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Language and Speech in Autism

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Abstract

Autism is a developmental disability characterized by atypical social interaction, interests or body movements, and communication. Our review examines the empirical status of three communication phenomena believed to be unique to autism: pronoun reversal (using the pronoun *you* when the pronoun *I* is intended, and vice versa), echolalia (repeating what someone has said), and a reduced or even reversed production-comprehension lag (a reduction or reversal of the well-established finding that speakers produce less sophisticated language than they can comprehend). Each of these three phenomena has been claimed to be unique to autism; therefore, each has been proposed to be diagnostic of autism, and each has been interpreted in autism-centric ways (psychoanalytic interpretations of pronoun reversal, behaviorist interpretations of echolalia, and clinical lore about the production-comprehension lag). However, as our review demonstrates, none of these three phenomena is in fact unique to autism; none can or should serve as diagnostic of autism, and all call into question unwarranted assumptions about autistic persons and their language development and use.

Keywords

autism; language development; echolalia; pronoun reversal; language production; language comprehension; receptive language; expressive language; psychoanalysis; behaviorism

1. INTRODUCTION

Autism is a developmental disability characterized by atypical social interaction, interests or body movements, and communication. Autism first entered the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* in 1980 (DSM-III, APA 1980), and it has remained in subsequent editions through the most recent edition (DSM-5, APA 2013).

The earliest DSM-III (APA 1980) diagnostic criteria for Infantile Autism required "gross deficits in language development," or, "if speech is present, peculiar speech patterns such as

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immediate and delayed echolalia [repeating what someone has said], metaphorical language, and pronominal reversal [using the pronoun *you* when the pronoun *I* is intended].” When the diagnostic criteria were revised 7 years later as Autistic Disorder (DSM-III-R, APA 1987), the spoken language phenomena of echolalia and pronoun reversal were reduced to only optional components of a long list of possible criteria, and the optional criterion of metaphorical language was downgraded to idiosyncratic language.

When the diagnostic criteria for Autistic Disorder were further revised (DSM-IV, APA 2000; DSM-IV-TR, APA 2004), echolalia and pronoun reversal disappeared completely, although “stereotyped and repetitive use of language or idiosyncratic language” remained. In the most recent diagnostic criteria for Autism Spectrum Disorder (DSM-5, APA 2013), echolalia is no longer considered a communication impairment but is instead considered one of several “restricted, repetitive patterns of behaviors, interests, or activities,” along with “lining up toys or flipping objects.” Indeed, even speaking “idiosyncratic phrases” is no longer considered a communication impairment but is instead relegated to an example of “restricted, repetitive patterns of behaviors, interests, or activities.” Pronoun reversal remains absent from the most current diagnostic criteria, as does any mention of delay in language development.

Our review paints a contemporary portrait of speech and language in autism by examining the empirical status of three phenomena: pronoun reversal, echolalia, and, a newcomer, a reduced or even reversed production-comprehension lag. Each of these phenomena has been claimed to be unique to autism; therefore, each has been proposed to be diagnostic of autism, and each has been interpreted in autism-centric ways. However, as demonstrated in this review, none of these three phenomena is in fact unique to autism; none can or should serve as diagnostic of autism.

2. PRONOUN USE IN AUTISTIC SPEECH

Early descriptions of autistic children were driven by psychoanalytic motivations (Bettelheim 1967). Therefore, many autistic phenomena were interpreted through the lens of psychoanalysis. Consider, for example, the communicative act of taking another person’s hand to indicate or execute wants and needs. Typically developing children, prior to developing sentence-level spoken language, commonly exhibit this communicative behavior (Gómez 2015, Stilp et al. 2010). Children with speech delays also exhibit this communicative behavior, even more frequently and for a longer stretch of development (Yoder et al. 1998). Adults with aphasia and apraxia also commonly exhibit this communicative behavior, at a frequency correlated with the severity of their aphasia and apraxia (Borod et al. 1989).

