Qualitative and quantitative differences in social interactions are core symptoms of the autism spectrum disorder (ASD) diagnostic criteria, although there is heterogeneity among individuals with ASDs. This study used a concurrent operants arrangement to evaluate whether social interactions functioned as positive reinforcement, negative reinforcement, or as neutral stimuli for 6 individuals with autism. Data suggest that clinicians who work with individuals with ASD should ascertain the functional properties of social interactions prior to using them as a consequence in interventions.

Key words: concurrent operants, choice, autism, social interaction

Impairment in social behavior is a core characteristic of an autism diagnosis (American Psychiatric Association, 2000). However, the extent to which this characteristic manifests in any given individual varies widely in both degree and quality (Jones & Klin, 2009). It is possible to conceptualize social impairments in terms of differences in the functional properties of social interactions across individuals. For example, despite broad social impairments, attention and joint play still seem to function as a source of positive reinforcement for some individuals with autism. Others may be indifferent towards such social interactions, or even find them to be aversive.

Identifying the functional properties of social interactions may be important for clinicians who work with children with autism. Social interactions, as positive reinforcers, may have advantages over other potential reinforcers commonly used in interventions (e.g., leisure or edible items) because they are more economical and natural (Parsonson, Baer, & Baer, 1974). Social interaction also can be more efficient when compared to tangible reinforcers because social interaction can be “consumed” without slowing the pace of instruction, which has been shown to affect rate of acquisition (Koegel, Dunlap, & Dyer, 1980). However, if social interactions do not function as reinforcers for a given individual, their delivery could punish rather than reinforce responses targeted for intervention.

Previous attempts to characterize the functional properties of social interactions among individuals with autism have primarily relied on indirect measures such as caregiver reports (e.g., Wing & Gould, 1979). The few studies that have directly assessed the functional properties of social interactions (e.g., Nuernberger, Smith, Czapar, & Klatt, 2012) have examined only whether or not they function as positive reinforcers. The current study presents a methodology for directly assessing whether social interaction functions as a reinforcer for a given individual with autism, and if so, whether it serves as a positive or negative reinforcer.

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METHOD

Participants, Setting, and Materials

Six children with a diagnosis of autism participated during their attendance at a day-treatment program. At the time of participation, Zeke, Gerard, Jayce, Turner, Vienna, and Conrad were 8, 6, 3, 2, 3, and 11 years old, respectively. Sessions were conducted in rooms (3 m by 3 m to 4 m by 5 m) that were equipped with a one-way observation panel to facilitate unobtrusive data collection. Rooms were divided in half using tape affixed to the floor. Identical chairs and sets of highly preferred toys that were selected based on the results of a paired-stimulus preference assessment (Fisher et al., 1992) were placed on each side of the room.

Response Measurement and Interobserver Agreement

The percentage of time participants allocated to the social interaction and no-interaction sides of the room served as the primary dependent variable. Trained observers used computers located in an adjoining observation room to collect duration data. Participants were scored as being on the social interaction side of the room when both feet were on the same side of the tape as the therapist for at least 3 s. Time spent on the no-interaction side of the room was defined as both of the participant’s feet on the side of the room without the therapist for at least 3 s. After participants had positioned themselves on one side of the line or the other, a change in location was scored only when both feet crossed the line.

Interobserver agreement was collected by separating each session into 10-s intervals. An exact agreement was scored when two trained observers independently recorded the same amount of time (to within 1 s) on a side of the room within each 10-s interval. Interobserver agreement was collected for 36%, 17%, 21%, 30%, 22%, and 47% of sessions for Zeke, Gerard, Jayce, Vienna, Turner, and Conrad, respectively. Interobserver agreement for time spent with the therapist was 87% (range, 67% to 98%) for Zeke, 87% (range, 65% to 98%) for Gerard, 79% (range, 67% to 100%) for Jayce, 82% (range, 57% to 100%) for Vienna, 95% (range, 90% to 97%) for Turner, and 97% (range, 90% to 100%) for Conrad.

Procedure

Three experimental conditions were evaluated within a reversal design. In all conditions, the therapist delivered social interaction in the form of participant-initiated joint play (e.g., interacting with toys the participant attended to or played with), reinforcing mands (e.g., picking up the participant and spinning him or her if he or she emitted the mand for “spin”), and talking to him or her (e.g., actively describing the environment), whenever the therapist was on the same side of the room as the participant. However, the conditions differed in terms of whether or how long the therapist remained on each side of the room. The label for each side of the room (i.e., social interaction vs. no interaction) was based on the location of the therapist. Therefore, whenever the therapist switched sides, the label for each side of the room switched as well. For example, if the participant was on the same side of the room as the therapist (i.e., the social interaction side) and then the therapist switched sides but the participant remained in place, the participant was then on the no-interaction side.

The side of the room on which the therapist began the session alternated across sessions. Participants were exposed to the contingencies associated with each side of the room during a forced exposure trial prior to each session. During this presession forced exposure, the participant was physically guided to one randomly selected side of the room for 1 min and then the other for 1 min. Attempts to switch sides were blocked during the presession exposure only. When the participant was guided to the initial no-interaction side, the therapist immediately retreated to the other side and did not interact with the participant. When the participant was guided to the initial social interaction side, the therapist
remained on that side and interacted with the participant.

