Characterizing Caregiver Input to Children with Diverse Developmental Outcomes during Pretend Play

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In neurotypical development, infants begin engaging in pretend play at 18 months old. Toddlers with developmental disorders, including autism spectrum disorder (ASD) and language delays (LD), may not meet neurotypical play development benchmarks. Little research has examined the relationship between pretend play and caregiver input in toddlers with ASD and LD.

This study addressed two questions: 1) does the type of play caregivers encourage vary depending on their child's age and developmental status?; and 2) How often is caregiver input prompted by the child's behavior?

Participants included toddlers with an autistic older sibling, at elevated likelihood (EL) for ASD and LD. EL participants were classified as: EL-ASD, EL-LD, or EL-no diagnosis (ND). A comparison group consisted of children at typical likelihood for (TL) ASD. Caregiver-child dyads were videotaped playing together at 18- and 36-months-old. Caregivers' utterances were classified into categories denoting the various types of pretend play, if any, each utterance encouraged. Pretend-play-related utterances were categorized as *prompted* (if the child was actively playing with the specific toy or engaging in the specific play) or *unprompted* by the child, before the caregiver spoke.

A higher proportion of utterances were pretend-play-related at 36-months (46%) than at 18-months (40%, p=0.030). The proportion of complex pretend play encouraged increased significantly over time, while the proportion of simple pretend play encouraged decreased. A

higher proportion of pretend-play-related utterances were *prompted* by the child's play at 36-months (60%) than at 18-months (37%, $p<0.050$). At 36-months, caregivers of EL-ASD children used fewer *prompted* utterances than caregivers of TL children ($p=0.020$). These analyses suggest that caregivers encourage more pretend and complex play over time, and that play becomes increasingly child-driven as children age. Additionally, this suggests that caregivers of autistic children encourage play that is less contingent on the child's actions. This study helps us better understand the bidirectional influences between caregivers and children, and demonstrates that caregivers are highly attuned to their children during play in order to provide a salient, challenging environment in which their children can thrive and develop through play.

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1.0 INTRODUCTION

Play is a primary way through which young children explore the world and is a key context for development in cognitive, social, and linguistic domains. Of the forms of play exhibited by young children, pretend play is unique because it involves the ability to "suspend the here and now," a core skill that has real world applications throughout the lifespan (Lillard, 2007). Pretend play provides opportunities for children to hone their counterfactual reasoning and symbolic understanding skills (Weisberg, 2015), practice narrative recall and problem solving abilities (Bergen, 2002), and improve their understanding of false-beliefs and the distinction between appearance and reality (Schwebel et al., 1999). Individual differences in pretend play are also related to children's abilities to understand the emotions and feelings of others, which may be due to the role of perspective taking in pretend play (Youngblade & Dunn, 1995). Some research suggests a relationship between play and language development, with one study finding that children's symbolic play at 13 months predicts the semantic diversity of their language at 20 months (Tamis-LeMonda & Bornstein, 1994). Given the documented associations between pretend play and various aspects of development, the acquisition and development of play itself warrants specific attention, as differences in play development may have cascading impacts over time.

1.1 Play in Neurotypically Developing Toddlers

The developmental trajectory of play in neurotypical children is well-documented. Overall, the research suggests three general levels of play through which young children progress: 1) Sensorimotor play, 2) Functional play, and 3) Pretend play. Infants as young as 2 to 4 months first engage in sensorimotor play, which involves the indiscriminate exploration of toys using the child's various senses, such as mouthing, grasping, and banging objects (Belsky & Most, 1981; Casby, 2003; Freeman & Kasari, 2013; Largo & Howard, 1979). Around 9 months, sensorimotor play begins to decline, and functional play, which involves manipulating an object in a way that is uniquely appropriate for that object's properties (e.g., stacking blocks, rolling marbles), becomes more prevalent (Belsky & Most, 1981; Fein, 1981; Largo & Howard, 1979). Finally, as functional play starts declining, toddlers begin to exhibit pretend play, which Belsky and Most (1981) define as play which moves "beyond the discovery of properties to the use of preexisting knowledge in manipulating them." This shift occurs around 18 months (Fenson & Ramsay, 1981; Leslie, 1988; Weisberg, 2015), although some research suggests that children can understand pretend play as early as 12 to 16 months old (Bosco et al., 2006; Largo & Howard, 1979). The patterns seen throughout various studies detailing the trajectory of play suggest that it develops in a progressive manner, with simpler actions declining as children develop the ability to play in more complex and sophisticated ways (see Fein, 1981 for a comprehensive review).

A clear developmental progression is also evident within pretend play, as children advance from simpler to more cognitively demanding pretense actions. Toddlers first conduct pretend actions directed towards themselves (e.g., feeding oneself with a toy spoon) before beginning to direct those pretend actions towards other real people, then finally towards inanimate objects such as dolls (Belsky & Most, 1981; Bornstein et al., 1996; Freeman & Kasari, 2013). Toddlers first

engage in pretend by imitating "realistic" functions with replicas of real objects (e.g., cooking with pretend pots and pans). They then begin to employ substitutions, which involve using one object in the place of another (e.g., using a fork as a microphone, or a cardboard box as a spaceship). (Belsky & Most, 1981; Freeman & Kasari, 2013; Largo & Howard, 1979; Weisberg, 2015). The stages of pretend play that develop during the first 2 to 3 years of life have been robustly studied in neurotypical toddlers. However, the timeline during which pretend play is expected to develop may not be comparable for children with diverse developmental outcomes such as autism spectrum disorder (ASD) and non-ASD language delays (LD).

1.2 Play in Toddlers with ASD and Language Delays

Base rates of ASD are relatively low across the general American population, with approximately 2.8% of children being diagnosed with autism by age 8 (Maenner, 2023). Therefore, prospective research studying indicators of ASD in the first few years of life often focuses on younger siblings of older children with ASD. These younger siblings have an elevated likelihood (EL) of receiving an autism diagnosis themselves, with approximately 18.7% of EL children being diagnosed with ASD (EL-ASD; Ozonoff et al., 2011). Additionally, EL children have higher rates of non-ASD language delays (EL-LD; Marrus et al., 2018), while a majority of EL children receive no diagnosis (EL-ND). This heterogeneity in developmental trajectories and outcomes make EL siblings an ideal group for studying variations in the development of play.

Previous studies have reported conflicting results surrounding non-pretend play development in autistic children. Some research finds that EL-ASD toddlers produce fewer spontaneous functional play behaviors than EL-ND or typical likelihood (TL) comparison toddlers

(Christensen et al., 2010). Other studies find no differences in functional play between groups (Campbell et al., 2016; Charman et al., 1998). Conversely, there are clear differences in the developmental trajectories of pretend play specifically between autistic and neurotypical toddlers. Starting around 20 months, autistic toddlers demonstrate a significantly lower quantity of pretend play behaviors, as well as less complex types of pretend play (e.g., playing with only realistic objects instead of engaging in substitutions) than their neurotypical peers (Campbell et al., 2018; Charman et al., 1998; Freeman & Kasari, 2013; Moerman et al., 2021).

While differences in pretend play development between neurotypical and autistic toddlers are well documented, much less is known about this developmental trajectory in toddlers with language delays. One study found that a group of EL siblings who showed deficits in cognitive, linguistic, or social domains but did not receive an ASD diagnosis did not differ from EL-ND or TL groups in the number of novel functional or symbolic play behaviors performed. However, this "other delays" group produced less self-directed play than their TL peers (Christensen et al., 2010). Other research has shown that children with expressive language delays perform fewer spontaneous pretend play behaviors and score lower on tasks meant to elicit complex pretend play (Rescorla & Goossens, 1992). Additionally, preschool-aged children with language delays tend to depend more on concrete, physical objects to engage in play, while children without language delays are able to use speech in order to further pretend scenarios in the absence of said objects (Lovell et al., 1968). Existing literature suggests the possibility of differing trajectories of play development between neurotypically developing children and children with LD, but to date there have been few studies comparing play in these two populations of children. More research is needed to investigate whether such differences exist at a group level.

1.3 Caregiver Input during Play

As is the case across all domains of development, play does not develop in a vacuum. Rather, children's play is influenced by the environment around them and they shape that environment with their own actions. Various studies have explored the effect that scaffolding, or adult structuring of play can have on children's play abilities. In one study, when examiners verbally prompted and nonverbally modeled functional and pretend play actions, children ages 9 to 30 months were unable to imitate play that was more complex than the actions they were already able to produce spontaneously (Largo & Howard, 1979). Blanc et al. (2005) reported opposite results, finding that relative to their spontaneous play, both typically developing and autistic children were able to engage in more complex play sequences when the play actions were verbally prompted and then demonstrated for them.

Complementary work has supported the idea that the verbal prompting, often supported by nonverbal modeling of play by caregivers or researchers increases the frequency and complexity of pretend play in both TL and EL-ASD children (Charman et al., 1998; Marjanovič-Umek et al., 2014; Moerman et al., 2021; Rutherford et al., 2007). One recent study conducted naturalistic observation of mothers and toddlers playing together in the home and reported that caregiver input, especially that which was multimodal and involved verbal prompting augmented by physical gestures, corresponded with toddler engagement in more complex types of play, as well as longer play bouts (Schatz et al., 2022). Little attention has been paid to this interaction between caregivers and EL-LD toddlers. However, the relationship between caregiver input and play development with this group of children does warrant consideration, as verbal instruction, supported by physical demonstration when necessary, may help children with LD engage in more complex play than they performed spontaneously (Rescorla & Goossens, 1992). To date, research has emphasized the

effect of verbal and nonverbal prompting simultaneously. However, to understand how different aspects of scaffolding affect play, it is important to isolate and analyze verbal input on its own.

