Rapid Assessment of Attention Types for the Treatment of Attention-Maintained Problem Behavior

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Abstract

In the current study, we expanded previously described attention assessment procedures (e.g., Piazza et al., 1999) to create a rapid assessment of attention types (RAAT) suitable for clinical and educational settings. The RAAT was developed to identify a form of attention most likely to reinforce functionally equivalent alternatives to problem behavior. We describe the procedures for conducting a RAAT, as well as the results of a treatment evaluation that included two attention types from the RAAT, programmed to increase prosocial alternative behaviors.

Keywords Functional analysis · Attention assessment · Problem behavior · Replacement behavior

Treatment for problem behavior maintained by contingent attention often represents a slight departure from treatment approaches for problem behavior maintained by other functional reinforcers, such as escape from demands or access to preferred tangibles. For the latter two functions of problem behavior, reinforcers are often borrowed directly from the functional analysis (FA) and provided contingent on an alternative behavior during treatment (either a break from work or access to a toy, respectively). The form of attention most frequently provided during an FA is social disapproval (SD) or a statement of concern related to problem behavior. But providing SD contingent on an appropriate alternative behavior may be considered awkward or socially inappropriate (Piazza et al., 1999, p. 438). Therefore, praise is often assigned as a form of attention delivered contingent on a treatment-related alternative behavior. Although this may be common practice, some research suggests that dissimilar forms of attention may function differently as reinforcers for both problem behavior and

alternative behavior (Fisher, Ninness, Piazza, & Owen-DeSchryver, 1996; Kodak, Northup, & Kelley, 2007; Piazza et al., 1999).

Pretreatment attention assessments can be used to determine the reinforcing value of different forms of attention. For example, Piazza et al. (1999) conducted a two-part study during which the investigators demonstrated that (a) praise was not effective as a reinforcer for alternative behavior if problem behavior continued to produce verbal reprimands and (b) a specific attention type derived from an attention assessment and delivered contingent on a functional communication response (FCR) produced high rates of FCRs even when problem behavior continued to produce verbal reprimands.

The current study describes a method for conducting a rapid assessment of attention types (RAAT). The RAAT procedures were based, in part, on free operant preference assessment procedures (Roane, Vollmer, Ringdahl, & Marcus, 1998) and the concurrent-schedules attention assessment described by Piazza et al. (1999). The RAAT was intended to rapidly assess different attention types that may serve as positive reinforcers for alternative behavior, while problem behavior is placed on extinction. In the current study, RAAT procedures and results are described for a participant who demonstrated attention-maintained problem behavior. Additionally, results are presented from a treatment evaluation that incorporated identified attention types from the RAAT.

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Method

Participant and Setting

The participant was a 13-year-old male diagnosed with attention deficit hyperactivity disorder, autism spectrum disorder, anxiety disorder, and obsessive compulsive disorder. He was admitted to an outpatient clinic for the assessment and treatment of severe problem behavior. All sessions were conducted in the clinic's padded session rooms (approximately 3×3 m), which included a one-way mirror used for data collection. The attention condition sessions of the FA and treatment evaluation sessions included items indicated as low to moderately preferred based on the results of a paired stimulus preference assessment (Fisher et al., 1992; data available from the corresponding author).

Measurement and Interobserver Agreement

Trained observers collected data on laptop computers. Across all sessions, frequency data were collected on combined target behavior (CTB). Frequency data were converted to a rate (responses per minute, rpm) and graphically depicted for visual analysis. CTBs were defined as self-injury (hand-to-head or hand-to-body contact, object-to-head or object-to-body contact, and head-to-surface [e.g., table, wall, etc.] or head-to-knee contact), aggression (hitting another person with an open hand or a closed fist, kicking another person, throwing an object toward another person, spitting toward another person, and grabbing another person [closing a hand around a part of the body or clothing] outside the context of a handshake), and disruptive behavior (throwing an object outside of the context of play and hitting surfaces [e.g., table, wall, etc.] with an object, hands, or feet). Two trained observers independently recorded the frequency of CTBs during 65.52% of FA sessions, 22.22% of RAAT sessions, and 21.15% of treatment sessions subsequent to the RAAT. An agreement was recorded when both observers recorded the same responses in a 10-s interval. The mean agreements were 98.65%, 99.79%, and 99.95%, respectively.

