

Use of Props During Mealtime for Children With Autism Spectrum Disorders: Self-Regulation and Reinforcement

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Abstract

Mealtime is an important family routine commonly affected for families with children with autism spectrum disorders (ASD). Limited research is available regarding strategies families incorporate to support mealtime engagement. The purpose of this study was to explore the frequency and characterize the purpose of Props used during mealtimes with children with ASD. A total of 12 families with a child(ren), $N = 14$, aged 2 to 7 years, with ASD and mealtime challenges or eating difficulties participated in video-recorded mealtimes in their home. Independent coders analyzed mealtimes for the frequency and purpose of Props (items used to support child participation during mealtime). Props were used by 75% of families ($n = 9$); common Props included toys, electronics, and books. Props were used primarily as a self-regulation tool for the child and occasionally as positive reinforcement for specific behaviors. Overall, Props were used to support child engagement in mealtime. Occupational therapists should consider using Props as individualized, accessible, and supportive mealtime interventions for families and children.

Keywords

caregivers, family centered practice, pediatrics

Background

Family Mealtime and Mealtime Challenges in Autism Spectrum Disorders (ASD)

Mealtime is an important routine contributing to family cohesion and well-being (Fiese, Foley, & Spagnola, 2006; Fruh, Fulkerson, Mulekar, Kendrick, & Clanton, 2011). Eating together helps build family identity and contributes to family stability (Spagnola & Fiese, 2007). Additional benefits of participation in family mealtime include expanded language development, improved social skills, and increased academic success for children (Snow & Beals, 2006; Spagnola & Fiese, 2007). Disrupted mealtime participation experienced by families with children with ASD and associated feeding challenges, may place these benefits at risk.

Mealtime and eating challenges are estimated to occur in 46% to 89% of children with ASD and may include food selectivity, sensory sensitivity, and behavior problems such as expulsion of food, or refusal to stay seated at the table (Cermak, Curtin, & Bandini, 2010; Johnson et al., 2014; Ledford & Gast, 2006). These challenges and problematic mealtime behaviors can lead to disruption in the family and decreased family engagement during mealtime (Suarez, Atchison, & Lagerwey, 2014). Limited mealtime engagement

contributes to overall difficulty constructing mealtime routines for families with children with ASD (Curtin et al., 2015; Ledford & Gast, 2006; Sharp et al., 2013; Suarez et al., 2014). Problematic behaviors during mealtime also lead to increases in caregiver stress, specifically affecting the mother, and a decrease in overall family mealtime satisfaction (Ausderau & Juarez, 2013; Marquenie, Rodger, Mangohig, & Cronin, 2011). Thus, the need for strategies to effectively address challenging mealtime behaviors and increase mealtime participation of children with ASD is critical.

Mealtime Strategies

Families with children with ASD use a number of strategies to support engagement in mealtime; however, these strategies have not been clearly identified in the literature. Previous studies have explored family use of mealtime strategies such as

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modifying the environment, preparing preferred foods, traditional behavioral interventions, or disguising nutrients in other foods (Bruns & Thompson, 2011; Rogers, Magill-Evans, & Rempel, 2012; Suarez et al., 2014). Additional studies offered a parent-report scale to capture and describe the mealtime strategies and behaviors used at home (Hendy, Williams, Camise, Eckman, & Hedemann, 2009; Williams, Hendy, Seiverling, & Can, 2011). However, direct observations of specific mealtime strategies used by families in their natural context have yet to be clearly defined in the literature. Direct observations may reveal additional strategies parents are consciously unaware of and contribute to a more complete understanding of parent mealtime strategies. As part of a larger qualitative study, mealtime strategies used by families with children with ASD were identified and defined (Ausderau, St. John, Kwaterski, Nieuwenhuis, & Bradley, in press). After reviewing mealtime videos from 12 families with a child(ren) with ASD between the ages 2 and 7 years, six types of strategies were identified: (a) Parent Intervening and Ignoring, (b) Meal Preparation and Adaptability, (c) Positive Reinforcements, (d) Play and Imagination, (e) Distractions, and (f) Modeling. The use of Props, defined as items used to support child participation in mealtime, was embedded within these strategies, but not a unique strategy within itself. Props were most commonly toys, pacifiers, blankets, electronics, and books as well as common household objects. Due to their high use by families and children across the different strategies, Prop use warranted further investigation.

