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REPORT

# Incorporation of Restricted Interests Reduces Stereotypy and Facilitates Play and Social Engagement Between a Preschooler with Autism and Peers in an Inclusive Setting

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**Abstract** Effects of a restricted interest play activity on stereotypy, social engagement, and functional play of a preschooler with autism were evaluated in an ABAB design. Baseline free play with peers involved high levels of stereotypy and little play and social engagement. Incorporating restricted interests decreased stereotypy and increased play and social engagement. Effects generalized across peers and were maintained at six-weeks. Results suggest a potential approach to supporting play and social interaction in inclusive settings and extend research suggesting a relationship between play and stereotypy.

**Keywords** Autism · Inclusion · Restricted interests · Stereotypy · Social skills · Functional play

## Introduction

Stereotypy is a central feature of autism spectrum disorder (ASD) and typically consists of repetitive movements that do not appear to serve an adaptive function (American Psychiatric Association 2013). Although stereotypy may be present in typically developing children to some extent, children with ASD tend to exhibit more intense and frequent stereotypical behavior relative to peers of typical development (Bodfisch et al. 2000; Ahearn et al. 2007). Stereotypy may interfere with skill acquisition, disrupt educational environments, and contribute to social isolation and stigmatization (Morrison and Rosales-Ruiz 1997; Lanovaz et al. 2013). Therefore, intervention to reduce stereotypy in children with ASD is often warranted (Rapp and Lanovaz 2016).

The majority of intervention studies targeting stereotypy have involved either consequence-based approaches exclusively or a combination of antecedent manipulations in tandem with consequence-based approaches (Reed et al. 2011). Although many of these studies have taken place in schools, few have been conducted in inclusive classroom settings involving typically developing peers (Lanovaz et al. 2013; Lanovaz and Sladeczek 2012). Students with ASD are increasingly included in settings with typical peers, and teachers in inclusive classrooms may not have specialized knowledge of evidence-based practices specific to these students (Lang et al. 2010b; Pazey et al. 2014). In addition, potential untargeted effects (e.g., functional play and peer social engagement) of interventions targeting stereotypy in the natural classroom environment have not been thoroughly investigated in the literature (e.g., Lang et al. 2009; Lanovaz et al. 2013). Therefore, interventions for stereotypy that may be feasible in inclusive classrooms warrant additional research, and the extent to which interventions may also produce other desirable behavior changes should be considered (e.g., Lang et al. 2014).

The purpose of the current study was to investigate the effects of a restricted interest play intervention on the stereotypical behaviors of a student with ASD in an inclusive preschool classroom. This investigation was an expansion of a study examining the effects of this intervention on the social interaction between preschoolers with and without ASD. As stereotypy may be more likely to occur in the absence of

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preferred activities (Kennedy et al. 2000), we hypothesized that stereotypical behavior would decrease when the participant's restricted interests were incorporated into play activities with a typically developing peer. In addition, we assessed whether embedding restricted interests into play activities would also result in an increase in functional play skills and social engagement with peers.

## Method

### Participants

Austin, a 57-month-old White American male, was diagnosed with ASD by a qualified professional prior to and independent of this study. He scored 45 on the Childhood Autism Rating Scale second edition (CARS-2; Schopler et al. 2010), indicating severe symptoms of ASD. Austin rarely exhibited intelligible communicative speech and demonstrated restricted patterns of behavior involving objects (i.e., repetitively organizing, lining up, rotating, or sorting small items) and body movement (i.e., flapping his hand in front of his face, kicking legs, and waving arms). Austin exhibited few functional play skills and used toys to engage in stereotypy. Results of the Questions About Behavioral Function survey (QABF; Matson and Vollmer 1995) indicated that non social reinforcement was the maintaining variable for his stereotyped behaviors.

A 59-month-old typically developing classmate served as Austin's play partner. She was chosen based on age-appropriate verbal and social skills, a history of compliance with teacher directions and of offering to help classmates, and based upon teacher and support staff recommendation (Chan et al. 2009; Watkins et al. 2015). Two typically developing classmates served as generalization partners and were based on the same selection criteria.