During the RAAT sessions, response allocation toward an area of the room with Attention Type 1, Attention Type 2, or the control area was recorded using a duration measure (i.e., duration the participant spent in an area after entering for at least 3 s). Response allocation was graphically depicted for visual analysis by calculating the percentage of each 5-min session that the participant spent in each area. The mean agreement for participant response allocation was 93.83%.

During treatment, frequency data were collected on FCRs. FCRs involved vocal mands for an attention type paired with placing a picture card depicting the attention type in another person's hand. This mand topography was selected because (a) the participant's vocal mands were unintelligible at times

and (b) the combined vocal + card exchange mand topography response unit provided the opportunity to utilize an alternative response restriction strategy as a method of schedule thinning (Roane, Fisher, Sgro, Falcomata, & Pabico, 2004). For an FCR to be recorded, the entire vocal + card exchange response unit was required. The mean agreement for FCRs was 99.39%.

Experimental Design

The FA was conducted within a multielement design. For the RAAT, participant response allocation was assessed using a three-component concurrent-schedules arrangement. The treatment evaluation was conducted within an A-B-A-B reversal design, using results of the attention condition from the FA as comparison data for the first phase of the treatment evaluation.

Procedure

FA An FA was conducted to determine the function of participant CTBs. The following conditions were included in the FA: toy play, alone, demand, and social attention (see Iwata, Dorsey, Slifer, Bauman, & Richman, 1994, for a description of the procedures for each condition).

RAAT We implemented the RAAT subsequent to an unsuccessful brief treatment probe of functional communication training (FCT) + extinction (EXT) with descriptive praise as a reinforcer for FCRs aimed at directing a therapist's attention toward the participant (i.e., "Look at me."). The RAAT was developed as an additional pretreatment assessment to determine an attention type that would potentially reinforce an appropriate alternative behavior.

Masking tape was placed on the floor to divide the room into three sections. Two of the sections included an attention type, whereas the third section was a no-interaction control area (Fig. 1). A different colored 8×12 in. (20.32×30.48 cm) piece of construction paper was correlated with each attention type. The construction paper was taped to the wall or a chair in each section that included an attention type. Attention types were randomized so that each was paired with another at least once. A therapist was in the room and remained in the control area until the participant demonstrated response allocation to an area of the room with an attention type. The therapist then immediately moved to the appropriate area of the room and provided the relevant attention type until the participant demonstrated response allocation toward a different attention type or the control area. The types of attention included two "negative" attention types and two "positive" attention types. The negative attention types included SD (e.g., "Don't do that!") and answering perseverations (AP; i.e., answering questions that were asked and answered

Fig. 1 Schematic of the RAAT session room

previously, e.g., if the participant asked repeatedly, “Is it 4 o’clock?” the therapist would reply each time, “It’s not 4 o’clock yet.”). The SD attention type was chosen because FA results indicated SD and statements of concern as a reinforcer for problem behavior. Therefore, we included it in the RAAT to determine if it could be used as an attention type that would also reinforce an arbitrary nonproblematic behavior (i.e., allocation to the side of the room that produced the SD attention type). Additionally, caregivers supported the inclusion of the SD attention type because they reported that one of the participant’s preferred activities was to request stories about “bad things” delivered in a dramatic, but playful, manner (e.g., how certain bugs are so gross, and it would be terrible if they infested the house, etc.). The two positive attention types were praise statements (PS; e.g., saying, “Good job!”) and positive physical contact (PP; e.g., pats on the back and head). Three series of the assessment were conducted where each attention type was compared with the other and the no-interaction area at least once per series. Each session was 5 min in duration and attention extinction was implemented for problem behavior throughout the assessment.

