

Language Outcomes for Preverbal Toddlers with Autism

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Abstract

Research on late talking toddlers who do not have autism indicates the majority of late talkers will perform within normal limits on comprehensive language measures by the time they reach school age, and toddlers with higher receptive language skills will have better language outcomes. There is little research on school-age outcomes for late-talking toddlers who have autism. The present research investigated 75 children between 2 and 3 years of age who presented with language delays and characteristics of autism. Results indicated the majority (81%) of children with autism use verbal language by the time they reach school age. A subset of 40 of these children who were reported to use verbal language completed language testing. Results revealed that children with better language scores between the ages of 2 and 3 demonstrated better language scores upon follow-up. These findings add to our knowledge of the nature of language use and performance in children with autism.

Key words: Autism; Nonverbal; Language; Preschool; School age; Outcomes

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LANGUAGE OUTCOMES FOR PREVERBAL TODDLERS WITH AUTISM

Autism is a developmental disorder of unknown origin manifested by notably impaired social skills, impaired communication skills, and patterns of repetitive and restrictive stereotypic behaviors resulting in variable difficulties across a wide range of developmental domains. Young children with autism exhibit delays in early communication and language acquisition. These delays are often the first indication of the disorder (Lord & Paul, 1997; Rutter & Bartak, 1971). The general language trajectory of children with autism can be variable, often involving deficits in both the form and function of language (Kjelgaard & Tager-Flusberg, 2001; Lord & Paul, 1997; Tager-Flusberg & Joseph, 2003; Tager-Flusberg, Paul, & Lord, 2005). Typical language characteristics of autism include: delayed onset of speech and/or limited word repertoire in expressive vocabulary, immediate or delayed echolalia, misuse of pronouns, abnormal word use, lack of communication initiation, and in some instances a total lack of speech (Bartak, Rutter, & Cox, 1975; Kanner, 1943).

There is a great deal of information about long-term language outcomes of children with language delays who do not exhibit characteristics of autism (e.g., Armstrong, 2006; Paul, 1996; Rescorla, 2002). Studies of 2-year-old children who have few words in their expressive vocabulary; adequate nonverbal intelligence; and no signs of hearing loss or physical, neurological, behavioral or social disorders (such as autism) show that approximately 70% of these "late talkers" will recover by age 5, performing within the normal range on a test of expressive language, while the remaining 30% will continue to exhibit expressive language delays (Armstrong, 2006). There is also evidence that early receptive language skills are related to later language outcomes, i.e., late talking toddlers with low comprehension have poorer outcomes

than late talking toddlers with normal comprehension (Paul, 1996; Rescorla, 2002).

Parents and professionals often wonder about the prognosis of young late-talking children with characteristics of autism; however, there is no consensus on language outcomes for this population. It is still unknown what percentage of nonverbal toddlers with characteristics of autism will continue to be nonverbal into middle childhood and beyond. In 1996, Bailey, Phillips and Rutter predicted that 50% of children with autism do not acquire useful language, an estimate that is still cited by many researchers (e.g., McDuffie, Yoder, & Stone, 2005; Prizant, 1996), developmental pediatricians, and other professionals, and yet lacks any supporting empirical evidence (Sir M. Rutter, personal communication, December, 2006). It is also unknown if early receptive language scores are related to language outcomes in later childhood and adolescence for individuals with autism.

There has been extensive research on the language abilities of school-age children with autism (see Loveland & Belgin, 2005, for a review). There is, however, little long-term follow-up data regarding the language outcomes of young children with autism, particularly for those who are now beyond the elementary school years. It is not known whether the degree of severity of early linguistic difficulties among toddlers with autism relate to later language and communicative abilities. Factors such as unknown etiology, comorbidity, and variable manifestations of autism as well as the nature of intervention provided further complicate our ability to predict the communicative outcome of these children (Howlin *et al.*, 2004). Many of these children eventually gain adequate language skills that enable them to communicate but continue to present with residual language challenges. Some will score below the normal range on general tests of language abilities throughout childhood and early adulthood. Others will score within the normal range on language measures while continuing to show deficits in the specific domain of pragmatics, i.e., socially abnormal use of language (Tager-Flusberg, 1981).

Since Kanner's (1943) first description of autism, several informative follow-up studies have attempted to identify the progression of the disorder. The first studies, conducted by Kanner (1971, 1973), found the majority of the individuals with autism continued to maintain a highly dependent life, living either with their parents or in institutions. Kanner's (1973) follow-up observations focused only on the social-emotional functioning of these individuals throughout adulthood and were based on subjective anecdotal descriptions obtained through updating letters sent by the parents. His follow-up studies did not include standardized assessments using comprehensive language measures.

