

UCLA

UCLA Electronic Theses and Dissertations

Title

Associations Between Early Social Communication and Play Skills and Conversation Quality in Children with Autism Spectrum Disorders

Permalink

<https://escholarship.org/uc/item/590111zq>

Author

Williams, Belinda Lynette

Publication Date

2013

Peer reviewed|Thesis/dissertation

**UNIVERSITY OF CALIFORNIA
Los Angeles**

**Associations Between Early Social Communication and Play Skills and Conversation
Quality in Children with Autism Spectrum Disorders**

**A thesis submitted in partial satisfaction of the requirements for the degree Master of
Education**

by

Belinda Lynette Williams

2013

ABSTRACT OF THE THESIS

Associations Between Early Social Communication and Play Skills and Conversation

Quality in Children with Autism Spectrum Disorders

by

Belinda Lynette Williams

Master of Education

University of California, Los Angeles, 2013

Professor Connie Kasari, Chair

Background: Children with ASD frequently display deficits in pragmatic language skills and social communication. Research on early skills that are associated with later conversation skills in children with ASD may inform targets for early intervention. **Methods:** This longitudinal study includes 23 children with ASD. At ages 3-4, play skills and joint attention skills were assessed. At age 8-9, children were given a conversation quality rating from ADOS, Module 3 interviews and interviews were coded for pragmatic skills using the Yale Adaptation of the Pragmatic Rating Scale (Y-PRS). **Results:** Analyses revealed significant associations between symbolic play type ($p = .387$) and frequency ($p = .388$). Other play skills and early social communication variables were non-significant. **Conclusions:** Symbolic play skills represent flexibility in play skills. The flexibility in play may allow children to further develop their representational, and social conversational abilities through multiple interactions with adults and peers. **Keywords:** ASD, pragmatic language skills, conversation quality, symbolic play

The thesis of Belinda Lynette Williams is approved.

Jeff Wood

Alison Bailey

Connie Kasari, Committee Chair

University of California, Los Angeles

2013

Firstly, I want to thank my family and friends for their consistent love and encouragement. Additionally, I'd like to sincerely thank Los Angeles Speech and Language Therapy Center, Inc. for their support. This paper is dedicated to all the children with ASD and their families who have participated in my social skills groups throughout the years. Thank you for inspiring this research.

Table of Contents

Operational Definitions of Constructs	vi
Introduction	1
Autism Spectrum Disorders and Core Areas of Deficit	1
Pragmatic Language Skills and ASD	3
Early Social Communication and Play Skills Predict Outcomes in ASD	5
Identifying the Gap in the Literature and Introducing the Current Study	6
Methods	8
Participants	8
Procedures	9
Measures	11
Results	14
Discussion	15
Appendix 1	18
References	19

Operational definitions of constructs

High-functioning ASD: children with a diagnosis of ASD according to the ADOS-Module 3, a module of the diagnostic tool for autism restricted to verbally fluent children (e.g., beyond pre-linguistic, single word, and phrase speech)

Conversation quality: defined on a 5-point Likert scale based on impression of examiner-examinee rapport and child demonstration of contingent questions and responses (e.g., pertinent to the conversation topic) with “5” being the highest quality and “1” being the lowest quality

Symbolic play: play that indicates increased flexibility via the ability to pretend an object represents something else (e.g., not the object itself)

Joint attention (JA): when 2 (or more) people share attention on an activity or object (or group of objects) indicated via eye contact (e.g., 3-point looking: at object—person—back to object), pointing, giving, showing, and/or expressive language

Introduction

Autism spectrum disorders (ASD) are characterized as a heterogeneous, neurobiological condition consistently marked by deficits in social interaction regardless of severity of speech and language function. These deficits in social communication have adverse implications across the lifespan for individuals with ASD. As such, research investigating associations between early social communication skills and later successful pragmatic language outcomes in children with autism is warranted. Given that pragmatic language skills are positively correlated with successful conversation and social interaction that facilitates mutually engaging peer relationships, investigating early social communication and play skills that correlate to later pragmatic language outcomes and conversation ability may help to develop targeted intervention strategies for children diagnosed with ASD receiving early intervention. The first aim of the current longitudinal study is to examine children with high-functioning autism and investigate correlations between their early social communication and play skills and later pragmatic language skills and conversation quality. The second aim of the current study is to explore the strength of associations between conversation quality and specific pragmatic language items.

Autism Spectrum Disorders and Core Areas of Deficit

Autism spectrum disorders (ASD) are marked by difficulty forming typical affective contact with people (Kanner, 1943). The DSM-IV defines autism as a neurodevelopmental disorder marked by deficits in three core areas: communication, social interaction, and repetitive and restricted interests (APA, 1994). However, the newly published DSM-V changes the definition of ASD to specify deficits in just two core areas: social communication and repetitive and restricted interests. This change highlights the importance of social relatedness being a key and core deficit in ASD. Researchers collectively agree that autism encompasses a

heterogeneous spectrum of disabilities, making the term autism spectrum disorders (ASD) more fitting than a singularly labeled “autism.” Indeed, early researchers on ASD observed striking variability in the manifestation of the disorder. They concluded that, amongst all children at levels of functioning, it was the child’s relation to people that was most strikingly different than in typically developing children (Kanner, 1943). In fact, current researchers assert that given the vast heterogeneity in ASD, it appears that the singular homogeneous factor may be the failure of socialization (Jones and Klin, 2009). Emerging research on reward circuitry function in autism suggest that children with ASD exhibit hypoactivation of reward circuitry that adversely impacts their sensitivity to social rewards (Dichter et al., 2010). Thus, children with ASD demonstrate poor social motivation that, as a result of disordered neural circuitry, adversely impacts their social development (Scott-Van Zeeland, Dapretto, Ghahremani, Poldrack & Bookheimer, 2010).