Although caregiver input facilitates pretend play in both autistic and neurotypical toddlers, caregiver-child interactions during play may look very different in children with different developmental outcomes. While observing parent-child interactions during free play, Freeman & Kasari (2013) found that parents of TL children initiated and prompted play at a level that correlated with the child's level of play ability. In contrast, parents of EL-ASD children often responded to their children's play actions with slightly higher levels of play. This difference may be related to findings that autistic children tend to be less engaged with their caregivers during play (Campbell et al., 2016, 2018). When children are less engaged, it may be more difficult for their caregivers to tune their input to their child's level, leading to differences in caregiver input across developmental groups. Highlighting one such difference, Campbell et al. (2018) found that parents of EL-ND children tend to be slightly more sensitive, or in tune with their child's needs, during play than parents of either EL-ASD or TL children. In this way, caregivers and children may reciprocally influence one another, with the child's play actions prompting different types of caregiver input, which further influences that child's development.

1.4 Current Study

There are four significant gaps in the extant literature on caregiver modeling during pretend play with children with different developmental outcomes. First, previous research on reciprocal interactions during play has mostly been experimental, using highly scripted experimenter prompting or having caregivers trained to prompt their children in specific ways. Little naturalistic

research has been conducted exploring how caregivers encourage play outside of a laboratory setting. Second, there has been little focus on how interactions between caregiver and child during play vary between developmental groups, with some research addressing differences between autistic and neurotypical children but very few focusing on children with language delays. Third, research has tended to emphasize the role of caregiver input as a whole and has not teased apart differences between verbal and nonverbal input. Finally, most research focuses on child-caregiver interactions a single age and has not explored how they may change over time.

The current study addresses these gaps in the literature by: (1) analyzing child-caregiver interactions during semi-structured play recorded in participants' homes without explicit instructions regarding modeling; (2) including diverse developmental groups in the sample (i.e., EL-ASD, EL-LD, EL-ND, and TL toddlers); (3) focusing solely on caregiver speech; and (4) collecting data at both 18 and 36 months in order to analyze caregiver input and reciprocal interactions during play at multiple stages throughout development.

This study aims to answer two main questions:

1. How does the type of play that caregivers encourage vary depending on their child's developmental status?

Given previous descriptions of the typical progression of play development (Fein, 1981; Tamis-LeMonda & Bornstein, 1991; Weisberg, 2015), we expect to see more pretend play overall, as well as more complex forms of pretend play (such as substitutions) encouraged at 36 months than at 18 months. Additionally, one study found that parents of neurotypical children initiate play that is equally as complex as their children's spontaneous play, while parents of autistic children tend to initiate more complicated play activities than those their children produce spontaneously (Freeman & Kasari, 2013). Thus, we anticipate that caregivers of TL and EL-ND toddlers will

encourage pretend play less frequently and simpler types of pretend play at 18 months, as their children are just beginning to demonstrate pretend play, while caregivers of EL-ASD toddlers may encourage more pretend and complex play that does not match the level of play their children conduct spontaneously. At 36 months, we expect to see an increase in the complexity of play being prompted by caregivers of TL and EL-ND children. However, we do not expect the level of play encouraged by caregivers in the EL-ASD group to change from 18 to 36 months.

Alternatively, it may be the case that caregivers of EL-ASD children are influenced by the fact that their children tend to engage in less spontaneous pretend play than their neurotypical peers (Charman et al., 1998; Rutherford et al., 2007). These caregivers then may encourage less pretend play overall at both 18 and 36 months as compared to their TL and EL-ND counterparts. Following this line of reasoning, one would in fact expect to see an increase in the complexity and amount of pretend play encouraged by caregivers of EL-ASD children, as these children do develop more complex play abilities over time, albeit often not to the same level as their neurotypical peers. Little research exists to inform a hypothesis about caregivers of EL-LD children. Therefore, we aim to describe patterns and gain insight into the ways in which caregivers of EL-LD children encourage their children to play.

2. How often is caregiver verbal input prompted by the child's play actions?

As children develop more advanced play skills and increase the amount of play that they produce spontaneously over time, we expect caregiver input to be prompted more often by the child at 36 months than at 18 months. Additionally, previous research indicates that parents of EL-ND children are more likely to pay attention to their child's interests during play and follow the child's lead than are parents of EL-ASD or TL children (Campbell et al., 2018). Therefore, we expect to see caregiver verbal input prompted more often by EL-ND children than any other

outcome group. Additionally, as autistic toddlers and toddlers with language delays produce fewer spontaneous pretend play actions than their peers (e.g., Rescorla & Goossens, 1992; Rutherford et al., 2007), we anticipate that EL-ASD and EL-LD children's play will only prompt a small proportion of play-related caregiver utterances.

2.0 METHOD

2.1 Participants

The proposed study leveraged a sample previously described in Roemer et al. (2021) , which includes 55 caregiver-child dyads (21 female children). Forty-three of the children had older siblings with autism spectrum disorder (ASD), placing them at elevated likelihood (EL) for both ASD and other language delays (LD). Twelve of the children had no first-degree relative with ASD and were therefore considered at typical likelihood (TL; $n = 12$, 4 female) for these diagnoses. As a part of two longitudinal studies, EL and TL participants were visited in their homes at regular intervals the first year and a half of life, and all had follow-up visits at 18, 24, and 36 months.

All participants were from predominantly English-speaking households and came from full-term, uncomplicated pregnancies. Participants were recruited through a university autism research program and research registry, as well as various agencies and support organizations serving caregivers and children, and word of mouth. Sample characteristics are outlined in Table 1. 6 caregivers who participated in the play sessions were not mothers. 5 were fathers (EL-ND = 2, EL-LD = 1, EL-ASD = 1, TL-ND = 1) and 1 was a grandfather (EL-LD).

Table 1 Participant Demographic Characteristics

	TL	EL-ND	EL-LD	EL-ASD	Difference
Sex (M, F)	8, 4	7, 7	10, 6	7, 3	*n.s.*
Race	$N = 12$	$N = 14$	$N = 16$	$N = 10$	*n.s.*
White	11	14	15	9	
Black/African American	0	0	0	1	
Asian	0	0	1	0	

Mixed Race	1	0	0	0	
Ethnicity	*N* = 12	*N* = 14	*N* = 16	*N* = 10	*n.s.*
Hispanic/Latino	0	0	3	1	
Not Hispanic/Latino	12	14	13	9	
	N = 12	*N* = 14	*N* = 16	*N* = 10	
					n.s.
Mother's Average Age	31.4	33.8	34.6	31.1	
					p = 0.04
Father's Average Age	32.8	37.2	37.6	33.9	
Mother's Education					*n.s.*
	N = 12	*N* = 14	*N* = 16	*N* = 10	
High School	0	2	3	5	
Associates	0	2	2	1	
Bachelor's	7	7	5	3	
Graduate	5	3	6	1	
Father's Education					*n.s.*
	N = 12	*N* = 13	*N* = 16	*N* = 10	
High School	2	2	1	3	
Associates	0	2	3	2	
Bachelor's	3	6	7	1	
Graduate	7	3	5	4	

2.2 Procedure

As a part of the two aforementioned studies, dyads were visited at home at 18 and 36 months and videotaped while engaging in semi-structured play. After a brief warm-up period,

toddlers and their caregivers were asked to play as they normally would for 3 minutes with a standard set of toys, which included a teddy bear, cup, spoon, brush, washcloth, and bowl. Participants who did not complete this 3-minute play session at either 18 or 36 months were excluded from the present study (n = 2). One additional participant was excluded as she was eating during the session, which likely impacted the number of utterances she produced. Additional developmental measures were administered to EL toddlers at these visits as described in more detail below.

2.3 Outcome Classification and Measures

2.3.1 Autism Diagnostic Observation Schedule

The Autism Diagnostic Observation Schedule (ADOS) is an assessment of various features of social communication and behaviors, and is considered a reliable and valid assessment for ASD, with high levels of accuracy in diagnosing (Kamp-Becker et al., 2018). At the 36-month follow-up visit, all EL participants were assessed by a clinician who was naive to previous study data using the ADOS.

2.3.2 Mullen Scales of Early Learning

The Mullen Scales of Early Learning (MSEL) assesses a variety of motor and language skills, as well as visual reception abilities (Mullen, 1995). This assessment has demonstrated high

levels of convergent, divergent, and construct validity with both ASD and non-ASD populations (Swineford et al., 2015). Trained researchers completed the MSEL at all three follow-up visits, and Expressive and Receptive Language subscale scores at 36 months were used to help classify toddlers in the LD outcome group.