More recent follow-up studies of children with autism revealed that higher levels of early communicative skills

such as joint attention (e.g., Charman *et al.*, 2003; Sigman & McGovern, 2005), imitation (e.g., Charman *et al.*, 2003), non-verbal intelligence (e.g., Sigman & McGovern, 2005), useful communicative speech before the age of 5 or 6 (e.g., Gillberg & Steffenburg, 1987; Lord & Bailey, 2002), and one-word vocabulary measures at age 3 (e.g., Charman *et al.*, 2005) were early predictors of better language outcomes. Compared to earlier research, these studies suggest more favorable outcomes for individuals with autism, possibly due to earlier identification and treatment.

However, few follow-up studies assessed early comprehensive receptive and expressive language skills as they relate to language outcomes in the school years. Designing such long term follow-up studies can be challenging since many of the diagnostic assessments used in early childhood are not appropriate for older age groups (Rutter, 2005). Those follow-up studies that did address early language predictors (e.g., Charman, 2005; Mawhood, Howlin, & Rutter, 2000) used a one-word lexical receptive and/or expressive language measure rather than a more comprehensive language assessment. While using one-word vocabulary tests may have some advantages in identifying early language delays, using comprehensive language measures may be more informative in assessing the impact of early language delays on future language abilities. Using this design at initial assessment and follow-up would allow researchers to determine whether early receptive language skills are related to language outcomes.

The focus of the present studies involves the language outcomes of 2- and 3-year-old children who had characteristics of autism and a subsequent diagnosis of autism. The following research questions were addressed: (1) What percentage of children with autism become verbal? (2) Does early language ability as measured on a comprehensive language assessment relate to later language outcome?

STUDY 1

METHOD

Participants

Participants in this follow-up study had attended the Preverbal Communication Program (PVP) at The University of Texas at Dallas. PVP is a preschool program for children who exhibit severe speech and language delays and/or characteristics of autism. Facilitation occurs in a classroom setting with a one-to-one clinician-child ratio where children learn to communicate for a variety of reasons. Intervention focuses on facilitating early language and communication by using communicative functions including behavior regulation, social interaction and joint attention (Prizant & Wetherby, 1993; Wetherby & Prizant, 1989).

Families of the 198 children who had attended PVP during their early childhood years were identified through the program's database. The first 75 families contacted were interviewed. The children consisted of 57 males and 18 females, aged 6;0 to 24;10 years ($M = 11;5$, $SD = 4;8$). Of these children, 22 children were reported to have other diagnoses (e.g., Noonan Syndrome, Cerebral Hypoplasia, Delayed Myelination, Angelman Syndrome, Mitochondrial Myopathy, dyslexia, other learning disabilities or unknown diagnoses) and were thus excluded from the analysis. The remaining 53 participants (44 males, 9 females) were reported as having a diagnosis of autism according to their parents and were thus included in the analysis. Their ages ranged from 6;0 years to 24;10 years ($M = 10;9$, $SD = 4;5$).

Design and Procedure

Parents were contacted via telephone and a short interview regarding their child's language use was conducted. Parents were asked to provide their child's current diagnosis and to identify their child's primary mode of communication: speech/language, pictures, gestures, signs, or another augmentative communication system.

Results

Data were analyzed by calculating the proportion of children with autism who reportedly use verbal language as their primary mode of communication. Results indicated that 81% of the 53 children diagnosed with autism (36 males, 7 females) were verbal according to parent report, and only 19% (8 males, 2 females) did not primarily use verbal language at follow-up.

Discussion

This study provides one of the first empirical findings on children with autism who use verbal language versus an alternate means of communication as their primary mode of communication. The finding that 81% of children with autism use verbal language to communicate does not support the estimate often cited in the literature that only 50% of individuals with autism become verbal (e.g., McDuffie, Yoder, & Stone, 2005; Prizant, 1996). Rather, this result is more in line with a reported finding by Lord, Risi, and Pickles (2004) that only 14-20% of 9-year-old children with autism were nonverbal. The finding of the present study will allow us to provide encouraging information about language outcomes to the parents of young children with autism who so desperately seek prognosis as to whether their child will eventually talk.