Treatment Evaluation Each treatment session was 10 min in duration. Treatment included (a) FCT, (b) EXT, (c) a multiple schedule of reinforcement, and (d) planned ignoring. FCT was initiated to teach a combined vocal-verbal and picture card exchange FCR for attention types. FCT trials were conducted prior to starting treatment evaluation sessions to verify that the FCR was mastered, indicated by the participant demonstrating the appropriate FCR independently for three consecutive trials. Throughout treatment sessions, the cards were located on an 8 × 12 in. (20.32 × 30.48 cm) laminated board and the board was placed on a table where the child and therapist were seated throughout the session. This arrangement was held constant throughout the treatment evaluation in order to control for response effort related to the FCR. EXT was implemented by withholding any form of attention for CTBs. The two FCRs introduced during the treatment evaluation were “Don’t do that!” and “Good job!” The “Don’t do that!” FCR produced 30 s of access to the SD attention type in response to a non-CTB response. For example, if the participant

demonstrated the “Don’t do that!” FCR and then began touching the wall with his finger, the therapist stated, “Don’t do that! Don’t touch the wall. You can’t touch the wall like that!” for 30 s. The “Good job!” FCR produced 30 s of access to the PS attention type for a non-CTB response. For example, if the participant demonstrated the “Good job!” FCR and then began interacting with a game in the room, the therapist stated, “Good job playing your game. You’re really good at that!” for 30 s.

The multiple schedule of reinforcement component was implemented by placing the icons depicting attention types on either the red side or the green side of an 8 × 12 in. (20.32 × 30.48 cm) piece of laminated paper. The icons were fixed to the laminated paper with Velcro®. The therapist moved icons to the green or red side of the board when an attention type was available contingent on an FCR (green side; S^D) or when an attention type was not available even after the demonstration of an FCR (red side; S^Δ). Therefore, an icon on the green side of the board was discriminative of reinforcement for FCRs and extinction for CTBs. An icon on the red side of the board indicated extinction for FCRs related to that icon, as well as CTBs. Schedule thinning was initiated at Session 47 by introducing an S^Δ interval at the midpoint of the session, making the FCR card for “Don’t do that!” unavailable (i.e., moved to the red side of the board) while an alternate FCR (“Good job!”) continued to be available (i.e., on the green side of the board). The S^Δ interval was increased to 8 min over the course of 12 sessions. During treatment expansion, the “Good job!” FCR card was also made unavailable during the S^Δ interval but was made available on the green side for 30 s contingent on task demands completed on a random ratio 5 (RR5) schedule of reinforcement. If the card was exchanged within the 30 s, the therapist provided the “Good job!” attention type for 30 s, before placing the card back on the red side and resuming task demands. If it was not exchanged within 30 s, then the therapist moved it back to the red side and resumed task demands on the RR5 schedule.

A brief time-out from attention procedure in the form of planned ignoring was developed after rates of problem behavior were observed at near clinically significant elevations during Session 58 (the procedure was first implemented at Session 61). Due to the severity of the problem behavior, as well as therapist observation that the failure to withdraw attention when problem behavior occurred may have provided adventitious reinforcement, a 30-s planned-ignoring procedure was programmed contingent upon an instance of problem behavior. Planned ignoring consisted of a 30-s interval, implemented contingent on a CTB, in which the therapist or caregiver withdrew attention from the participant. After 30 s, the participant could demonstrate an FCR to regain access to attention if a corresponding FCR card was still on the green side.