2.3.3 MacArthur-Bates Communicative Development Inventory

The MacArthur-Bates Communicative Development Inventory (CDI) is a measure of child language development consisting of a caregiver-report vocabulary checklist (Fenson et al., 2007). The CDI has high levels of test-retest reliability and validity (Fenson et al., 1994). The Words and Gestures form, CDI-I, is a checklist containing 396 vocabulary words which parents indicate whether children understand the word, or both understand and say the word. The Words and Sentences form, CDI-II, contains 680 vocabulary words, and asks parents to report on both the vocabulary their child uses, as well as the syntax of the child's speech. Finally, the CDI-III consists of 100 vocabulary words, as well as 12 questions regarding the pragmatic, semantic, and grammatic complexity of the child's speech. At the 18-month visit, caregivers either completed the CDI-I or CDI-II, depending on whether they reported low or high word production. At the 24-month visit, all caregivers completed the CDI-II, and at the 36-month visit, all caregivers completed the CDI-III. This assessment was conducted at all three follow-up visits, and standardized scores at or below the 10^{th} percentile were used to classify participants in the LD outcome group. Specific classification criteria are outlined below.

2.3.4 Outcome Classification

The above assessments were used to classify EL participants into one of three outcome groups. EL toddlers received a diagnosis of ASD (EL-ASD; *n* = 10, 3 female) if they both scored above the threshold on the ADOS and met DSM-IV criteria for ASD.

Some EL children did not receive an ASD diagnosis, but were classified as language delayed (EL-LD; *n* = 16, 6 female) because they either received: (1) standardized scores at or below the 10th percentile on the CDI-II and/or CDI-III at more than one of the three assessment time points, or (2) standardized scores at or below the 10th percentile on the CDI-III at 36 months of age as well as standardized scores on the receptive and/or expressive subscales of the MSEL greater than or equal to 1.5 standard deviations below the mean.

The remaining EL toddlers did not meet any of the above criteria and were categorized as no diagnosis (EL-ND; *n* = 14, 7 female).

2.4 Data Coding

2.4.1 Transcription

As part of a previous study, all caregiver speech directed to the child during the 36-month play session was transcribed using the video coding software Datavyu by researchers who were naïve to outcome classification. Caregiver speech was broken up into utterances. An utterance is defined as a segment of speech separated by grammatical closures such as commas or periods,

long pauses, or changes in intonation (Britsch, 2022). Coders were trained using CLAN conventions until they reached an agreement threshold of at least 90% agreement on utterance identification and 80% agreement on exact words transcribed on three consecutive videos. Once reliable, coders transcribed videos independently, with a second trained coder reviewing each video. Meetings were held weekly to double-check one another's work and come to a consensus on final transcription, with agreement between initial and final transcription maintaining reliability and ranging from 84 to 100%. Caregiver speech during the 18-month play session was transcribed for an earlier study (Roemer et al., 2022), and a trained coder reviewed the 18-month transcription in an additional pass to make edits and confirm that the transcription was consistent with the 36-month transcripts.

2.4.2 Types of Utterances

In a new coding pass, each caregiver utterance was categorized as encouraging different types of play, or not encouraging play at all. Categories denoting different types of play that the caregiver is encouraging their child to engage in included *functional* (referring to an object's unique functions or purposes), *pretend functional* (referring to the imaginary physical properties of a pretend object), *pretend self* (encouraging pretense play acting on the child), *pretend person* (encouraging pretense play acting on another person such as the caregiver), *pretend object* (encouraging pretense play directed towards an inanimate object such as the teddy bear), and *substitution* (decontextualizing an object, or giving an object a different purpose after having already used it in one way). These categories were adapted from previous literature describing the typical trajectory of the development of play and different stages of pretend and non-pretend play (Belsky & Most, 1981; Casby, 2003; Fein, 1981; Largo & Howard, 1979; Weisler & McCall,

1977). The order in which these categories are listed above reflects their hierarchical nature, with *functional* utterances representing the least advanced type of play, and *substitution* utterances representing the most advanced. Thus, for utterances in which more than one type of play appeared, the most advanced type of play involved in the utterance was coded. Non-play related utterance categories included *repetition* (an utterance was repeated multiple times in a row), *other* (the caregiver said anything unrelated to play, such as descriptive speech), and *uncodable* (times when the caregiver's utterance was unintelligible, so that the meaning of what they were saying was not understandable). See Table 2 for examples of each type of utterance. The complete coding manual is presented in Appendix A.

Table 2 Examples of Utterance Classification Categories

Type of Utterance	Examples
Functional	"let's put the bear's head in the bowl" "what do you use a cup for?"
Pretend Functional	"is the soup hot?" (there is no real soup) "there is water in the cup" (there is no real water in the cup)
Pretend Self	"clean up your mess, Childname" (about a pretend spill) "Childname, do you want to drink some apple juice?" (there is no real juice)
Pretend Person	"can you make soup for Mommy?" "look, Daddy is having breakfast"
Pretend Object	"the bear is hungry" "does the bear want to go to bed?"
Substitution	"this could be a swimming pool" (about the bowl) "can this be bear's blanket?" (about the towel)
Other	"do you want to play with our toys?" "pay attention, Childname"

	"the spoon is yellow"
Repetition	"I'm hungry" followed by "Childname, I'm hungry" (second utterance coded as repetition)
Uncodable	"xxx" (denotes unintelligible speech) "xxx today" (not enough intelligible speech to discern meaning)

Two coders naïve to children's outcome status were trained to a threshold of 80% agreement on codes on three consecutive videos. Once coders were reliable, videos were independently coded by one researcher, with the second researcher coding a random 25% of each video to ensure reliability. Weekly meetings were conducted between coders to discuss discrepancies and agree on final codes. Interrater reliability was strong, as measured via overall percent agreement (86%) as well as a kappa statistic ($\kappa = 0.8$).

2.4.3 Prompted Status

A final pass was conducted to determine whether caregiver utterances were prompted by the child's actions. All pretend utterance types (*pretend functional, pretend person, pretend self,* and *substitution*) were categorized as either *prompted* (child is playing with or indicating a desire to play with the toy in a way that prompted the caregiver's speech), *object_touch* (child was not playing with the toy but was holding toy passively), or *unprompted* (child was not playing with or indicating a desire to play with the toy), considering the child's words and actions within 4 seconds before the caregiver spoke. See Table 3 for examples of utterances of each prompted status. Non-pretend utterance types (*functional, other, repetition,* and *uncodable*) received a code of *not*

applicable for this pass, as the focus of the current study was the production of specifically pretend utterances by caregivers. Two coders were trained and reliability was conducted in the same way as described above (overall percent agreement = 86%, $\kappa = 0.76$).

Table 3 Examples of Prompted Status Categories

Prompted Status	Examples
Prompted	Child puts towel over bear, prompting caregiver to ask "is that teddy's blanket?" Child says "wanna cook", prompting caregiver to say "let's make breakfast"
Object_Touch	Child is holding the bowl and not paying attention, caregiver says "you can make yourself some soup" Child is holding the teddy and chewing on the spoon, caregiver says "you should feed teddy some lunch"
Unprompted	Child sitting, walking, cuddling, etc., not paying attention to toys until caregiver says "let's give the bear a bath" Child is focused on the bear; caregiver introduces the hairbrush and says "this can be a microphone"

3.0 RESULTS

The goal of this study was to examine the ways in which caregivers of differently developing children encourage their children to engage in play. Because the data were proportional and variables were dependent on one another, all analyses were conducted using nonparametric Kruskal-Wallis H tests. Mann-Whitney U tests were subsequently conducted as post-hoc pairwise comparisons. The first aim of this study was to analyze how the type of play that caregivers encourage varies depending on their child's developmental status. The second aim was to investigate how often caregiver input is prompted by the child's words or actions. Analyses for each of these aims are presented in turn below.

3.1 Comparing Caregiver Input by Child's Developmental Outcome Group

Our first aim was to examine whether the type of play that caregivers encourage varies depending on their child's developmental status. Three sets of analyses were conducted. First, we compared the proportions of all utterances that were pretend-play related ((*pretend functional* + *pretend self* + *pretend person* + *pretend object* + *substitution*) / *total # of utterances)* both over time and between outcome groups. Figure 1 presents the proportion of pretend-play related utterances spoken by caregivers across all four outcome groups (TL, EL-ND, EL-LD, and EL-ASD) at 18 and 36 months. As is evident, caregivers used significantly more pretend-play related utterances at 36 months compared to 18 months, regardless of outcome group, $H(1) = 4.55$, $p = 0.034$. At 18 months, 40% of all utterances were pretend-play related, with no significant

differences between outcome groups, $H(3) = 5.25$, $p = 0.154$. At 36 months, 46% of all utterances were pretend-play related and there was a significant effect of outcome group, $H(3) = 9.07$, $p = 0.028$, such that caregivers of EL-ASD children used a significantly smaller proportion of pretend-play related utterances than caregivers of EL-ND children (Table 4).