Sessions were conducted in a private preschool classroom where one head and two assistant teachers provided educational services to five students with developmental disabilities and six typically developing peers. The room was approximately 5.3 × 6.1 m. The front half of the room contained a round table and a rectangular table for group and seatwork, as well as a sensory table filled with sand. The back half of the room consisted of a reading area delineated by rug surrounded by cushions and pillows and a play area delineated by another rug surrounded with shelves of toys. All baseline and intervention sessions took place on the rug in the play area. The teacher, assistants, and other students were in close proximity with Austin and his peer during all sessions but were engaged in other activities within the classroom (e.g., small group work, free play, individual instruction).

### Procedure

An ABAB design was used to evaluate the effects of the restricted interest-based activity intervention on stereotypy, functional play, and social engagement (Barlow et al. 2008).

**Baseline** The facilitator directed Austin and the peer to the play area of the classroom and told them "it's time to play." Austin and the peer were allowed to select any of the toys that were available on the shelves surrounding the play area or to select other items within the classroom that were deemed to be appropriate by the teacher and bring them to the play area rug. The children were not given instructions and no prompting or reinforcement was provided for any behaviors exhibited by either child. If Austin or the peer attempted to leave the rug, the facilitator directed the child back to the play area.

**Restricted Interest Play Intervention** An age-appropriate play-based activity that would potentially be appealing to both Austin and his peers was selected. Researchers observed Austin during free play and interviewed the classroom teacher, parents, and other school staff in order to determine which activities Austin most frequently engaged in (Koegel et al. 2012a, 2012b, 2013). Austin exhibited repetitive behaviors that involved organizing, sorting, and lining up items by shape, size, or color. Based on the topography of his repetitive behaviors, we chose socially appropriate play activities that matched aspects of his stereotypy (Lang et al. 2009; Rapp et al. 2004). These play activities included games such as Connect Four®, Kerplunk® (which involve lining up game pieces as part of the game play), and stacking wooden beads of different shapes and colors on a pole to create a variety of patterns. The play activities utilized materials and items typically found in an early childhood education setting and did not require the development of novel or specialized materials.

As in baseline, Austin and his peer partner were directed to the play area of the classroom. The facilitator was responsible for the organization of the materials and providing, upon first introduction of a play activity, a brief introduction (i.e., 2 to 3 min) of the activity to the children through modeling with verbal explanation. The facilitator did not direct the play activity or otherwise engage with the children. Furthermore, no feedback was provided to Austin or the peer following the play session. As in baseline, if Austin left the play area, the facilitator directed him back.

**Generalization and Maintenance** Generalization with novel peers was assessed across all phases. To assess the durability of the intervention, maintenance probes were collected at 6 weeks following the conclusion of the intervention with the usual peer partner and a novel generalization peer that had not been involved in sessions prior to follow-up.

**Social Validity** Post-intervention, the classroom teacher provided feedback regarding the acceptability and feasibility of the intervention on a survey using a 5-point Likert scale. The typically developing classmates also provided feedback on their enjoyment of the play activity that incorporated Austin's restricted interests.

## Measures

**Data Collection** Data were collected on the percentage of intervals within play sessions that Austin engaged in stereotypy, functional play, and social engagement. Stereotypy was defined as rapid and repetitive rotation of hand with or without materials (e.g., rotating a block in front of the face), kicking legs and swinging arms up and down while seated, vocalizations that are not recognizable words, and lining up toys or other items. As in previous research, functional play was defined as using play materials in a manner appropriate to their intended function, for example, rolling a toy car along the ground (c.f., Lang et al. 2009). Social engagement was defined based on the description provided by Koegel et al. (2013) as the child with ASD remaining in proximity (i.e., 1.5 m) to the peer and appropriate engagement in one of the following social activities with the peer: playing a game (e.g., Connect Four®), creating something together (e.g., building a block tower), or oriented toward the peer while observing the peer's play (e.g., watching the peer take a turn during a game).

The percentage of intervals engaged in stereotypy, functional play, and social engagement was scored from videos of each 10-min session using 10-s partial interval recording. For each interval, the presence or absence of each dependent variable was recorded, and the percentage of intervals with presence of stereotypy, functional play, and social engagement was calculated for each session. Stereotypy, functional play, and social engagement were not mutually exclusive and could occur within the same interval. For example, stereotypy and social engagement could both occur within the same interval.

