointed downward) with or without tears in/around the eyes and with or without whining. The motion of mad or angry was defined as the eyebrows drawn inwards with the lips pursed. Mad or angry also included the participant's hands balled into fists, arms crossed over his/her body, and/or the emission of negative vocalizations (e.g., screaming, verbal refusal). "Mad" was selected as the target response for Elliot, and "sad" was selected as the target response for Olivia and Carter. See Figure 1.

Functional Analysis. Prior to intervention, a functional analysis (FA; Iwata, Dorsey, Slifer, Bauman & Richman, 1982, 1994) was conducted to determine the maintaining variables for problem behavior. The results of the assessment helped determine whether the participant was a good candidate for this study. Problem behavior that was maintained by escape from demands was not relevant to this study, and therefore sessions to test for that function were not conducted. The FA included three conditions: play (control), tangible, and attention. Sessions were 5 min. During the play condition, the participants were in a room with moderately preferred toys and a researcher who gave continuous attention to the participant. This condition served as the control; in other words, no problem behavior was expected to occur during this condition. During the attention condition, the participants had access to moderately preferred toys around the room. The researcher was in the room as well but said "I have some work to do" before withdrawing attention from the participant. Attention in the form of a statement such as "Don't do that" or "Poor baby, I know that's such a bummer" was delivered to the participant contingent on negative vocalizations. In the tangible condition, participants had access to their most preferred item for 1 min prior to the start of session. At the onset of the session, the therapist removed the item. Contingent on negative vocalizations, the therapist returned the item back to the participant for the duration as determined from the pre-experimental

assessment. After the specified duration for each participant elapsed, the therapist once again removed the item from the participant.

Baseline. Ten trials were conducted each session, five trials with the highly-preferred item (EO present) and five trials with the neutral item (EO absent). EO-present and EO-absent trials were randomly interspersed. Once a minute, the therapist gave the participant the designated item (preferred or neutral) for the amount of time that had been indicated by their pre-experimental assessment. After the interval was up, the therapist said, "my turn" and removed the item. No consequences were provided contingent on emotion tacts or problem behavior.

Emotion tact training. Sessions were run as in baseline, except the treatment package was in effect. On the trials in which the preferred item was removed (EO present), the therapist immediately prompted the emotion tact by providing the model "I'm sad" or "I'm mad," as determined for each participant during the pre-experimental assessment. The participant would then imitate the tact. If the participant did not imitate the tact, the therapist repeated the model prompt every 5 s up to three times. After the participant imitated the vocal model, the therapist delivered a highly-preferred edible, identified through the edible MSWO, in addition to providing an empathy statement, such as "I'm sorry you're sad." Once the participant began to emit the tact consistently, the therapist faded the model prompt using a progressive time delay (e.g., 0-s, 2-s, 5-s) (Cooper,

Heron, & Heward, 2007, p 404). As sessions progressed, prompted responses were no longer reinforced. If the participant did not imitate the vocal model after three attempts, the trial was terminated, and the researcher removed attention for 1 m before starting the next trial. Trials in which the neutral item was removed (EO absent) were conducted in the same manner as in baseline.

Rule. Elliot did not imitate the vocal model during many trials, so a rule was introduced to facilitate responding. At the onset of the session, the experimenter said, "If you say, 'I'm mad,' you will get a piece of candy."

Peer Model. During peer model sessions, the experimenter and peer modeled the correct behavior that Elliot was to engage in. Elliot observed his peer engage in negative affect and vocalizations when a highly-preferred item was removed and then model the tact of the target emotion.

Tact emotions in videos. Recordings of Elliot as "happy" and "mad" were used to teach the emotion tact due to his noncompliance with imitating the vocal model. Similar to the emotion tact training condition, the trials were randomized prior to beginning session. During baseline, Elliot was exposed to 5 s of each emotion. After 5 s elapsed, the experimenter removed the video and asked him, "How did you feel?". No programmed consequences were in place during baseline. Sessions during treatment were run as in baseline, except the experimenter provided a model of "happy" or "mad" and provided praise, edibles and tickles for correct, independent responses.

Results

Olivia. Figure 3 depicts the results of the functional analysis for Olivia. Olivia's problem behavior was maintained by access to preferred items. Olivia did not exhibit any problem behavior during the play (0 per min) and attention conditions (0 per min) during the functional analysis. Olivia engaged in an average of 3.6 instances of combined problem behavior per minute during the tangible condition.