It is important to note that the classification of verbal versus nonverbal language use in this study was obtained from parent reports and not based on professional judgment. The reported use of verbal language alone as the primary mode of communication does not necessarily imply adequate language use or abilities as measured on a comprehensive language measure. Thus, it is unknown if

the children who were reported to be verbal were in fact communicatively competent, i.e., able to use language correctly and appropriately to communicate. Study 2 attempted to address this issue by assessing language skills using a comprehensive measure.

STUDY 2 METHOD

Participants

All 75 families contacted in Study 1, regardless of reported diagnosis, received an introductory letter by mail describing the study. They were also asked to complete and return a comprehensive questionnaire in a pre-paid envelope regarding family background and history as well as their child's current clinical diagnosis and medical, developmental, therapeutic intervention, social, academic, and behavioral history. The first 40 children who were reported by their parents to be verbal communicators were invited to participate in a follow-up assessment. All 40 families agreed to participate.

In order to avoid bias and to assure that knowledge of PVP language history did not impact the follow-up assessment, the participants' charts were collected and reviewed only after the follow-up assessment was completed. After reviewing the charts, children who had other diagnoses at PVP were excluded ($n = 5$). In addition, the data for another 5 participants could not be analyzed for Study 2 because their PVP charts/language scores were not available. Finally, because the aim of Study 2 was to examine outcomes of children with autism, those who did not have a diagnosis of autism on follow-up were excluded from the analysis ($n = 4$). During follow-up testing, 7 additional participants were excluded because the participant was unable to speak ($n = 1$), could not attend to the tasks presented ($n = 5$) or did not achieve basal ($n = 1$). Therefore, 19 participants (15 males, 4 females) were included in the statistical analysis for Study 2. The ages of these participants at follow-up ranged from 6;9 to 15;9 years ($M = 11;5$, $SD = 2;7$). The participants were 95% Caucasian ($n = 18$) and 5% Native American ($n = 1$).

Design and Procedure for Preverbal Program Data Collection

While children attended PVP, they were assessed using standardized, comprehensive tools to evaluate language abilities. *The Preschool Language Scale-Third Edition (PLS-3; Zimmerman, Steiner, & Pond, 1992)* or the revised version, *The Preschool Language Scale-Fourth Edition (PLS-4; Zimmerman et al., 2002)* was used to assess receptive and expressive vocabulary, grammar, morphology, and language reasoning between ages 2 and 3. The language assessments obtained in PVP were scored by student clinicians working with the children. A certified speech-language pathologist or a trained "assessment student"

reviewed each protocol for scoring accuracy. These scored protocols were analyzed retrospectively.

Design and Procedure for Follow-Up Data Collection

Participants were tested in either a university clinic or at their home depending on the preference of the parent. An in-depth follow-up assessment was performed by a licensed speech-language pathologist, and segments of the follow-up assessments were videotaped for further analysis. The extent of each child's communicative abilities was determined through formal and informal measures.

Following a 10- to 20-minute language sample, each participant was administered the *Clinical Evaluation of Language Fundamentals-Fourth Edition (CELF-4; Semel et al., 2003)* standardized assessment in order to assess language abilities. The *CELF-4* is a clinical tool for the identification, diagnosis and follow-up evaluation of language and communication disorders in children 5;0 to 21;11 years old. The *CELF-4* was chosen to provide a comprehensive language follow-up evaluation since it is a reliable indicator of the underlying linguistic abilities of children with autism (Condouris, Meyer, & Tager-Flusberg, 2003). The *CELF-4* assesses global language processing skills including the knowledge and use of semantics, syntax and morphology as well as the integration across these language domains, yielding a composite score for each participant. The receptive and expressive language scores were used for analysis along with the core language score (also referred to as "general"

language ability), since it provides a calculation of the most discriminating and clinically sensitive subtests for the identification of a language disorder (Semel *et al.*, 2003). The *CELF-4* scores were compared with the *PLS* early language scores obtained in PVP.

Results

Correlations were conducted to determine whether there was a relationship among early language performance in PVP as measured on the *PLS* and later language ability as measured on the *CELF-4*. Clinical evidence suggests that young children with characteristics of autism may score higher on expressive than receptive language; thus, a post hoc analysis was conducted for PVP expressive language as well. Correlations of early receptive and expressive scores on the *PLS* with follow-up receptive, expressive and core language scores on the *CELF-4*, respectively, were performed in order to look at relationships.