**Interobserver Agreement** The first author coded data for all sessions, and the third author provided independent interobserver agreement for 32% of sessions. Reliability was calculated by dividing the number of agreements by the total number of agreements plus disagreements and multiplying by 100%. Mean interobserver agreement was 91% (range = 86.8–98.4%) for stereotypy, 93.2% (range = 84.9–100%) for functional play, and 92.8% (range = 83.7–100%) for social engagement. In terms of fidelity to intervention procedures, the presence or absence of the restricted interest play activity (independent variable) within each session was noted during data coding and fidelity of implementation was 100%.

## Results

Figure 1 depicts the percentage of intervals the participant engaged in stereotypy during play sessions with a typically developing peer across each phase of the study. Figure 2 depicts the percentage of intervals the participant engaged in functional play and social engagement during play sessions with a typically developing peer across each phase of the study. During baseline, Austin exhibited high levels of stereotypy in each session ($M$ = 80.25%, range = 53.9–98.3%) and rarely demonstrated functional play skills ($M$ = 4.5%, range = 0–26.9%). No social engagement with a peer occurred during baseline sessions. Immediately following the implementation of the restricted interest play activity, stereotypy decreased ($M$ = 19.8%, range = 7.5–29.5%), and Austin demonstrated increases in functional play skills ($M$ = 47.9%, range = 35.3–76.7%) and social engagement with a peer ($M$ = 49%, range = 36.1–72%). Similarly, during the second implementation of baseline conditions, the percentage of

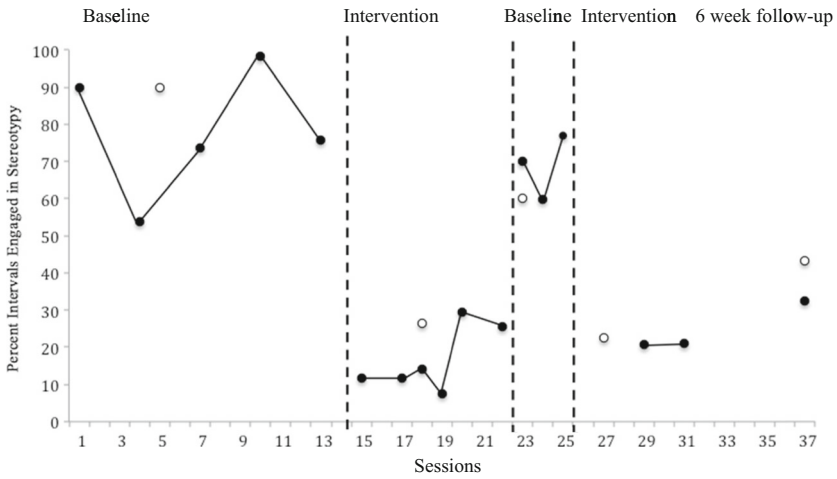


**Fig. 1** Percentage of intervals participant engaged in stereotypy during play sessions with a typically developing peer. *Open circles* indicate generalization probes with a novel peer

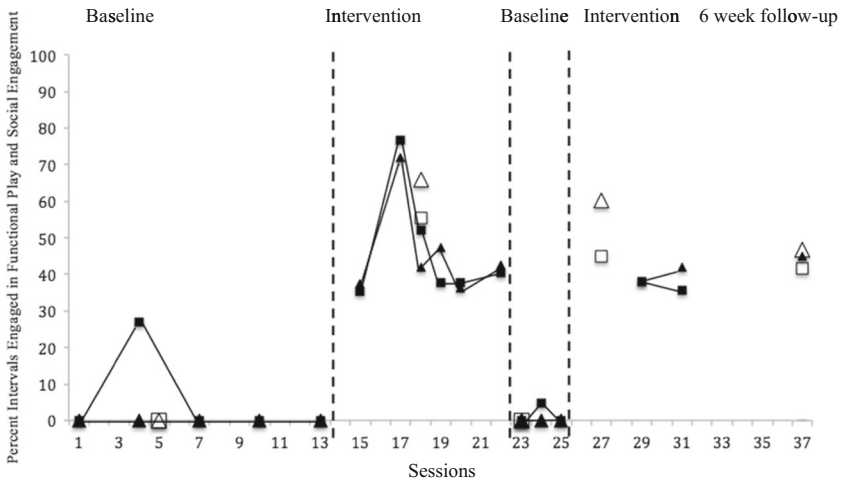


**Fig. 2** Percentage of intervals participant engaged in functional play (*closed squares*) and social engagement (*closed triangles*) with a typically developing peer during play sessions. *Open squares* and *triangles* represent generalization probes of functional play and social engagement, respectively, with a novel peer

