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The effects of item preference and token reinforcement on sharing behavior exhibited by children with autism spectrum disorder☆

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ABSTRACT

The current studies evaluated variables affecting sharing exhibited by children with autism spectrum disorder. Study 1 evaluated the effects of manipulating item preference on the level of assistance needed to exhibit sharing behavior for 4 children with autism. Item preference clearly affected 2 participants' percentage of independent sharing. Preference did not have as clear of an effect for a third participant. However, sharing a high-preference item generally required a higher level of prompting (e.g., vocal prompts) to share. The fourth participant's percentage of independent sharing was not influenced by preference, and his independent sharing behavior was similar across item preference. Study 2 assessed the effectiveness of a token reinforcement procedure as an intervention designed to increase independent sharing of high-preference items for the two participants who did not independently share those items during Study 1. Independent sharing increased for both participants when the token procedure was in place and decreased when it was removed.

Children diagnosed with autism spectrum disorder (ASD) experience qualitative impairments in communication and social interaction (American Psychiatric Association, 2013). These persistent deficits make everyday interactions between individuals with ASD and their peers and care givers challenging. One essential skill for young children to learn to develop relationships with peers and to participate in appropriate social interactions is sharing. Sharing, or responding to requests to share, is a social skill that children with ASD struggle to master (Baron-Cohen, Leslie, & Frith, 1985; Eisenberg & Fabes, 1998; Marzullo-Kerth, Reeve, Reeve, & Townsend, 2011; Rheingold & Hay, 1980; Rutter, 1978; Volkmar, Carter, Sparrow, & Cicchetti, 1993; Wing, 1988). However, according to Bryant and Budd (1984), successful mastery of this social skill might result in more chances for positive social interactions with peers. In fact, some consider sharing to be a fundamental part of interactive play between peers (Bryant & Budd, 1984; DeQuinzio, Townsend, & Poulson, 2008).

Several studies have focused on increasing sharing repertoires in typically developing children and children with ASD. For example, Barton and Ascione (1979) increased the sharing behavior exhibited by typically developing preschool children by implementing a treatment package that included instructions, modeling, behavior rehearsal, prompting, and social reinforcement. Bryant and Budd (1984) extended the findings of Barton and Ascione (1979) by using the same training package to increase sharing behaviors and decrease nonsharing behaviors exhibited by participants described as preschool

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children with behavioral handicaps. The introduction of the training package resulted in an increase in sharing behaviors and suggested decreases in nonsharing behaviors for five out of six children.

Sawyer, Luiselli, Ricciardi, & Gower (2005) implemented an intervention package that included a priming procedure before play sessions, prompting, and contingent social reinforcement to increase sharing exhibited by a child with ASD. The package consisted of the instructor explaining the importance of sharing to the participant, the instructor and a peer of the participant modeling appropriate sharing behaviors, the participant rehearsing sharing behaviors with the instructor and the peer, and the participant receiving feedback from the instructor with prompting and contingent praise throughout the rehearsals. The participant's sharing behaviors increased from baseline levels when the entire treatment package was implemented. When the priming procedure was removed during a second treatment phase, the participant's sharing decreased, suggesting that the priming procedure was necessary to increase sharing exhibited by the participant.

DeQuinzio et al. (2008) demonstrated the utility of a forward chaining procedure to increase sharing behavior exhibited by four children with ASD. The sharing behavior chain consisted of a sequence of show–give–play responses. This sharing response chain was taught across multiple toys using auditory prompting from voice-recorders, manual guidance, and contingent access to toy play and teacher interaction during intervention sessions. Sharing behavior increased in the presence of peers and generalized to novel toys in a new setting.

Marzullo-Kerth et al. (2011) extended the findings of DeQuinzio et al. (2008) by training offers to share exhibited by four children with ASD across several multiple-exemplar classes (e.g., art materials, toys, gym materials, and snack foods). The intervention included an error-correction procedure that consisted of a video model, auditory and physical prompts, and contingent token reinforcement for correct offers to share. All four children increased their offers to share during intervention, and offers to share generalized to novel stimuli, a new setting, and the presence of new peers and adults. One participant showed generalization of sharing across categories, and all participants displayed generalization of sharing within categories.