Evidence suggests that deficits in social interaction can be identified early in development by poor non-verbal social communication acts such as decreased instances of: reaching to others, showing and giving toys and objects, and engaging in referential looking (e.g., looking at a toy and then to an adult as if to engage the adult in sharing the enjoyment of the toy object) (Mundy, Sigman, Ungerer, & Sherman, 1986). All of these non-verbal actions, if not being intended to make a request, are evidence of joint attention, which is a noted deficit in early social communication identified in children with ASD. While social engagement appears to be a hallmark deficit of ASD, there is a great deal of variability in level of functioning for individuals diagnosed with the disorder. Some children with early diagnoses can achieve significant gains in expressive and receptive language, verbal IQ, and behavior to the point that they achieve scores on standardized assessments making them comparable to the neurotypical peers. Such children are often termed as having “high-functioning” ASD because they can

participate in mainstream classrooms with typical peers and do not require special academic considerations to succeed in school. However, even when children with ASD achieve optimal outcomes for receptive and expressive language development, they continue to demonstrate pragmatic difficulties and social awkwardness (Sutera et al., 2007).

Pragmatic Language Skills and ASD

Bloom and Lahey's model of language (1978) describe the three domains of language as form (e.g., syntax and grammar), content (e.g., language meaning), and use (e.g., purpose of language). Given that impaired social communication is a hallmark feature of ASD, it can be concluded that children with high-functioning ASD most commonly demonstrate difficulties with language *use* rather than form or content given that they can attain typical receptive and expressive language abilities and age-appropriate verbal IQ.

Language use, referred to in this study as pragmatic language skills, includes a variety of verbal and non-verbal behaviors. Prior research notes substantial pragmatic difficulty among children with autism compared to typically developing children (Lam & Yeung, 2012). Specific pragmatic language impairments common in ASD include: difficulty establishing and maintaining eye contact, difficulty turn-taking in conversation, failure to take the listener's perspective (e.g., theory of mind), poor speech prosody, difficulty expressing and understanding emotions, and difficulty interpreting figurative language (Krasny, Williams, Provencal, & Ozonoff, 2003; Kerbel & Grunwell, 1998; Shaked & Yirmiya, 2003; Tager-Flusberg, 2003). Researchers note that specific pragmatic language deficits such as the use of noncontingent utterances are correlated with the presence of other autism symptoms (Hale and Tager-Flusberg, 2005). A study comparing 15 children with autism and 15 typically developing children revealed that children with autism frequently failed to respond to questions and comments appropriately

or to properly extend conversations by offering relevant personal narratives (Capps, Kehres, & Sigman, 1998). Paul and colleagues (2005) found evidence of significant differences between children with high-functioning ASD and typical controls in domains of pragmatic language such as speech prosody. Another study comparing youth ages 12-18 with ASD to typical age-matched peers found significant differences in particular areas of pragmatic language skills that involved topic management, intonation, reciprocity in conversation, and eye gaze (Paul, Orlovski, Marcinko, & Volkmar, 2009). Difficulty with theory of mind has been attributed as a specific pragmatic area of deficit with children with ASD (Baron-Cohen, 1989). There is evidence that children with ASD can demonstrate improvement in their theory of mind abilities and demonstrate improvement in attributing beliefs to others, although these gains have been correlated with gains in language abilities (Steele, Joseph, & Tager-Flusberg, 2003). Researchers have found neural correlates in children with ASD with difficulty interpreting pragmatic language areas such as voice (e.g., tone) and facial expressions (Wang, Lee, Sigman, & Dapretto, 2007). Wang and colleagues (2007) found reduced activity in the medial prefrontal cortex and right superior temporal gyrus in children with ASD in comparison to typical children, which may offer a neurological etiology for poor functioning in areas of pragmatic comprehension like appropriately interpreting tone and facial expression. Landa and colleagues (1992) developed the Pragmatic Rating Scale (PRS), which identifies 30 distinct areas of deficit frequently reported in ASD. Overall, researchers conclude that pragmatic language skills are a component of language consistently impaired in individuals with autism (Kelley, Paul, Fein, & Naigles, 2006).

