

Conventions for unconventional language: Revisiting a framework for spoken language features in autism

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Abstract

Background and aims: Autism has long been characterized by a range of spoken language features, including, for instance: the tendency to repeat words and phrases, the use of invented words, and “pedantic” language. These observations have been the source of considerable disagreement in both the theoretical and applied realms. Despite persistent professional interest in these language features, there has been little consensus around terminology, definitions and developmental/clinical interpretation.

Main contribution: This review paper updates and expands an existing framework for unconventional language in autism to include a broader range of non-generative (echolalia and self-repetition) and generative (idiosyncratic phrases, neologisms and pedantic language) features often observed in the language of individuals on the autism spectrum. For each aspect of the framework, we review the various definitions and measurement approaches, and we provide a summary of individual and contextual correlates. We also propose some transitional language features that may bridge non-generative and generative domains (e.g., mitigated echolalia and gestalt language).

Conclusions: This updated framework offers a unified taxonomy and nomenclature that can facilitate further investigation and interpretation of unconventional language in autism.

Implications: There are important implications of this work for our understanding of the complex interplay between autism and language development. Equally important are the clinical ramifications that will guide evidence-based practice in assessment and intervention for individuals on the autism spectrum.

Keywords

Autism, language, echolalia, neologisms, repetitive speech

The earliest accounts of autism¹ include detailed descriptions of unconventional language use, including the tendency to repeat words and phrases, the use of invented words, unusual phrasing and “pedantic” language (Asperger, 1991; Kanner, 1943). These patterns of language use have been confirmed across countless studies; they are

often of central interest in educational and clinical settings (Arora, 2012; Gladfelter & Vanzuiden, 2020), and some of these features are now even included in the diagnostic criteria for ASD (APA, 2013). They have been the source of heated debates over clinical decision-making, with some professionals suggesting that these tendencies are

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“maladaptive” (Lovaas et al., 1973; Risley & Wolf, 1967; Schreibman & Carr, 1978) and should be diminished (e.g., Carr et al., 1975; Fisher et al., 2013; Handen et al., 1984; Lanovaz & Sladeczek, 2012; Neely et al., 2016) and others arguing that they are important developmental markers that should be harnessed for language learning (e.g., Blanc, 2012a; Peters, 1983; Prizant, 1983; Schuler, 1979; Stiegler, 2015). Despite decades of scholarly and applied attention to these language patterns, the autism community lacks consensus around terminology, definitions and developmental interpretation.

One important step towards a common framework was proposed by Prizant and Rydell (1993), who suggested a taxonomy for these behaviors using the term “unconventional verbal behavior,” defined as the following: “vocal production that is composed of recognizable speech, but violates to some degree, socially acceptable conventions of linguistic communication” (Prizant & Rydell, 1993, p. 263). Within this framework, they proposed four categories: immediate echolalia, delayed echolalia, perseverative speech, and incessant (repetitive) questioning. In the years since Prizant & Rydell’s important work, their framework has not been widely adopted, despite sustained interest in these patterns of language use. Therefore, this paper aims to revive and expand the initial “unconventional verbal behavior” framework, reporting on what is currently known about these areas of language in autism and proposing some modifications.

The paper is organized around three primary clusters of unconventional spoken language (see Figure 1). The first is “non-generative forms”, including (as outlined by Prizant & Rydell, 1993) immediate echolalia, delayed echolalia and repetitive speech (including what Prizant & Rydell called “perseverative” speech and “incessant/repetitive questioning”). We term the second cluster “generative forms,” and this includes idiosyncratic language (the use of idiosyncratic words/neologisms and idiosyncratic phrasing) and pedantic language. We add this cluster to Prizant and Rydell’s (1993) original framework, as previous work on language patterns in ASD has made an important distinction between echolalia/repetitive language (i.e., non-generative forms) and language that involves novel morphological and/or syntactic combinations (i.e., generative forms) (e.g., Rydell & Mirenda, 1991, p. 1994; Tager-Flusberg et al., 2009), and which is sometimes referred to as “spontaneous”. Finally, we recognize a third cluster of “transitional” forms (including mitigated echolalia and gestalt language), which combine features of the other two domains.

It is important to state outright that the primary aim of our proposed framework is to classify the *form* of language behaviors. Nevertheless, for some aspects of the framework – namely the non-generative and transitional forms – we will secondarily consider their function. Aspects of communicative intention and function can vary when individuals use any form of unconventional language (see Schuler & Fletcher, 2002); thus, we do not equate either non-

generative or generative types of unconventional language with terms like non-intentional, non-communicative, or non-functional, nor do the definitions of any of our language categories allude to the role of communicative intent. While our categorizations of different behaviors do not assume any role of communicative intent, in some sections, we will review what previous work has outlined regarding the communicativeness of certain unconventional language signals. This discussion is especially salient for non-generative forms (i.e., immediate and delayed echolalia and self-repetitions), which have historically been regarded as non-communicative. There has been less discussion around the communicative function of generative forms of unconventional language, perhaps because the communicative functions of these language forms are more readily apparent. As part of this review, we include several first-hand accounts of unconventional language use from autistic self-advocates. These authors provide invaluable insights into the interactive, communicative and expressive functions of unconventional language, and they also explain how unconventional language might help scaffold and contribute to language development.

It is also critical to acknowledge that none of these categories of language use are *unique* to autism. Accordingly, we do not claim here that unconventional language is specific to autism; however, a review of the developmental scope and sequence of these features in non-spectrum populations and/or other neurodevelopmental or acquired disorders is beyond the scope of this paper (for a developmental perspective see, for instance, Schuler & Fletcher, 2002). Instead, we aim to review the various definitions and measurement approaches for unconventional language that have been used in the field of autism research and synthesize findings about individual and contextual correlates of unconventional language. The overarching goal of this work is to provide a taxonomic framework, unify the previous reports, and provide suggestions for future directions.

Non-generative

Over decades of autism research and clinical work, perhaps the most salient of unconventional language forms are those that are non-generative – that is, they do not involve the generation of novel morphological or syntactic forms but rather involve the rote repetition of a word or words. Included in this category are echolalia (immediate and delayed), both characterized by the repetition of language previously spoken by *others*, and self-repetition, which is characterized by the repetition of language previously spoken by *oneself*.