While treatment packages have been identified that can successfully increase sharing behavior, less research has been conducted related to the conditions under which independent sharing occurs, particularly for children with ASD. Some children may not have sharing behavior in their behavioral repertoire at all. Other children may exhibit sharing behavior, albeit in an inconsistent manner. For this first group of children, teaching sharing behavior using the aforementioned treatment packages may be effective. For this second group of children, intervention may be able to be more streamlined and consist simply of reinforcement for exhibiting the desired behavior under conditions not typically associated with sharing. One likely variable that may affect sharing behavior is the preference of the stimulus to be shared. Removal of preferred stimuli has been demonstrated to be evocative of problem behavior exhibited by some individuals with developmental disabilities (Kang et al., 2010, 2011). Thus, it makes some intuitive sense that independently giving up access to high-preference stimuli (i.e., sharing) may be difficult.

Thus, the purpose of Study 1 in the current investigation was to evaluate the effect of stimulus preference on the level of assistance or prompting (independent, gestural, verbal, or physical) needed to respond to a peer's request and share items. The hypothesis of Study 1 was that the participants would require a higher level of prompting or assistance to respond to a peer's request to share a high-preference item compared to the level of prompting or assistance needed to respond to a request to share a low-preferred item. Study 2 was designed to evaluate the effectiveness of a token economy-based intervention to increase independent sharing if assistance or prompting was needed to successfully share during Study 1.

1. Methods: study 1

1.1. Participants

Four children with ASD participated in Study 1. Each participant attended a local autism service provider where they attended biweekly therapy sessions. A clinic therapist referred each participant for possible inclusion in the study because each inconsistently exhibited sharing behavior during peer interactions that occurred in the course of their therapy sessions. Each participant communicated using vocal statements (ranging from one word to full sentences) and each participant had prior experience with token reinforcement programs.

Jack was 4 years old at the time of the study. He typically communicated using full sentences, (e.g., "Finn is playing with a balloon"). His sentences were mostly descriptive and referred to the people and activities in his present surroundings. His requesting behavior also consisted of full sentences such as, "I want (name of item), please." Finn was 5 years old at the time of the study. Finn's communication, including requesting behavior, could include full sentences (e.g., "Jack, can I have the (name of item), please?"). Susie was 3 years old at the time of the study. She communicated using one or two-word utterances (e.g., "hi," "want ball") and pointing. Roger was 6 years old at the time of the study. His communication and requesting behavior included full sentences (e.g., "(Peer's name), can I have the markers, please?").

1.2. Setting and materials

1.2.1. Preference assessment

Paired choice preference assessments (Fisher et al., 1992) were conducted in a small therapy room (2 m × 3 m) meant for individual sessions. There was one child-size table and three child-size chairs the therapy room. Other materials present

during the preference assessments included a handheld timer, two clipboards with data collection sheets, pen, and the different stimuli used for the preference assessment.

1.2.2. Sharing assessment

The sharing assessment was conducted in a partitioned off area in the main therapy room. The area was partitioned off to reduce extraneous stimuli and included a child-size table, two child-size chairs, a video camera, timer, clipboard, data sheets, and a pen. One high- or one low-preference item, based on the results of the paired choice preference assessment, was also present during these sessions, depending on the condition.

1.3. Dependent variables

1.3.1. Preference assessment

The dependent variable for the preference assessment was selection, defined as the participant making physical contact with only one of the presented items for each trial or the participant vocally requesting one of the two items presented for each trial (e.g., saying "bus"). The percent of trials selected was calculated for each stimulus.