Studies specifically exploring the use of Props during mealtime are limited and findings are mixed. Orrell-Valente and colleagues (2007) identified the use of play (primarily involving toys) during mealtime as reinforcement for typically developing kindergarteners to increase food consumption and variety. In addition, access to preferred toys was associated with a reduction in negative mealtime behaviors for nine children with a variety of diagnoses enrolled in an intensive feeding program (González, Rubio, & Taylor, 2014). In contrast, Powell, Farrow, Meyer, and Haycraft (2017) found the use of a distraction, including toys, during mealtime was correlated with an increase in food refusals for typically developing toddlers. Although there are selective studies exploring the use of toys and Props within specific populations, findings are conflicting and do not explore mealtime engagement. In addition, the use of Props (i.e., toys and household/child objects) and their purpose within mealtimes has yet to be explored for families with children with ASD. The purpose of this study was to explore the frequency and characterize the purpose of Prop use during mealtimes with children with ASD.

Method

The current study was a secondary video analysis from a larger mixed-methods study on the impact of mealtime challenges and eating difficulties in children with ASD on family

Table 1. Child and Family Characteristics.

Children	N = 14
Current ASD diagnosis (allowed to select more than one)	
Autism/autistic disorder (%)	71.4
Asperger's disorder (%)	7.2
Pervasive developmental disorder- not otherwise specified (%)	21.4
Chronological age (SD) months	65.1 (18.4)
Average number of siblings	1.0
Mother's college education (%)	
Partial high school or lower	0
High school or graduate equivalent degree	7.2
Associate's degree/partial college	21.4
Bachelor or master degree	71.4
Advanced degree such as doctorate	0
Two-parent household (%)	92.9
Annual household income (%)	
Less than US\$20,000	14.3
US\$20,000-US\$39,999	0
US\$40,000 -US\$59,999	21.4
US\$60,000-US\$79,999	21.4
US\$80,000-US\$99,999	14.3
US\$100,000 or more	28.6

Note. ASD = autism spectrum disorder.

mealtimes. Human participants' approval was obtained (ethic's approval 2012-0488) and all participants completed an informed consent procedure prior to participation. Twelve families, with a total of 14 children with ASD and mealtime challenges, participated in the study. Eleven of the 14 children were male with 100% reporting to be White with no Hispanic or Latino origin. Children in the study were receiving variable types of intervention, but no one was receiving any direct services to address the child's eating or mealtime challenges. Participants were recruited through a local research registry and fliers displayed in local clinics. Families were English speaking, had a child(ren) between 2 and 7 years of age with mealtime challenges reported by a caregiver, and a diagnosis of ASD confirmed by a community physician or psychologist. Children with co-occurring diagnoses such as significant primary sensory impairments, physical disabilities, or genetic disorders were excluded. Table 1 summarizes child and family characteristics.

One goal of the larger study was to observe typical family mealtimes in their natural context to better understand family mealtimes that included young children with ASD. Families identified what typical family mealtimes were for them, including information such as where the meal took place, who was present, and what type of foods was served. Based on that information, families participated in one to two mealtime video observations. Five of the families described having multiple types of typical mealtimes that represented their family's experiences, so they were observed twice. For

example, one family, the mid-day meal always occurred at the counter with siblings, but the evening meal occurred at the family dinner table with all family members, so both examples were observed.