Echolalia

In his seminal work, Kanner (1943) observed that his patients often had the tendency to “echo” language

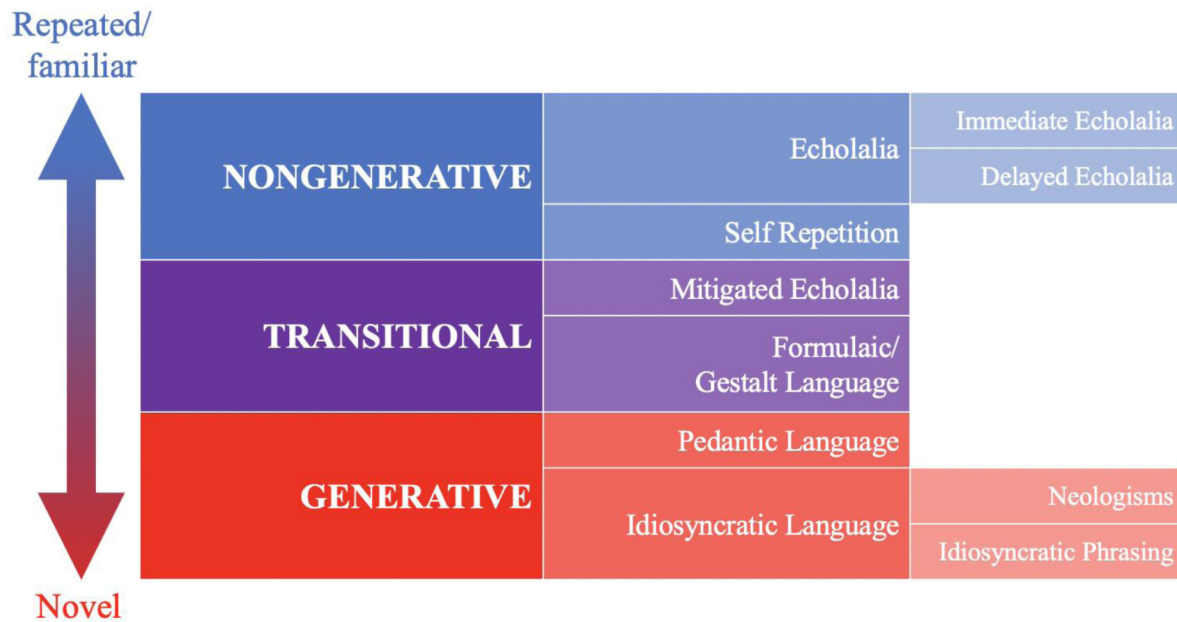


Figure 1. Graphical representation of the unconventional spoken language framework.

spoken by others and that this mimicry retained the original words and the original prosody. He further noted that such repetitions occurred both “immediately” and in a “delayed” fashion. The dual characterization of echolalia as *immediate* and *delayed* has endured ever since, although some scholars have suggested further differentiation based on whether the delay is brief or “distant” (Sidtis & Wolf, 2015). In keeping with Kanner’s foundational differentiation between immediate and delayed echolalia, the two will be considered separately below. It is important to note that, in many accounts, there has been a conflation of echolalia (both immediate and delayed) and another salient feature of language use in autism: pronoun reversal, wherein the individual reverses second- or third-person pronouns in place of first-person (e.g., “Want me to draw a spider” meaning “I want you to draw a spider” (Kanner, 1943, p. 241) or “Do you want a bath?” instead of “I want a bath” (Kanner, 1943, p. 219). More recent accounts have suggested that pronoun reversal may not be entirely due to echolalia (see below for further discussion) (Hobson et al., 2010; Hobson & Meyer, 2005; Lee et al., 1994; Ricard et al., 1999).

Immediate echolalia. Definition and Examples. Following on Kanner’s case descriptions, several researchers provided formal definitions of immediate echolalia in the context of autism research. Fay (1969) described it as “the meaningless repetition of a word or word group just spoken by another person” (p. 39); another early example comes from Schuler (1979), who described echolalia as “the literal repetition of utterances of others immediately after their occurrence” (p. 412). More detailed definitions have

also been proposed: “a response (that) must have occurred subsequent to the interlocutor’s utterance, and it must have consisted of segmental or suprasegmental similarities to the previous speaker, involving...rigid echoing of the model utterance...occurring within two utterances of the original utterance” (Prizant & Duchan, 1981, p. 243; Rydell & Miranda, 1994). Alternative, similar definitions have been proposed elsewhere (e.g., Stribling et al., 2007), and some definitions have tried to differentiate autistic, “echolalic” repetitions of language from repetitions used as a “memory device” or those used “meaningfully” by children with low levels of expressive language (Lord et al., 2012). The following example (Arnold, 2021) shows how immediate echolalia appears in context, where a child repeats full or partial utterances produced by both his parent and an experimenter; each repetition is within two utterances of the original, model utterance.

Parent: Ooh what’s in there?
 Parent: Come sit and we’ll see.
 Child: What’s in there?
 Experimenter: Let’s put the candles in.
 Child: Let’s put the candles.

Across this array of operationalizations, there is consensus around the characterization of immediate echolalia as being the repetition of a word or words spoken by others, immediately after hearing them; much less consensus exists around the function and communicative nature of echolalia (see below). Importantly, other terms for echolalia may be used in neighboring bodies of literature. For

instance, as discussed by Stiegler (2015), there is some overlap between immediate echolalia and “vocal stereotypy”, although the latter is a broader term more common in the literature on the (controversial) abatement of echolalia (e.g., Neely et al., 2016) and which often also includes nonword vocalizations (e.g., Lanovaz & Sladeczek, 2012). In typical development, the tendency to mimic speech may be called “echoic” language (Charlop, 1983).

Measurement Approaches. A variety of measurement approaches have been developed to quantify immediate echolalia. Fay (1969) presented standardized verbal stimuli and coded the presence or absence of an echolalic response to each probe. In other work, videos and/or transcriptions from child/adult interactions have been reviewed by trained coders, who extracted the number of echolalic utterances during the session (e.g., Prizant & Duchan, 1981; Rydell & Mirenda, 1994) and, in still other studies, transcripts have been fed into automated software programs (that is, automatic algorithms) to extract measures of echolalia (Van Santen et al., 2013). Ordinal rating scales based on frequency of echolalia have been employed in “gold standard” diagnostic tools, relying on clinician observations (Lord et al., 2012) and parent report (Rutter et al., 2003), and qualitative approaches, including conversation analysis, have also been introduced (Dobbinson et al., 1998; Stribling et al., 2007).

