Teaching Children with Autism to Identify Private Events of Others in Context

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Abstract

Many children diagnosed with autism spectrum disorder have difficulties identifying and labeling emotions of others. Three adolescent males all diagnosed with ASD participated in the study. In a multi-element design, the participants were trained to tact private events of others in context using novel video-based scenarios. Two of the three participants were able to increase and maintain their responding for all trained, derived, and transformation of stimulus function relations. The third participant required multiple-exemplar training of novel stimuli to increase his responding for all the video-based scenarios. The results of the study support the utility of relational training for teaching children with autism to identify private events of others in context.

Keywords Autism · PEAK-T · Private events in context · Multiple-exemplar training

Individuals diagnosed with autism spectrum disorder (ASD) often find it difficult to recognize facial expressions and the emotions associated with them, as well as understanding and interpreting emotions, whether it is their own or others. Deficits in the ability to tact private events have been linked to inappropriate behaviors (Durrand, 1993) and impairments in social behaviors (LeBlanc et al., 2003). While it is imperative that individuals are able to identify emotions, it is equally important for them to be able to identify emotions in context since the same behavior may have a different meaning depending on the context it is occurring in. For example, it is important to differentiate between crying at a wedding versus crying at a funeral, given that contextually, one could be labeled as happy (wedding) and the other as sad (funeral). If an individual is unable to identify the private events and the context to which it is occurring, that individual may react at odds

with the social conventions of the culture, yielding loss of reinforcement or delivery of social punishers (e.g., “it is not nice to laugh when others are crying at a funeral”). To date, there has only been one study that has addressed this issue, McHugh, Bobarnac, and Reed (2011), in which they successfully taught situation-based emotions to children with ASD through novel cartoon videos using a multi-component procedure.

Due to the infancy of this literature, there appears a need for a greater understanding of the phenomena, as well as a technology designed to address the resulting repertoire deficits. Relational frame theory (RFT) provides a description of not only how one’s own emotions are developed, but also how an individual may come to understand the emotions of others as coordination relations through internal private states and external labels (Rehfeldt & Barnes-Holmes, 2009). With this framework, RFT provided a conceptual foundation to explore the area of private events in clinical and applied settings, and has led to the development of front-line technologies such as the PEAK curriculum (Dixon, 2016), designed for implementation with children diagnosed with autism. Found within PEAK are a variety of task analyses for teaching various elements of emotional discrimination within ones’ self, as well as detecting similar states of others. The current study sought to extend on the existing literature in two ways. First, by demonstrating how to teach the identification of private events of others in context using stimulus equivalence and transformation of stimulus

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function procedures. Second, accomplish this feat using a program found within a standard curriculum that was designed for front-line staff, which might yield potential for greater replication both clinically and in research.

Methods

Participants, Setting, and Materials

A concurrent multiple baseline across three adolescent males with disabilities, who attended a specialized school for individuals with autism, participated in the current study. Dane and Stanley were 13 years old, while Byron was 17 years old. Participant results on the PEAK-Transformation pre-assessment (PEAK-T-PA) indicated that all three participants were able to demonstrate non-arbitrary, cultural, and arbitrary relations of the coordination relational frame prior to the study. Sessions were conducted in an empty classroom separate from other students, containing a table, three chairs, and stimuli required to conduct the experiment. Consent was obtained from each participant prior to each session. Two sessions were conducted each week lasting anywhere from 20 to 30 min. Preferred items were indicated by the participants prior to each session, which included playing on an iPad or edible items.

Materials were those described in the *PEAK-T* program *11H- Coordination: Private Events of Others in Context*, which included 6 novel video-based scenarios for the following private events: happy, angry, scared, and excited. The “happy” stimuli included videos of a man crying at a wedding and a coach screaming at a football game. “Angry” stimuli included videos of a football player crying at a football game and a bride screaming at a wedding. The “scared” stimuli included a video of a man jumping away from a lake, while the “excited” stimuli included a video of friends jumping around in a house. Each video clip lasted no longer than 7 s (Table 1).