Outside the realm of autism, using another person’s hand to indicate wants and needs is considered a highly adaptive form of communication that is as sophisticated as (if not more sophisticated than) pointing, looking, and other mechanisms for requesting joint attention (Akhtar & Gernsbacher 2008, Crais et al. 2004, Gernsbacher et al. 2008). However, within the realm of autism, psychoanalytic interpretations of this communicative behavior have reigned since the earliest descriptions of the autism phenotype.

The 1961 Working Party was assembled to identify characteristics of autistic children (who at that time were called psychotic, schizophrenic, or mentally defective). The Working Party described autistic children's use of another person's hand to indicate wants and needs as "using parts of persons," and they attributed the behavior to autistic children's "gross and sustained impairment of emotional relationships" (Creak 1961, p. 502). Similarly, psychiatrist Stella Chess described autistic children's use of another person's hand to indicate wants and needs as an "abnormal form of communication," which she attributed to "an impaired awareness of other people as persons" (Wolff & Chess 1964, p. 461).

Thirty years later, the authors of the gold standard in contemporary autism diagnosis, the Autism Diagnostic Interview–Revised (Lord et al. 1994), continued to categorize autistic children's use of another person's hand to indicate wants and needs as indicating autistic children's "lack of social-emotional reciprocity" (cf. Gernsbacher 2006), rather than indicating their attempts at communication. The psychoanalytic interpretation was made, and the diagnostic categorization remains, despite empirical evidence (i.e., factor analysis) documenting that the phenomenon is more appropriately categorized as a positive communicative act, not as a pathological affective behavior (Lecavalier et al. 2006).

Similarly, psychoanalysis has driven the interpretation of autistic children's occasional difficulty with pronouns. The 1961 Working Party attributed autistic children's pronoun difficulty to the children's "apparent unawareness of [their] own personal identity" (Creak 1961, p. 502). Such psychoanalytic interpretations continued through the rest of the twentieth century. For example, Lee et al. (1994, p. 174) interpreted autistic children's difficulty with pronouns as manifesting "abnormalities in the way autistic children 'sense' and (probably) conceptualize self and other in relation to one another."

Psychoanalytic interpretations of autistic children's pronoun use persist today. For example, Duff & Flattery (2014, p. 1030) recently interpreted autistic children's difficulty with pronouns as manifesting their "disturbed processing of the understanding of self and other in the reciprocal relationship."

However, difficulty producing correct pronouns, including substituting the second-person pronoun *you* for the first-person pronoun *I*, is not unique to autistic speech development (Evans & Demuth 2012). Precocious, typically developing children also confuse these two personal pronouns (Schiff-Myers 1983), and the age at which personal pronouns are mastered varies widely among typically developing children (Clark 1978).

Children with other developmental disabilities, including intellectual disability (Le Couteur et al. 1989), deafness (Petito 1987), blindness (Pérez Pereira 1999), and specific language impairment (Yoder et al. 1998), also demonstrate difficulty producing correct pronouns. For example, in a sample of 500 children with Down syndrome, the number of parents who reported that their children had at some time during development reversed their pronouns was nearly double the number of parents of a reference sample of autistic children (Warner et al. 2014).

Furthermore, even among autistic children, difficulty producing pronouns is far from universal among all autistic children in all linguistic contexts (Castles et al. 2010,

Noterdaeme et al. 2000, Shield et al. 2015). Difficulty producing pronouns occurs most often when producing more complex sentences (Arnold et al. 2009, Fortunato-Tavares et al. 2015, Perovic et al. 2013) and when producing more complex pronouns, such as reflexives versus clitics (Terzi et al. 2014). Not only autistic children but also non-autistic children with language delay, children with Down syndrome, and typically developing children encounter more difficulties producing pronouns in more difficult production contexts.