Figure 6 displays the percentage of trials in which she emitted the correct emotion tact. The secondary y-axis depicts the frequency of problem behavior during sessions. Olivia did not emit the emotion tact during baseline (average = 0%) and engaged in an average of 3.33 instances of combined problem behavior throughout all baseline sessions. During the emotion tact training condition, Olivia reached mastery criteria in 50 trials (highly preferred items). Olivia's problem behavior decreased in comparison to baseline levels, although it persisted throughout teaching sessions and throughout mastery of the emotion tact.

Elliot. Figure 4 depicts the results of the functional analysis for Elliot. Elliot engaged in an average of 12.2 instances of combined problem behavior per session during the tangible condition. Elliot engaged in 0 instances of combined problem behavior during the play (control) condition. During the attention condition, Elliot engaged in an average of 1.17 instances of combined problem behavior per session.

Elliot did not emit the emotion tact during emotion tact baseline (0%) and engaged in an average of 12 instances of combined problem behavior per session. During emotion tact training, he did not independently emit the emotion tact to mastery criteria. Elliot engaged in high-intensity problem behavior once the item was removed, and often would engage in vocal protest when the experimenter delivered the vocal model prompt. During the rule, Elliot emitted the emotion tact on average of 6.67% of session. During the peer model condition, he emitted the emotion tact on average 20% of session. During the tact emotions in video, Elliot did not engage in problem behavior and did not emit emotion tacts. During the treatment condition, he did not engage in problem behavior and required on average 80 teaching trials to meet mastery criteria.

Carter. Figure 5 depicts the results of the functional analysis for Carter. Carter engaged in moderate rates of problem behavior during the tangible condition. On average, Carter engaged in 5.5 instances of combined problem per minute behavior during the tangible condition. Carter engaged in 0 instances of combined problem behavior during the play (control) condition. On average, Carter engaged in 0.5 instances of combined problem behavior during the attention condition.

Carter did not emit the emotion tact during baseline (0%) and engaged in an average of 9 instances of combined problem behavior. During the emotion tact training, Carter reached mastery criteria in 20 trials (highly preferred item trials).

For Carter, problem behavior decreased to near 0 levels in comparison to baseline levels.

Discussion

The results of this study were partially inconsistent with the parenting literature which states that teaching a child to label their emotion will serve as a replacement for tantrums ("Toddler Tantrums", 2017). The parenting literature also says that the empathy statement can be mirrored back to children to help teach emotional literacy (Robinson, 2017). By teaching children to label their emotions, we are teaching them an additional way to communicate with us how they are feeling. The results for Olivia are partially consistent with the parental literature. Olivia's problem behavior decreased during treatment although it did not extinguish. She would continue to engage in problem behavior while engaging in the correct response. Elliot's results were inconsistent with the parental literature as he did not acquire the tact and engaged in high rates of high intensity problem behavior. He required additional modified teaching procedures to acquire an emotion tact. Carter's results were consistent with the parental literature. Carter acquired the emotion tact quickly and problem behavior decreased to near 0 levels. It is possible that the parental advice may not be suited for higher intensity problem behaviors such as Elliot's.

During the neutral item trials (EO absent), Carter and Olivia did not emit the tact. Elliot emitted the tact during the EO absent trial during peer model phase.

It is possible that Elliot emitted the tact during this trial because the discriminative stimulus of "my turn" in combination with the removal of the item evoked the tact. In the previous condition, Elliot was given the rule "If you say, 'I'm mad' when I take away your toy, you get candy" it is possible that he was attending only to the "say 'I'm mad' when I take away- you get candy." The neutral trials were randomized throughout session in order for the participant to learn the emotion tact in the correct context of when a highly preferred item is removed rather than an arbitrary item such as a paperclip or Post-it note.

Skinner proposed that children learn to tact private events by hearing another person tact the event. An adult may see a child engaged in some kind of collateral behavior, such as holding his arms over his stomach (public behavior) and infer the presence of a private stimulus (e.g., stomachache) due to her own history of holding her arms over her stomach in the presence of a stomachache. It is important for children to learn to talk about what is going on inside them, although it is a challenging skill to learn since it is difficult to be able to describe painful or emotional sensations.

Previous researchers taught children to tact others' emotions using pictures of faces portraying specific emotions (McHugh, Bobarnac, & Reed, 2011) or vignettes of situations in which particular emotions would be likely (e.g, child drops ice cream) (Shrandt, Townsend, & Poulson, 2009). In previous literature, authors were successful at implementing procedures to teach children to

tact the emotions of others, although there is little if any research on teaching children to tact their own emotions. During the modified procedures for Elliot, experimenters were able to successfully teach him to tact his emotions of "happy" and "mad" as he was engaging in those emotions during varying situations. Elliot's results from the modified procedures are consistent with previous research where he was able to acquire the tact using similar teaching methods.