Table 1
Correlations between PLS and CELF-4 language assessment for participants with autism at follow-up

	<i>CELF-4</i> Receptive	<i>CELF-4</i> Expressive	<i>CELF-4</i> Core
<i>PLS</i> Receptive	.664**	.724***	.699**
<i>PLS</i> Expressive	.586**	.584**	.565*
<i>PLS</i> Total	.689**	.725***	.694**

*Significant at $p < 0.05$ (2-tailed)

**Significant at $p < 0.01$ (2-tailed)

***Significant at $p < 0.001$ (2-tailed)

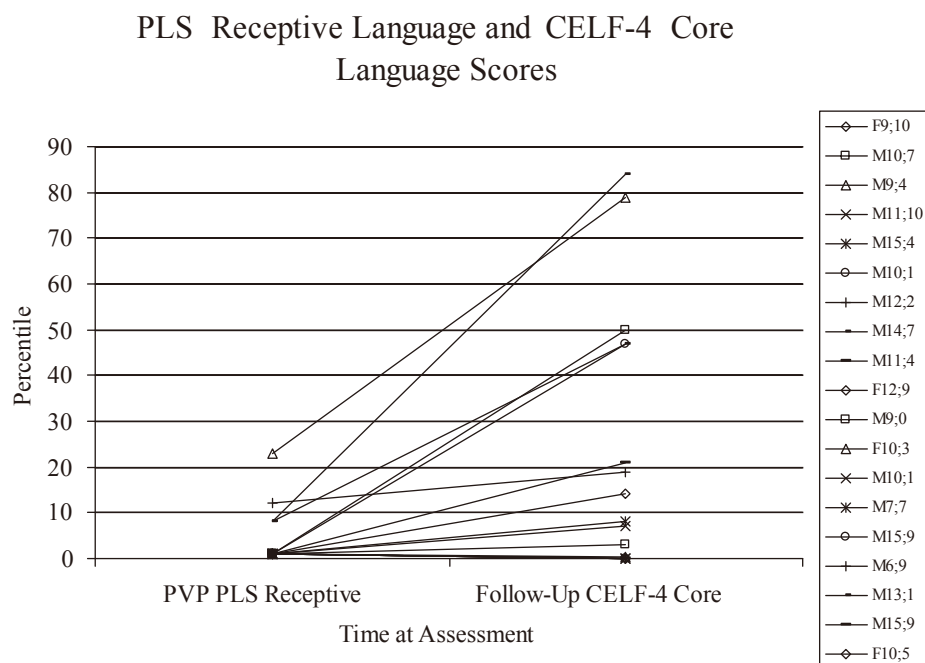


Figure 1
PLS Receptive and CELF-4 Core Percentile Scores for Children with Autism at Follow-up

PLS receptive scores and *PLS* expressive scores were all significantly positively correlated with *CELF-4* receptive, *CELF-4* expressive and *CELF-4* core scores (see Table 1), indicating that higher receptive or expressive language scores between the ages of 2 and 3 were associated with higher language scores at follow-up.

Visual inspection of the individual scores for both the *PLS* and *CELF-4* indicated that there may be a significant difference in scores between the two assessments. A post-hoc repeated measures ANOVA revealed a significant difference between the *PLS* receptive scores and the *CELF-4* core scores, $F(1, 18) = 9.25, p = .007$, with the participants scoring significantly higher on the *CELF-4* core ($M = 72.89; SD = 25.60$) than the *PLS* receptive ($M = 59.63; SD = 12.77$) (see Figure 1). Significant differences were also found between the *PLS* expressive scores ($M = 62.37; SD = 8.84$) and *CELF-4* core scores ($M = 72.89; SD = 25.60$), $F(1, 18) = 4.41, p = .05$.

Discussion

Results suggest a strong relationship between early language ability and later language outcomes. Participants who scored lower on the *PLS* receptive in PVP tended to score lower on follow-up on the *CELF-4* core, and those who scored higher on the *PLS* receptive scored higher on the *CELF-4* core. A similar relationship was found for *PLS* expressive language and the *CELF-4* core scores.

As can be seen in Figure 1, some of the scores were stable; however, the majority of participants showed enormous gains in their language abilities. Follow-up scores of 8 (42%) of the 19 participants remained stable (i.e., within 2 *SD* below the mean at PVP and at follow-up). One participant (5%) showed minor improvement (a standard score of 51 in PVP and 72 on follow-up) while the remaining 10 participants (53%), who achieved low standard scores on the *PLS* (more than 1.5 *SD* below the mean) scored close to the mean (within 1.5 *SD*) or above on follow-up (*CELF-4* standard scores ranged from 78 to 115).