1.3.2. Sharing assessment

The dependent variable for the sharing assessment was sharing, defined as the participant handing the requested item to the requesting peer with or without prompting. Sharing was further defined as occurring independently, with a gestural prompt, with a vocal prompt, or with a physical prompt. Independent sharing was defined as the participant handing the requested item to the peer immediately (within 5 s) following the request and in the absence of additional prompts from the therapist. Sharing with a gestural prompt was defined as the participant handing the requested item to the requesting peer following a point prompt from the therapist. Sharing with a vocal prompt was defined as the participant handing the requested item to the requesting peer following a vocal statement from a therapist such as "(Requesting peer's name) asked for the (item's name)" for Jack, Finn, and Roger and "share toy" for Susie. Sharing with a physical prompt was defined as the participant handing the requested item to the requesting peer with the help of hand-over-hand assistance from the therapist. Sharing was reported as the percentage of trials with independent or the various types of prompted shares.

1.4. Data collection and interobserver agreement

1.4.1. Preference assessment

Data were collected using a pen-and-paper data sheet that indicated the various pairs to be presented during the assessment. The data collector scored selection by circling the number assigned to the stimulus selected during each trial of the assessment. A second, independent observer collected data for the purposes of obtaining interobserver agreement (IOA) during 100% of preference assessments conducted.

Agreement was defined as both observers circling the same number for a given trial. Interobserver agreement coefficients were calculated by counting the number of agreements and dividing it by the number of agreements and disagreements (i.e., total number of trials) and multiplying by 100. Agreement scores were 100% across all participants.

1.4.2. Sharing assessment

Data were collected using a pen-and-paper data sheet that indicated trials and the level of prompting needed for the sharing response to occur. The data collector scored sharing by circling the letter corresponding with each level of prompting required to complete sharing (e.g., "I" for independent sharing, "G" for sharing with a gestural prompt). During at least 33% of sessions for each condition (high or low preference) for each participant, a second, independent observer collected data for the purposes of obtaining IOA

Agreement was defined as both observers marking the same level of prompting required to complete sharing for a given trial. Interobserver agreement coefficients were calculated by counting the number of agreements for a session and dividing it by the number of agreements and disagreements and multiplying by 100. Data for the purposes of IOA were collected during 40% of both the high and low preference condition sessions for Jack, and 33% of both the high and low preference conditions for Finn, Susie, and Roger. The mean percentage of agreement for Jack was 100% during the high preference condition and 90% during the low preference condition. The mean percentage of agreement for Finn was 100% during the high preference condition and 100% during the low preference condition. The mean percentage of agreement for Susie was 100% during the high preference condition and 100% during the low preference condition. The mean percentage of agreement for Roger was 100% during the high preference condition and 100% during the low preference condition.

1.5. Procedures and experimental design

1.5.1. Preference assessment

A paired choice preference assessment (Fisher et al., 1992) was completed with each participant to determine one high and one low-preference item to include in the sharing assessment. The participant accessed each item for 5 s before the start of the assessment. For each trial, the experimenter placed two items in front of the participant and asked the participant to

pick one. The items were an equal distance apart and an equal distance from the participant. When a selection was made, as defined above, the participant accessed the selected item for 30 s. In accordance with Fisher et al. (1992) each item was paired with every other item in the preference assessment once. Pairs were presented in a fixed order.

Based on the preference assessment, Jack's high-preference item was a remote controlled four-wheeler and his low-preference item was a slinky. Finn's high-preference item was also the remote controlled four-wheeler and his low-preference item was a set of wooden robots. Susie's high-preference item was pin art and her low-preference item was a set of four stackable plastic blocks. Roger's high-preference item was the Sponge Bob video game, played on a small television, and his low-preference item was a dinosaur book.

1.5.2. Sharing assessment

A multielement design was used to evaluate the effects of stimulus preference on sharing. The design consisted of alternating between high- and low-preference conditions. High-preference and low-preference conditions were alternated on a session-by-session basis.

1.5.2.1. High-preference item condition. During this condition, the participant was seated across from their peer at the table with each child's individual therapist beside them. The experimenter was seated on the other side of the participant. The peer sat across from the target participant. Jack and Finn served as each other's peers because they attended the same therapy sessions. Susie and Roger's peers included other children diagnosed with ASD who attended therapy sessions with them. Every session in this condition was conducted with the participant's high-preference item, as identified by the preference assessment. Each session in this condition consisted of five trials.