stereotypy per session increased ($M$ = 67.2%, range = 58.62–73.68%), and functional play ($M$ = 1.2%, range = 0–4.8%) and social engagement (0%) decreased. With the return of the intervention, stereotypy again returned to lower levels ($M$ = 21.3%, range = 20.6–22.4%), and functional play ($M$ = 39.5%, range = 35.5–44.8%) and social engagement increased ($M$ = 46.8%, range = 38.1–60.3%). Generalization probes with novel peers during each phase reflected levels of stereotypy found with the usual peer partner in each phase. Stereotyped behavior during maintenance probes was slightly higher than during intervention sessions ($M$ = 38%, range = 32.5–43.3%), but levels were still lower than in baseline sessions. Social engagement and functional play during maintenance probes remained at levels similar to those during intervention at 45.9 and 41.7%, respectively.

Results of the social validity survey indicated that the teacher expressed a high level satisfaction with the intervention, that the strategy was feasible to implement within the normal classroom routine, and the teacher would be able to implement the procedures independently without the assistance of the researchers.

## Discussion

The results of this study indicate that incorporating the restricted interests of a preschooler with ASD into play activities mutually appealing to typical classmates was effective in reducing stereotypical behavior and occasioned gains in social engagement and functional play. This finding is consistent with research suggesting stereotypy is more likely to occur in the absence of preferred activities (Kennedy et al. 2000) and extends findings that have shown that antecedent intervention strategies alone may be effective in reducing some stereotypical behaviors (Lang et al. 2010a; Reed et al. 2011). Stereotypy remained low in intervention sessions with novel peers. In addition, functional play skills and social engagement simultaneously increased during the restricted interest play activity. This finding is consistent with research suggesting that it may be possible to produce an increase in functional play skills by implementing play activities that utilize aspects similar to the stereotyped behavior (Lang et al. 2009; Lang et al. 2010a, b; Rapp et al. 2004).

This intervention strategy would seem likely to be appealing to practitioners in inclusive classrooms as it did not require extensive direct instruction or continuous monitoring and support. Other than a few minutes of coaching on specific activities (e.g., how to play Connect Four®), no additional training for Austin or his peers was needed, and the intervention utilized only items typically found in an early childhood education setting. This simplicity reduces the need for training classroom teachers and paraprofessionals and may therefore be seen as more ecologically and socially valid than approaches requiring ongoing coaching and feedback to support treatment fidelity (Rispoli et al. 2011).

In addition, the teacher also observed and reported that Austin was more included in classroom activities with his peers following the intervention. Anecdotal feedback provided by the peers indicated that they enjoyed playing with Austin and liked the play activities. The usual peer partner did occasionally express an interest in playing with a wider variety of games and toys beyond what was present during intervention sessions. When implementing play sessions incorporating restricted interests, teachers should consider utilizing multiple peers across play sessions so that the child with ASD has access to a variety of play partners.

Although the findings of the restricted interest play activity are promising, these results should be interpreted cautiously. Facilitator modeling during intervention sessions may have influenced changes in behavior, and although adult modeling was not provided in every intervention session, future studies might attempt to analyze the effects of the restricted interest activity in isolation and introduce additional components if needed. In

addition, it is unknown if this approach would be effective for stereotyped behaviors that are maintained by socially mediated variables. Austin's stereotypy was maintained by nonsocial variables, and it is possible that the intervention was effective because it served the same function as Austin's stereotypy. Replications with participants with diverse characteristics are essential in order to improve the generalizability of this approach and advance evidence-based practice.

**Compliance with Ethical Standards** The authors declare that no funding was received for this study.

**Ethical Approval** Appropriate institutional board approval and informed consent was obtained for the study. 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.

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