Contextual and Individual Correlates. Although immediate echolalia has been highly visible in the field of autism research and practice, and it has even been documented in children on the autism spectrum who use signed language (Shield, 2014; Shield et al., 2017), its prevalence in autism is difficult to quantify. Some research has suggested echolalia is more common in autism than in non-spectrum individuals: children with other language impairments (but who are not on the autism spectrum) also showed elevated levels of immediate echolalia (Cantwell et al., 1978; Leyfer et al., 2008), but they may show less use of echolalia relative to children on the spectrum (Van Santen et al., 2013). Interestingly, associations between levels of echolalia and individual characteristics are tenuous. Some studies found no associations between immediate echolalia and autism symptoms (Gladfelter & Vanzuiden, 2020; Van Santen et al., 2013), age (Mcevoy et al., 1988) or nonverbal cognitive abilities (Gladfelter & Vanzuiden, 2020; Mcevoy et al., 1988). Some researchers have also reported no associations with language abilities (Gladfelter & Vanzuiden, 2020; Van Santen et al., 2013), while others found that immediate echolalia was negatively associated with language skills, such that higher language skills were associated with lower levels of echolalia (Fay & Butler, 1968; Kang et al., 2020; Mcevoy et al., 1988). Finally, the role of other skills, such as short-term verbal memory (Dobbinson et al., 1998), inhibition (Grossi et al., 2013) or “auditory monitoring” (Schuler, 1979) is also inconclusive.

Nearly as long-standing as the accounts of immediate echolalia in autism is the debate over whether it offers valuable cognitive or communicative functions (e.g., Schuler, 1979; Stiegler, 2015). Early characterizations of immediate echolalia suggested that it was nonfunctional (e.g., Kanner, 1943); indeed, many clinically oriented studies in the years since have treated it as a problematic repetitive behavior requiring extinction (e.g., Carr et al., 1975; Fisher et al., 2013; Neely et al., 2016). Other approaches sought to clarify the contexts and purposes of immediate echolalia. A seminal paper by Prizant and Duchan (1981) carefully coded the use of immediate echolalia during natural interactions and posited that it was a valuable communicative and cognitive tool serving seven distinct interactive functions, including turn-taking, yes-answer, requesting, declarative and self-regulatory. Many studies in the ensuing years have further explored the complex potential communicative and developmental functions of immediate echolalia (e.g., Local & Wootton, 1995; Pruccoli et al., 2021; Sterponi & Shankey, 2014; Stiegler, 2015). These studies reported that immediate echolalia was more frequently used in response to “high constraint” utterances (e.g., yes/no questions, directives) (Rydell & Mirenda, 1991, p. 1994; Violette & Swisher, 1992) and/or novel or challenging language input – that is, when understanding was low (Gladfelter & Vanzuiden, 2020; Schuler, 1979; Violette & Swisher, 1992). Even further, some found that immediate echolalia was an effective responsive strategy for mastering new language (Charlop, 1983; Leung & Wu, 1997) and developing social communication and play skills (Schuler, 2003).

First-person perspectives from autistic adults describe several possible functions of immediate echolalia. Sinclair (2019) suggests that use of immediate echolalia may be interpreted in several different ways depending on the context, and it may or may not be intended as communicative. In Amythest Schaber’s *Ask an Autistic*, episode #18 (2014), they explain the use of immediate echolalia for both communicative and non-communicative purposes. Schaber describes the communicative purposes of immediate echolalia by autistics to include: buying time while processing what was just said, as a form of verbal expression, engagement, and interaction, or as a way of making needs and desires known. For instance, the immediate repetition of the question “would you like some more salad?” (while holding out a plate) can mean “yes, I would like some more salad.” Schaber (2014) also explained that immediate echolalia can be used for personal, non-communicative ways, including as self-soothing behavior, self-stimulation, and self-rehearsal of what they are preparing to say.

Delayed echolalia. Definition and Examples. Schuler and Fletcher (2002) described a child repeating a phrase verbatim (including the intonation and pausing of the original

utterance) that he heard on television, “Barney was brought to you by the makers of Juicy Juice ©, 100 percent real fruit juice, and by the J. Arthur Vining Foundation ©, the Corporation for Public Broadcasting and by contributions to your PBS stations from viewers like you” (Schuler & Fletcher, 2002, p. 135). This utterance is an example of delayed echolalia, which – like immediate echolalia – involves the repetition of *speech spoken by another person* (Stribling & Rae, 2007). However, unlike immediate echolalia, delayed echolalia entails that the echoed speech occurs after some interval of time has passed between the model utterance and the echo.

Authors have been more or less specific about what length of separation between the model and the echo constitutes a delay. Kanner (1943) identified the presence of delayed echolalia in his original case series, and he defines the phenomenon as “word combinations... ‘stored’ by the child and uttered at a later date” (p. 243). Thus, he suggested that a delayed echo involves a period of time between the model utterance and the echo, but he did not offer a specific duration that qualifies an echoed utterance as delayed (vs. immediate). Similar definitions followed, including “echoing of a phrase after some delay or lapse of time” (Simon, 1975, p. 1440). In contrast, Rydell and Mirenda (1994) were more specific, in that they stipulated that delayed echolalia involved repeated speech occurring more than two speaking turns after the model utterance (Rydell & Mirenda, 1994). Sidtis and Wolf (2015) proposed differentiating delayed echoes that were proximal to the original utterance from those that were “distant” (more than 5 turns), although this distinction has not been widely adopted.

Prizant and Rydell (1984), in their systematic exploration of delayed echolalia, emphasized the valuable role of a familiar adult in distinguishing delayed echolalia from generative utterances and/or self-repetitions (see next section). In their account, delayed echolalia was identifiable based on two criterion (at least one of which had to be met): the utterance was (1) “beyond the child’s level of grammatical complexity based on creative utterances” (level of grammatical complexity was characterized according to the five stages of language development outlined by Brown (1973)) and/or (2) “identified as memorized routines by the child’s language clinician or teacher” (p. 185). The following excerpt, adapted from their text, describes how a child, Mary, uses an echoed phrase about having a splinter to convey her fear of a stranger. This example underscores the importance of the familiarity of the interlocutor, not only in identifying delayed echoes in the first place, but also in interpreting their function in a given context.

...[O]n one occasion, while working with her teacher, Mary observed an unfamiliar visitor to her classroom. After noticing the stranger, Mary turned toward the teacher and

exclaimed in a distressed voice, “You got a splinter, got a splinter!” Mary’s teacher responded, “Don’t be afraid, that’s Barry. He’s come to spend some time with us today.”... Mary’s teacher later explained that ever since Mary had a painful splinter the year before, she repeats this phrase, which was said to her at the time, whenever she is upset or experiencing pain. ... The phrase would ... be challenging to a naive listener who was either unfamiliar with Mary’s original experience or with her history of using the phrase. However, as the example illustrates, Mary’s speech production was not challenging to her teacher who was familiar with the relationship between Mary’s utterance and the communicative intent that it expressed. (p. 266)

In their first-person accounts, both Cynthia Kim and Emma Zurcher-Long described using delayed echolalia similarly to the way Mary does, in order to capture a specific emotional experience. Zurcher-Long (2016) explained that she uses sentences “from another time in [her] life” because they accurately convey her current emotional state. Kim (2013) described using the introductory line of a children’s story book (“It’s a bright sunny day”) when she is feeling optimistic about the day ahead.