Results

Subsequent to an FA that showed CTBs were maintained by positive reinforcement in the form of SD, we conducted a brief treatment probe that consisted of FCT + EXT with descriptive praise as a reinforcer for FCRs aimed at directing a therapist's attention toward the participant (i.e., "Look at me."). Across three sessions, independent FCRs were observed on a decreasing trend and CTBs remained high and variable (see Fig. 2, bottom panel, Sessions 28–30). We then decided to conduct the RAAT. Results from the RAAT are depicted in Fig. 3. The highest average percentage of response allocation was directed toward AP ($M = 55.52\%$), followed by SD ($M = 49.51\%$), PP ($M = 34.23\%$), PS ($M = 26.23\%$), and no interaction ($M = 21.84\%$). Highest average rates of CTBs were observed in AP ($M = 1.35$), followed by SD ($M = 0.86$), PP ($M = 0.48$), PS ($M = 0.40$), and no interaction ($M = 0.27$). A positive attention type and negative attention type were selected for inclusion in the treatment evaluation. SD was chosen as a negative attention type because, on average, it co-occurred with fewer CTBs than AP. Also, when it was assessed concurrently with AP, response allocation toward SD was observed to increase across sessions (data available from the corresponding

author). Similarly, PS was chosen as a positive attention type based on an analysis of the data when PS and PP were assessed concurrently. Response allocation increased for PS over time, and a higher percentage of time was allocated to PS overall, when comparing PS and PP. Additionally, although problem behavior occurred during the RAAT, it decreased across the three series (3.52, 3.40, and 2.40 rpm, respectively), possibly due to the implementation of extinction for CTBs during the assessment.

Figure 2 (top panel) shows the rate of CTBs during the attention condition of the FA and subsequent treatment evaluation. The bottom panel of Fig. 2 shows the rate of FCRs during the treatment evaluation. Baseline data from the FA depict a clear increasing trend in rate of CTBs ($M = 1.2$). In the treatment phase subsequent to the RAAT, implementation of FCT + EXT produced an immediate decrease in the rate of CTBs ($M = 0.40$) and a stable rate of FCRs for SD ($M = 0.96$). During the reversal-to-baseline phase, problem behavior returned to a rate higher than the initial baseline FA average ($M = 12.73$ rpm). Upon reinstatement of FCT + EXT during Sessions 37–46, the rate of CTBs again decreased ($M = 0.75$), and the rate of FCRs for SD recovered ($M = 1.29$).

Fig. 2 CTBs demonstrated during the treatment evaluation (top panel), and "Don't do that!" and "Good job!" FCRs demonstrated during the treatment evaluation (bottom panel)

Fig. 3 Percentage of each session with response allocation toward a specific attention type and the co-occurring rate of CTBs

Schedule thinning was initiated at Session 47 by introducing an S^A interval at the midpoint of the session, making the FCR card for “Don’t do that!” unavailable (i.e., moved to the red side of the board) while an alternate FCR (“Good job!”) continued to be available (i.e., on the green side of the board). The S^A interval was increased to 8 min over the course of 12 sessions. During treatment expansion, the “Good job!” FCR card was also made unavailable during the S^A interval but was made available contingent on task demands completed on a RR5 schedule of reinforcement. During this phase, CTBs occurred at an average of 0.10 rpm, FCRs for “Good job!” occurred at an average of 1.08 rpm, and FCRs for “Don’t do that!” occurred at an average of 0.03 rpm.

Discussion

In the current study, the RAAT revealed that various forms of attention were differentially likely to function as reinforcers for alternative behavior. During the treatment evaluation, two attention types (SD and PS) were concurrently available contingent upon appropriate FCRs. Prior to schedule thinning, the participant consistently demonstrated the FCR for SD, with minimal co-occurring problem behavior, thus confirming results of the RAAT. After schedule thinning, from Session 59 through the end of the treatment evaluation, the participant

demonstrated FCRs for PS almost exclusively, which did not occur during the brief treatment probe prior to conducting the RAAT.