Table 4 Proportions of Utterances that were Pretend-Play Related by Caregivers in the Four Outcome Groups

	TL	EL-ND	EL-LD	EL-ASD	Difference
18 months	0.31(0.08-0.56)	0.4 (0.1-0.63)	0.45(0.19-0.62)	0.33 (0-0.6)	*n.s.*
36 months	0.42(0.18-0.63)	0.6 (0-0.75)	0.46 (0.14-0.7)	0.4 (0.16-0.55)	$H(3) = 9.07$; $p = 0.028$ EL-ASD < EL-ND

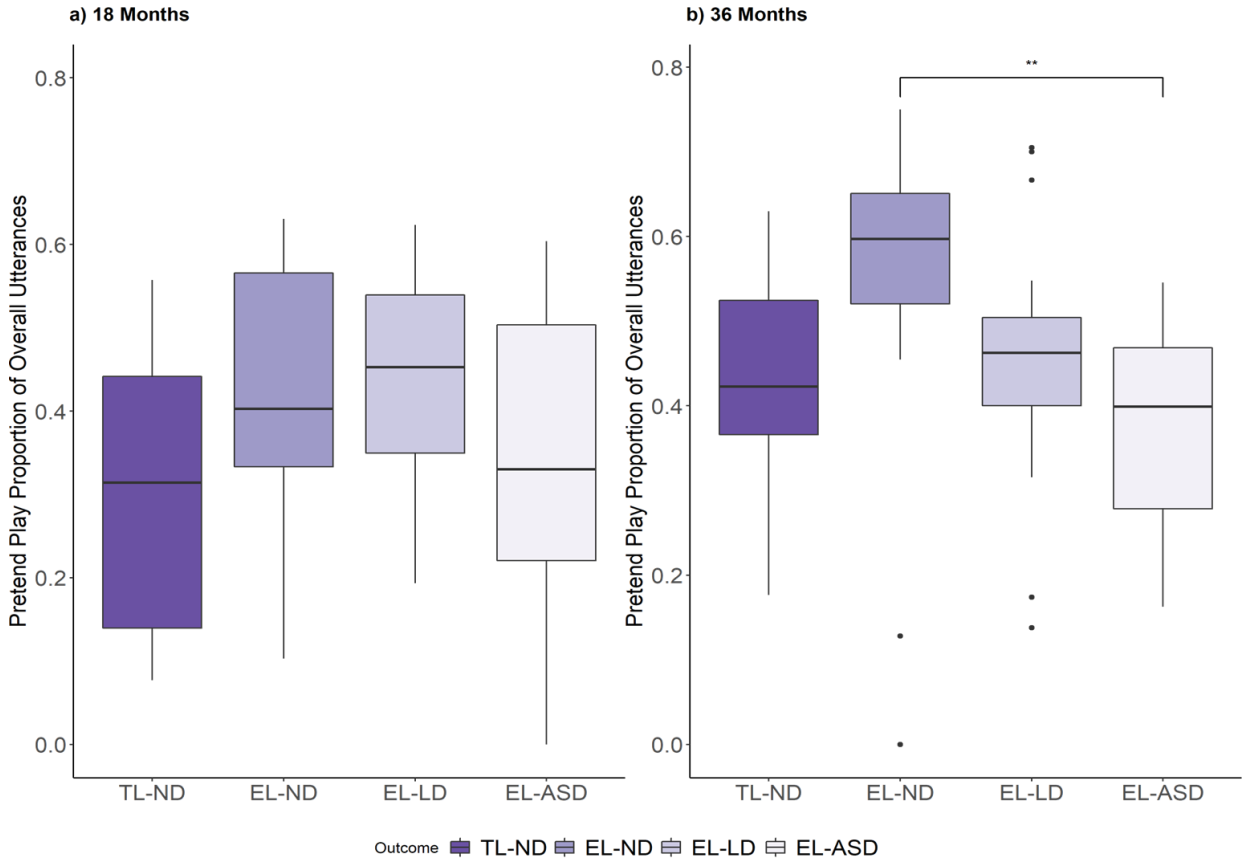

Figure 1 Proportions of Utterances that were Pretend-Play Related by Caregivers in the Four Outcome Groups

Next, we examined the relative proportions of each type of pretend play-related utterances. We first calculated these proportions (e.g., *pretend object / total # of pretend utterances*) for each type of pretend-play related utterance at both time points. One EL-ASD caregiver used no pretend-play related utterances at 18 months and one EL-ND caregiver produced no such utterances at 36 months; both were excluded from this analysis. Figure 2 displays these proportions across all four outcome groups at both 18 and 36 months.

Overall, *pretend object* (utterances encouraging play acting on an inanimate object, such as "feed the teddy bear") was the most common type of play encouraged. *Pretend self* (encouraging play acting on the child, such as "make yourself breakfast") was the next most common. All other types occurred at low frequencies. At 18 months, 71% of pretend-play related utterances were *pretend object*, 14% were *pretend self,* 4% were *pretend person*, 2% were *pretend functional,* and <1% were *substitution* (Table 5). There were no significant differences between outcome groups in the proportions of any type of pretend-play related utterances at 18 months. By 36 months, 79% of pretend-play related utterances were *pretend object,* 8% were *pretend self,* 4% were *pretend functional,* <1% were *pretend person,* and <1% were *substitution*. There was a significant effect of outcome group only for *pretend functional* utterances $H(3) = 10.70$, $p = 0.013$, such that caregivers of EL-ASD children used a significantly smaller proportion of *pretend functional* utterances than caregivers of TL-ND children at 36 months (Table 5).

Table 5 Proportions of Each Type of Pretend-Play Related Utterances by Caregivers in the Four Outcome Groups

	TL	EL-ND	EL-LD	EL-ASD	Difference
18 Months					
Pretend Object	0.65 (0.3-1)	0.81 (0-0.94)	0.74(0.25-0.93)	0.44 (0-1)	*n.s.*
Pretend Self	0.2 (0-0.6)	0.13 (0-0.86)	0.12(0.03-0.33)	0.29 (0-1)	*n.s.*
Pretend Person	0.05 (0-0.3)	0.02 (0-0.5)	0.05 (0-0.33)	0 (0-0.47)	*n.s.*

Pretend Functional	0.02 (0-0.1)	0.01 (0-0.16)	0.05 (0-0.33)	0 (0-0.11)	*n.s.*
Substitution	0 (0-0.38)	0 (0-0.14)	0 (0-0.05)	0 (0-0)	*n.s.*
36 Months					
Pretend Object	0.73 (0.411)	0.89 (0.26-1)	0.78 (0.33-1)	0.81(0.33-1)	*n.s.*
Pretend Self	0.9 (0-0.25)	0.05 (0-0.37)	0.08 (0-0.25)	0.13(0-0.41)	*n.s.*
Pretend Person	0.05(0-0.08)	0 (0-0.26)	0 (0-0.004)	0 (0-0.43)	*n.s.*
Pretend Functional	0.06(0-0.31)	0.04 (0-0.18)	0.07 (0-0.42)	0 (0-0.12)	$H(3) = 10.70$; $p = 0.013$ EL-ASD < TL-ND
Substitution	0 (0-0.2)	0.002(0-0.005)	0 (0-0.007)	0 (0-0.007)	*n.s.*

Finally, analyses were conducted to compare the proportions of each type of pretend-related utterances between 18 and 36 months. There were significant effects of time, such that caregivers used significantly higher proportions of *pretend self*, $H(1) = 5.42$, $p = 0.020$, *pretend person*, $H(1) = 5.62$, $p = 0.018$, and *substitution*, $H(1) = 3.83$, $p = 0.050$, utterances at 18 months, and a significantly higher proportion of *pretend object* utterances at 36 months, $H(1) = 4.65$, $p = 0.031$. However, the proportion of *pretend functional* utterances did not differ significantly across the two timepoints, $H(1) = 1.70$, $p = 0.192$. Pretend play that acts upon real people (*pretend self* and *pretend person*) is simpler for children to understand, and these types of play decreased over time, whereas more challenging play involving pretending with an inanimate object (*pretend object*) increased over time. Only 8 caregivers overall used any *substitution* utterances at 18 months (EL-ND = 5, EL-LD = 1, TL-ND = 2). Comparing between outcome groups, 36% of EL-ND caregivers, 6% of EL-LD caregivers, 17% of TL-ND caregivers, and 0% of EL-ASD caregivers produced *substitution* utterances at 18 months. While the average proportion of pretend utterances that were *substitution* utterances decreased over time, the number of caregivers that used any *substitution* utterances increased to 19 caregivers at 36 months (EL-ND = 8, EL-LD = 6, TL-ND = 4, EL-ASD = 1). Comparing between outcome groups, 57% of EL-ND caregivers, 38% of EL-LD caregivers, 33% of TL-ND caregivers, and 10% of EL-ASD caregivers produced

substitution utterances at 36 months. A chi-square test was performed to examine the relationship between child's age and caregiver's likelihood to produce *substitution* utterances. The relationship between these variables was significant, X^2 (1, N = 52) = 6.05, $p < 0.050$. Significantly more caregivers produced *substitution* utterances at 36 months than at 18 months. Overall, these results indicate that the play-related language which caregivers used became more complex over time, and that caregivers of differently developing children encouraged their children to play in relatively similar ways.