At the beginning of each session, the experimenter placed the high-preference item in front of the participant and said, "You can play with the (item's name) for 10 seconds" then provided access to the high-preference item/activity and set a timer for 10 s. When the timer signaled the end of the access period, the peer's individual therapist prompted the peer to request the item. For Jack and Finn's high preference sessions, the experimenter removed the remote control for the four-wheeler when the timer sounded and before the peer's request. Peer requests varied from full sentences (e.g., "Can I have the four-wheeler?"; Jack, Finn, and Roger's peer) to one or two word utterances (e.g., "toy" or "toy please"; Susie's peer). The peer's individual therapist also blocked any attempts the peer made to grab the item out of the participant's hands during the 10-s access period and during their requesting.

If the participant shared the item independently, the experimenter said, "Good job sharing!" and started the 10-s timer. The experimenter provided a statement of praise after independent sharing responses because that was typical of how therapists responded throughout the participants' regular therapy sessions. If the participant did not independently share within 5 s of the peer's request, the experimenter provided a gestural prompt to share by pointing at the participant and then over to the peer. If the participant shared within 5 s after the gestural prompt, the experimenter started the 10-s timer. If the participant did not share within 5 s after the gestural prompt, the experimenter provided a vocal prompt such as "<requesting peer's name> asked for the <item's name>" for Jack, Finn, and Roger and "share toy" for Susie. If the participant shared the item within 5 s after the vocal prompt, the experimenter started the 10-s timer. If the participant did not share the item within 5 s after the vocal prompt, the experimenter provided a physical prompt to share by assisting the participant to place the item in front of the peer using hand-over-hand guidance. Following completion of the physical prompt, the experimenter started the10-s timer. The participant's individual therapist blocked any attempts the participant made to grab the item from the peer during the peer's 10-s access period. When the timer sounded, the experimenter removed the item from the peer and started the next trial.

1.5.2.2. Low-preference item condition. The same procedures used during the high-preference item condition were implemented during the low-preference item condition. However, the low-preference item, as determined by the preference assessment, was included instead of the high-preference item. During Finn's low-preference sessions, when the timer went off signaling the end of his access period, the experimenter assisted him in placing all of the wooden robots in the plastic storage container before his peer was prompted to request. During Susie's low-preference sessions, when the timer went off signaling the end of her access period, the experimenter assisted her in stacking all four of the plastic blocks together before her peer was prompted to request. This procedure was followed so the participant only had one item to share to make it consistent across participants.

2. Results and discussion: study 1

Fig. 1 displays the percentage of trials with independent shares during the sharing assessment. Jack (first panel) exhibited similar levels of independent sharing across the high- and low-preference conditions until the last session in each condition. Independent sharing was on a downward trend during the last three sessions of the high-preference condition, and was stable across all sessions of the low-preference condition. In addition, mean levels of independent sharing differed (M = 24% of trials, high preference; M = 48% of trials, low preference). Finn (second panel) exhibited differentiated levels of independent sharing across all sessions of both conditions, with greater independent sharing exhibited in the low-preference condition (M = 73.3% of trials) than in the high-preference condition (M = 13.3% of trails). Susie (third panel) also exhibited differentiated levels of independent sharing across all sessions of both conditions, with greater independent