Following exposure to each side of the room, the therapist guided the participant to stand on the tape in the center of the room. The therapist immediately retreated to the predesignated social interaction side. The session timer began as soon as the participant left the center line such that both feet were on one side of the room or the other. Sessions were either 5 min (Jayce, Turner, Vienna, and Conrad) or 10 min (Zeke and Gerard). During all sessions, the participant was allowed to move freely around the room and interact with any of the toys. Attempts to take toys from one side of the room to the other were blocked, although identical toys were available on each side of the room. If the participant was on the social interaction side of the room, the therapist interacted with the participant as described previously. If the participant was on the no-interaction side, the therapist did not provide any vocal attention and restricted eye contact by looking away or at the floor. All sessions for each participant except Gerard were conducted by a single therapist. For Gerard, three different therapists conducted sessions at differing stages of his analysis. Participants were unfamiliar with all therapists prior to participating.

**Stay condition.** The therapist remained on the same side of the room for the entire session regardless of the participant’s location. The participant could go to the opposite side of the room from the therapist (i.e., no-interaction side) and avoid social interaction, or could remain on the same side of room as the therapist (i.e., social interaction side) and maintain access to social interaction.

**Follow condition.** If the participant remained on the no-interaction side of the room for 30 s, the therapist crossed the center line towards the participant and began to interact with him or her. The process of switching sides to follow the participant was repeated any time the participant was on the no-interaction side of the room (i.e., opposite from the therapist) for 30 s.

**Leave condition.** Procedures were similar to the follow condition with one exception. Instead of the therapist crossing the line every 30 s towards the participant when the participant was on the no-interaction side of the room, the therapist crossed the line to leave the participant when the participant was on the social interaction side for 30 s. The process of switching sides to leave the participant was repeated any time the participant was on the social interaction side of the room for 30 s.

Progressing from one condition to the next was contingent on participants demonstrating a clear preference for social interaction or no interaction. A clear preference was defined as two consecutive sessions with 75% or greater time spent on the social interaction or no-interaction side of the room and no decreasing trend in time spent on that side of the room. However, if the participant did not meet the criteria to move to the next phase within 10 sessions, the phase was discontinued and the next one was initiated. This 10-session cap was instituted after the first participant, Gerard, had already completed the concurrent operants assessment, so he experienced more than 10 sessions in some phases. All participants were exposed to the stay condition first. If the participant demonstrated a preference for no interaction in the stay condition, the follow condition was conducted next to test the hypothesis that social interactions were aversive. If during the follow condition the participant crossed the line repeatedly, thereby avoiding social interaction, then results from both conditions supported this hypothesis. If the participant demonstrated a preference for social interaction during the stay condition, the leave condition was conducted next to test the hypothesis that social interactions were positively reinforcing. If, during the leave condition, the participant crossed the line repeatedly, thereby maintaining access to social interaction, we considered this to be a confirmation of the results of the stay condition, suggesting that social interactions functioned as positive reinforcement.
Figure 1. Percentage of each session spent on the no-interaction side of the room and the social interaction side of the room for each participant.
If the results of the follow or leave condition contradicted the results of the initial stay condition, the alternative hypothesis was that social attention was a neutral stimulus because the participant did not exhibit preferences strong enough to maintain the more effortful response of repeatedly switching sides. Thus, the condition that had not yet been evaluated with that participant (i.e., follow or leave) was conducted next. If the participant still did not switch sides repeatedly during this condition, the hypothesis that social interactions were neutral was considered to be confirmed.

RESULTS AND DISCUSSION

Results for all participants are depicted in Figure 1. One participant (Zeke) demonstrated a preference for social interaction, even when he was required to emit a more effortful response (i.e., switching sides approximately every 30 s) to maintain access. The remaining five participants demonstrated preferences that suggested that social interaction was a neutral stimulus. Of these participants, Vienna, Turner, and Conrad all displayed clear preferences for no interaction in the stay and leave conditions. They either displayed a preference for social interaction in the follow condition by failing to engage in the more effortful response of switching sides that would have resulted in avoidance of social interaction (Turner and Conrad), or reached the maximum number of sessions without meeting the criteria for showing a preference (Vienna). Similar to Vienna, Jayce showed an eventual preference for social interaction in the first stay and both leave conditions and did not demonstrate a preference in the first follow condition. However, unlike Vienna, Jayce preferred social interaction in the second follow and stay conditions. Finally, although his responding resulted in a different sequence of conditions, Gerard also made choices that were similar to those of Vienna and Jayce, indicating that social interaction was likely a neutral stimulus. Unlike Vienna and Jayce, Gerard’s results from the second stay condition failed to replicate the results of the first.

This study presents a methodology for assessing the functional properties of social interaction in individuals with autism. However, it is limited by the fact that it assessed only a specific form of social interaction (e.g., play or conversation with a novel person), although future research could use this method to assess other forms. The dichotomous nature of concurrent operants arrangements also may have limited the findings because it depicts a categorical characterization of the properties of social interaction. This could have affected the finding that social interaction was a neutral stimulus for all but one of the participants. Other measures of reinforcer efficacy, such as responding under progressive-ratio schedules, would allow a dimensional estimate of the effectiveness of social interaction as a reinforcer. However, such an approach may lose one of the strengths of the present method, the ability to detect whether social interaction is a positive or negative reinforcer in a single assessment.

REFERENCES


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