Most importantly, when autistic children are carefully matched with non-autistic children in their language production skills, autistic children do not produce more pronoun errors than non-autistic children (Norbury & Bishop 2003). Note that vocabulary skill is an insufficient means for matching in studies of language production (or language comprehension; e.g., Lee et al. 1994); matching with nonverbal intelligence is even worse (Gernsbacher & Pripas-Kapit 2012); and matching by either standardized or age-equivalent scores, when the ages of the two groups of children vary, is as uninformative as it is ill advised (Mervis & Klein-Tasman 2004).

Similarly, when autistic children are carefully matched with non-autistic children in their language comprehension skills, autistic children do not comprehend pronouns more poorly than non-autistic children (Edelson et al. 2011). All children's comprehension of pronouns is, unsurprisingly, driven by their comprehension ability (O'Connor & Klein 2004).

During autistic development, difficulty producing pronouns can persist longer than it persists during typical development (Noterdaeme et al. 2010); however, many aspects of language development can be protracted during autistic development (Ellis Weismer et al. 2011, Gernsbacher et al. 2015). Most difficulties with pronoun production are resolved with continued development. Even autism pioneer Kanner (1943, p. 249) noted that "between the ages of 5 and 6 years, [autistic children] gradually … learn spontaneously to use personal pronouns with adequate reference."

3. ECHOLALIA IN AUTISTIC SPEECH

Early descriptions of autistic children considered repetitive or echolalic speech as a primary characteristic (Creak 1961). Among the eight children described by Kanner (1943) who produced spoken language, nearly all displayed examples of immediate or delayed echolalia (Gernsbacher et al. 2005). Thus, the earliest DSM-III (APA 1980) diagnostic criteria for Infantile Autism required either "gross deficits in language development" or, "if speech is present, peculiar speech patterns such as immediate and delayed echolalia."

When the diagnostic criteria were revised for the DSM-III-R (APA 1987), the characteristic of echolalia was reduced to merely an optional component of a long list of possible communication impairments. By the DSM-IV (APA 2000) and DSM IV-TR (APA 2004), echolalia had disappeared completely, although "stereotyped and repetitive use of language" remained. In the most recent DSM-5 (APA 2013), echolalia is no longer even considered a communication impairment. Instead, echolalia is considered one of several "restricted, repetitive patterns of behaviors, interests, or activities," along with "lining up toys or flipping objects."

Echolalia, like pronoun reversal, was also initially interpreted through the lens of psychoanalysis. Roberts (2014) reports that, in psychoanalytic terms, autistic children's use of echolalia was considered "a hostile behavior … indicative of a failure of [their] ego development." As psychoanalysis gave way to behaviorism, autistic children's use of echolalia was reinterpreted as a "a self-stimulatory behavior" that interfered with their learning. Such beliefs persist today. As Roberts (2014, p. 57) notes, treatment of autistic children's echolalia involves "extinguishing echolalia (usually by punishment) so learning [can] start (Lovaas et al. 1974). Unfortunately, the preferred [behaviorist] strategy for training speech [is] by rewarding the child for imitating a model, which must [be] confusing for everyone."

The empirical evidence argues against classifying echolalia as a so-called self-stimulatory or repetitive behavior and argues for considering echolalia as a communicative behavior. In a large-scale factor analysis of autism diagnostic criteria, echolalia did not load on the same factor as other so-called self-stimulatory, restricted, or repetitive behaviors, such as "repetitive use of objects," "repetitive motor movements" (e.g., hand flapping or finger flicking), or "rituals." Instead, echolalia loaded on the same factor as other communicative behaviors, including pronoun use (Lecavalier et al. 2006), which is why scales of so-called restrictive or repetitive behaviors rarely, if ever, include items assaying echolalia or linguistic repetition (Aman et al. 2004, Lam & Aman 2007).

Furthermore, echolalia is not unique to autism. In Lois Bloom's seminal case study of four typically developing children, all four children produced echolalia during early stages of their language development (Bloom et al. 1976). In Bloom's study, echolalia (referred to as imitation) was defined as repeating "all or part of the preceding utterance … with no change," as in the following two dialogues.