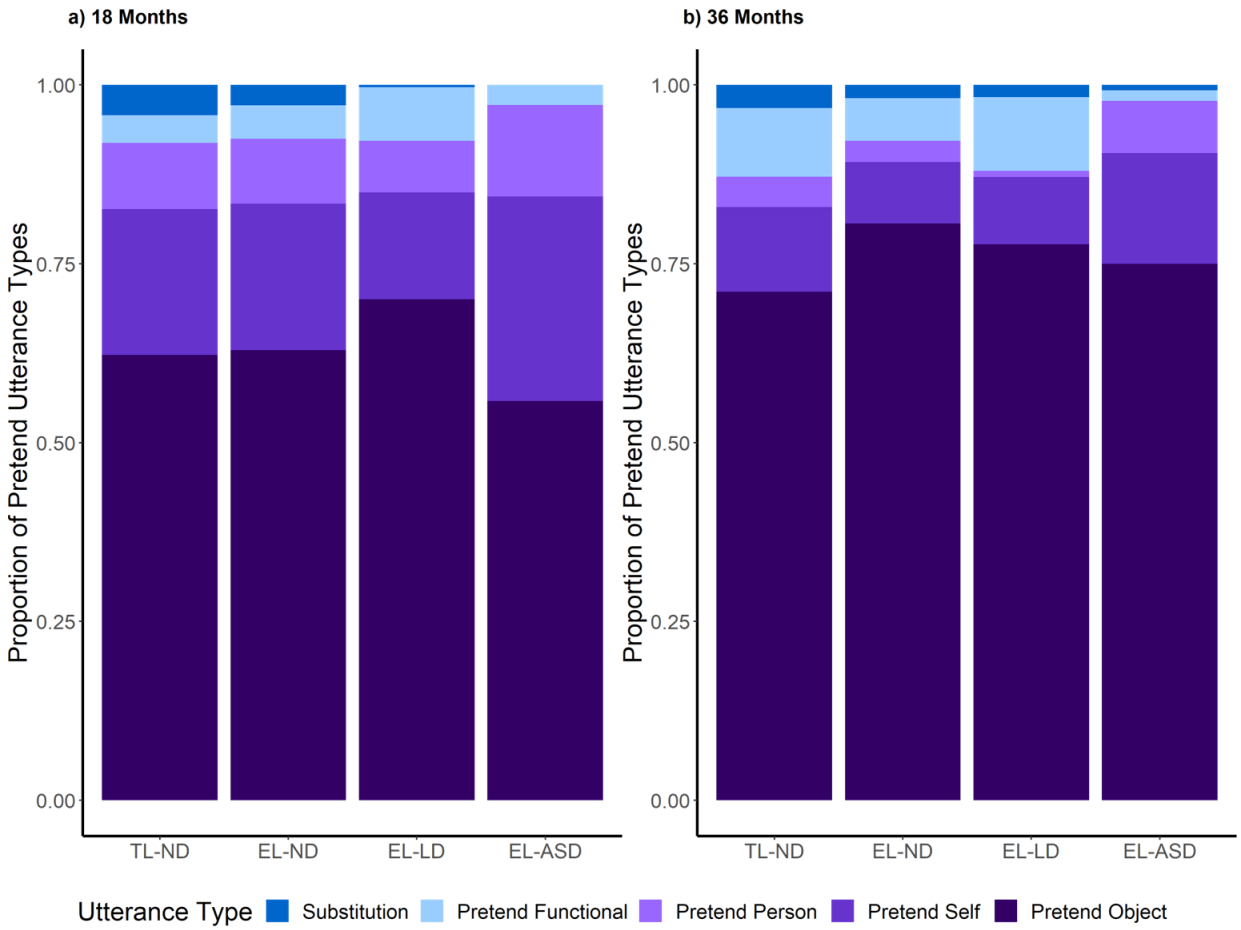

Figure 2 Proportions of Each Type of Pretend-Play Related Utterances Used by Caregivers in the Four Outcome Groups

3.2 Proportions of Caregiver Input Prompted by the Child

The second aim of this study was to examine how often caregiver verbal input was prompted by the child's words or actions. Two sets of analyses were conducted. We first calculated the proportions of all pretend-play related utterances that were coded as *prompted* (i.e., child played with or expressed the desire to play with the toy), *object_touch* (i.e., child was not playing with the toy but was holding toy passively), or *unprompted* (i.e., child was not playing with or

indicating a desire to play with the toy). The two caregivers who used no pretend-play related utterances (see above) were excluded from these analyses. At both 18 and 36 months, less than 1% of all pretend-play related utterances received the code of *object_touch*, with no significant differences between outcome groups or over time (*p*s > 0.050). As a result, proportions regarding *prompted* and *unprompted* utterances were essentially reciprocal, and the analyses reported below focus on *prompted* utterances (e.g., # prompted/total # of pretend play related utterances) to avoid redundancy.

Figure 3 presents the proportion of pretend-play related utterances that were *prompted* by the child's active play across all four outcome groups at 18 and 36 months. As is evident, a significantly higher proportion of utterances were prompted by the child's words or actions regarding the specific toy or play activity at 36 months than at 18 months, regardless of outcome group, $H(1) = 17.56$, $p < 0.001$. At 18 months, 37% of pretend-play related utterances were *prompted*, with no significant differences between outcome groups. By 36 months, 60% of pretend-play related utterances were *prompted*, and there was a significant effect of outcome group, $H(3) = 10.37$, $p = 0.016$, such that a significantly smaller proportion of pretend-play related utterances spoken by caregivers of EL-ASD children were *prompted* compared to utterances spoken by caregivers of TL-ND children (Table 6). Overall, these results indicate that caregivers encourage their children to play in ways that may be increasingly contingent upon the child's actions as the child grows older. They further suggest that while caregivers of differently developing children encourage play in similar ways at 18 months, by 36 months, caregivers of autistic children are less likely to encourage play that is contingent on their child's actions than caregivers of neurotypical children.

Table 6 Proportions of Pretend-Play Related Utterances Prompted by Children in the Four Outcome Groups

	TL	EL-ND	EL-LD	EL-ASD	Difference
18 Months					
Prompted	0.37 (0-0.73)	0.44 (0-0.72)	0.32(0.07-0.83)	0.33 (0-1)	*n.s.*
Object_Touch	0.05 (0-0.38)	0.04 (0-0.2)	0 (0-0.11)	0 (0-0.05)	*n.s.*
Unprompted	0.56 (0.2-1)	0.52 (0.17-1)	0.6 (0.17-0.93)	0.67 (0-1)	*n.s.*
36 Months					
Prompted	0.73(0.17-0.96)	0.58(0.2-0.95)	0.6 (0.17-0.84)	0.45(0.05-0.85)	$H(3) = 10.37$; $p = 0.016$ EL-ASD < TL-ND
Object_Touch	0 (0-0.33)	0 (0-0)	0 (0-0.09)	0 (0-0.17)	*n.s.*
Unprompted	0.17 (0.04-0.5)	0.42(0.05-0.8)	0.38 (0.16-0.8)	0.48(0.15-0.95)	$H(3) = 10.70$; $p = 0.013$ EL-ASD > TL-ND

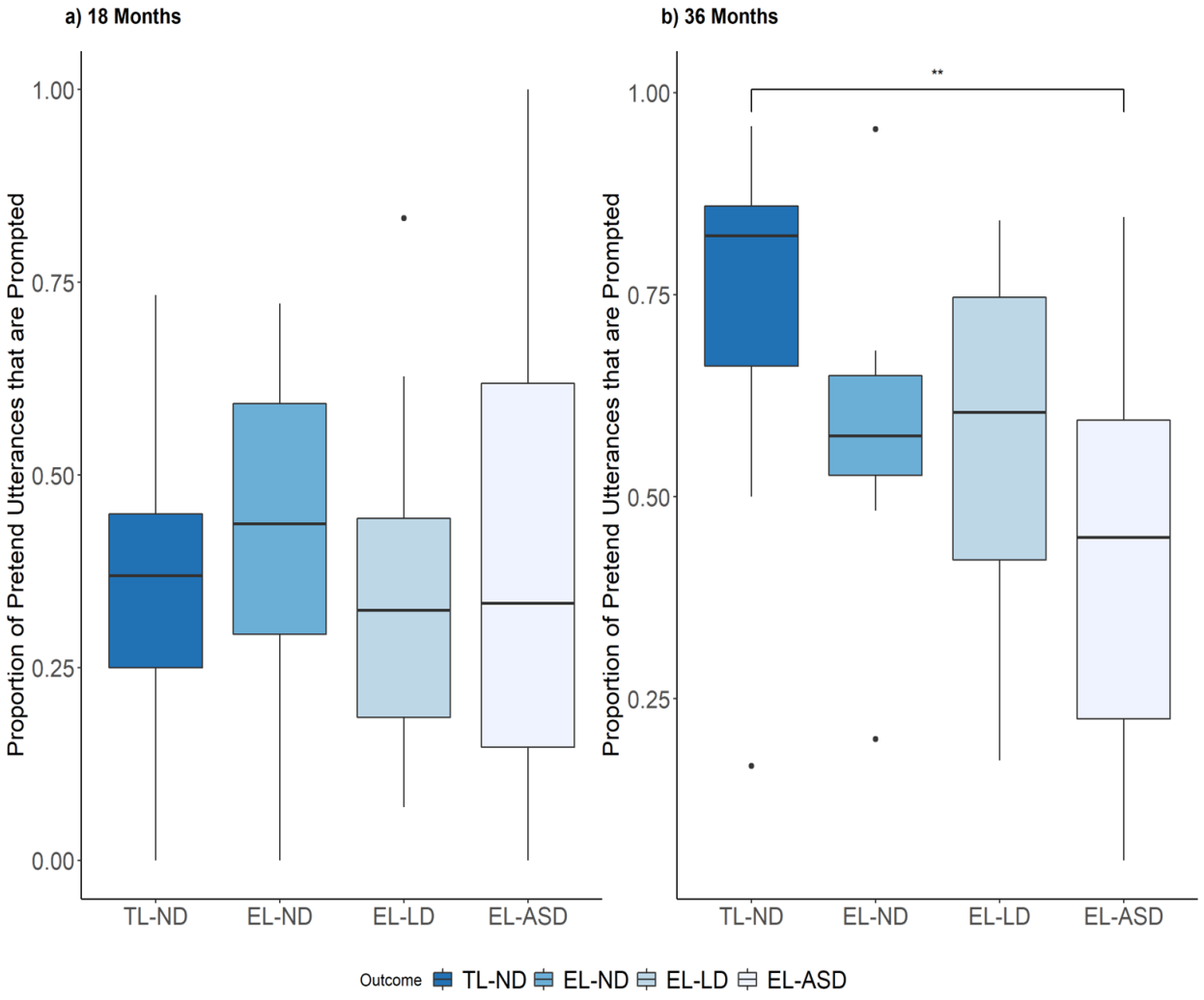

Figure 3 Proportion of Pretend-Play Related Utterances Prompted by Children in the Four Outcome Groups