Social interaction issues for children with ASD often persist in spite of age-appropriate verbal communication skills and average intelligence. Such difficulties become of paramount importance as children with high-functioning autism are placed in mainstream general education

classrooms with their typically developing peers and exposed to greater social risk within inclusive academic settings. In fact, evidence suggests that children with ASD may confront an increased risk of peer rejection and social isolation (Chamberlain, 2001) particularly during less structured, social language activities such as lunch time or recess. As children with ASD transition to school settings, their deficits in pragmatic language skills and social communication become apparent because social demands change when children try to engage in age-appropriate social relationships. Children with high-functioning autism can often experience peer rejection in school when attempting to interact with their typically developing peers (Kasari, Locke, Gulsrud, & Rotheram-Fuller, 2011). As such, children with high-functioning autism report more loneliness than their neurotypical peers (Bauminger & Kasari, 2000). Social isolation can be particularly damaging to school-age children. Studies note that peer relationships are critical to children's social success at school (Kasari, Rotheram-Fuller, Locke, & Gulsrud, 2012). Further, social success at school precipitates social skills later in life. Researchers who study typical social development note that children's social interaction and friendship formation early in life serve to predict their social adjustment and competence later in life (Howes, 1988). Pragmatic language skills that facilitate successful social interactions are notably impacted in children with autism. Thus, children with ASD are at risk for becoming social outcasts as they lack the pragmatic language skills to successfully engage with their neurotypical peers.

Early Social Communication and Play Skills Predict Outcomes in ASD

Researchers have found correlations between early social communication skills and later social interaction skills in children with ASD. Mundy and colleagues (1986) found associations between non-verbal indicating skills (e.g., pointing to share and command joint attention) and social skills deficits in children with ASD. Associations have also been established between early

social communication and joint engagement. Kasari and colleagues (2010) found that increased joint attention resulted in greater joint engagement between toddlers with ASD and their caregivers. Research has established links between early skills and later language development. Toth, Munson, Meltzoff, and Dawson (2006) found associations between joint attention and imitation in pre-school children and language ability at ages 3-4. The same study also found that toy play was a predictor of rate of communication development from ages 4-6.5. Bono, Daley, & Sigman (2004) found that increased joint attention skills were associated with greater language development and concluded that joint attention skills predicted receptive and expressive language in children with ASD.

Identifying the Gap in the Literature and Introducing the Current Study

Despite prior research indicating that early skills in toddlers can significantly predict later skills in older children with ASD, specific correlations between early social communication and play skills and later pragmatic language skills remain an under-researched area of the field. Specific research on pragmatic language skills and conversation and their correlation with early social communication skills has not been extensively investigated, in spite of social communication being noted as the hallmark deficit in ASD. Prior research has centered on early intervention as it is positively correlated with gains in receptive and expressive language and play skills (Kasari, Paparella, Freeman, & Jahromi, 2008; Kasari, Gulsrud, Wong, Kwon, & Locke, 2010). Pragmatic language has been under-researched in part due to the vast heterogeneity in the field and poor inter-rater reliability among self, parent, and teacher reports. Indeed, with the changing DSM-V definition of autism spectrum disorders to specifically link impaired speech and language skills with impaired social interaction, more research on specific pragmatic language skills and conversation skills in children with ASD is warranted.

In the current longitudinal study, analysis was conducted of 23 videotaped administrations of the ADOS, Module 3 given to children ages 8-9 who participated in a larger UCLA study at ages 3-4. My hypothesis was that joint attention and symbolic play skills in children with high-functioning autism at ages 3-4 were positively correlated with their conversation quality scores at ages 8-9. My rationale for this hypothesis was that symbolic play skills represent flexibility in thought that may predict a similar flexibility within social interaction. The ability to ascribe different meanings to objects, rather than simply play with objects as they are intended (e.g., functional, discriminant play or combinational play), represents a higher level of cognition. This higher play level may correlate with pragmatic language skills, which also call for flexibility. Despite pragmatic flexibility being in the social interaction realm rather than the play realm, it was my hypothesis that increased flexibility in play at ages 3-4 will be associated with increased flexibility in conversation at ages 8-9. Further, given the known positive effects of joint attention skills, I hypothesized that higher skills in joint attention early in life would be significantly associated with later conversation quality, similar to the way in which joint attention skills are positively correlated with later language skills.

My second hypothesis for the current study was that particular pragmatic areas would be more negatively correlated to conversation quality scores than others. Pragmatic items were measured by analyzing videotaped ADOS-Module 3 assessments and coding the videos using an adaptation of the Pragmatic Rating Scale. I hypothesized that, while all the items would be negatively associated with conversation quality (e.g., indicating that both measures are valid since conversation quality is directly impacted by pragmatic language), some items would be more significantly correlated than other items. My rationale for this hypothesis was that the PRS

identifies several pragmatic items commonly noted as adversely impacted in ASD; however, specific items may be more devastating to conversation than others.

This current study might help to inform intervention practices if significant correlations are found. As there are several different areas of pragmatic language skills commonly identified as deficits in children with ASD, findings from this study may help to inform items that are most disruptive to conversation and thus warrant a more intense focus in intervention. Furthermore, this study will help to continue the effort to address pragmatic deficits in ASD in hopes of guiding more research in this underdeveloped field.