It is of interest that while all of these participants were reported to be verbal, follow-up scores on the language measures were extremely variable. Our results suggest that scores on the language measure do not necessarily indicate verbal ability. One female child, for example, achieved very low receptive, expressive, and core language standard scores on the *CELF-4* (67, 51, and 48, respectively). Nevertheless, she used verbal language to communicate her needs and wants very effectively and held lengthy conversations providing very accurate information, as long as the conversation involved topics of interest such as dinosaurs, sharks or guitars. Thus, poor performance on the standardized language measure does not necessarily indicate an inability to communicate. At the same time, good performance on these measures did not necessarily indicate good communicative ability. One male child, for example, achieved *CELF-4* standard scores of 102, 99, and 100 on receptive, expressive, and core

language, respectively, while throughout the assessment he did not use much language to communicate. His mother reported his use of verbal language at the follow-up assessment was representative of his daily language use.

Interestingly, not all children who were reported by their parents to be verbal in Study 1 were able to use language to communicate effectively at the follow-up assessment. Of the 40 participants tested, 6 (17.5%) were not communicatively verbal. Though they used verbal language as their primary mode of communication, their verbal language use was minimal. For example, when approached by the examiner at follow-up, one 10-year-old female did not interact at first. She remained silent when introduced by her mother and did not respond to interactions from the examiner. Only after numerous attempts from the examiner to elicit communication did she finally respond using echolalia to communicate. When asked "What grade are you in?" she replied "What grade are you in?" Her mother expressed concern that the follow-up assessment performed (which was held at their home) was not representative of her true abilities. We offered to leave our video recorder with the family over the weekend with the goal of obtaining a more representative language sample. A review of the recording revealed minimal language use in a routine situation where major scaffolding was provided by the mother and very little spontaneous language, although more than was observed at the assessment. Thus, parent reports of verbal language use as the primary mode of communication must be interpreted with caution.

General Discussion

The present research study examined language outcomes of individuals who had characteristics of autism between the ages of 2 and 3 years. The language abilities of individuals who had a diagnosis of autism upon follow-up were investigated as well. There were two major questions. First, do 50% of children with autism remain nonverbal? Second, is early receptive language ability related to later language outcome? The results of Study 1 revealed that 81% of the children with autism were reported to be verbal upon follow-up. Study 2 found that receptive language scores for individuals between the ages of 2 and 3 were related to later language outcomes for children with autism.

While Bailey, *et al.* (1996) predicted that 50% of children with autism acquire useful language, the present study suggests a higher rate of children with autism who are verbal. It is possible that the higher percentage of children who become verbal beyond the age of 6 may be attributed to early and intensive intervention. It is also possible that the estimation that only 50% of children with autism become verbal was based on a sample of more severely affected individuals. This study included participants who had variable language and cognitive abilities, possibly allowing for a more representative sample.

It is important to note that being verbal implies using verbal language as a primary mode of communication. It does not imply communicative competence. Not all children assessed at follow-up were able to use verbal language to communicate their needs and wants and to express themselves effectively. This was surprising since all parents reported that their child's primary mode of communication was verbal language. Thus, parent reports on the use of verbal language among children with autism must be interpreted with caution since they are not a sufficient indicator of language ability. Consequently, future studies attempting to determine verbal language use must clearly define verbal language use.

Our study further suggests that generalizations about later language outcomes in children with autism can be made from early receptive language performance. Both early receptive and expressive language scores were found to be related to later overall language abilities, though a slightly stronger relationship was found for receptive language. This may be attributed to the fact that in order to be able to use expressive language appropriately, one must have good comprehension abilities.

One limitation of this research was that PVP was not designed for follow-up research purposes. Though careful documentation of the participants' progress was in place, files were stored in the medical records office and occasionally did not contain the required data. Another limitation involved participant selection. We tried to obtain a comprehensive sample but got a sample of opportunity. Caution should be exercised with the generalization of the results since all participants of this research were from PVP.

The results of the current research will add to our knowledge of language outcomes for children with autism. For example, knowing there is a high percentage of individuals who become verbal can be encouraging information to share with parents or caregivers of individuals with autism. These findings also suggest that early receptive language scores among children with characteristics of autism can serve as a predictor for later language outcomes. Combined, such findings are of great value when discussing prognosis with parents of children with autism.

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