Dependent Variable, Interobserver Agreement, and Procedural Fidelity

The dependent variable was the percentage of correct responses within an 8-trial block. Interobserver agreement (IOA) was calculated by comparing the scores recorded for each trial by two independent observers during both training and probing sessions. The total number of agreements between the two observers was divided by the total number of agreements and disagreements, and multiplied by 100. IOA was taken for 65% of the trials, and averaged 100% across participants. Procedural fidelity was also collected and was assessed for 80% of the trials using the PEAK Implementation Checklist (Belisle, Rowsey, & Dixon, 2016). A trained observer tallied the number of steps performed correctly and incorrectly by the researchers for each trial, and then, the number of steps performed correctly was divided by the total number of steps and multiplied by 100. Procedural fidelity for this study was 100%.

Baseline and Relational Testing

In baseline, trained, derived, and transformation relations were probed to identify if any of the participants demonstrated correct responding prior to training. To test for the AB relation, the experimenter presented the participant a video and asked, “what is happening?” Testing of the BC relation involved asking the participant, “if someone is (behavior in context), how might they feel?” (i.e., if someone is crying at a wedding, how might they feel?) Similar to the AB relation, to test for the AC relation, the experimenter presented a video and asked, “how might they feel?” To test for the YZ transformation of stimulus function, the experimenters would say, “I felt (emotion) and I was (behavior), where was I?” (i.e., I felt happy and I was crying, where was I?). Throughout, baseline participants were provided with access to a preferred item following each trial block for non-experimental behaviors, and no reinforcement was provided contingent on correct responding nor were prompts provided following incorrect responding. Conditions were identical to baseline conditions in the relational testing phase.

Table 1 The stimuli used in the study

	A	B	C	Y	Z
Stimulus:	Video: crying at a wedding/crying at a football game	“Crying at a wedding/crying at a football game”	“Happy/angry”	“I felt happy/angry and I cried. Where was I?”	“Wedding/football game”
	Video: screaming at a wedding/screaming at a football game	“Screaming at a wedding/screaming at a football game”	“Angry/happy”	“I felt angry/happy and I screamed. Where was I?”	“Wedding/football game”
Multiple exemplar:	Video: jumping around in friends’ house/jumping away from a lake	“Jumping at friends’ house/jumping at a lake”	“Excited/scared”	“I felt excited/scared and I jumped. Where was I?”	“Friends’ house/at a lake”

Relational Training

Relational training occurred for both the AB and BC relations. The stimulus presentation for the train relations was identical to the baseline phase; however, correct responses were reinforced with social praise, while incorrect responses were followed by the experimenter stating the correct response and having the participant repeat the correct response. Mastery criteria were three consecutive trial blocks with greater than 80% correct responding. Participants progressed to the relational testing phase once the mastery criteria were achieved. If all the relations were above mastery criteria following the relational testing after the A-B relation, training of the BC relations ensued. Mastery criteria were three consecutive trial blocks with greater than 80% correct responding. Participants progressed to the relational testing phase once the mastery criteria were achieved.

Maintenance Probes

Maintenance probes were conducted for all the relations across all participants 2-weeks following the final trials in the training phases. Maintenance probes were identical to the probes conducted in the baseline phases, wherein participants were provided with a preferred item following each trial block, and no reinforcement was provided contingent on correct responding nor were prompts provided following incorrect responding.