Compared to Cater, Olivia required more teaching trials to acquire the emotion tact and problem behavior decreased compared to baseline levels, although it was not extinguished. When given the chance to emit the emotion tact independently, Olivia instead requested for the specific item that was removed. Olivia may have taken longer to acquire the emotion tact due to a long history of reinforcement for mands in the absence of the specific item. During sessions, Olivia often engaged in high-intensity tantrums which consisted of negative vocalizations and flopping. During the high-intensity tantrums, Olivia often did not echo the vocal model prompt and instead continued to engage in longer bouts of the tantrum. Problem behavior may have decreased due to treatment during her early intervention sessions, therefore we cannot infer a functional relation between acquiring the emotion tact and a decrease in problem behavior. Problem behavior initially occurred at a high frequency during sessions and decreased significantly from high to low frequency within one session. It is possible that the staff on her EIBI team were implementing different procedures when Olivia

engaged in a tantrum to reduce problem behavior. Future research could look at including participants who have yet begun EIBI services to ensure there are no other interventions in place which could contribute to a decrease in behavior.

Carter acquired the least amount of teaching trials to acquire the emotion tact and problem behavior decreased to near 0 levels. Carter often imitated the affect of the experimenter prior to emitting the emotion tact and continued to show a negative affect when independently emitting the tact. When the highly preferred item was removed from Carter's possession, he engaged in negative vocalizations and flopping and requested to get the item back using the frame, "I want ___ back, please." Carter did not engage with the moderately preferred item during sessions. He also requested for the item back during the baseline and EO-absent trials until the intertrial interval had elapsed. In addition, he engaged in problem behavior during the EO-absent trials.

Elliot did not acquire the tact during the emotion training trials, and problem behavior continued to occur at similar levels as in baseline. During the tact training phase, Elliot engaged in high frequency and high-intensity problem behavior in the form of negative vocalizations, aggression, property destruction, vocal protest, and elopement. Elliot also manded for the item back using phrases such as “hey that’s mine!” or “give it back to me,” while also engaging in negative vocalizations and other problem behaviors. Elliot also engaged in vocal protest and aggression when the experimenter delivered the echoic prompt.

Elliot's preferences often changed throughout session. Therefore, all items were removed from his possession after 10 s elapsed prior to the last trial. On occasion, when Elliot did respond to the vocal model prompt or responded independently, he would not ingest the edible. He instead kept it in his hands or packed it in his mouth and engaged in vocal protest when given the edible reinforcer. Elliot's preference for edible reinforcers also changed throughout session and therefore he was able to pick from a variety of reinforcers when he echoed the vocal model prompt or engaged in an independent response.

When given the rule "If you say, 'I'm mad' when I take your toy, you get some candy", Elliot continued to engage in high-intensity problem behavior and did not acquire the emotion tact. Elliot continued to engage in vocal protest or would not echo the prompt during the rule and peer model conditions, as well. The experimenter provided the vocal model prompt up to three times each trial. It is possible that Elliot did not comply with the vocal model prompt due to escaping from the demand to echo. Once Elliot stopped emitting the problem behaviors, the high-preferred item was re-introduced. When the procedures were modified to the tacting emotions in video condition, Elliot did not engage in problem behavior, attended to the videos and complied with prompts to echo the correct emotion tact. Elliot's parents reported that he spontaneously emitted the target tact, "I'm mad" in contextually appropriate circumstance in the natural environment on two occasions.

It is possible that due to the removal of the preferred item, the stimuli associated with the experiment became aversive to Elliot. During the baseline sessions, Elliot eloped from the experimenter at the onset of session. To help avoid this, future researchers should attempt to build rapport with participants prior to and after sessions. It is also possible that for Elliot and Olivia the alternative source of reinforcement (edible) in combination with the empathy statement did not serve as a powerful enough reinforcer for problem behavior to decrease. Future studies should consider conducting a reinforcer assessment (Mason, McGee, Farmer-Dougan & Risley, 1989) for each participant prior to beginning baseline or teaching sessions. A reinforcer assessment would help determine if the reinforcers selected during the preference assessment would function as reinforcers.

Future research should look at incorporating teaching participants to say, "happy" while engaging with the highly preferred item prior to the experimenter removing the item. If the participant then emits the emotion tact "happy" while playing, they can earn the alternative reinforcer which may then transfer to the removal of the high preferred item and can help them discriminate emotions in different contexts. Noncompliance may decrease if the participant learns that echoing the response will produce a reinforcer prior to the EO-absent trials in which their toys are removed.