4.0 DISCUSSION

This study examined ways in which caregivers of differently developing children encourage their children to engage in pretend play at 18 and 36 months of age. We used videos of dyadic play to study the types of pretend play that caregivers encouraged. Results indicated that overall, caregivers produced higher proportions of pretend-play related utterances at 36 months compared to 18 months. Caregivers across all outcome groups used higher proportions of *pretend self*, *pretend person*, and *substitution* utterances at 18 months, and a higher proportion of *pretend object* utterances at 36 months. Finally, a significantly higher overall proportion of pretend-play related utterances were prompted by the child's active play at 36 months as compared to 18 months. At 18 months, there were no differences between outcome groups for any variables. At 36 months, however, EL-ASD caregivers used a significantly smaller proportion of pretend-play related utterances than EL-ND caregivers, as well as a smaller proportion of *pretend functional* utterances than TL-ND caregivers. Finally, at 36 months, a smaller proportion of pretend-play related utterances from EL-ASD caregivers were prompted by the child's play actions than those from TL-ND caregivers. Findings related to changes in caregiver input over time and differences between groups will be discussed in turn.

4.1 Changes in Caregiver Input over Time

4.1.1 Caregivers Encourage Proportionately More and Increasingly Complex Pretend Play over Time

With regard to the overall amount of pretend play encouraged, caregivers produced higher proportions of pretend play focused utterances at 36 months compared to 18 months. This finding is in line with our hypothesis, as well as with previous literature regarding the progression of pretend play during development. Although children begin to engage in pretend play at about 18 months (Fenson & Ramsay, 1981; Leslie, 1988), the overall amount of pretend children engage in increases over time (Fein, 1981; Weisberg, 2015). Children also tend to engage in pretend that is first applied to themselves, and then to other people, before enacting pretend onto inanimate objects (see Belsky & Most, 1981, for a review on the progression of pretend play).

Results from the current study suggest that caregiver input follows this developmental progression as caregivers encouraged higher proportions of simple forms of pretend (*pretend self* and *pretend person)* at 18 months than at 36 months, but higher proportions of complex forms of pretend (*pretend object*) at 36 months than at 18 months. This finding is consistent with previous research. For example, one study reported that mothers were consistently most likely to shift away from simpler towards more sophisticated types of play from 13 to 20 months (Tamis-LeMonda & Bornstein, 1991).

An unexpected finding was that the proportion of *substitution* utterances decreased over time. Recall that *substitution* was the most developmentally advanced form of play that we coded. However, few *substitution* utterances occurred at either time point, raising the possibility that this result may have been due to chance, or to the influence of a few specific caregivers, rather than

indicative of an overall trend. While the proportion of pretend play-related utterances that were *substitution* utterances decreased over time, more caregivers overall produced *substitution* utterances at 36 months than at 18 months. Thus, the significant decrease in the proportion of *substitution* utterances may have been driven by a few caregivers who used many *substitution* utterances at 18 months, while the majority of caregivers did not encourage this type of play until 36 months.

The significant increase in the proportion and complexity of pretend play encouraged over time highlights the bidirectional effects that exist between caregivers and children during dyadic play. As children develop the ability to engage in play, they may create more opportunities for caregivers to encourage play at a higher level. This increase in encouragement from the caregiver may then scaffold the child's ability to engage in more complex pretend play, creating a positive feedback loop.

4.1.2 Higher Relative Frequencies of Pretend Play Related Utterances were Prompted by the Child at 36 Months

Relative to 18 months, a significantly higher proportion of caregivers' pretend play related utterances were *prompted* by the child's specific play at 36 months. This finding is consistent with our hypothesis and is in line with previous literature that suggests as children age, caregivers more frequently continue the play topic created by the child, instead of initiating their own play scenes (Marajanovic-Umek et al., 2014). Similarly, the current study demonstrated a shift towards child-initiated play instead of caregiver-initiated play with increasing child age. By 36 months, children spontaneously initiate complex, pretend play that they were previously only able to accomplish when the action was first modeled (Largo & Howard, 1979). This is reflected in the results of the

current study: over time caregivers increasingly responded to play initiated by the child, instead of prompting play independent of the what play (if any) the child is engaging in. This further emphasizes the influence of bidirectional effects on caregiver-child interactions during play and underscores the ways in which caregivers capitalize on the opportunities their children provide them.

4.2 Differences in Caregiver Input between Groups

4.2.1 No Differences between Groups on any Variables at 18 Months

Across all the variables measured, there were no differences between outcome groups (EL-ASD, EL-LD, EL-ND, and TL-ND) at 18 months. This contradicts our hypothesis that caregivers of EL-ASD children would encourage higher proportions of pretend and complex play than TL-ND and EL-ND caregivers at this age. While previous literature indicates that caregivers of EL-ASD children may encourage more complicated play activities than their children produce spontaneously (Freeman & Kasari, 2013), the similarities between outcome groups seen in the current study may be due to age. Previous research reports that autistic children begin showing differences in pretend play from their neurotypical peers at 20 months (Campbell et al., 2018; Charman et al., 1998; Moerman et al., 2021). Although individual differences influence the exact age at which a specific child begins to demonstrate developmental differences, this is an important timeline to keep in mind when considering the results of the current study. If, as previous literature suggests, children with different developmental outcomes have not yet begun to diverge in their

play at 18 months, there are may not yet be significant differences in the ways that caregivers encourage pretend play.

4.2.2 Caregivers Encouraged Various Types of Pretend Play at 36 Months in Similar Proportions

Caregivers across outcome groups encouraged different types of play at comparable rates, with one exception. Relative to caregivers of TL-ND children, caregivers of EL-ASD children produced significantly lower proportions of pretend play focused utterances that encouraged *pretend functional* play (in which caregivers refer to the imaginary physical properties of a pretend object). These results are generally consistent with our hypothesis, which did not predict any differences in the type of play that caregivers encourage at 36 months. One study of mother-child dyads during play found that mothers of neurotypical children were most likely to encourage play that matched the level of complexity of the play their children were engaging in, while mothers of autistic children more often encouraged play that was one level of complexity above that in which their children engaged (Freeman & Kasari, 2013).

These results may explain why, in the current study, caregivers of EL-ASD children encouraged various types of play in similar proportions as caregivers of neurotypically developing children. This suggests that the types of play caregivers of EL-ASD children encourage may not always directly reflect their children's developmental level, but rather what kinds of play these caregivers believe are appropriate for their children's age. The null results we found may also have been driven by similarities in child behavior between groups, although coding and analysis of child play would be necessary to further investigate this possibility.

The significant differences in *pretend functional* play utterances across groups merits further consideration. *Pretend functional* play was rarely encouraged by caregivers of any outcome group, and thus this may be a spurious result. However, it may be that caregivers of EL-ASD children are less likely to talk about things that are not actually there, as autistic children often struggle with imagining things that are not really there (Craig & Baron-Cohen, 1999). This may make this type of play especially challenging for them.

4.2.3 EL-ASD Caregivers Produced a Smaller Proportion of Utterances Encouraging Pretend Play at 36 Months Compared to EL-ND Caregivers

At 36 months, caregivers of EL-ND children produced a significantly higher proportion of pretend play utterances than caregivers of EL-ASD children. These caregivers also encouraged a higher proportion of pretend play at 36 months than caregivers of EL-LD and TL-ND children, though the difference was not significant. This pattern of findings does not support our initial hypothesis, which predicted no differences between groups in the amount or complexity of pretend play encouraged at 36 months.

There is some indication in the literature that caregivers of EL-ND children interact with their toddlers in ways that differ from their EL-ASD and TL-ND peers. One study found that caregivers of EL-ND children used more stimulating and scaffolding play for their children at 22, 28, and 34 months than those of EL-ASD and TL-ND children (Campbell et al., 2018). It may be that caregivers of EL-ND children are hypersensitive to their children's needs, as they know that their children are at an elevated likelihood of receiving an ASD diagnosis, and they have experience using strategies to stimulate and engage with their children due to their experiences supporting their older, autistic children. EL-ND children may benefit from this hypersensitivity,

as they spontaneously provide more opportunities for their highly attuned caregivers to engage them in play, leading to a positive feedback loop.