Methods

Participants

The participants included 23 children with ASD seen at 3-4 years of age and later at 8-9 years of age. Subjects participated in a larger study held at UCLA (Kasari, Freeman, & Paparella, 2006). The original randomized treatment study included children ages 3 to 4 years diagnosed with autism. A diagnosis of ASD was accepted following a battery of widely accepted evaluation tools including the Autism Diagnostic Observation Schedule (ADOS). The study obtained institutional review board (IRB) approval from University of California, Los Angeles. Children with co-morbid conditions such as seizures or genetic syndromes were excluded from the study. Study participants were randomly assigned to three different treatment conditions: a joint attention intervention group, a symbolic play intervention group, and a control group that did not receive intervention. The original study intervention took place for 30 minutes per day for a span of 5-6 weeks. All children were enrolled in an Early Intervention Program at UCLA and they remained in that program during their participation in the study regardless of their treatment group assignment. The early intervention class consisted of 6 hours per day with a

teacher to student ratio of nearly 1:1. The school incorporated an applied behavioral analysis (ABA) model and utilized a standard preschool curriculum. The school staff was blind to the objectives of the study and was independent from the research staff. A final sample of 58 children (20 in the joint attention group, 21 in the play group, and 17 in the control group) were analyzed.

For the current study, the sample consisted of children from the aforementioned larger study who fit the following criteria: (1) participated in the original treatment study at ages 3-4 referenced as Time 1 (regardless of randomized treatment group assignment) and received baseline assessments, (2) participated in the follow-up assessments at ages 8-9 referenced as Time 2, (3) were administered the ADOS- Module 3 specified for children with verbally fluent speech at Time 2. The criteria of completion of the ADOS – Module 3 was included because it restricted participants to children with verbally fluent speech who could participate in conversation without the use of augmentative communication modalities. Thus, the children included in the present study could all be characterized as having “optimal outcomes” as they exhibited sufficient expressive and receptive language skills to actively participate in fluent 1:1 conversation with a trained examiner. Given the parameters of the current study, a final sample of 23 children was included in this secondary analysis of existing data.

Procedures

At Time 1 (ages 3-4) all of the children received the Early Social Communication Scales (ESCS) and Structured Play Assessment (SPA). The ESCS is a measure that analyzes development and communicative interactions in terms of both initiations and responses of protodeclaratives and protoimperatives. The SPA is a structured play assessment that evaluates a child’s highest level of play skills.

At Time 2 (ages 8-9) children were assessed on the Autism Diagnostic Observation Schedule – Generic (ADOS-G), Module 3. The ADOS is a standardized diagnostic tool for autism that evaluates social communication and restricted/repetitive behaviors using a series of “presses” to assess levels of functioning within a semi-structured interview. Using the Module 3 of the ADOS restricted participants to children who had fluent verbal output and did not require adaptive communication modalities. From the videotaped ADOS, portions of the structured interview that did not call for materials were assessed in order to specifically analyze pragmatic language in conversations within unstructured contexts without visual cues. As such, only the following tasks from the ADOS, Module 3 were analyzed: “Conversation/reporting a nonroutine event” and Socioemotional task questions “Emotions,” “Friends/loneliness/marriage” and “Social difficulties/annoyance.” Specific interview questions from the ADOS are listed below:

Socioemotional task questions: “Emotions”

What do you like doing that makes you feel happy and cheerful?

What kinds of things make you feel this way? How do you feel when you’re happy? Can you describe it?

What about things you’re afraid of?

What makes you feel frightened or anxious? How does it feel? What do you do?

What about feeling angry?

What kinds of things make you feel that way?

How do you feel “inside” when you’re angry?

Most people have times when they feel sad. What kinds of things make you feel that way?

How do you feel when you’re sad? What is it like when you’re sad? Can you describe that?

Socioemotional task questions: “Social difficulties/annoyance”

Have you ever had problems getting along with people at school?

Are there things that other people do that irritate or annoy you? What are they?

Were you ever teased or bullied? Why, do you think?

What about things you do that annoy others?

Did you ever try to change these things? Did you ever do anything so that others wouldn’t tease you? Did it work?

Socioemotional task questions: “Friends/loneliness/marriage”

Do you have some friends? Can you tell me about them?

What do you like doing together? How did you get know them? How often do you get together?

What does being a friend mean to you?

*What is different about a friend than someone whom you just go to school with?
 Do you have a girlfriend/boyfriend? What is her/his name? How old is she/he?
 When did you see her/him last?
 What is she/he like? What do you like to do together?
 How do you know she/he is your girlfriend/boyfriend?
 Do you ever think about having a long-term relationship or getting married (when you are older)?
 Why, do you think, do some people get married when they grow up?
 What would be nice about it? What might be difficult about being married?*

Measures

Time 1 variables were obtained from the Early Social Communication Scales (ESCS) and Structured Play Assessment (SPA). The ESCS provided a joint attention variable. The SPA provided four different variables: functional play types, functional play frequency, symbolic play types, and symbolic play frequency. There were a total of five variables obtained from the Time 1 measures.

The Time 2 variable was obtained from the videotaped ADOS – Module 3 assessment given to the children during their follow-up assessments at ages 8-9. From the conversation portions of the ADOS, a conversation quality score was assigned based on a 5-point Likert scale given while watching the interaction between the child and the examiner. A top score of “5” was assigned if the conversation quality between child and examiner exhibited a high degree of rapport and the child posed contingent responses and questions (e.g., indicative of topic maintenance) during the exchange. A low score of “1” was assigned if there was no rapport established between the child and examiner during the exchange and the child neither offered contingent comments to the examiner’s questions nor posed contingent questions on the established topic during the conversation.