Future research should look to include participants who do not have a long history of reinforcement for manding. Participants in the current study frequently emitted appropriate mands to get their preferred items back. This history may have interfered with acquisition of the emotion tact. Future research should also look to include participants whose problem behavior may also be maintained by attention. It is possible that the prompts and empathy statements could strengthen problem behavior for those who are sensitive to attention as a reinforcer. On the other hand, emitting emotion tacts is unlikely to meet with natural contingencies of reinforcement for such children.

As previously stated, one of the most commonly used procedures to reduce problem behavior is FCT, a communicative response that is prompted and reinforced while the problem behavior is placed on extinction. FCT and the tacting emotions approach are different in that once the child emits the emotion tact, they receive alternative reinforcement due to the possibility that it is not always possible to return the original reinforcer back to the child. Throughout this study, the participants were not delivered their preferred item, but instead they were given an alternative source of reinforcement (edible). In the FCT literature, problem behavior is placed on extinction and the FCR is only reinforced in the absence of problem behavior. The current investigation did not first extinguish problem behavior prior to teaching the emotion tact as a form of FCR. The EIBI staff who regularly worked with the participants were trained to avoid reinforcing

negative vocalizations and other problem behavior. It is also possible that the parents of the participants were trained to avoid reinforcing these problem behaviors.

Limitations

One limitation of this study was that the participants' affect may not have been truly representative of the emotion they were experiencing. Their facial expression could have been showing sadness because they were crying, but their emotion could have been anger. It is possible that we misinterpreted facial expressions and taught participants to inaccurately tact. During sessions in which the vocal prompt was delivered, the participant would often stop exhibiting the negative affect and they would begin to smile or show flat affect, possibly in anticipation that the highly preferred item would be delivered again at the onset of the next trial. Thus, it is possible that once the vocal prompt was delivered, the participant no longer felt the target emotion. Future research could address this limitation by first teaching children to tact others situation-based emotions such as McHugh, Bobarnac, and Reed (2011) did in their study. This may help children identify that a smile is associated with a feeling of happiness or a frown is associated with the feeling sadness prior to tacting their own emotions. Once the participants are able to identify emotions of others from pictures of videos, they can then move on to tacting photos or videos of themselves emitting those

emotions, such as was done in the current study with Elliot. This may facilitate acquisition of the tact in more natural situations.

The verbal community is at a disadvantage when it comes to verbal behavior related to private events from internal conditions of the body. We can say that the verbal community does not know when the appropriate private stimulation is present or absent, which Skinner calls the "problem of privacy" (Skinner, 1945). The verbal community can differentially reinforce responses based on public state of affairs which are accessible to both the speaker and verbal community and correlated with the private stimulation. Control will develop in an original situation based on the public stimulation, then transfers to the accompanying private stimulation so eventually the control resides with the private form.

Another way to address this issue may be to replicate and extend Schmick, Stanley and Dixon (2018) who first taught children to identify emotions in context using stimulus equivalence and transfer of stimulus function procedures. In this study, they used two scenarios in which a person was crying (at a wedding and a football game) while exhibiting the same emotions. The authors taught the emotions "happy" and "sad." Relational training occurred for both the AB relation (A=video, B=tact) by showing a video and asking what was happening and the BC relation (B=tact, C=emotion tact). Once the participant reached mastery criteria for relations A-B and B-C, they then tested for the emergence of the A-C

relation. Experimenters then tested for the YZ transformation of stimulus where Y was the phrase “I felt (emotion) and I (behavior). Where was I?” and X is the context (A). This study extended the previous literature by demonstrating that these procedures might facilitate correct responding to a transformation task that requires the transformation of stimulus function to a novel context. The authors chose exemplars that were clinically meaningful for adolescents with ASD because these are situations that many individuals may find themselves in throughout their lives.

Prior to teaching the child to emit an emotion tact in the context of a preferred item being removed, teaching them to tact other’s emotions in context may help children better understand how they are feeling during a specific situation. This could also help the experimenter better decide which emotion the participant is exhibiting to teach during emotion tact training. Experimenters could gather videos of the participants engaging with preferred toys or activities and capture the emotion of feeling “happy” when they are playing and record their feeling and behavior to depict them feeling “angry” or “sad” in the context in which a preferred item or activity is not available or removed. This could also help promote generalization to other situations in which the children will feel similar emotions of “happy” or “sad”.

Another limitation of this study was the amount of time that it took to complete. It is possible that for Olivia and Elliot, due to the length of time

between sessions, that when items were removed outside of sessions that problem behavior was reinforced. Due to tight schedules of the participants and experimenter, sessions were not run as frequently during a shorter period and therefore the time it took to complete this study was greater than originally anticipated.