Measurement Approaches. Few studies have closely examined delayed echolalia, perhaps due to the difficulty in identifying it as distinct from immediate echolalia and self-repetition. Indeed, some approaches do not distinguish between these categories (Lord et al., 2012; Rutter et al., 2003). Other studies have relied on transcription and coding of dyadic, semi-structured and/or play-based interactions either by trained coders (Gladfelter & Vanzuiden, 2020; Prizant & Rydell, 1984; Rydell & Mirenda, 1994) or automated algorithms (Van Santen et al., 2013). Qualitative studies have explored the usage of delayed echolalia using conversation analysis, in order to capture both the communicative/interactive function of these echoes and their prosodic contours (Sterponi & Shankey, 2014; Tarplee & Barrow, 1999; Wootton, 1999).

Contextual and Individual Correlates. Delayed echolalia appears to be less common than immediate echolalia (Gladfelter & Vanzuiden, 2020; Rydell & Mirenda, 1994; Van Santen et al., 2013), but even so, it may be more frequent than other commonly studied features of language use by individuals on the spectrum. For instance, Szatmari et al. (1995) found that – in children on the autism spectrum who had “functional” language – 50% used delayed echolalia, whereas only 26% showed pronoun reversal and 10.5% used neologisms. Nevertheless, there is a relative dearth of research on the correlates (either contextual or individual) of delayed echolalia. An early study by Cantwell et al. (1978) reported that children on the spectrum used delayed echolalia more often than a group of children with other language impairments (but not autism). A similar finding was reported by Leyfer

et al. (2008), who found that only 2% of children with specific language impairment (SLI) were reported to use delayed echolalia or other repetitive speech. In contrast, Gladfelter and Vanzuiden (2020) failed to find associations between an omnibus measure of repetitive language (including immediate and delayed echolalia and other forms of repetitive spoken language) and participant characteristics in their sample of children on the spectrum; this is similar to previous findings (Van Santen et al., 2013).

Interestingly, Rydell and Mirinda (1994) found that most delayed echolalia followed low-constraint adult utterances (in contrast to immediate echolalia, which tended to follow high-constraint utterances) and showed evidence of language comprehension. Not surprisingly, it has been suggested that (as with immediate echolalia), delayed echolalia often serves important interactional functions, including turn-taking, providing information, affirmation, protest and directive (Prizant & Rydell, 1984; Sterponi & Shankey, 2014; Tarpree & Barrow, 1999).

First-person accounts from authors on the spectrum exemplify how delayed echolalia can be used to recall a previous experience associated with a specific emotion (e.g., Zurcher-Long, 2016). Some adults on the spectrum report that the use of the echoed speech can be interpreted as conveying emotion (e.g., optimism, in the case of Kim, 2013). Others describe the use of delayed echolalia to connect to a previous emotional state as a method for conveying and *regulating* emotions (e.g., as a child, Sinclair (2019) repeated the question “What is one plus one?” to soothe himself in moments when he felt nervous or anxious because it reminded him of “the good times [he] had solving equations in school”).

Self-Repetition. Definition and Examples. In addition to repeating words and phrases initially produced by another person (i.e., echolalia), individuals on the autism spectrum have also been observed to repeat words, phrases, and questions initially produced by themselves.² For instance, Kanner (1943) noted that his patients had a tendency to use an utterance and then “keep repeating [it] over and over again” (p. 221). This behavior has received less attention in the autism literature than echolalia has, although some research finds that self-repetitions are actually more common in the speech of individuals on the spectrum than echolalia is (Van Santen et al., 2013). Like echolalia, subsequent repetitions of the initial utterance are non-generative, in that the speaker is repeating language by rote, rather than generating a novel utterance. Van Santen et al. (2013) provide the following excerpt, which shows how self-repetition can occur across conversational turns:

- Child: This time he’s not at the end of the big string he’s floating
 Experimenter: Okay that would be a better idea so we’re going to change the trip
 Child: At the end of the big string

We refer to this behavior as self-repetition (Van Santen et al., 2013), but it is important to note that this behavior has been categorized under a litany of labels through the years, including “palilalia” (e.g., Stribling et al., 2007), “verbal perseveration” (e.g., Abbeduto & Hagerman, 1997; Murphy & Abbeduto, 2007), “deviant repetitive language” (Sudhalter et al., 1990), “repetitive speech” (Handen et al., 1984), “verbal stereotypy” (Gladfelter & Vanzuiden, 2020), among others. The term “stereotyped” language has also been used in standardized tools (e.g., Lord et al., 2012; Rutter et al., 2003) to refer to words or phrases used repeatedly (note, however, the definition of “stereotyped” utterances allows for delayed echolalia along with self-repetition). It is important to note that many authors include “incessant” (Sudhalter et al., 1990) revisiting of the same *topic* (sometimes called “topic perseveration”) within the category of self-repetition (Kang et al., 2020; Murphy & Abbeduto, 2007). Instead, we limit our discussion to the repetition of linguistic units (words, phrases, and sentences), as we interpret excessive focus on a particular topic (but using different linguistic forms) as a pragmatic (rather than purely linguistic) phenomenon.

Measurement Approaches. Standardized diagnostic tools have used general ordinal rating scales to capture “stereotyped” utterances (which overlap with delayed echolalia), relying on both parent report (Rutter et al., 2003) and direct clinician observation (Lord et al., 2012). Other approaches used a more fine-grained observational approach. For instance, Sudhalter et al. (1990) provided subcategories of self-repetition which classified subsequent repetitions of a previous utterance by the linguistic unit (e.g., word/ phrase vs. sentence) that was repeated. Murphy and Abbeduto (2007) offered a similar conceptualization, but added an additional category, “conversational device repetition,” encapsulating a speaker’s repetition of comments or questions that are used to maintain a conversational exchange. See, for example, a participant’s repeated use of the question “How about you?” at the end of several conversational turns in the following excerpts adapted from their paper (2007, p. 392):

- Participant: My favorite sport is baseball. And my favorite team is the [team name]. Those are cool teams. How about you?
 Participant: Well, my Dad likes the [team name]. And my team is famous. The [team name]. How about you?
 Participant: Well, my favorite one is [song name]. Yeah. How about you?