Additionally, Time 2 videos were analyzed using the Yale-Adaptation of the Pragmatic Rating Scale (Y-PRS), a measure based on videotaped ADOS interviews. This measure served to

provide concurrent validity with the assigned rating of conversation quality given that pragmatic language skills are directly associated with conversation skills.

Research questions/hypotheses

Longitudinal Correlational Analysis: Hypothesis 1 – All variables are positively correlated.

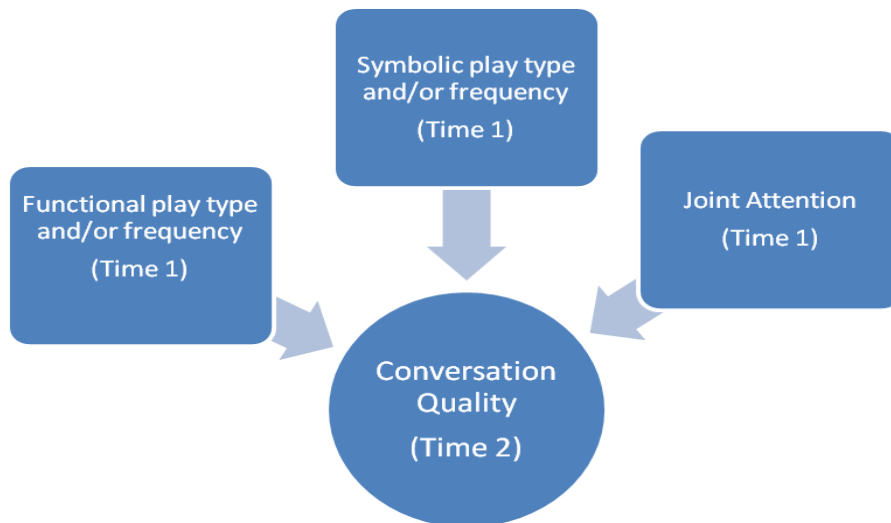
Time 1 (variables from ages 3-4) = (1) Symbolic play type, (2) Symbolic play frequency, (3)

Functional Play type, (4) Functional Play frequency - 1-4: SPA variables, (5) Joint Attention –

ESCS variable



Time 2 (variable from video analysis from ages 8-9) = conversation quality score (1 assigned variable)

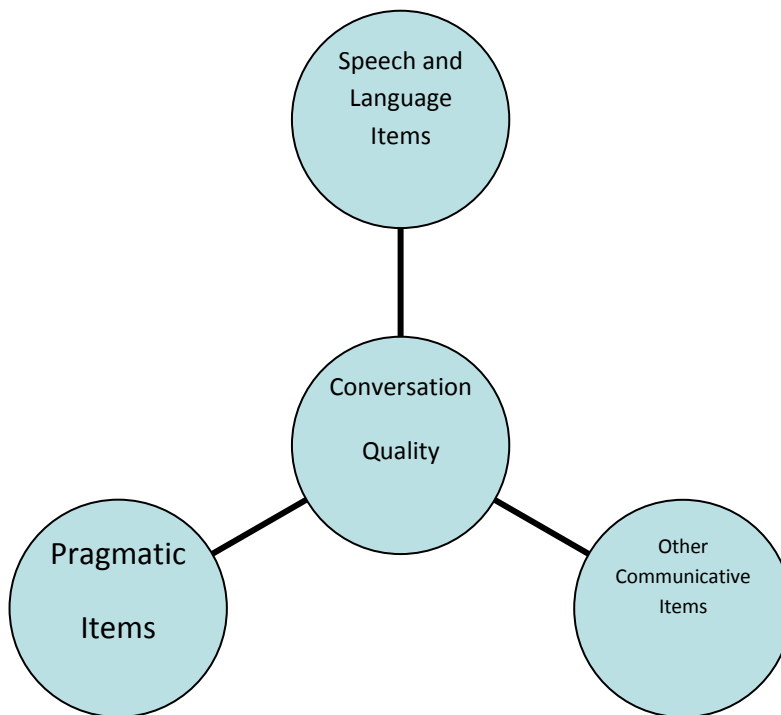


Correlational Analysis: Hypothesis 2 – Particular pragmatic core deficit areas are most strongly negatively correlated than others (although all items will be negatively associated indicating concurrent validity).

Y-PRS categories (3 separate variables): (1) Pragmatic Items, (2) Speech and Language Items, (3) Other Communicative Items