> Examiner: Take your shirt off.
>
> Child (Karen): Shirt off.
>
> Examiner: She might pinch her fingers.
>
> Child (Peter): Pinch her fingers.

As illustrated in Figure 1, for two of the four typically developing children studied by Bloom, most of their 200 utterances at Stage 1 of development were echolalic. For all the typically developing children, the proportion of their utterances that were echolalic decreased across development. Thus, as with difficulty with pronouns, echolalia is not unique to autism.

Despite the widespread belief that autistic children are more self-oriented than typically developing children, autistic children are no more likely than either typically developing children or non-autistic children with language delay to echo their own utterances (van Santen et al. 2013). For example, the following utterance, which exemplifies a child echoing themselves within the same utterance, is just as likely to be produced by a typically developing child or a non-autistic child with language delay as it is to be produced by an autistic child (van Santen et al. 2013).

Child: He loves me he loves me he loves me he loves me he loves me he loves me oh yeah and I tell him jokes.

Similarly, autistic children are no more likely than typically developing children or non-autistic children with language delay to echo themselves across utterances (van Santen et al. 2013). For example, the following utterance, which exemplifies a child echoing themselves across utterances, is just as likely to be produced by a typically developing child or a non-autistic child with language delay as it is to be produced by an autistic child (van Santen et al. 2013):

Child: This time he's not at the end of the big string he's floating.

Examiner: Okay that would be a better idea so we're going to change the trip.

Child: At the end of the big string.

Furthermore, autistic children are no more likely than non-autistic children with language delay to echo another person, either immediately, as in the first dialogue below, or after a one-turn delay, as in the second dialogue below.

Examiner: And the moon was coming up.

Child: The moon was coming up.

Examiner: Well what makes it feel comfortable—you think it's the quiet with nobody else around or?

Child: Yes.

Examiner: What do you think?

Child: I think it's the quiet with nobody else around and also I can do anything that I want like I can make the decisions.

Most notably, neither the frequency of echoing oneself nor the frequency of echoing another person is a function of the frequency of autistic traits (van Santen et al. 2013).

Echolalia is usually transient. Although echolalia occurs during some stages of language development for typically developing children, non-autistic children with language delay, and autistic children, it usually does not persist. For instance, most of the autistic children who were reported to have "lost" their autism diagnosis by age 9 exhibited echolalia when they were younger (Kelley et al. 2006).

Most importantly, echolalia is productive. Against the zeitgeist of psychoanalysts interpreting echolalia as a lack of ego development and the continuing mantra of behaviorists interpreting echolalia as a disruptive self-stimulatory behavior, Fay (1967), Prizant (1987), and even Kanner (1973) proposed that echolalia was a productive stepping stone to more generative speech (see also Baltaxe & Simmons 1977, Manning & Katz 1989, Roberts 1989).

In particular, mitigated echolalia demonstrates clear trajectories to more generative language production. Mitigated echolalia refers to echoed speech that modifies the original utterance. For example, Bud, an autistic child who was quite fond of the Teletubbies television show,

initially echoed the sentence, “One day in Teletubbyland, all of the Teletubbies were very busy when suddenly a big rain cloud appeared.” Weeks later, using mitigated echolalia, the child said, “One day in Bud’s house, Mama and Bud were very busy when suddenly Daddy appeared,” to express the construct of his father returning home.

As another example, during early stages of Bud’s language development when he wanted to play ball, he would approach his mother or father and echo the sentence, “Quick, Dipsy, help Laa-Laa catch the ball.” During later stages of Bud’s language development when he wanted to play ball, the syntactic structure of his echolalic utterance remained intact, but he replaced the nouns (e.g., “Quick, Daddy, help Bud catch the ball”). Eventually Bud began generating original two-word phrases (e.g., “Daddy ball?” and “Dad, wanna play ball?”) (Dawson et al. 2008).