Sidtis and Wolf (2015) went beyond defining repetition by the larger linguistic unit that was repeated (i.e., word, phrase, sentence), by measuring repetitiveness according to the number of morphemes that were repeated from the

initial utterance. Other authors have focused their analysis on whether the repetition occurs within or between turns (e.g., Van Santen et al., 2013). Combined approaches using transcription and automated algorithms have been used to tally each instance of self-repetition (Van Santen et al., 2013), and qualitative approaches have applied conversational analysis to repetitive exchanges in order to document the interactional and/or communicative functions of such repetitions (e.g., Dobbins et al., 2003; Stribling & Rae, 2007).

Contextual and Individual Correlates. Various studies have examined correlations between the frequency of repetitive language use and individual characteristics, like age, IQ, and language ability. Findings from this research have been mixed, with some research finding that IQ and age were negatively correlated with repetitive language frequency (Bishop et al., 2006), while others showed the opposite relationship (Cervantes et al., 2014), and still others reported no relationship at all, including any relationship with language ability (Gladfelter & Vanzuiden, 2020) or even echolalia (Van Santen et al., 2013). Such inconsistencies are likely due to the incredible variation of behavior subtypes (topic perseveration, word repetition, conversation device repetition) that are considered under the umbrella of self-repetition. It is probable that certain repetitive language behaviors (e.g., repetitions used across turns to maintain conversational topic) are associated with stronger overall language skills than others (e.g., repetitions of single words within a conversational turn). Thus, differences in correlations between age, IQ, and repetitive language use may depend on the types of self-repetition examined. There are also studies examining self-repetition in individuals with Fragile X syndrome and/or children with both Fragile X and autism diagnoses. Some of this work reported higher levels of repetitive language among males with Fragile X (vs. females), independent of cognitive or linguistic skill (Murphy & Abbeduto, 2007). Other work found that males with both Fragile X and autism diagnoses were more likely to repeat an utterance once compared to males on the spectrum without Fragile X; children in both groups were equally likely to repeat an utterance more than once and to perseverate on a topic (the authors considered perseveration a type of self-repetition; Friedman et al., 2018).

As with the other forms of non-generative unconventional language, some scholars have explored the function of self-repetition; although, it has garnered much less attention than echolalia. Stribling and Rae (2007) used conversation analysis to explore the function of self-repetitions produced by an adolescent on the spectrum; they reported that self-repetitions often served a social function (e.g., to gain or maintain the attention of her social partner), sometimes in conjunction with other non-verbal behaviors (like handing over an object). Other work has suggested that self-repetitions may serve to maintain preferred topics in

conversation (Dobbins et al., 1998). Further, even repetitions of the same utterance may be used to serve varying functions (e.g., turn-taking, confirming, part of a larger response); these functions can be differentiated by varied prosodic contours (i.e., rising or falling intonation) across repetitions of the same word/phrase/sentence (Dobbins et al., 2003).

Generative

While most work on “unconventional” language behaviors in autism has focused on non-generative spoken language, since Kanner’s original work (1943), there have been observations of unconventional language use that is *generative*, i.e., idiosyncratic productions that originate from the individual’s own linguistic repertoire. For example, Kanner described a child using the word “Peten” as neologistic jargon for the nursery rhyme “Peter, peter pumpkin eater.” He described another child who used the preposition “near” to describe paintings affixed to a wall, when speakers would conventionally use the preposition “on” instead. In fact, the child *corrected* his father’s use of “on,” suggesting that the child was knowingly refusing to adopt the conventions of his native language and was convinced that his prepositional choice is more accurate (even though it is not conventional). These examples are striking because they lie in opposition to non-generative spoken language: rather than repeating speech by rote, the individual is uniquely combining phonemes, morphemes, and words together to create forms they have never heard before. In fact, Asperger (1991) described children in his case studies as having “a special creative attitude towards” language, emphasizing the fact that instances of idiosyncratic language implicate linguistic productivity. This is an important point, in that the presence of generative unconventional forms further discussed below (i.e., idiosyncratic and pedantic language), by virtue of being generative, are expected to be associated with higher concurrent structural language skills than the non-generative forms described above.

We separate the overarching category of unconventional generative language into two subtypes: idiosyncratic language and pedantic language. Idiosyncratic language involves the creation of novel words and phrases, and it can therefore be subcategorized based on what linguistic elements are being used to create a new linguistic form. While idiosyncratic words (a.k.a. neologisms) are the combination of phonemes, bound morphemes (or free morphemes in the case of compound words) to create a novel word (e.g., “Peten”), idiosyncratic phrasing is the production of a unique combination of words to produce a semantically unconventional phrase (e.g., “the paintings are hanging near the wall” to mean “the paintings are hanging on the wall”). Volden and Lord (1991) argued that both neologisms and idiosyncratic phrases are evidence

of a similar linguistic phenomenon and are likely due to similar underlying factors. Pedantic language, sometimes referred to as “overly formal speech” (Paul et al., 2009), involves the combination of rare lexical items with formal phrasing, making the individual sound “bookish” (Ghaziuddin & Gerstein, 1996). Before the publication of the DSM-5 (APA, 2013), pedantic speech was often used as a diagnostic indicator of Asperger’s syndrome (vs. autism) (Asperger, 1991; Eisenmajer et al., 1996; Ghaziuddin & Gerstein, 1996; Wing, 1981).

Idiosyncratic language

Idiosyncratic words/neologisms. Definitions and Examples. As mentioned above, idiosyncratic words, or “neologisms,” have been noted in the speech of individuals on the autism spectrum since Kanner’s original account (1943). Volden and Lord (1991) argued that neologisms involve a phonological or morphological variation of a conventional word, rather than a word fabricated *de novo*.³ The following excerpt of the speech of a woman on the spectrum, provided by Werth et al. (2001, p. 116) in their case description, helps elucidate how neologisms morphologically and phonologically relate to known words:

Later on we got to King’s Cross, we vamperated the train, then we consailed the King’s Cross underground [sings] “Going underground, going thunder-ground.” Later on we were beckoned off, then we piled into the flying Victoria train and Mum and I gaggled as well as I showed Mum this advert of the Victoria Express.

The underlined words indicate unique forms that involve morphological (“consailed”, “thunder-ground”) or phonological (“gaggled”) manipulations of known English words. These forms are striking not only because they evidence a productive command of phonology and morphology, but also because the words’ meanings are (for the most part) interpretable from context. Werth et al. (2001) explained that this was not always the case for this speaker, who sometimes used neologisms that are uninterpretable (e.g., “Then I went to bed... then shavered the zed-zed-zeds” (p. 5)). Similar cases – where a word’s meaning is not interpretable from linguistic or extralinguistic context – are also noted by Eigsti et al. (2007) in an analysis of language produced by five-year-old children on the spectrum during play sessions (e.g., “the serpice is flying”). Werth et al. (2001) used the fact that some neologistic forms are uninterpretable as evidence that the speaker may not be sensitive to the listener’s needs.