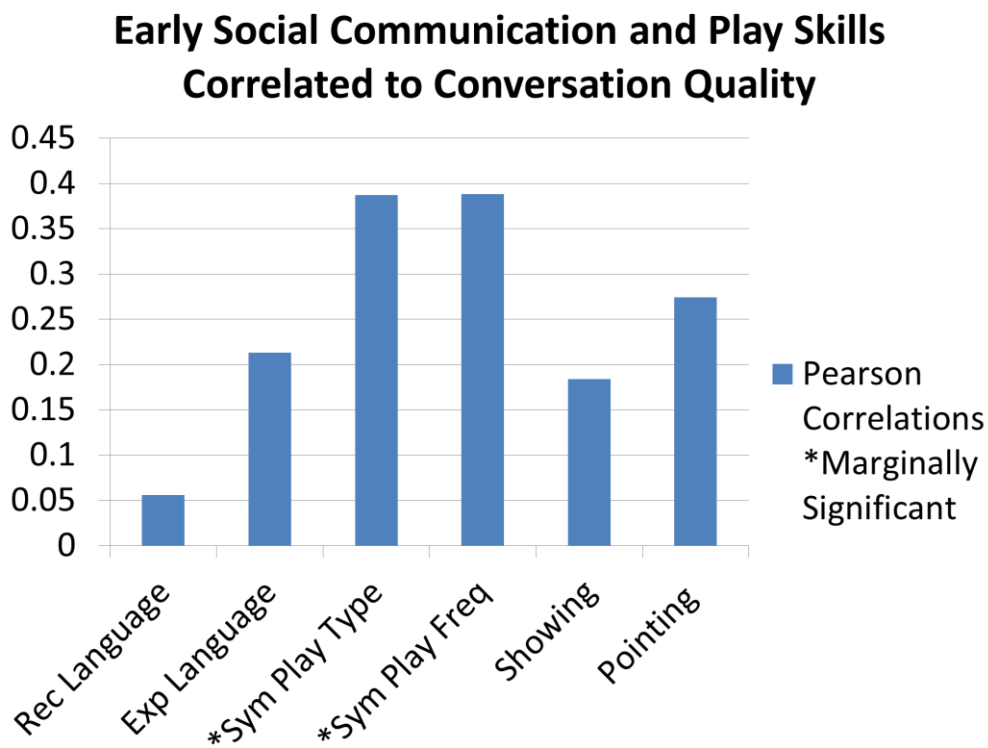
Conversation Score (1 variable)



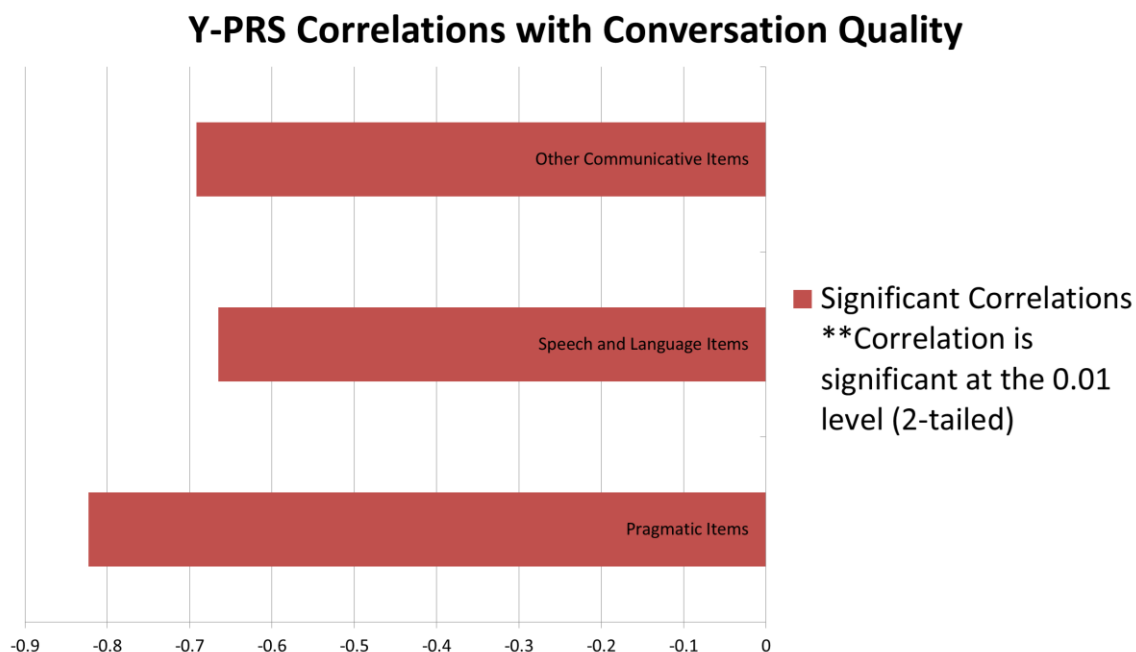
Results

Descriptive statistics of all variables were obtained using SPSS analysis. Correlational analyses were used to analyze associations between data collected at Time 1 (ages 3-4 years) and ratings of conversation quality assessed at Time 2 (ages 8-9 years).

As hypothesized, there were positive correlations between all early social communication measures obtained from Time 1 and later conversation quality ratings obtained from Time 2. However, the only significant correlations between Time 1 and Time 2 variables were symbolic play type ($p = .387$) and symbolic play frequency ($p = .388$). Other early social communication variables of expressive and receptive language and joint attention measures were non-significant. Functional play type and frequency were also non-significant.



As hypothesized, there were significant negative correlations between all 3 core deficit areas noted on the Y-PRS and the conversation quality score variable. The most significantly associated variable was the “Pragmatic Items” category ($p = -0.823$).



Discussion

Marginally significant associations were found between symbolic play types and symbolic play frequency variables at ages 3-4 and conversation quality at ages 8-9 within a longitudinal sample. Other early social communication and play variables such as joint attention, expressive and receptive language, and functional play skills were non-significant. Symbolic play skills represent flexibility in play skills. The flexibility in play may allow children to further develop their representational, and social conversational abilities through multiple interactions with adults and peers. The extent to which specific aspects of pragmatic language are influenced by early social communication and play skills should be further investigated.