Multiple-Exemplar Training

Multiple-exemplar training (MET) was conducted for Stanley since he did not meet mastery criteria for all the relations after the relational training. Baseline conditions, as previously conducted, were collected to ensure that the MET stimuli were novel to the participant. The MET stimuli were two videos, one of a man jumping away from a lake (scared) and one of the friends jumping around in a house (excited). With conditions identical to the relational training, the AB relation was trained to mastery criteria of three consecutive trial blocks of 80% or higher correct responding. Once mastery for that relation was met, probes were conducted for all the MET relations and the originally trained relations. These probes were conducted the same as baseline, with no reinforcement or prompt being provided. After probing the relations, training of the BC multiple-exemplar relation was conducted the same as the AB relation, though a change in reinforcer magnitude occurred during this training to promote compliance, since Stanley was exhibiting non-compliance throughout the study. Once mastery was obtained, testing probes were conducted again for all of the MET relations and originally trained relations.

Results and Discussion

Figures 1 and 2 display the percentage of correct responses across all conditions and participants. In Fig. 1, Dane displayed low levels of correct responding across all relations for the baseline probes. Responding averaged 0% for the AB and AC relations, 13% for the BC relation, and 25% for the transformation task. During AB training, Dane achieved mastery criteria within 4 trial blocks, and correct responding ranged from 50 to 100% ($M = 87.5\%$). For the second set of baseline probes, Dane responded at 100% correct for the AB relation, while responding for all other relations and transformation task remained at 0% correct. With the implementation of BC training, Dane reached mastery criteria within 5 trial blocks, with correct responding that ranged from 38 to 100% ($M = 75.2\%$). For the second set of baseline probes, Dane showed an increase in level for all relations relative to the initial set of baseline probes. Correct responding for Dane ranged from 88 to 100% ($M = 96\%$) for the AB relation, 100% ($M = 100\%$) for the BC relation, 88–100% ($M = 96\%$) for the AC relation, and 63–75% ($M = 75\%$) for the transformation task. For the maintenance probes, Dane's percentage of correct responding ranged from 13 to 100% ($M = 78.25\%$) for the AB relation, 75–100% ($M = 87.5\%$) for the BC relation, 88–100% ($M = 97\%$) for the AC relation, and 88–100% ($M = 97\%$) for the transformation task.

Stanley exhibited low levels of correct responding for all relations during baseline, with responding that averaged 0% for the AB and BC relations, 6.5% for the AC relation, and 31.5% for the transformation task. During AB training, Stanley showed an increase in correct responding, with scores that ranged from 0 to 100% ($M = 53.5\%$). Stanley reached mastery criteria in 12 trial blocks. For the second set of baseline probes, Stanley responded at 88% for the AB relation, 0% for the BC and AC relations, and 25% for the transformation task. During the BC training, Stanley's responding showed a variable, yet steadily increasing trend that reached mastery criteria within 20 trial blocks. Correct responding ranged from 0 to 100% ($M = 69\%$) for this phase. For the second set of baseline probes, Stanley's correct responding ranged from 50 to 88% ($M = 75.3\%$) for the AB relation, 75–88% for the BC ($M = 79.3\%$) and AC ($M = 79.3\%$) relations, and 13–63% ($M = 42\%$) for the transformation task. For the maintenance probes, Stanley's correct responding averaged 13% for the AB relation, 88% for the BC relation, 94% for the AC relation, and 50.5% for the transformation task. Since Stanley did not reach mastery criteria following the relational training, a multiple-exemplar training was implemented. In Fig. 2, Stanley's correct responding to the original set of stimuli showed an increase in level, relative to the initial set of baseline probes. Stanley's correct responding for the final set of baseline probes in this phase ranged from 88 to 100% ($M = 96\%$) for the AB relation, 88–100% for the BC relation ($M =$

Fig. 1 Multiple baseline with an embedded multiple probe design. Filled markers represent train relations and open markers represent derived and transformation relations. Data path indicate where training occurred

92%), and averaged 88 and 100% for the AC relation and transformation task, respectively.