The length of the study could be due to the concurrent multiple probe design that was chosen for the current study. Prior to Elliot and Carter beginning treatment, Olivia was required to master the emotion tact. Because of this, the other participants were not able to receive training close in time to the initial baseline sessions. Elliot requiring additional sessions and alternative procedures; thus, Carter was required to stay in baseline for an extended period of time. Future studies should look to change the experimental design to a nonconcurrent multiple baseline design (Watson & Workman, 1981) in order to minimize the length of the study.

A third limitation of this study is that generalization of the emotion tact was not assessed for novel items and other forms of denied access. Therefore, it is unknown whether the participants would continue to emit the emotion tact in novel situations or with novel people. Future studies may want to consider adding in pre- and post-training generalization probes with other high-preference items and the participants' caregivers. Often children with diagnosed with ASD have difficulty engaging in responses with unfamiliar people (de Marchena, Eigsti, &

Yerys, 2016). Although parents and caregivers are not unfamiliar to the participants, they do not have the same rapport as the experimenter would have after repeated exposure during these contexts in which demands are placed. It is important to teach parents and caregivers these strategies to help them transfer these procedures into more naturalistic settings such as at home or in the community.

Future research should look to extend this study by incorporating delay and denial tolerance training to extinguish problem behavior (Ghaemmaghami, Hanley, & Jessel, 2016). Rather than teaching the participants "I want ___," the emotion tact will replace the functional communication response. After the experimenter emits the empathy response, which will serve as the "no" response, the participant should emit a tolerance response, such as "okay" and then engage in an alternate activity or engage in a variable number of demands as in Ghaemmaghami et al. (2016). First, participants should wait for a short duration and a small number of demands prior to increasing the delay. Trials in which reinforcement is delayed should be randomly interspersed with trials with immediate reinforcement once the tolerance response is emitted. Therefore, they will be able to access the preferred item once again.

It is possible that because all participants in this study have a fairly sophisticated vocal verbal repertoire, it cannot be assumed that these procedures will generalize to those with fewer vocal verbal skills, those who use sign

language, or those who use an augmentative communication device. Future studies should look to include participants who less sophisticated verbal skills than those participants who were included in the current study.

Verbal behavior develops when the verbal community differentially reinforcers a response contingent on the presences of a discriminative stimulus (Moore, 2011). The source of differential reinforcement may vary from approval inherent in ordinary discourse to actually receiving a tangible item after requesting for it. It is important that the speaker and verbal community are both in contact with the same discriminative stimulus so that the verbal community can maintain the appropriate consistency in its reinforcing practices and the discriminative stimulus can become the appropriate occasion for the speaker's emitting the verbal behavior in the future.

It is important to teach children to tact their emotions as a form of communication. Many children diagnosed with ASD often have difficulty communicating what they are feeling, and instead, they engage in problem behavior (NIMH, n.d.). According to Sundberg and Partington (1998) problem behavior is often reduced by reinforcing a communicative response. In clinical settings, we often ignore this behavior until the child has stopped engaging in the tantrum to provide attention or a preferred item is returned. Individuals who are unfamiliar with behavior analytic procedures may see this approach as mean or uncaring, as the child is engaging in a tantrum and being ignored. It is important

to consider the social validity of our practices and take into account other strategies at teaching a new skill and reducing problem behavior (Wolf, 1978).