This current study can provide useful information on targets for early intervention. Prior research concludes that pragmatic skills are particularly persisting deficits in children with ASD. If symbolic play skills are significantly positively associated with later pragmatic skills and conversation quality, then symbolic play might be an important goal to specifically target in early intervention programs because it has a positive trajectory for later skills.

Secondly, all the items on the Y-PRS were negatively associated with conversation quality ratings. The strongest associations were found between the pragmatic items category and conversation quality. This finding provides implications for treatment planning for interventionists, who work with school-age children with ASD to target pragmatic goals. Given the vast array of commonly noted deficit areas, it may be helpful to use the findings in this current study to plan a targeted strategy for short-term goal selection. Interventionists should first begin to target pragmatic items, which would have the greatest overall impact in improving conversation quality. Goals with the “Other Communicative Items” and “Speech and Language Items” domains would be best addressed as secondary objectives following the target of “Pragmatic Items” in order to have the most global impact on optimal outcomes for the child. These findings might be particularly relevant to speech-language pathologists and other professionals who lead social skills interventions for children with high-functioning ASD and target pragmatic language skills pertinent to successful communicative and social interactions. Such professionals might specifically target certain pragmatic skills prior to targeting others in order to elicit higher overall judgments in conversation quality (e.g., deficits in some pragmatic areas are more damaging than others and should thus take priority in intervention).

Overall, the implications of this study can serve to better inform clinicians working with children with ASD and direct the targets for intervention in this population. This study may serve

to guide the direction of future research to perhaps (1) look at longitudinal studies with children with ASD in early intervention programs specifically targeting joint attention and play skills to then measure their pragmatic language skills and conversation quality years later (e.g., preschool ages of 3-4, school-age children ages 8-9, older adolescents and then perhaps young adults) and (2) study the implications of social skills programs using direct teaching methods to address the specific PRS items found to be most negatively correlated with conversation quality to assess if improving performance in those specific items might have a direct impact on improving conversation quality.

Appendix 1

Items included in the Pragmatic Rating Scale (Landa 2000; Landa et al. 1992)

Item

1. Inappropriate/absent greeting (omitted from this current study)
2. Strikingly candid
3. Overly direct or blunt
4. Inappropriately formal
5. Inappropriately informal
6. Overly talkative
7. Irrelevant/inappropriate detail
8. Out of sync content/unannounced topic shifts
9. Confusing accounts
10. Topic preoccupation/perseveration
11. Unresponsive to examiner's cues
12. Little reciprocal to-and-fro exchange
13. Terse
14. Odd humor
15. Insufficient background information
16. Failure to reference pronouns, terminology
17. Inadequate clarification
18. Vague

Speech and Language Behaviors

19. Scripted, stereotyped sentences or discourse
20. Awkward expression of ideas
21. Indistinct speech/mispronunciations
22. Rate of speech is too rapid/slow
23. Intonation is unusual
24. Volume is inappropriate (note too loud/soft)
25. Unusual timing of responses, reformulations
26. Unusual rhythm of speech such as stuttering

Other Communicative Behaviors

27. Physical distance
28. Gestures
29. Facial expressions
30. Eye gaze (e.c., or to help identify referent)

Rating Scale

- 0 = occurs almost never
 1 = occurs sometimes
 2 = occurs almost always
 cnr = could not rate
 n/o = no opportunity

References

- American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: American psychiatric Association.
- Bauminger, N., & Kasari, C. (2000). Loneliness and friendship in high-functioning children with autism. *Child Development, 71*, 447-456.
- Bloom, L. & Lahey, M. Language Development and Language Disorders. New York, Wiley, 1978.
- Capps, L., Kehres, J., & Sigman, M. (1998). Conversational abilities among children with autism and developmental delays. *SAGE Social Science Collections, 2* (4), 325-344.
- Chamberlain, B. O. (2001). Isolation or involvement? *The social networks of children with Autism included in regular classes*. Unpublished doctoral dissertation, University of California, Los Angeles.
- Cooper, M. J., Griffith, K. G., & Filer, J. (1999). School intervention for inclusion of students with and without disabilities. *Focus on Autism and Other Developmental Disabilities, 14*, 110-115.
- Dichter, G., Felder, J., Green, S., Rittenberg, A., Sasson, N., & Bodfish, J. (2010). Reward circuitry function in autism spectrum disorders. *Social Cognition and Affective Neuroscience, 7* (2): 160-172.
- Hale, C., & Tager-Flusberg, H. (2005). Brief Report: The Relationship between Discourse Deficits and Autism Symptomology. *Journal of Autism and Developmental Disabilities, 35*, 519-524.
- Howes, C. (1988). Peer interaction of young children. Monographs of the Society for Research in Child Development, 53(1, Serial No. 217).
- Jones, W., & Klin, A. (2009). Heterogeneity and Homogeneity Across the Autism Spectrum: The Role of Development. *Journal of American Academy of Child and Adolescent Psychiatry, 48*, 471-473.
- Kanner, L. (1943). Autistic disturbance of affective contact. *Nervous Child, 2*, 217-250.
- Kasari, C., Freeman, S., & Paparella, T. (2006). Joint attention and symbolic play in young children with autism: a randomized controlled intervention study. *Journal of Child Psychology and Psychiatry, 47*: 611-620. doi: 10.1111/j.1469-7610.2005.01567.x
- Kasari, C., Gulsrud, A., Wong, C., Kwon, S., & Locke, J. (2010). Randomized Controlled Caregiver Mediated Joint Engagement Intervention for Toddlers with Autism. *Journal of Autism and Developmental Disorders, 40*, 1045-1056.
- Kasari, C., Locke, J., Gulsrud, A., & Rotheram-Fuller, E. (2011). Social Networks and Friendships at School: Comparing Children With and Without ASD. *Journal of Autism and Developmental Disorders, 41*, 533-544.
- Kasari, C., Paparella, T., Freeman, S., & Jahromi, L. (2008). Language Outcome in Autism: Randomized Comparison of Joint Attention and Play Intervention. *Journal of Consulting and Clinical Psychology, 76* (1), 125-137.
- Kasari, C., Rotheram-Fuller, E., Locke, J., & Gulsrud, A. (2012). Making the connection: randomized controlled trial of social skills at school for children with autism spectrum disorders. *Journal of Child Psychology and Psychiatry, 53*, 431-439.
- Kelley, E., Paul, J., Fein, D., & Naigles, L. (2006). Residual Language Deficits in Optimal Outcome Children with a History of Autism. *Journal of Autism and Developmental Disorders, 36*, 807-828.