During coding and data analysis of the larger qualitative study, the use of Props was identified as a component of caregiver strategies embedded within the six strategy categories (Parent Intervening and Ignoring, Meal Preparation and Adaptability, Positive Reinforcements, Play and Imagination, Distractions, and Modeling). See Ausderau et al., (in press) for complete details on the larger study. Researchers within the larger study participated in group discussion and preliminary video review to reach agreement on a definition of Props to include in video coding. For the purpose of this study, a Prop was identified as any object, typically a child friendly item or a common household/child object, used during mealtime by the child and/or caregiver to support participation. Common mealtime materials (i.e., cups, plates, utensils, and placements) were only identified as a Prop if the parent intentionally used the item during the mealtime. For example, if the table was set with a child-friendly character cup and plate, but the child nor parent engaged with the item outside of its primary purpose, the items were not considered a Prop. Once a definition of Props was finalized, all researchers from the larger study participated in group discussions, paired coding, and finally, individual coding to develop reliability between coders. For the purpose of the larger study, moderate interrater reliability values (κ above 0.41) were considered acceptable due to the qualitative nature of the coding and the number of independent observations. See Ausderau et al. (in press) for complete details on interrater reliability procedures for the larger study. After acceptable reliability was obtained for the larger study, research team members used the predetermined definition of Props to review each video and identify if the video contained an example of Prop use. For each mealtime video, Props use was coded as “present” or “not present.” Due to the limited number of video observations, 100% coder agreement was necessary to ensure accuracy of results related to Prop use, therefore, all coders participated in group discussion to resolve any disagreement between coders.

Any video that included coded Prop use as part of the larger study was then included for further thematic analysis (Braun & Clarke, 2006) to confirm if Props were used during the mealtime observation, and identify how the Prop was used within the context of mealtime. First, research team members (three graduate students and one faculty member) independently coded each identified video and generated initial codes related to the potential purpose of the Prop during the mealtime. Next, based on the initial codes, preliminary themes further describing the purposes for Prop use were considered. In addition, in small groups the initial codes and the preliminary themes categorizing the purpose of Prop use were reviewed and analyzed to develop and define final themes and refine the coding system. Each video was coded

by a minimum of two researchers using the finalized coding scheme. Codes between researchers were compared. Disagreement was managed through a third independent reviewer, peer discussion, and secondary reviews until all team members were in agreement with the final coding of both the presence of Props within each video as well as the identified purpose of the Prop. The iterative analysis process and agreement among coders occurred during multiple team meetings. Noldus Observer XT (2013), video coding software, was used to assist with data management and analysis. Mealtime videos were uploaded into the coding software. Once the coding scheme was finalized, coders were able to review, visualize, and independently code mealtime observational data in the coding software.

Results

Props were used during mealtime by 75% of the families ($n = 9$) in the larger study and served as an important tool to support child participation across caregiver strategies. Prop use primarily occurred within the strategies of Mealtime Preparation and Adaptability, Distraction, and Positive Reinforcement. Items were used both independently by the child (i.e., holding toys at the table), as well as collaboratively between the child and caregiver (i.e., reading books together throughout mealtime). Three of the nine families using Props reported receiving at least one therapy service that addressed feeding between 0% and 25% of the time. The additional six families indicated they had not received any feeding-focused intervention. It is possible that observed parent strategies were adapted or applied from clinical intervention. Two primary themes that described how Props were used by children and families at mealtime were identified: (a) regulation and (b) reinforcement. The two themes were not necessarily considered mutually exclusive. Rather, due to the qualitative nature the study, themes were used to further describe the observed use of Props within a natural family context.

Regulation

Most commonly, observed in seven families, Props were used to support a child's behavioral or sensory regulation throughout the mealtime experience. A distinction was not made between behavior and sensory regulation. Rather, regulation was considered to be an overarching purpose, encompassing both sensory and/or behavioral components. Props were considered to support regulation when the item calmed the child, supported the child's focus, or appeared to provide a unique sensory input for the child with the goal to increase mealtime participation. Props were considered regulatory for children when the items were included in mealtime in the absence of contingent demands for participation or performance. Observed examples of Props used for regulation included children holding toys at the table during mealtime, an apparent seeking of sensory input by interacting with a Prop, or the presence of a distraction such as a book being read or a screen during mealtime.