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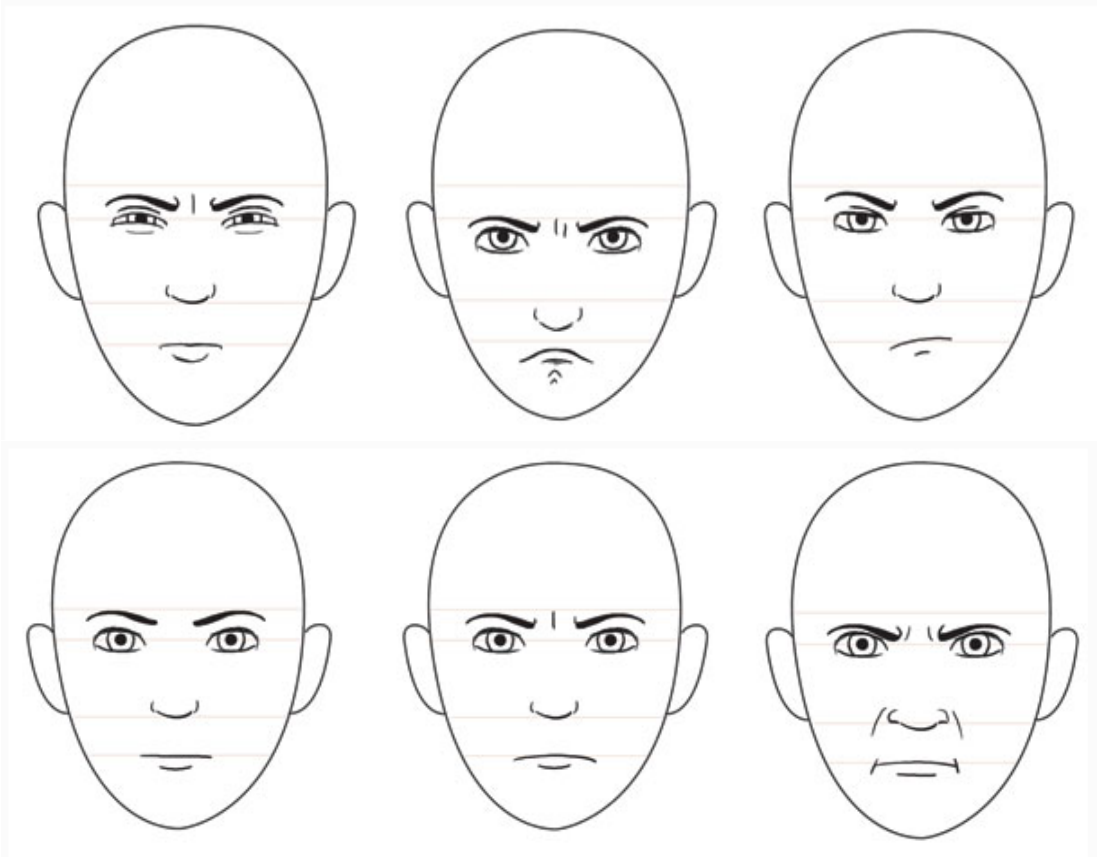

Figure 1. These are the facial features for “mad” that were used to help determine which emotion the participant was exhibiting during the pre-experimental assessment.

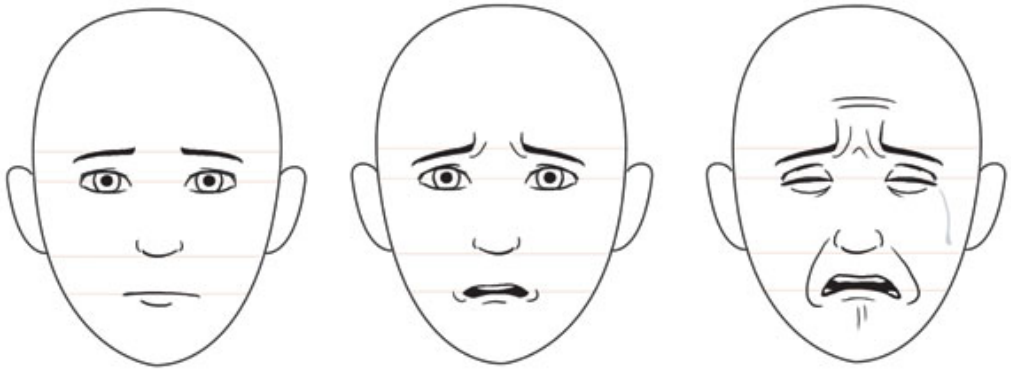

Figure 2. These are the facial features for “sad” that were used to help determine which emotion the participant was exhibiting.