Therefore, not only does the frequency of immediate echolalia decrease as language development increases, but also the frequency of mitigated echolalia increases as more generative language increases. Figures 2, 3, and 4 present data from Roberts’s (2014) longitudinal study of autistic and non-autistic children with language delay. As Figure 2 illustrates, both autistic and non-autistic language-delayed children increase their comprehension skills across time.

As Figure 3 illustrates, across the same time period, both autistic and non-autistic language-delayed children decrease their use of immediate echolalia. As Figure 4 illustrates, across the same time period, both autistic and non-autistic language-delayed children increase their use of mitigated echolalia. Thus, as language comprehension skills increase, immediate echolalia decreases, and mitigated echolalia increases, demonstrating that echolalia provides stepping stones for further language development.

4. PRODUCTION-COMPREHENSION LAG

In the late 1990s, autism researchers began to ascribe another putatively unique speech-language phenomenon to autistic children: an abnormal production-comprehension lag (Cohen & Volkmar 1997). During typical language development, what children can say (language production) lags behind what children can understand (language comprehension). The fact that language production lags behind language comprehension makes sense, during both language development and proficient language use.

Children, as well as adults, need to understand a linguistic form—be it an unusual grammatical structure or a novel vocabulary item—before they can skillfully use that linguistic form in their own production (Ingram 1974). Thus, language production (also called expressive language) always lags behind language comprehension (also called receptive language). Production lags comprehension for children learning their native language (Benedict 1979), for adults using their native language (Pilulski & Templeton 2004), and for children and adults learning and using a second language (Schmitt 2008).

To illustrate a typical production-comprehension lag in vocabulary development, Figure 5 presents data from the norming sample of the MacArthur–Bates Communicative Development Inventory (Fenson et al. 2007). The number of words that children in this

typically developing sample could produce (i.e., the size of their expressive vocabularies) lagged behind the number of words that the same children could understand (i.e., the size of their receptive vocabularies). The production-comprehension lag occurred at each age of development, which in these data ranged from 8 to 18 months.

Although the data shown in Figure 5 were collected cross-sectionally (data from different-age children were collected at the same time), the production-comprehension lag in vocabulary skill is also demonstrated when the data are collected longitudinally (data from the same children are collected at different times). Typically developing children, as well as typically developed adults, produce fewer words than they can successfully comprehend, and they understand more words than they can successfully produce.

Similarly, typically developing children, as well as typically developed adults, produce less complex grammatical structures than they can successfully understand, and they understand more complex grammatical structures than they can successfully produce. Thus, the production-comprehension lag occurs through all stages of development and for all forms of language (vocabulary, grammar, and the like).

Recently, some autism researchers have claimed that the normative production-comprehension lag is reduced in autistic language development. These researchers claim not only that autistic children's language development can be delayed, which is a well-established phenomenon (Gernsbacher et al. 2015), but also that autistic children's comprehension of language is even more delayed than their production of language, thereby reducing the normative production-comprehension lag. For example, Maljaars et al. (2012, p. 2182) claim that "in contrast to typical development, [autistic children's] language comprehension is often even more delayed relative to production."

Other researchers claim that the normative production-comprehension lag does not even exist in autistic language development. For example, Goodwin et al. (2012, p. 109) write that "typically developing children almost always demonstrate understanding of words and grammatical constructions prior to their production of these forms …. This indicates that they are [understanding] the language of their input prior to using it in conversation." In contrast, Goodwin et al. (2012, p. 109) claim that autistic children "only [understand] what they can first produce." Similarly, Ellis Weismer et al. (2010, p. 1260) write that "there is evidence to suggest that the typical receptive language [comprehension] advantage over expressive language [production] *is not observed* in toddlers on the autism spectrum" (emphasis added).