Four children used toys as Props during mealtime with the apparent purpose of regulation. For example, one child held toy dinosaurs throughout the meal and became upset when they were set on the table. Once he was able to return to holding the dinosaurs, he became calm again and resumed his participation in mealtime. In this example, the primary caregiver did not require the child to participate in the mealtime in any specific way to obtain access to the dinosaurs, and the dinosaurs provided some comfort to the child during mealtime participation. Additional examples included children holding toys or stuffed animals throughout the mealtime as well as leaving the table to retrieve a toy and then resuming participation in mealtimes.

The use of a Prop to provide intermittent intense sensory input throughout mealtime was observed in one participant. The child alternated between coming to the table to take a few bites of food and jumping on a small trampoline placed near the dinner table. Access to jumping on the trampoline was not contingent on taking bites of food but rather appeared to facilitate participation in mealtime as part of the child's eating routine.

Props with the apparent purpose of distraction were considered a form of regulation support such that they diverted a child's attention from the challenge of eating and participating in mealtime and reduced the burden of the task for the child. Examples of a Prop being used for regulation and distraction included a caregiver reading books aloud to a child during mealtime without specifying that reading was contingent on eating, and the presence of screens (i.e., iPad or TV) during mealtime without specified participation requirements. Books read aloud was observed in two of the nine families, and noncontingent screen use was observed in four of the nine families.

Reinforcement

Props were also used as an incentive to reinforce a positive eating or mealtime behavior, although this was observed in a minority of families ($n = 2$). Props were considered reinforcement when the parent offered a desired Prop when the child completed a mealtime-related goal. For example, a mother required that the child take bites of food to put the preferred stuffed animals on the table. After each successful bite, she would add a stuffed animal to the table. An additional example included an offer of a long container of gumballs to a child in exchange for a specific number of bites of food. The container of gumballs was considered a Prop as it was an interactive and child-centered object introduced to the mealtime to support and motivate participation. Although reinforcement was observed infrequently, the research team determined it was vital to differentiate between these examples and the observed use of Props to support regulation.

Discussion

Families with children with ASD are integrating Props into the context of family mealtime as a way to support mealtime

participation. Results of this study indicate Props were used to promote a child's participation in family mealtimes through supporting the regulation of the child or providing behavioral reinforcement. However, the effectiveness of Props during mealtime could not necessarily be determined within the context of the current data set, but would be important to consider in future studies.

In other childhood occupations, such as school participation, sensory-based strategies that would be comparable with some of the Props identified in our study (e.g., trampoline) are implemented to support both behavioral and sensory regulation (Schilling & Schwartz, 2004; Van Rie & Heflin, 2009). Parents and educators routinely use sensory-based tools for children's regulation in the school setting (Green et al., 2006). Despite minimal evidence overall for these interventions (Case-Smith, Weaver, & Fristad, 2014), parents are also implementing similar strategies in the home environment. In addition, some of the items that we identify as Props are frequently used as reinforcement with varying success in more traditional behavioral-based intervention such as discrete trial training to more naturalistic developmental behavioral interventions (NDBI; Schreibman et al., 2015). NDBI, as described by Schreibman and colleagues (2015), is based upon principles of applied behavior analysis, but supports a more developmental framework in natural contexts. Incorporating interventions (i.e., NDBI) that align with embedding reinforcement in routine daily practices may provide a structured methodology for caregivers to use a Prop to reinforce a desired behavior or developmental skill during mealtime. The implementation and effectiveness of Props in environmentally valid contexts, such as mealtime, needs to be examined in relationship to both primary and secondary family mealtime goals. For example, a particular Prop may support a child's regulation and reduce behaviors, but does it also support the child's increased consumption of the desired quantity and variety of foods.