More broadly, all uses of neologisms are interesting in that they violate the lexical principle of conventionality, which states that “words have conventional meanings” (Clark, 1983). For this reason, neologisms produced by very young non-spectrum children – called “invented

words” (Locke, 1983) or “protowords” (Kent & Bauer, 1985) in developmental literature – are interpreted as entailing that the child does not yet know or cannot yet articulate the conventional label (Laakso et al., 2010; Menn, 1978). In non-spectrum development, proto-words are replaced by conventional forms in the second year (e.g., Yousofi & Ashtarian, 2015). The protracted use of unconventional labels noted in individuals on the autism spectrum – well beyond the time when they can pronounce the conventional form – may indicate a prolonged adoption of the principle of conventionality. Alternatively, it may reflect struggles with lexical access, such that the individual uses a neologistic form in spontaneous speech merely because s/he cannot access a target word in the moment. This latter explanation has been used to account for the use of neologisms by other groups with language impairments, such as individuals with aphasia (e.g., Dell et al., 1997). Interestingly, neologisms have also been noted in children with SLI (Leyfer et al., 2008), who may have unique vulnerabilities in semantic networks (Haebig et al., 2015).

Measurement Approaches. The Autism Diagnostic Interview – Revised (Rutter et al., 2003) includes an item addressing the production of neologisms. This item defines neologisms as “words that are obviously peculiar,” and it has been used as a simple measurement strategy for some research quantifying neologisms (e.g., Leyfer et al., 2008; Szatmari et al., 1995). Few researchers have proposed a more detailed, systematic approach to measure the use of neologisms by individuals on the spectrum, but Volden and Lord (1991) compared the frequency of neologisms and idiosyncratic phrasing between the language samples of three groups of adolescents: a group on the autism spectrum, a group with cognitive impairments (but not on the spectrum), and a group not on the spectrum and with average IQ. Language use was recorded during the administration of a standardized observational diagnostic assessment (Autism Diagnostic Observation Schedule – Generic, or ADOS-G; Lord et al., 2000). In this study, neologisms were defined, simply, as non-words. The authors further explained that this category included a variety of subtypes, ranging from neologisms that were unrecognizable/unrecoverable as they were neither phonologically nor morphologically related to any known word (e.g., “Kellogg’s nahavaties”; Volden & Lord, 1991, p. 125) to neologisms involving morphological modifications of known words (e.g., “redundiate”, p. 125). Using a similar approach, Eigsti et al. (2007) coded transcripts from play sessions for the use of neologisms (what they called “non-sense words/jargon”), defined as “intelligible but uninterpretable words or phrases. Any words or phrases that the transcriber was able to hear, but was not able to supply a gloss or meaning for, was included” (p. 1015).

Contextual and Individual Correlates. Little is known about the correlates of neologisms, perhaps due to their relative rarity (e.g., Szatmari et al., 1995). Research on

Deaf children on the autism spectrum found that they produced neologistic signs, which were not evident in the language of non-spectrum Deaf peers (Shield, 2014). Further, the use of neologisms separated the discourse of older children on the autism spectrum from language-matched neurotypical peers and peers with other types of developmental disabilities (Eigsti et al., 2007; Suh et al., 2014; Volden & Lord, 1991). Leyfer et al. (2008) reported that nearly 9% of their sample of children with SLI were reported to use neologisms either currently or in the past, indicating that neologisms are not exclusive to autism. One study suggested a negative association between the frequency of neologisms and nonverbal cognition and language abilities in autism (Eigsti et al., 2007), while other qualitative work suggested that the use of neologisms may signal a relative strength in humor or creativity (Werth et al., 2001).

Idiosyncratic phrases. Definitions and Examples. Not only is the language of individuals on the autism spectrum noted for containing *unique word forms*, but it also contains unique *uses of known words*. For example, a twelve-year-old child on the spectrum was observed using the adjective “sparkly” to describe the way that an alcohol swab felt when it was used on the skin of his arm (author’s personal anecdote). In this case, the child uniquely extended an adjective that is typically used to describe a visual experience to something he was experiencing tactilely. Idiosyncratic language also goes beyond the unconventional use of single words (and/or the use of rare, less prototypical words); it also can involve unique *combinations* of words. Consider the following nonconsecutive utterances from a ten-year-old on the spectrum (Arnold, 2021):

Child: I just fake that up.

Child: [I see] pictures of frogs gliding warbly.

And in another example, Wing (1981) described a child using the phrase “temporary loss of knitting” to refer to a hole in a sock (p. 127). This child’s phrase was more descriptive (and, perhaps, more accurate) than the word “hole” would have been in a similar context, as it proposes an explanation for the hole’s origin. In this way, like neologisms, idiosyncratic language may evidence linguistic creativity that allows a speaker to express concepts that are not readily capturable using conventional forms. From Asperger (1991, underline added for emphasis): “All young children [I have clinically observed] have a spontaneous way with words and can produce novel but particularly apt expressions” (p. 71). Asperger’s impression that his patients all had striking linguistic gifts (which included the production of unique word combinations) led researchers that followed him to use idiosyncratic phrasing as a behavior that could distinguish autism from Asperger’s

syndrome (Eisenmajer et al., 1996). In fact, children on the autism spectrum may show an aptitude for acquiring rare word forms. For example, children on the spectrum have been found to provide more non-prototypical exemplars of a target category (e.g., “catamaran” as a member of the vehicle category) but less prototypical ones (e.g., “car”) than either non-spectrum peers or peers with SLI (Dunn et al., 1996). The authors offered many interpretations for their findings, including the possibility that children on the spectrum have a firmer grasp of non-prototypical category members than their non-spectrum counterparts.

However, like neologisms, unique uses of real words are (by definition) not conventional, and can therefore lead to misinterpretation; thus, idiosyncratic phrasing may sound poetic, but it may also hinder communication. Further, the underlying cause of such uses may actually be semantic weakness rather than language strengths. That is, rather than these uses signaling a relatively strong grasp of language that allows the speaker to use words creatively (even poetically), such uses may instead evidence an atypical, underspecified, or even erroneous understanding of a word’s meaning. In other words, individuals on the spectrum are using a word in a unique way, not because they “have a special creative attitude towards language”, as Asperger purports (1991, p. 70), but because they do not know how to use the word appropriately.