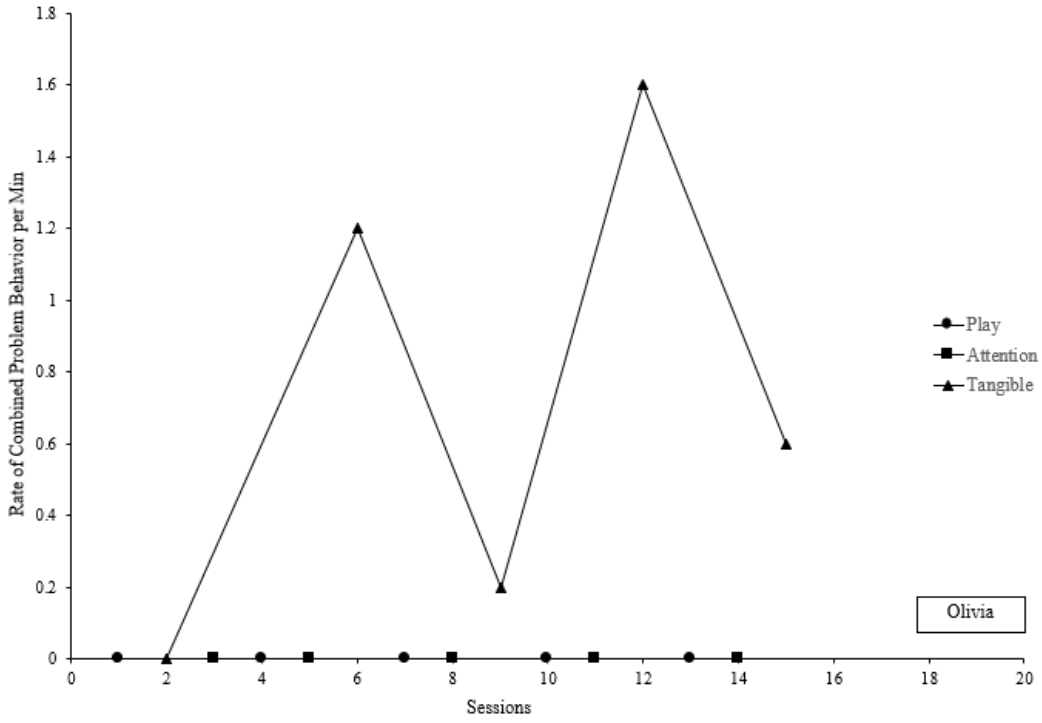

Figure 3. Rate of combined problem behavior per minute during the play, attention and tangible conditions.

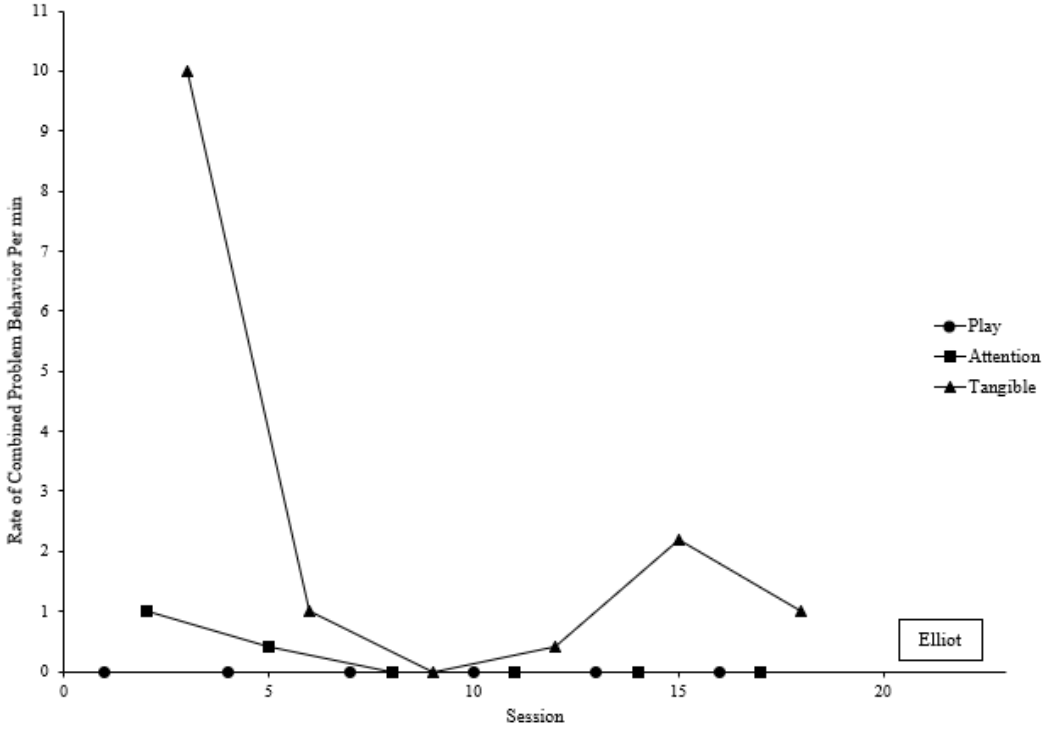

Figure 4. Rate of combined problem behavior per minute during the play, attention and tangible conditions.