EL-ASD children, on the other hand, may not benefit as much as their EL-ND peers from their caregivers' heightened sensitivity. Previous research suggests that compared to neurotypical children, autistic children show lower levels of social engagement when engaging in play (Hobson et al., 2013; Rutherford et al., 2007). Lower levels of social engagement have been found to attenuate the differences between pretend play and developmental outcome group (Campbell et al., 2018). Given the results of the current study, it may be that EL-ASD children are less responsive to scaffolding from their caregivers, as more complex types of play may be more challenging for them.

4.2.4 Differences in Pretend Play Related Utterances at 36 Months by Outcome Group

With regard to the proportion of pretend-play related utterances that were prompted by the child's play, EL-ASD children prompted a significantly smaller proportion of caregiver utterances than their TL-ND peers. This runs counter to our hypothesis that a higher proportion of utterances from caregivers of EL-ND children would be prompted than any other group. It does, however, partially support our hypothesis that EL-ASD and EL-LD children would prompt a smaller proportion of utterances than EL-ND and TL-ND children. As discussed above, children with autism tend to engage in less spontaneous pretend play than their neurotypical peers (Charman et al., 1998; Rutherford et al., 2007). Therefore, it is unsurprising that these children prompt a smaller proportion of their caregivers' pretend-play related utterances. Notably, although EL-ASD children's specific play actions prompted a smaller proportion of pretend play, their caregivers still encouraged a substantial amount of pretend, with every caregiver in this outcome group

encouraging at least one instance of pretend play at 36 months. This highlights the high levels of attunement that caregivers have to their children's individual needs. As EL-ASD children may create fewer opportunities for caregivers to respond to their play actions, their caregivers adjust accordingly in order to give their children the necessary scaffolding and support to learn and grow through play.

4.3 Limitations and Future Directions

This study had a number of notable strengths, such as occurring in the participants' homes rather than in a lab, and utilizing a detailed coding manual to analyze specific types of pretend play, rather than splitting play into more general "pretend" versus "non-pretend" groups. An additional strength was that this was a prospective study, which allowed us to analyze early play behaviors before children receive different developmental diagnoses. There were also limitations, which included the use of a standard set of toys and the short length of the play period. The standard set of toys used for this study, which included a teddy bear, cup, spoon, bowl, and towel, was beneficial since every dyad had the same play opportunities. However, this standard set of toys also limits the generalization of our findings. Given the nature of the toys, caregivers may have prompted more pretend play, especially *pretend object* play focused around the teddy bear, than they do in their day-to-day lives.

Additionally, it is worth noting that 3 minutes is a relatively short period of time to conduct a free play session. While 3 to 5 minutes can be appropriate for this type of observational study (Christensen et al., 2010; Frey & Kaiser, 2011; Moerman et al., 2021), a longer period of

observation may be helpful in order to gather a more comprehensive sample of play behaviors (Choi et al., 2020; Damast et al., 1996; Schwebel et al., 1999). Finally, our sample size was relatively small (n = 52), and most participants were white, native English speakers, limiting the generalizability of the results.

Future studies should expand on our design by incorporating sequential play into the coding and analysis. For example, one caregiver may create a continuing storyline throughout three utterances ("is teddy hungry?" → "give teddy a snack" → "oops teddy spilled his food"), whereas another caregiver may use three consecutive utterances to prompt three different storylines ("is teddy hungry?" → "teddy is sleepy" → "should teddy go to school?"). Identifying sequences of utterances that build consistent storylines may provide additional context to the dyadic interaction. Future research should also include coding of child play vocalizations and actions, in order to further analyze the bidirectional influences that occur during play. The current study did not directly code these behaviors, which was a limitation as we could only speculate as to the impact of these bidirectional influences.

The present study adds to the literature by providing insight into the role of caregivers during pretend play. The study demonstrates that caregivers scaffold a child's playtime environment through the ways they speak to and encourage their children. It highlights the bidirectional influences between caregiver and child, as well as the ways in which caregivers adjust their input to be appropriate for their child's age and developmental level. Caregiver input is important to consider when studying play, given that the ways in which children play are influenced by the environment around them that caregivers create. Play is a critical way through which children grow and is linked with development across a variety of domains. Understanding the role of caregivers in this important activity will better inform us as to what types of interactions

are most beneficial in promoting children's development during play, particularly in children with diverse developmental outcomes.

Appendix A Coding Manual for Utterance Type and Prompted Status

Column: parent_prompts

Arguments: (type, followin)

First Pass: type (f/pf/ps/pp/po/s/x/o/u)

(f) Functional – manipulating an object in a way that is uniquely appropriate for its intended functioning

- Asking or talking about an object's intended function like "what is this cup for?" or "do you use this to eat?" or "do you put milk in there?"
    - Note: utterance should either have a specific noun (i.e. cup) or verb (i.e. brush), otherwise code (o)
- Discussing non-pretend relations between objects like "there is a cup on the teddy's head" or "teddy's leg is stuck in the cup" or "should we put the towel in the bowl?"
    - Note: packing up the toys ("put the toys in the bag") is relating to cleanup, not play, and should be coded (o)
- Playing with toys in a non-pretend way based on their physical shapes (i.e. using them as instruments to make sounds)

(pf) Pretend Functional – discussing the pretend physical properties of an object

- Describing fake properties of an object like "is the soup hot?", "is it good?" (while child is pretending to eat), or "soup, yummy", or "all clean" (about a dish, etc)
    - "Yummy" or "delicious" after mom/child (ps) or bear (po) eats food would be coded (pf)
    - "Mmm" or "yum" when preparing food with NO person or other recipient in mind
    - General descriptors without a specific property such as "good" or "so good" without a clear actor eating/drinking the pretend food should be coded as (o), NOT (pf)
- Asking for details about a pretend object without pretending the object is animate like "what kind of soup is that?"
- Discussing pretend relations between inanimate or imagined objects like "pretend there's soup in the bowl" or "what's in there?" referring to the bowl when the child "cooks"

- Asking about/naming pretend foods like “are there noodles?” or (after child says “the bear is eating rice”) “oh, rice”

(ps) Pretend Self – using pretense play with the child in mind

- Action prompts like “can I brush your hair?” or “can you make yourself soup?”
    - Note: if the subject of the action is unclear, and it is impossible to discern between (ps) and (po), be conservative and code (ps), but mark a comment for further review
    - Note: if no subject is stated but it is clear with context, mark verbs/commands toward the child or caregiver as (ps)
        - Ex: parent holds up the spoon and says “stir, stir”
        - Ex: “open up the yogurt” talking about the child cooking pretend yogurt
- Emotion prompts like “are you hungry?” or “what do you want for breakfast?”
- Sound effects made “by” the child (ex: chewing noises while caregiver feeds child)
- Utterances encouraging dyad play using “we”
    - Ex: “let’s eat dinner” or “can we have a picnic?”

(pp) Pretend Person – using pretense play with another person (usually the caregiver) in mind

- Action prompts like “brush my hair” or “make me breakfast”
- Emotion prompts like “I’m hungry” or “I want to have a picnic”
- Sound effects made “by” the person (ex: chewing noises while caregiver feeds him/herself)
    - Sound effects made when playing with inanimate objects like a “pshh” noise while pretending to pour juice

(po) Pretend Object – pretense play directed towards an inanimate “other”

- Action prompts like “brush the bear’s hair” or “what are you feeding the bear?”
    - Note: even though questions like “what is the bear drinking?” do include a (pf) aspect, code (po) because the idea of the bear doing the action is still being prompted
    - Note: if no subject is stated but it is clear with context, mark verbs/commands toward or about an inanimate “other” as (po)
        - Ex: parent holds up the cup up to the bear and says “drink, drink, drink”
    - “Taking care of” counts as a pretend action in context of the bear
- Emotion prompts like “what does the bear need/want?” or “the bear likes soup”

- Giving the inanimate object a job or identity (ex: bear looks like a chef today!")
- Statements in the first person while pretending to be somebody else (ex: "I'm hungry" while pretending to be the bear)
- Sound effects made "by" the play object (ex: chewing noises or laughing while pretending to be the bear)
    - Note: if parent is moving/gesturing the bear while making the sound, likely code (po)
- Naming an inanimate object (ex: "what's the bear's name?")
- Talking specifically and obviously to the bear (usually can tell if parent is using second person)
    - Ex: mom picks up the bear and says "are you hungry?"
- If the subject is unclear, but it is obvious that there is an inanimate "other", code (po)
    - Ex: "who's going to eat that?"