- Kerbel, D., & Grunwell, P. (1998). A study of idiom comprehension in children with semantic-pragmatic difficulties. Part II: Between-groups results and discussion. *International Journal of Language and Communication Disorders, 33*, 23-44.
- Krasny, L., Williams, B. J., Provencal, S., & Ozonoff, S. (2003). Social skills interventions for the autism spectrum: Essential ingredients and a model of curriculum. *Child & Adolescent Psychiatric Clinics of North America, 12*, 107-122.
- Lam, Y. & Yeung, S. (2012). Towards a convergent account of pragmatic language deficits in children with high-functioning autism: Depicting the phenotype using the Pragmatic Language Scale. *Research in Autism Spectrum Disorders, 6*, 792-797.
- Landa R, Piven J, Wzorek M, Gayle J, Chase G, Folstein S. Social language use in parents of autistic individuals. *Psychological Medicine* 1992;22:245-254. [PubMed: 1574562]
- Lord, C., Risi, S., Lambrecht, L., Cook, E.H. Jr., Leventhal, B.L., DiLavore, P.C., Pickles, A., & Rutter, M. (2000). The Autism Diagnostic Observation Schedule-Generic: A standard measure of social and communication deficits associated with the spectrum of autism. *Journal of Autism and Developmental Disorders, 30*, 205-223.
- Mundy, P., Sigman, M., Ungerer, J., & Sherman, T. (1986). Defining the Social Deficits of Autism: The Contribution of Non-Verbal Communication Measures. *Journal of Child Psychology and Psychiatry. 27* (5) 657-669.
- Paul, R., Augustyn, A., Klin, A., & Volkmar, F. (2005). Perception and Production of Prosody by Speakers with Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders, 35*, 205-220.
- Paul, R., Orlovski, S., Marcinko, H., & Volkmar, F. (2009). Conversational Behaviors in Youth with High-functioning ASD and Asperger Syndrome. *Journal of Autism and Developmental Disorders, 39* (1): 115. doi: 10.1007/s1083-008-0607-1.
- Scott-Van Zeeland, A., Dapretto, M., Ghahremani, D., Poldrack, R. & Bookheimer, S. (2010). *Autism Research, 3*: 53-67.
- Shaked, M. & Yirmiya, N. (2003). Understanding social difficulties. In M. Prior (Eds.), *Learning and behavior problems in Asperger syndrome* (pp. 126-147). New York: Guilford Press.
- Steele, S., Joseph, R., & Tager-Flusberg, H. (2003). Brief Report: Developmental Change in Theory of Mind Abilities in Children with Autism. *Journal of Autism and Developmental Disorders, 33*, 461-467.
- Sutera, S., Pandey, J., Esser, E., Rosenthal, M., Wilson, L., Barton, M., Green, J., Hodgson, S., Robins, D., Dumont-Mathieu, T., & Fein, D. (2007). Predictors of Optimal Outcome in Toddlers Diagnosed with Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders, 37*, 98-107.
- Tager-Flusberg, H. (2003). Effects of language and communicative deficits on learning and behavior. In M. Prior (Eds.), *Learning and behavior problems in Asperger syndrome* (pp. 85-103). New York: Guilford Press.
- Toth, K., Munson, J., Meltzoff, A., & Dawson, G. (2006). Early Predictors of Communication Development in Young Children with Autism Spectrum Disorder: Joint Attention, Imitation, and Toy Play. *Journal for Autism and Developmental Disorders, 36*, 993-1005.
- Wang, A., Lee, S., Sigman, M., & Dapretto, M. (2007). Reading Affect in the Face and Voice. *Archgen General Psychiatry, 64*, 698-708.
- Williams-White, S., Keonig, K., & Scahill, L. (2007). Social Skills Development in Children

with Autism Spectrum Disorders: A Review of the Intervention Research. *Journal of Autism and Developmental Disorders*, 37, 1858-1868.