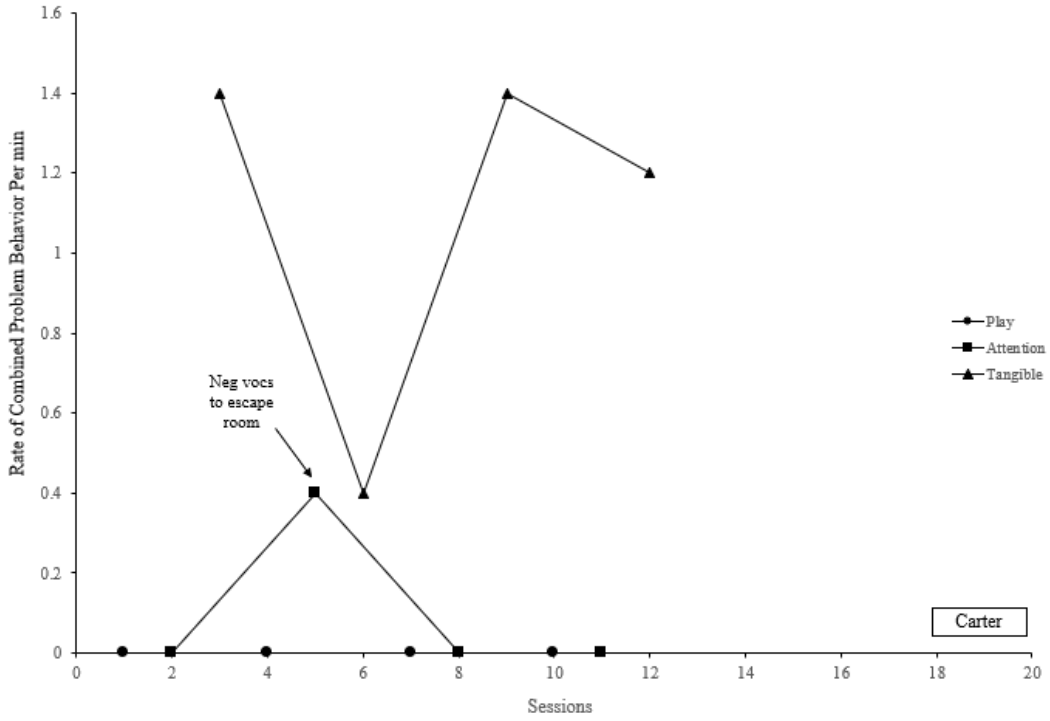

Figure 5. Rate of combined problem behavior per minute during the play, attention and tangible condition.

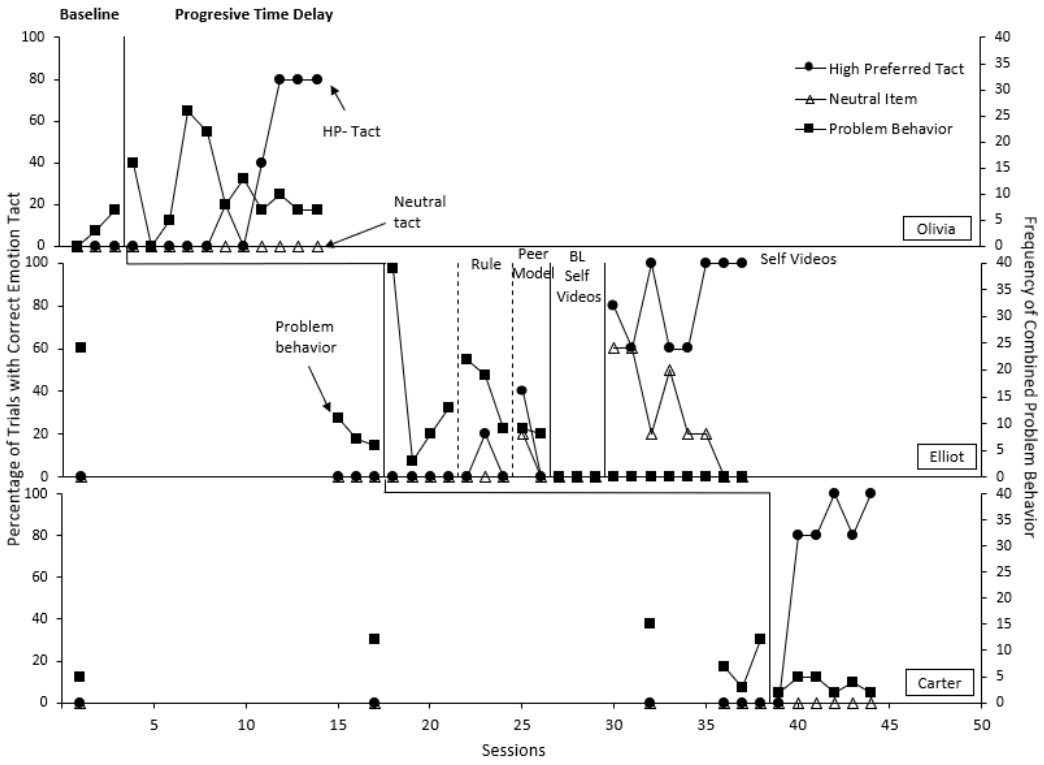

Figure 6. Results from emotion tact training for all participants. Percentage of Trials with Correct Emotion Tact is along the primary Y- axis and frequency of combined problem behavior per session is along the secondary Y-axis.