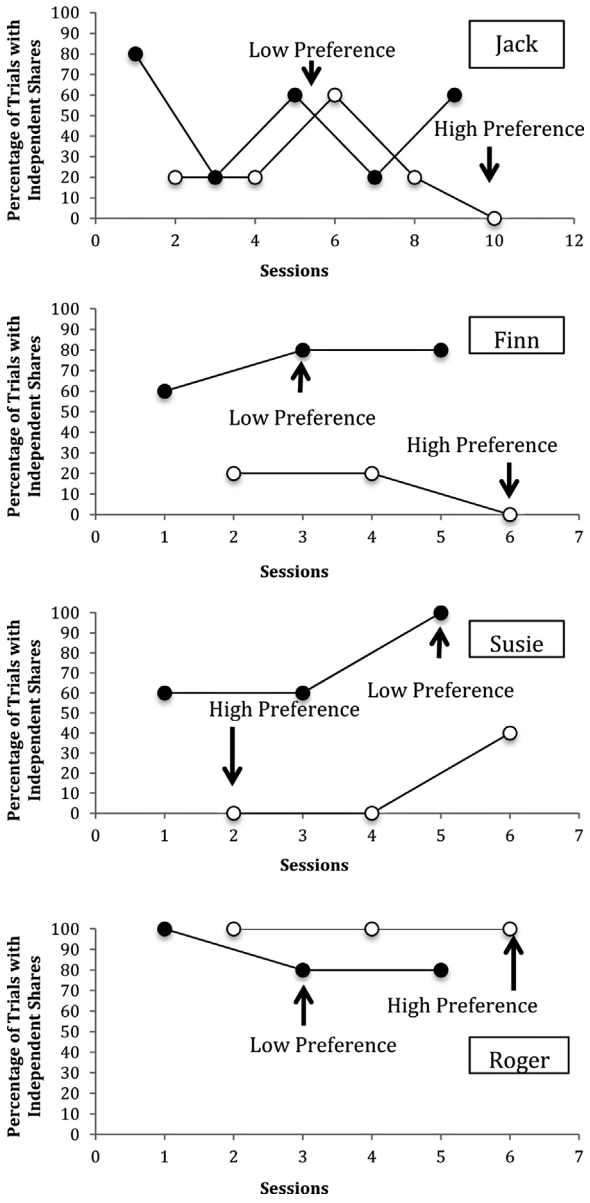

Fig. 1. Percentage of trials with independent shares exhibited by Jack, Finn, Susie, and Roger across low- and high-preference stimulus sharing conditions.

sharing exhibited in the low-preference condition ($M = 73.3\%$ of trials) than in the high-preference condition ($M = 13.3\%$ of trials). Roger (fourth panel) exhibited relatively high levels of independent sharing across both the high- and low-preference conditions. In fact, Roger exhibited somewhat higher levels of independent sharing during the high-preference condition ($M = 100\%$ of trials, high preference; $M = 86.7\%$ of trials, low preference). Table 1 lists the percentage of trials with independent shares, shares with gestural prompts, shares with vocal prompts, and shares with physical prompts with sessions grouped according to condition type (high- or low-preference).

The results of study 1 suggested that preference had an effect on the level of prompting needed to share items with a peer for two participants, Finn and Susie. Specifically, both of these participants required a higher level of prompting to share high-preference items than low-preference items. The effect of item preference was less clear for Jack. However, toward the end of the assessment, independent shares decreased in the high-preference condition while remaining stable in the low-preference condition. Roger exhibited a relatively high level of independent shares, regardless of condition type. If anything, preference level may have been negatively correlated with Roger's independent sharing behavior.

Collectively, these results suggest that item preference is a variable that affects independent sharing for some children with ASD. From a clinical standpoint, these results are important. If baseline observations of sharing are only made when

Table 1
Average percent of trials for each level of prompt needed to share during low- and high-preference conditions during Study 1.

Study 1		Prompt level			
Participant	Condition	Independent	Gestural	Vocal	Physical
Jack					
	Average: low preference	48% of trials	20% of trials	12% of trials	20% of trials
	Average: high preference	24% of trials	20% of trials	16%	40%
Finn					
	Average: low preference	73.3% of trials	6.7% of trials	13.3% of trials	6.7% of trials
	Average: high preference	13.3% of trials	20% of trials	33.3% of trials	33.3% of trials
Susie					
	Average: low preference	73.3% of trials	6.7% of trials	6.7% of trials	13.3% of trials
	Average: high preference	13.3% of trials	26.7% of trials	40% of trials	20% of trials
Roger					
	Average: low preference	86.7% of trials	6.7% of trials	0% of trials	6.7% of trials
	Average: high preference	100% of trials	0% of trials	0% of trials	0% of trials

low-preference items are the shared stimulus, therapists may incorrectly determine that the social skill of sharing is not a necessary intervention target. Similarly, if pre-intervention observations of sharing are only made when high-preference items serve as the shared stimulus, therapists may incorrectly conclude that "sharing" is not in the child's behavioral repertoire.