Still other language researchers claim that the normative production-comprehension lag is reversed in autistic language development. For example, Kover et al. (2013, p. 2697) write "there is mounting evidence that at least some [autistic children] display a profile characterized by a relative advantage of expressive [production] over receptive language [comprehension] …. [T]his pattern is the converse of that expected in typical development, in which a child's ability to understand vocabulary and syntax is generally far in advance of the ability to formulate spoken utterances reflecting that same competence." Similarly, Hudry et al. (2010, p. 682) claim that in autistic language development, rather than the

normative case of production [expressive language] lagging behind comprehension, "comprehension lags behind expressive language development."

Thus, autism researchers have claimed that a reduced, a nonexistent, or even a reversed production-comprehension lag characterizes autistic language development. Although claims of a reduced comprehension-production lag are somewhat plausible, claims of a nonexistent, much less a reversed, production-comprehension lag beg credulity. The assertion that autistic children "only [understand] what they can first produce" (Goodwin et al. 2012, p. 109) evokes a model of language acquisition and language development that is untenable.

Where did these assumptions come from? In a 2005 review of autism and language, Tager-Flusberg et al. (2005, p. 350) pointed to "a clear clinical impression" that the normal production-comprehension lag is abnormal in autistic children (but note that Tager-Flusberg and colleagues found a normal, rather than abnormal, production-comprehension lag in their own data; see, e.g., Kjelgaard & Tager-Flusberg 2001). Perhaps because of misconceptions about echolalia in autistic children's language, clinicians believe that autistic children say more than they know.

A more empirical answer to the question of whether autistic children say more than they know or whether, like typical children and typically developed adults, autistic children know more than they say, is provided by a recent meta-analysis of over 60 studies, reporting the results of over 100 samples, comprising more than 4,000 children (Kwok et al. 2015). The results of the meta-analysis are unambiguous.

Autistic language development follows a normative production-comprehension lag. Regardless of the autistic children's age, regardless of whether their vocabulary or their grammar is tested, regardless of whether the language measures are parent reported or examiner assessed, and despite claims to the contrary, autistic children demonstrate a normative production-comprehension lag. An abnormal production-comprehension lag is not diagnostic of autism.

5. CONCLUSIONS

Our review has painted a contemporary portrait of speech and language in autism by examining the empirical status of three phenomena: pronoun reversal, echolalia, and a reduced or even reversed production-comprehension lag. Each of these three phenomena has been assumed to be unique to autism; therefore, each has been proposed to be diagnostic of autism, and each has been interpreted in autism-centric ways (psychoanalytic interpretations of pronoun reversal; behaviorist interpretations of echolalia, and clinical assumptions about the production-comprehension lag).

However, none of these three phenomena is unique to autism; none can or should serve as diagnostic of autism. Moreover, all call into question assumptions made about autistic persons and their language use and development; therefore, all provide methodological cautions and practical guidance.

With regard to methodology, our review underscores the need to analyze typical language development alongside autistic language development. For example, precocious typically developing children also confuse the personal pronouns *you* and *I* (Schiff-Myers 1983), and the age at which personal pronouns are mastered varies widely among typically developing children (Clark 1978). Therefore, attributing difficulty producing personal pronouns to an abnormal understanding of self versus others is unwarranted, unless one is willing to attribute "disturbed processing of the understanding of self and other in the reciprocal relationship" (Duff & Flattery 2014, p. 1030) to typically developing, as well as autistic, children.

Similarly, analyzing typical language development alongside autistic language development illustrates that echolalia is not unique to autistic language development. Typically developing children as well as non-autistic children with delayed language development commonly echo their own and others' utterances. During both typical and autistic language development, echolalia is most often transient and productive, serving as a stepping stone to more generative speech. Mitigated echolalia (echoed speech that modifies the original utterance) demonstrates clear trajectories to more generative language production. Thus, analyses of typical language development alongside autistic language development argue against the idea that echolalia is an autism-specific, disruptive, self-stimulatory behavior.