There is some evidence to support this latter explanation. Perkins et al. (2006) analyzed the way that adults on the autism spectrum use words in conversation and found anomalous uses of many word classes, but especially spatial and temporal terms, which is similar to Kanner’s (1943) observations that many of his patients used prepositions atypically. The examples provided by Perkins et al. (2006) do not read as creative uses of spatial and temporal terms but instead as lexical confusion. For example, one participant described breakfast as “the first meal of the day prior to waking.” The use of “prior to,” rather than “after” suggests a basic mix-up of temporal terms. Relatedly, Hobson and Lee (2010) found that children with ASD inappropriately used the deictics “here” and “this” (rather than “there” and “that,” respectively) to refer to objects that were far from them. While these authors interpreted these findings as reflecting difficulties with perspective-taking in ASD, another explanation is that deictics (like prepositions and pronouns) have complex meanings that shift depending on context. This proposal has been proffered to explain atypical use of pronouns in children on the spectrum (Zane et al., 2021). Thus, idiosyncratic word use may reflect differences with initial word learning and/or extension (Tovar et al., 2020), which may particularly affect polysemous words, including prepositions, deictics, and pronouns (Arunachalam & Luyster, 2018).

In fact, overarching struggles with semantics (relative to other language components, like morphology and syntax) have long been noted in autism (see Boucher, 2012 for a review). Naigles and Tek (2017) provided a framework for capturing patterns in the language acquisition profile of children on the autism spectrum that emphasized language form (morphology/syntax) as a relative strength and language meaning (lexical semantics) as a relative weakness.

Measurement Approaches. Some diagnostic tools include a measure of idiosyncratic phrasing. The Autism Diagnostic Interview – Revised, for instance, includes an item asking caregivers to report on the use of idiosyncratic phrasing (Rutter et al., 2003). In this item, idiosyncratic phrasing is defined as “real words and/or phrases used or combined by the subject in a way that s/he could not have heard.” The end of this item (“could not have heard”) not only emphasizes the fact that idiosyncratic phrasing is unconventional, but also that it is generative; that is, these phrases must manifest from the speaker’s own linguistic repertoire. The Autism Diagnostic Observation Schedule (2nd edition, or ADOS-2; Lord et al., 2012) similarly includes a rated item (based on clinical observation) capturing “stereotyped/idiosyncratic use of words or phrases.” The overall rating on this item captures *both* “stereotyped” use of words or phrases (which could be echolalia or self-repetitions) *and* idiosyncratic use of words or phrases, which the item operationalizes as “idiosyncratic quality of the phrasing, unusual use of words or formation of utterances, and/or their arbitrary association with a particular meaning” (Lord et al., 2012).

Others have used language samples from the ADOS-G/ADOS-2 but have taken a more general, binary approach to quantifying the presence or absence of idiosyncratic language (without differentiating between pedantic language, idiosyncratic phrasing, neologisms and delayed echolalia; Suh et al., 2014). In contrast, Volden and Lord (1991) analyzed the use of idiosyncratic phrases by adolescents with ASD during the administration of the ADOS-G, where coders were trained to identify and tally each specific “use of conventional words or phrases in unusual ways to convey specific meanings” (p. 116) as instances of idiosyncratic phrasing.

Contextual and Individual Correlates. In addition to finding that the use of neologisms distinguished the narratives told by children on the spectrum from non-spectrum peers – as described above – Suh et al. (2014) also reported a higher frequency of idiosyncratic phrasing in the narratives produced not only by children on the spectrum, but also by children with “optimal outcome” (children who were at one time diagnosed with autism, but who subsequently lost the diagnosis due to their no longer meeting diagnostic criteria for autism spectrum disorder). Earlier work used the production of idiosyncratic phrasing as a diagnostic indicator of Asperger’s syndrome and even as

a distinguishing feature of this syndrome (i.e., vs. autism) (Eisenmajer et al., 1996).

Pedantic language

Definitions and Examples. In the previous section, we described a word fluency study where children on the autism spectrum were reported as providing less prototypical (i.e., rarer) exemplars of word categories than either their typically developing peers or their peers with SLI (Dunn et al., 1996). A command of less frequent word forms has frequently been observed as a feature of the expressive language of individuals on the spectrum (including in written expression, see Hilvert et al., 2019), since Asperger (1991). In a first-person account, an autistic author writing under the name “Aoife” (2019) mused on her own predilection for including rare/formal words in both her writing and speech, and she discussed her enjoyment in using such words: “Why use a smaller word when there are so many glorious synonyms floating around in the back of my brain[?]” Such word choices can sometimes give the listener the impression that the speaker is being (overly) precise and specific (De Villiers et al., 2007). And when these lexical items are combined, especially in syntactic frames that are more commonly associated with formal language contexts, including writing, the speaker begins to sound “bookish” (Ghaziuddin & Gerstein, 1996), “curiously pedantic” (Burgoine & Wing, 1983) or “overly formal” (Paul et al., 2009). Consider the following nonconsecutive examples from a 19-year-old on the spectrum, where pedantic speech is underlined (Arnold, 2021):

Now I shall give you some entertainment.

I’m sure the topographic information isn’t very accurate.

Volden and Lord (1991) included pedantic language under the larger category of idiosyncratic language (including both neologisms and idiosyncratic phrasing), where pedantic language was defined as the “unusual combination of conventional and overly complex words and phrases” (p. 111, underline added for emphasis). This definition overlapped with their definition of idiosyncratic phrasing, in that both pedantic speech and idiosyncratic phrasing involved an “unusual combination” of known words and phrases. What distinguished pedantic speech from other types of idiosyncratic phrasing in their framework was the impression that word choices and/or phrase structure was “overly complex”.

Pedantic language is arguably more than just a combination of rare words in complex/formal sentence structures. De Villiers et al. (2007) described pedantic language as involving the inclusion of factual, accurate, specific, and/or technical information that was too detailed for a particular context. Similarly, Ghaziuddin and Gerstein (1996)

based their definition of pedantic speech on the dictionary definition of the word “pedant”, arguing that – when these qualities are translated to speech – pedantic language involved more information than was necessary for a given discourse context, along with vocabulary and sentence structure that was typical of *written* language. Note that both De Villiers et al. (2007) and Ghaziuddin and Gerstein (1996) argued that pedantic language involved expressing details that were unnecessary for a particular context. Correspondingly, Asperger described several of his patients providing an extraordinary amount of detail when asked to explain the similarities and differences between two entities (for instance, between a fly and a butterfly) as part of an intelligence test. Asperger (1991) described one child’s descriptions as “threaten[ing] to go on forever” (p. 53), and he argued that this child’s descriptions included details that were unnecessary in the context of the exam. The importance of context in these descriptions underscores the fact that pedantic language may be best categorized as part of the *pragmatic* differences observed in autism, rather than a consequence of underlying language difference. However, the fact that it does include the use of infrequent words (words that are not conventionally used by other speakers) and perhaps the use of complex sentence structures that would not be produced by other speakers (i.e., only used in writing) motivates our inclusion of pedantic language as part of the unconventional spoken language framework.