3. Methods: study 2

3.1. Participants

Because Finn and Susie exhibited clearly lower levels of independent sharing during the high-preference condition from Study 1, they participated in Study 2. Jack did not participate in Study 2 because he started exhibiting frequent problem behavior toward the end of Study 1. The experimenter and facility staff determined that the goals of Study 2 were not as important as clinically addressing his problem behavior in his therapeutic setting. Roger did not qualify for Study 2 because he independently shared items across high- and low-preference conditions and did not need intervention to increase independent sharing.

3.2. Settings and materials

3.2.1. Token training

Token training for Finn and Susie was completed in the same individual therapy rooms in which their preference assessments were conducted. The materials used in the token training included one child-size table, three child-size chairs, the participant's high-preference item identified in the first study, one token, a timer, a video camera, a clipboard with data collection sheets, and a pencil or pen. The token used during training was a laminated 10 cm × 10 cm picture of the participant's high-preference item.

3.2.2. Baseline

Susie's high-preference condition sessions from Study 1 served as the initial baseline phase Study 2. During the return to baseline, sessions were conducted in the same setting and using the same materials as described in Study 1.

Finn's baseline sessions differed from the high-preference condition conducted in Study 1. During baseline sessions for Study 2, Finn did not share with a peer. Instead, the sharing partner was his individual therapist because the peer he completed sharing sessions with in Study 1 (Jack), did not continue on to Study 2. Thus, baseline performance in with the individual therapist as the sharing partner needed to be established. Finn's baseline sessions were conducted in his individual therapy room. The materials included a child-size table, three child-size chairs, the four-wheeler and remote, video camera, timer, clipboard, data sheets, and a pen.

3.2.3. Treatment

The settings and materials were the same during treatment as during baseline for each participant. However, five tokens and a token board (a laminated sheet of colored paper with Velcro® stickers arranged on the page) were included in the setting during this condition.

3.3. Dependent variable

The dependent variable and definition was the same as described in the sharing preference assessment of Study1. The dependent measure during baseline and treatment sessions was reported as percentage of trials with independent or prompted shares.

3.4. Data collection and interobserver agreement

A second, independent observer collected data for the purpose of obtaining IOA for at least 33% of sessions for each condition (baseline, treatment, return to baseline, and return to treatment) for each participant. Agreement scores were calculated in the same manner described in Study 1 and were obtained for 33% (baseline), 40% (treatment), 100% (return to baseline), and 100% (return to treatment) for Finn, and 33% (baseline), 33% (treatment), 33% (return to baseline), and 33% (return to treatment) for Susie. The mean percentage of agreement for Finn and Susie was 100% for all phases.

3.5. Experimental design and procedures

An ABAB (A = baseline, B = token economy) withdrawal design was used to evaluate the level of prompting needed to share the high-preference item.

3.5.1. Token training

At the beginning of token training, the participant had access to their high-preferred item. When the first trial began, the experimenter placed the token in the middle of the table and removed the high-preference item from the participant. If the participant did not hand the token to the experimenter within 5 s, the experimenter prompted the participant to hand her the token using a gestural prompt (i.e., pointing to her hand). If the participant did not hand the token to the experimenter within 5 s after the gestural prompt, the experimenter vocally prompted the participant to hand her the token. If the participant still did not hand the token to the experimenter after a vocal prompt was provided, the experimenter then physically hand-over-hand assisted the participant to place the token in the experimenter's hand. The participant received 30 s of access to the high-preference item after an independent response or after a response with a gestural, vocal, or physical prompt. The level of prompting needed for each trial to hand the token to the experimenter was recorded. Each participant completed 10 trials of token training for their corresponding high-preference item identified during the first study.

3.5.2. Baseline

Susie's baseline and return to baseline sessions during Study 2 followed the same procedures as described in the high-preference condition sessions in Study 1.

Finn's baseline and return to baseline sessions during Study 2 were conducted with a different requesting partner than his high-preference condition in Study 1, as described previously. The procedures for Finn's baseline and return to baseline sessions during Study 2 were otherwise the same as his high-preference condition sessions during Study 1, with the exception of this partner change.