(s) Substitution – decontextualization of an object, or using pretense play on an object in a different way after already using it one way

- "Could this be a bathtub?" (about the bowl)
- "This can be his blanket" (about the towel, after already having used the towel as a napkin)
- Note: once an object has been established as something else (ex: "this is a blanket" referring to the towel), subsequent references are no longer counted as substitutions (ex: "bear should use his blanket" after "this is a blanket" would be po; "pick up the blanket" after "this is a blanket" would be o)
    - If item was then switched back to its original or to another label (ex: "use the towel" after "this is a blanket"), this would count as a substitution as it is using an object in a different way than was previously established
- NOTE: referring to the cloth as a towel, rag, washcloth, or other synonym is a label, as that is what the object actually is, and thus would be coded "o". Referring to the cloth as a different object is a substitution and would thus be coded "s"
    - "Napkin" is NOT a synonym here

(x) Same as above – if multiple utterances in a row encourage one play action

- Repetitive utterances count for this (ex: "I'm hungry" followed by "I'm so hungry")
    - "I'm hungry" would be coded (po)
    - "I'm so hungry" would be coded (x) because it is a reiteration of the same play action that was just encouraged
    - Note: be conservative here, if the verb and/or noun change, the utterance is likely not enough of a repetition to code (x)

- Incomplete utterances that are completed in the next utterance count for this (ex: "I'm going to" followed by "make him dinner")
    - "I'm going to" would be coded (po)
    - "Make him dinner" would be coded (x) because it is one prompt, just split into utterances for purposes that don't matter here
    - Note: the two utterances must make grammatical sentence for this to count
- If a short fragment is followed by a full (or more full) sentence containing the exact fragment, code the short fragment as (po/ps/pf) and the second utterance as (x)
    - Ex: "the bears" followed by "dyou wanna brush the bears hair?" would code "the bears" (po) and "dyou wanna brush the bears hair?" (x)
- Sound effects/standard spellings that are different technical sounds/words but imply the same action and come right after one another
    - Eating sounds: ah, soundeffect, nom nom, yum, mmm all count as (x) if in utterances right after one another, with the first one being either (ps) or (po) depending on context
- Note: second utterance must occur within 4 seconds to be counted as (x)
- Note: utterances labeled (x) will not be counted in the final calculations of proportions of types of utterances, as they are repetitive and don't reflect the variety of prompts used

(o) Other – other sounds

- Vague questions like "what do you want to do with this?" or "what else do we have?"
- Includes labeling like "what's this?" or "look a spoon"
- Includes statements unrelated to play like "sit down"
- Manners like "please" and "thank you"
- Incomplete utterances like "what k/ind" that are not completed in the next utterance (see [x] below)
- Sound effects that are not clearly made "by" the self or another play object
    - Includes "shh" soundeffects as (o)
- Praise like "good job"
- Interjections like "wow!"
- Describing real actions like saying "what a nice kiss" when the child kisses the bear's head or "give teddy a hug", or like "mix" if mixing real objects, or actually physically "wrapping" the bear in the towel
- Questions that don't allude to specific actions like "guess what?" or "you know what I want to do?" or "can you do it?"
- "Can you say" followed by a pretend word or action
    - Purpose of utterance is to prompt language, not play
- Discussion about real world people/events like "what does sibname do with her brush?"
- Non-specific allusions to pretending like "let's play pretend" or "just pretend to drink"
- Non-specific mentions of play like "let's play with bear" or "what should we play today?"

- Describing physical properties like “feel the bear, he’s so soft” or “the spoon is yellow” or “the bag is empty”
    - If the cup has stickers on it, “the cup has stickers” code (f), but “what’s on your cup?” or “what animal is that?” (talking about the stickers) code (o)
- Asking about toys in a way that does not pretend they are sentient like “does the bear look nice?” or “he looks so handsome”
- Real games like tag and peekaboo
    - These games are real, so parent saying “I’m it” or “you’re it” or “peekaboo”, or if parent is explaining the rules of the game, are not pretend utterances, and would be coded (o)
    - However: if the teddy (or any other inanimate object) is engaging in the games, references to the object playing would be coded pretend
        - Ex: “let’s play peekaboo with teddy”, “tag teddy” or “I’m it” while parent is pretending to be teddy would be coded (po)
- Note: error on the side of caution when encountering utterances that are unclear as to whether or not they are pretend prompts of any kind
    - Ex: caregiver holds up the brush and just says “brush” – unless context makes it clear that this is a prompt for the child to brush, treat this as a label and code “o”
        - “Brush” or “brushing” without a defined subject like “your hair” or “the bear” should be counted as “o”
    - Ex: caregiver encourages the child to “come play with the bear” but doesn’t actually prompt any pretend actions, treat this as “o”

(u) Uncodable – if the caregiver’s utterance is unintelligible, so that the meaning of what they are saying is not understandable

- Transcribed parent utterances that are unintelligible are marked “xxx”
- An utterance transcribed as solely “xxx” should be automatically coded (u)
- An utterance in which part of it is understandable and part of it is transcribed “xxx” should be coded (u) only if the meaning of the utterance as a whole is unclear
    - Ex: “let’s xxx” should be marked (u) because it is unclear what the caregiver is encouraging
    - Ex: “xxx can brush the bear” should be marked (po) because the unintelligible piece is not necessary to understand the action that the caregiver is encouraging

Note: these categories progress in level of difficulty as to the type of play the parent is prompting. Therefore, the most difficult type of play being prompted by each utterance is the type of play that gets coded

- The progression order is: (x) → (o) → (f) → (pf) → (ps) → (po) → (s)
    - So, an utterance should only coded (x) if no new material from any other category is included, whereas an utterance will that includes (s) in any fashion will always be coded (s), even if material from another category is included
- Ex: "what are you giving the bear to eat?" includes both (pf) in discussing what the food is, and (po) in prompting the child to feed the bear. As (po) is more cognitively challenging, this utterance would be coded as (po).
- Ex: parent puts cup on head and says "I can wear this as a hat" includes both (ps) as the parent is the object of the action, and (s) in decontextualizing the cup to be a hat. As (s) is more cognitively challenging, this utterance would be coded as (s).

Second Pass: following (n/u/a/p)

(n) Not Applicable – enter this in the second pass for all utterances where type is coded f, o, x, u

- We are not looking to gain any information or data from this code, but the software works better if every argument is filled in. So, code "n" as to avoid leaving any blank <followin> arguments

(u) Unprompted – child was not playing with (or indicating a desire to play with) the toy in a way that would prompt the parent's speech

- Child is sitting, walking, cuddling, etc, but not paying attention to the toys until parent speaks
- Parent changes the "topic" of play unprompted
    - Ex: child is pretending to make soup, and parent says "the bear's tired now"
- Parent introduces a new toy that the child was not attending to
    - Ex: child is feeding the bear, parent picks up towel and says "he should use this napkin"
    - Note: if parent points out/uses an object that child did not mention/was not touching or playing with, it is likely (u)
- Parent comes up with a new function for a toy without function being prompted by child
    - Ex: child puts bear in the bowl, parent says "that could be his sailboat"
- Note: if parent asks a question and child responds "I don't know," then parent tries to answer that question, code (u)
    - Ex: parent says "what are you making?" (ps; u or p depending on circumstance), child says "I don't know", parent says "is it soup?" (pf, u)
- Note: if child is holding toys but not actively doing something specific with them, parent "furthering" the play scene by encouraging a specific action is coded (u)

- Ex: mom has kid hold the teddy bear so she can feed it. Kid doesn't help feed or say anything about food, just holds and giggles. Mom says "bear is so hungry" (po, u)
- Is the kid being passive or active with the toy?

(t) Object_Touch – child was not playing with the toy but was was holding toy passively in the 4 seconds before caregiver utterance

- Child is holding the main toy that caregiver's utterance is related to, but is not engaging with it
  - Ex: child is holding bowl and staring off into space, and caregiver says "let's make some lunch"
    - Note: if caregiver picks up teddy and says "let's make teddy lunch", this would stay as (u)
- Child was just holding toy and put it down (within 4 seconds)
- Child is mindlessly fiddling with the toys
  - Ex: distracted or staring off into space while putting the cup in and out of the bowl)
  - NOTE: if child is focused and intentionally putting the cup in the bowl, this does not count. The goal is to find instances where child is passive in his/her role in prompting the caregiver utterance
- Child is passively holding one toy and playing with another
  - Ex: child is passively holding bear while paying with the towel, caregiver says "let's feed the bear"
- NOTE: this does not include if caregiver hands child the toy (within the past 4 seconds), which child then holds passively as caregiver speaks, because that was not the child passively prompting the play (initial interaction with the toy was caregiver)
- NOTE: this does not include if a child is actively playing with one toy and caregiver introduces a new toy unprompted, or if the caregiver suggests a different way to play with the toy
  - Ex: child is stirring spoon & bowl and caregiver holds up teddy, saying "let's feed teddy" would still be coded as unprompted (u)
  - Ex: child is brushing his/her own hair actively and caregiver says "brush daddy's hair"
- NOTE: this does not include if the object is passively lying against the child's leg or on his/her lap

(p) Prompted – child is playing with (or indicates a desire to play with via speech or gesture) the toy in a way that prompted the parent's speech within four seconds before the parent spoke

- Parent is furthering a pretend play scene based on a clear action that the child has taken or on what the child says
    - Ex: child says “I’m brushing the bear’s fur” and parent responds “oh does teddy like that?”
    - Ex: child is feeding the bear and parent responds “I (bear) spilled my food!” or “the bear has food on his mouth, clean him off”
- Parent asks for details based on what the child is doing
    - Ex: child is brushing the bear’s hair, prompting parent to ask “are you putting his hair in pigtails?”
    - Ex: child is feeding the bear, prompting parent to ask “is he eating oatmeal?”
- Parent is repeating a declaration that the child makes about play
    - Ex: child says “I’m making soup” and parent responds “you’re making soup for me?”
- Parent asks for details based on what the child says
    - Ex: child says “I’m making soup” and parent responds “is that tomato or chicken soup?”

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