With regard to practical implications, our review underscores the wisdom of removing pronoun reversal from the autism diagnostic criteria (Gernsbacher et al. 2005). Our review also argues against placing echolalia as a diagnostic exemplar of repetitive behavior. All data point to echolalia as a communicative, not a repetitive, behavior. A large-scale factor analysis of autism diagnostic criteria, reviewed above, demonstrated that echolalia did not load on the same factor as other so-called self-stimulatory, restricted, or repetitive behaviors, such as "repetitive use of objects," "repetitive motor movements" (e.g., hand flapping or finger flicking), or "rituals." Rather, echolalia loaded on the same factor as other communicative behaviors, including pronoun use (Lecavalier et al. 2006).

Finally, with regard to practical implications, our review argues strongly against considering a reduced, much less a reversed, production-comprehension lag as diagnostic of autism. Although clinical lore has swirled that autistic children say more than they know, the empirical evidence is clear: Autistic language development follows a normative production-comprehension lag. Previous suggestions that autistic language development was characterized by a reduced, or even reversed, production-comprehension lag were most likely driven by pitfalls that compromise other realms of science (e.g., small sample sizes, atypical comparison data, and failures to replicate).

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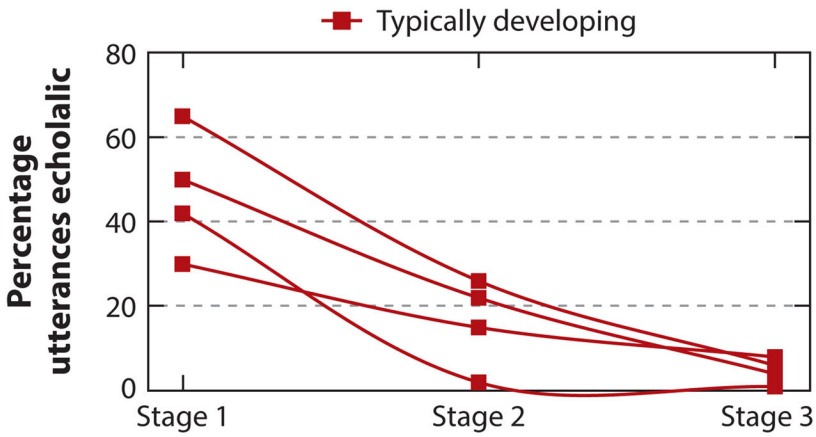

Figure 1.
The percentage of typically developing children's utterances that are echolalic. Data are from Bloom et al. (1976).

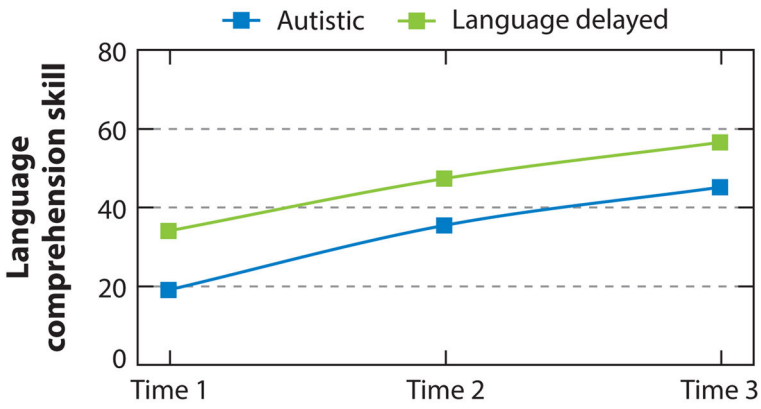

Figure 2.

Increase in language comprehension skill across time for autistic and non-autistic children with language delay. Data are from Roberts (2014).