3.5.3. Treatment

Treatment was conducted in a similar manner as baseline with the exception of (a) the presence of the tokens and token board, and (b) contingent delivery of a token following independent shares. The token board was set on the table next to the participant and the experimenter had a plastic Ziploc bag of tokens. At the start of each trial, the experimenter provided the participant with their high-preference item and said "You can play with the (item's name) for 10 seconds." During Susie's sessions, when the timer signaled the end of the 10 s, the peer's individual therapist prompted the peer to request the item in the same manner described in Study 1. During Finn's sessions, his individual therapist, as the sharing partner, requested the high-preference item, saying "Can I have the toy, please?" If the participant shared the item independently within 5 s of the initial request, the experimenter provided the participant with one token and praise such as "Good job sharing! You earned more time with the (high-preference item's name)." The participant then placed the token on their token board and the sharing partner accessed the item for 10 s. If the participant did not share the item within 5 s of the initial request, the experimenter provided a gestural prompt by pointing to the participant and then over to the peer. If the participant shared the item within 5 s of the gestural prompt, no token or praise was provided to the participant and the sharing partner accessed the item for 10 s. If the participant did not share within 5 s of the gestural prompt, the experimenter gave the participant a vocal prompt such as "share toy" for Susie and "(Therapist's name) asked for the (item's name)." If the participant shared the item within 5 s of the vocal prompt, no praise or token was provided to the participant and the sharing partner accessed the item for 10 s. If the participant did not share the item within 5 s of the vocal prompt, the experimenter hand-over-hand assisted the participant to share the item. No token or praise was provided to the participant after a physically prompted share and the sharing partner accessed the item for 10 s. Each trial consisted of this same sequence and each session consisted of five trials. After each session, the participant accessed their high-preference item for an amount of time determined by how many tokens they earned during that session. Each token was exchanged for 30 s of access to their high-preference item. Thus, the participant could up to 150 s with the high-preference item after each session.

4. Results and discussion: study 2

Fig. 2 displays the percentage of trials with independent sharing of the high-preference item across baseline and treatment phases for Susie (top panel) and Finn (bottom panel). Susie exhibited a low level of independent sharing during the initial baseline phase (M = 13.3% of trials). When treatment was implemented, an immediate increase to 100% of trials was

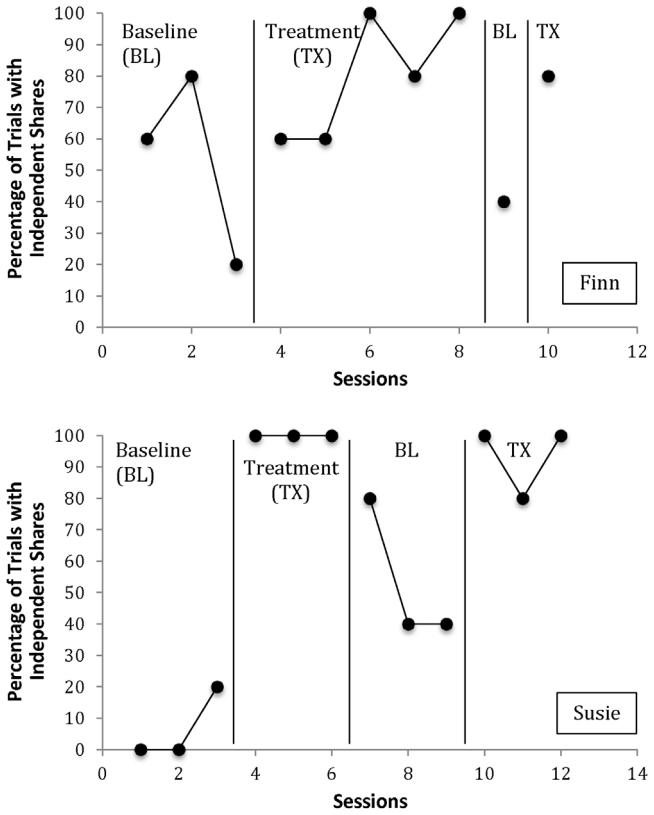

Fig. 2. Percentage of trials with independent shares exhibited by Finn and Susie during baseline (BL) and treatment (TX) sessions.

observed for independent sharing. Responding remained at this level for the three treatment sessions. When baseline was re-implemented, independent sharing decreased ($M = 53.3\%$ of trials). When treatment was again implemented, independent sharing returned to near 100% of trials ($M = 93.3\%$).