Within mealtime contexts, the use of toys or manipulatives at the table is often discouraged based on outcomes such as bite acceptance (e.g., Patton, Dolan, & Powers, 2008; Stough, Gillette, Roberts, Jorgensen, & Patton, 2015). However, there are other studies that support a child's access to preferred toys and activities during mealtime as an effective strategy for reducing problematic mealtime behaviors (González et al., 2014). Contradictory advice about toys during mealtime is also seen throughout popular parenting recommendations with clear suggestions to avoid toys at the table (Grogan, 2013; Rowley, n.d.), as well as encouragement to allow toys at the table (Jio, 2009). In the article by Jio (2009), toys and manipulatives were often introduced or encouraged by parents or they were not removed if the child independently brought them to the table. Although conflicting evidence exists, children with ASD may benefit from integrating toys or manipulatives into mealtimes to support child regulation. However, we hypothesize parents may be resistant to exploring the integration of these items or

revealing they are currently using them for their child during meals due to social stigma surrounding parenting practices. Occupational therapy practitioners may serve as an important collaborator with families to support the codesign of mealtime interventions in the home context. Together, they can determine if the use of toys or manipulatives during mealtime may be effective for a child based on the desired outcome and how implementing Props aligns with a family's mealtime practices.

Clinical Implications

Key findings and clinical implications from this study align with current evidence-based intervention reviews (Odom, Collet-Klingenberg, Rogers, & Hatton, 2010; Wong et al., 2015) and American Occupational Therapy Association practice guidelines for children with ASD (Tomchek & Patten Koenig, 2016). This study reveals families are integrating Props into their family mealtime construction to support the participation of their children with ASD. Practitioners must consider that a family's use of Props within mealtime has the potential to support participation for the child. By identifying the use of Props as a potential beneficial mealtime support, families can be empowered to be flexible in their individual mealtime construction to support their child and family's needs. How Prop use has been framed, implemented, and assessed in other settings (e.g., school) or types of intervention (e.g., behavioral-based) may provide a guide for practitioners as they consider collaborating with families around eating and mealtime.

Props have the potential to be a simple, affordable, and individualized therapy tool to integrate into family mealtime. Occupational therapy practitioners can use a family centered approach to collaborate with families to help identify what specific Prop may support a child's participation. A preference assessment could be conducted to help identify the most important and potentially effective Prop that may be acceptable within unique family structures. Once Props have been identified, practitioners may create a task analysis collaboratively with the family to determine how and when a Prop may be introduced to their child in the context of mealtime to increase the child's occupational performance. Further development of the child's occupational profile using the American Occupational Therapy Association Occupational Performance template may also assist in identifying mealtime-related routines and outcomes that are important to the child and family that may be supported by Props (American Occupational Therapy Association, 2017). Occupational therapy practitioners should work with families to evaluate the benefit of identified Props currently being used within the family mealtime structure and collaborate on which Props may be most effectively integrated to support family mealtimes and not distract the child or disrupt family goals.

Limitations and Future Research

Due to specific limitations identified in the study, results should be applied with caution and future research is essential. Due to the relatively small, homogeneous sample from one geographic area, generalization to a broader community of families with children with ASD and mealtime challenges is limited. In addition, data only included one to two family mealtimes versus sampling a larger number of mealtime observations over time.

As this was a secondary data analysis from a larger study, future research should recruit a larger and more diverse sample of families that all incorporate Props in their mealtime and potentially other daily routines. A primary assessment of how Props are used with the child with ASD and their siblings may expand findings and provide increased opportunities to observe Props being used as a reinforcement. In addition, observing multiple daily routines for Props use should be considered to explore if and how they are being implemented and may be successful therapy tools across multiple naturalistic contexts.

Although this study began to characterize how Props are being used in family mealtime, effectiveness of the Prop was not assessed. Future research should assess their effectiveness with primary and secondary mealtime outcomes as well as during other family daily routines. In addition to effectiveness, future research should incorporate a thorough child and family occupational profile, which would support family centered assessments of preferred Props, effective implementation, and relevant outcomes.

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Ethical Approval

This study was approved by the University of Wisconsin–Madison Education and Social/Behavioral Science Institutional Review Board with the approval number of SE-2012-0488.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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