A primary purpose of the current study was to evaluate a rapid method of assessing attention types that may serve as positive reinforcers for alternative behaviors. Furthermore, we conducted the RAAT as a way to identify alternate attention types after a treatment probe with descriptive praise failed to produce reductions in problem behavior and stable rates of appropriate alternative behavior (i.e., FCRs). Results aligned with other studies, suggesting that praise, a commonly used attention type during the treatment of attention-maintained problem behavior, is not functionally equivalent to the attention type commonly provided in an FA (Fisher et al., 1996; Piazza et al., 1999). The rapid method of assessment described in the current study was conducted in 90 min and offers a practical method for clinicians to initially assess the most appropriate attention type to include in a treatment evaluation for attention-maintained problem behavior.

In addition to increased effectiveness and efficiency in the design of treatments for attention-maintained problem behavior, the current study reported use of SD and statements of concern as an attention type to reinforce alternative behavior during treatment. This is the first study that the authors are aware of where the attention type used to reinforce appropriate behavior (i.e., FCRs) was similar to the form of attention

provided contingent on problem behavior during the FA. Although attending to benign, non-CTB responses with SD and statements of concern may seem unusual to an onlooker, (a) its use, along with extinction, produced immediate decreases in problem behavior and consistent demonstration of an alternative behavior; (b) it was provided in circumscribed contexts only; and (c) when the S^A component of the multiple schedule was faded in and PS remained available, “Good job!” FCRs increased with no collateral increase in problem behavior. As a result, the final treatment package included a more socially acceptable attention type (i.e., praise for alternative behavior) and limited use of SD for alternative behavior. Consequently, some clinicians may choose to use the RAAT over other previously established methods because it produces information about attention types that may serve as a reinforcer for a nonproblem behavior, as opposed to targeted problem behavior (e.g., Kodak et al., 2007). In this study, the nonproblem behavior was response allocation, which consisted of moving to one side of a room over another.

One limitation of the current study is that, although this may be a practical and efficient assessment for clinicians, it may not yield clear results, especially when analyzing the aggregated data. In the current study, the difference between the most preferred and least preferred form of attention was less than 30%. We clarified our findings by examining individual sessions when both positive forms of attention types were concurrently available, as well as when both negative attention types were concurrently available. Data patterns across sessions indicated increasing trends in response allocation toward a specific attention type, providing guidance for our process of deciding what attention types to include in the treatment evaluation. Future studies should consider other systematic methods of selecting attention types for inclusion in the treatment evaluation.

One area for further investigation involves the observation of a shift in response allocation from an FCR for one attention type to another. Some research suggests that decrements in alternative-behavior rate proceed in accordance with schedule thinning (Hanley, Iwata, & Thompson, 2001), which provides one possible explanation for why decreases in the FCRs for SD were observed. It remains unclear why the FCR for “Good job!” which was topographically similar to the form of attention that we first evaluated during a brief treatment probe, was able to produce stable rates of appropriate alternative responses later in treatment. Although some demonstration of FCRs for PS was expected because the RAAT results indicated that the PS attention type was more likely to function as a reinforcer for alternative behavior than no interaction, another limitation of the current study is the lack of explanation for the consistent and efficient rate of FCRs that emerged for PS during later stages of treatment, subsequent to schedule thinning. Future studies should replicate these procedures and implement a phase where FCRs for both attention types are

available for reinforcement on a similar schedule to determine if the increase in rates of FCRs for praise was due to a preference shift as a result of abolishing operations or conditioning history (see Hanley, Iwata, & Roscoe, 2006) or was a function of different schedules of reinforcement. Further elaboration and replication of these findings may provide practitioners with a method to shift responding toward an alternative behavior that produces the most acceptable attention type available.

Implications for Practice

- Treatment for problem behavior related to attention often involves providing praise contingent on alternative behaviors.
- Praise as a form of attention may not always be a functionally equivalent stimulus to the form of attention maintaining problem behavior.
- Assessment of attention types may identify the form of attention most likely to reinforce alternative behavior.
- Attention assessments that can be conducted rapidly may be valuable enhancements to the assessment and treatment of problem behavior related to attention.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflicts of interest.

Ethical Approval All procedures performed in studies involving human participants 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.

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