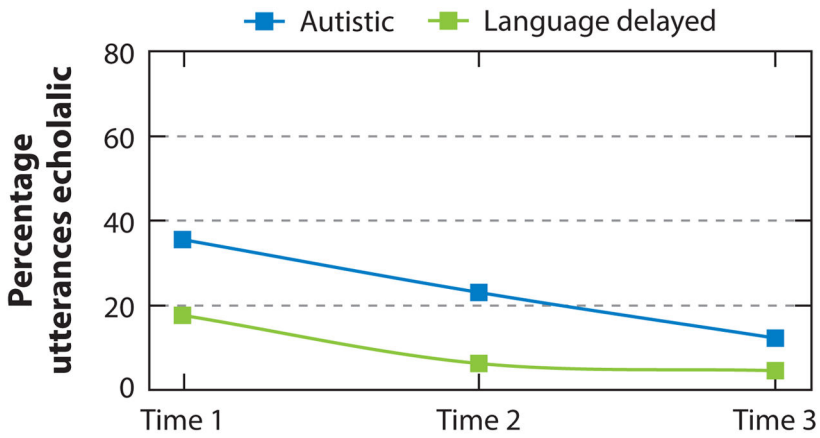

Figure 3.
Decrease in immediate echolalia across time for autistic and non-autistic children with language delay. Data are from Roberts (2014).

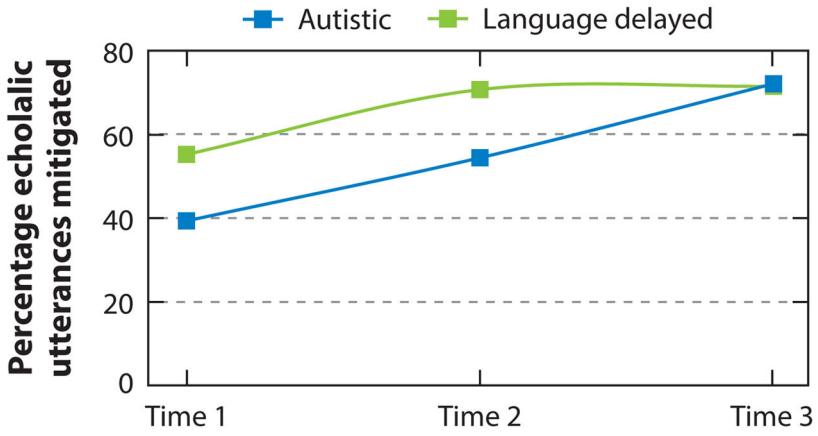

Figure 4.

Increase in mitigated echolalia across time for autistic and non-autistic children with language delay. Data are from Roberts (2014).

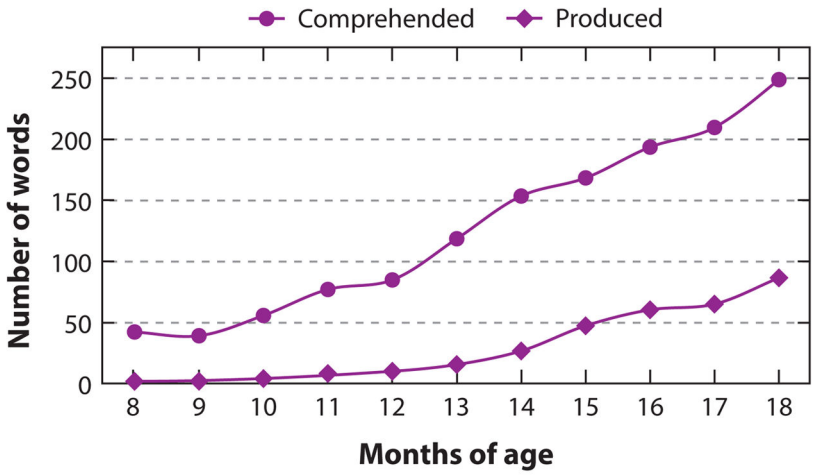

Figure 5.
A typical production-comprehension lag. Data are from the norming sample of the MacArthur–Bates Communicative Development Inventory (Fenson et al. 2007).