During Finn's first baseline phase, independent sharing was variable and was on a decreasing trend. Independent sharing averaged 53% of trials during this phase. When treatment was implemented, independent sharing was on a increasing trend, occurring on an average of 80% of trials. When baseline was re-implemented, independent sharing decreased to a level similar to what was observed during the previous baseline phase (40% of trials). A return to treatment resulted in an increase in sharing (80% of trials).

Collectively, the results of Study 2 demonstrated that the use of a token economy-based intervention increased independent sharing of high-preference item. Increases in independent sharing were noted for both participant and across two types of sharing partners (a peer and a therapist). These results were in line with the previous literature related to the utility of token-based interventions to improve socially important behavior exhibited by children with ASD.

5. General discussion

The majority of the research evaluating sharing between children with autism has used training packages (Barton & Ascione, 1979; Bryant & Budd, 1984; Sawyer et al., 2005), chaining procedures (DeQuinzio et al., 2008), and differential reinforcement procedures (Marzullo-Kerth et al., 2011). No studies have systematically identified the conditions under which sharing behavior is more or less likely to occur. More specifically, the impact of stimulus preference on independent sharing has not been investigated. Study 1 demonstrated an effect related to item preference and found that for the majority of participants, independent sharing was more likely in the presence of the low-preferred stimulus.

Several studies have evaluated at the utility of token economies to increase appropriate behavior exhibited by children with ASD, including increasing appropriate social interactions between peers and adults (see Matson & Boisjoli, 2009, for a review: Hung, 1977; McDonald & Hemmes, 2003; Odom, Hoyson, Jamison, & Strain, 1985; Steeves, Martin, & Pear, 1970; Tarbox, Ghezzi, & Wilson, 2006). Study 2 extended the literature related to the successful use of token economies with children with ASD by demonstrating its utility as a procedure to increase independent sharing of high-preference items. Study 2 also demonstrated effectiveness of the procedure across different types of sharing partners (peer and therapist).

The obtained results are not without limitations. First, Jack's data during Study 1 were not clearly differentiated. It is possible that continuation of the sharing assessment would have yielded similar responding across conditions. Regardless of this limitation, data for Finn and Susie were more clearly differentiated, suggest that independent sharing varies as a function item preference for some individuals. Similarly, due to the end of the school year, Finn's return to baseline and re-implementation of treatment were only in place for one session each. However, the stark differences in the percentage of trials with independent sharing as conditions changed rapidly provides an indication of experimental control and a functional relation between the independent and dependent variables. A second limitation of the current investigation relates to the inter-trail length. After a shared item was returned, the participant had 10 s of access prior to a new request to share. Ten seconds of access may not have been long enough to facilitate independent sharing. Individuals may be more independent with sharing if they have had an opportunity to interact with the item for a longer time. Researchers could focus on this question in subsequent studies. Specifically, independent sharing may be more likely, regardless of item preference, as satiation with the item increases.

From a clinical standpoint, the results have at least two implications. First, the results suggest that individuals with ASD who do share independently may not always do so. Inconsistency with this behavior may be a function of item preference and clinicians, therapists, parents, and other care providers should attempt to observe sharing behavior in the context of several different activities before determining if it is or is not in the individuals behavioral repertoire. Second, the results suggest that, when establishing teaching opportunities or opportunities to practice social skills such as sharing, care should be taken to identify the conditions under which the behavior does and does not occur. This approach to treatment design is typical when problem behavior is being addressed clinically. Often, a pre-intervention assessment is conducted to determine relevant variables to take into account during treatment. The results of Study 1 suggest a similar approach to pre-intervention assessment may be useful when constructing interventions related to social skills in general, and sharing in particular.

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