Byron exhibited low levels of correct responding for all relations during the initial set of baseline probes, with responding that averaged 0% for the AB relation, 4.3% for the BC relation, 21% for the AC relation, and 0% for the transformation task. During the AB training phase, Byron

showed an increasing trend for correct responding, with scores that ranged from 38 to 100% ($M = 77.8\%$) and reached mastery criteria in 5 trial blocks. For the second set of baseline probes, Byron responded at 100% correct for the AB relation, and 0% for all other relations. During BC training, Byron showed an increasing trend that reached mastery criteria in 8 trial blocks. Correct responding during this phase ranged from

Fig. 2 Multiple-exemplar training for Stanley. Gray markers represent MET relations. Filled markers represent train relations and open markers represent derived and transformation relations. Data path indicate where training occurred

0 to 100% ($M = 61\%$). For the second set of baseline probes, correct responding averaged 91.6% for the AB and BC relations, 100% for the AC relation, and 83.6% for the transformation task. For the maintenance probes, Byron responded at 100% correct for the AB and BC relation, 92% for the AC relation, and 85.7% for the transformation task.

The findings of the current study support previous literature attempting to teach individuals with autism to identify private events of others in context (e.g., McHugh et al., 2011). The current study also extends 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 exemplars utilized in the current study are clinically meaningful for adolescents with ASD because they are all represented situations that many individuals may find themselves in throughout life, starting at a young age (i.e., attending weddings, funerals, football games, and hanging out with friends). Although the PEAK curriculum was designed to be implemented by untrained staff, trained graduate students implemented the current study who were familiar with PEAK procedures, and thus replication with untrained staff is warranted. An unexpected, yet powerful modification was implemented with Stanley. Multiple-exemplar training, of additional relational classes, was sufficient to eventually produce accurate responding in this participant. As such, this remediation procedure as noted in the PEAK curriculum (Dixon, 2016), as a strategy by which derived relational responding might eventually occur after unsuccessful attempts at exposure to the trained relations among stimuli, seems to have initial empirical support.

There are a few limitations that must be noted. First, since all participants had a developed verbal repertoire, it cannot be

assumed that the procedures will generalize to those with lower verbal skills. Second, generalization to novel stimuli and real-life situations was not assessed, and therefore, it is not known if the participants could respond correctly if provided novel emotions and contexts. A third limitation is that the MET procedures implemented with Stanley were not replicated across any of the other participants or how changing in reinforcer magnitude during the MET BC training phase for impacted overall performance. Despite this limitation, Stanley exhibited high levels of correct responding across all relations, which supports the effectiveness of the procedures. Future research can extend on the current findings by evaluating the generalizability to novel stimulus sets. Future research should also evaluate the PEAK curriculum to other methods of teaching emotional identification. Additionally, future research can evaluate the extent to which MET of several stimulus classes influences the development of other stimulus classes.

Compliance with Ethical Standards

Ethical Approval All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

References

Belisle, J., Rowsey, K. E., & Dixon, M. R. (2016). The use of in situ behavioral skills training to improve staff implementation of the

- PEAK relational training system. *Journal of Organizational Behavior Management*, 36(1), 71–79.
- Dixon, M. R. (2016). *PEAK relational training system: Transformation module*. Carbondale, IL: Shawnee Scientific Press.
- Durrand, V. M. (1993). Functional communication training using assistive devices: Effects on challenging behavior and affect. *Augmentative and Alternative Communication*, 13, 207–225.
- LeBlanc, L. A., Coates, A. M., Daneshvar, S., Charlop-Christy, M. H., Morris, C., & Lancaster, B. M. (2003). Using video modeling and reinforcement to teach perspective-taking skills to children with autism. *Journal of Applied Behavior Analysis*, 36, 253–257.
- McHugh, L., Bobarnac, A., & Reed, P. (2011). Brief report: Teaching situation-based emotions to children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 41, 1423–1428.
- Rehfeldt, R. A., & Barnes-Holmes, Y. (2009). *Derived relational responding: Applications for learners with autism and other developmental disabilities*. Oakland, CA: New Harbinger Publications.