In addition to pedantic language falling somewhere on the interface between language and pragmatics, it may also fall somewhere between generative and non-generative language. While Asperger interpreted pedantic linguistic expression as absolutely generative and creative, other authors have argued that pedantic language reflects phrasing memorized from other sources that the individual has previously read (rather than heard; Wing, 1981).

Measurement approaches. As described above, Volden and Lord (1991) conceptualized pedantic language as part of the larger idiosyncratic language category. As such, it was not coded separately, but was instead subsumed under this larger category. A similar global approach is taken in standardized diagnostic measures, which fold pedantic language into more general items addressing unusual language use (Lord et al., 2012; Rutter et al., 2003).

Ghaziuddin and Gerstein (1996) offered a more nuanced coding scheme of pedantic speech, by operationalizing a rating scale that quantified how much the semantic, syntactic, and pragmatic nature of adolescents’ speech evidenced qualities that accorded with the dictionary definition of a “pedant”. When translated to speaking qualities, this involved speech that provided more information than was required in a given conversation (pragmatics), used sentence structures that were typically reserved for formal contexts (syntax/pragmatics), and included vocabulary that was

less frequent and/or more typical of written language (semantics/pragmatics). A similar definition and ordinal rating scale was employed in later work (De Villiers et al., 2007).

Another simple measure is to quantify the frequency of vocabulary, where higher rates of infrequent vocabulary words, along with lower rates of frequent vocabulary words, corresponds with a more pedantic quality of language; this approach was used by Hilvert et al. (2019) in an examination of the essays written by children on and off the spectrum. Finally, languages which take diglossic forms – that is, use a colloquial, casual form and a more formal version – have afforded new insights by documenting the use of the “high,” formal dialect (when not contextually required) in children on the spectrum (Francis et al., 2019).

Contextual and individual correlates. Recent work has suggested that use of formal dialects in informal contexts may also be a diagnostic indicator of autism, generally (Francis et al., 2019). And as mentioned in the introduction to our section on generative unconventional language in autism, a pedantic quality of speech was often used to distinguish Asperger’s syndrome from autism, where individuals diagnosed with Asperger’s were described as using pedantic language, while individuals diagnosed with autism were not (Eisenmajer et al., 1996; Ghaziuddin & Gerstein, 1996). Despite the implication from this earlier work that pedantic speech was associated with more skillful language and cognitive skills (i.e., associated with diagnosis of Asperger’s rather than autism), other work has failed to find an association between pedantic language and nonverbal cognition or language abilities (De Villiers et al., 2007).

Some autistic writers have described their tendency to use pedantic speech (specifically, less common vocabulary items) as stemming from a simple enjoyment of words. Aoife, mentioned above, wrote that she “always [has] been fond of big words,” and, as we describe earlier, wondered why anyone would choose a more common, shorter word when there is rarer, longer alternative (2019). Similarly, the Aspiring Aspergian (2015) commented, “When walking away from a group I will often say that I’m going to ‘mosey’, ‘meander’, or ‘locomote’, instead of simply excusing myself. I love choosing odd, silly-sounding, archaic, or complex words and phrases to describe things.”

Another possibility is that autistic speakers use rarer, more pedantic-seeming words not only because they enjoy them, but also because they are more accurate/precise. At the Consortium on Autism and Sign Language in Cambridge, Massachusetts (2015, <https://www.amacad.org/news/consortium-autism-and-sign-language>), several presenters discussed this possibility, by introducing the “Precision Hypothesis” – an account of language use in ASD where speakers prioritize accuracy and specificity above other aspects of communication (e.g., efficiency).

This hypothesis suggests that autistic speakers use rarer words and are simply more verbose because they aim convey exact information. Such an account accords well with many of the definitions/observations of pedantic language we have listed above, where speakers are described as being precise, specific, and including a surprising amount of detail (Asperger, 1991; De Villiers et al., 2007; Ghaziuddin & Gerstein, 1996). In fact, this hypothesis also can account for other types of generative unconventional language, like neologisms and idiosyncratic phrasing, which – as we discuss in those sections – may represent a specific sense that is not captured via conventional words/phrases.

What lies in between?

While we have thus far treated unconventional language behaviors as falling into one of two binary categories – generative versus non-generative – this is not to suggest that all such behaviors can straightforwardly fit into only one category, as we have already discussed. In fact, there is an important subset of unconventional language behaviors that we have not yet addressed, which are best categorized as bridging the divide between non-generative and generative. These include mitigated echolalia and formulaic/gestalt language, which both involve the manipulation of repeated and/or stored linguistic units, respectively (Fay, 1967; Prizant & Duchan, 1981; Schuler & Fletcher, 2002; Wray & Perkins, 2000). In such cases, the speaker generates a novel utterance, when looking at the utterance as a whole and comparing it to previous utterances; however, when the utterance is analyzed, it contains formulaic pieces/chunks of language and does not clearly evidence that the speaker has fully decomposed these pieces into constituent parts. For example, Dobbins et al. (2003) described an adult on the autism spectrum discussing a favorite topic (the Pershing missile and the origin of its name); each time he introduced the topic, he began the sentence with “That Pershing missile,” modified that noun phrase with a relative clause, and ended the sentence with the adverb “now” (p. 304). This individual was therefore reusing a specific syntactic frame (along with some lexical formulaicity) each time he created such sentences, but the sentences themselves were unique as a whole. In their framework, Dobbins et al. (2003) described how this type of formulaicity can apply to both prosody and lexical items, in addition to syntactic frames.

Similarly, the following excerpt, adapted from Sterponi and Shankey (2014, p. 285), includes three examples of mitigated echolalia (underlined>, and shows how mitigated echolalia can result in the production of diverse utterances. [Note: in their transcription conventions, colons are used to indicate lengthened syllables.]

Mom:

Alright Aaron. This water’s coolin’ off. One more minute.

Aaron: One more mi:.....nute.

Mom: O::ne more minute.

Aaron: A minute time.

Mom: And the:n it’s time,

Aaron: Is it minute time?

Mom: One more minute.

Aaron: Is it minute time?

Mom: It is one minute time.

Aaron: It’s minute time.

Thus, even though the utterance in line 2 exactly repeats the mother’s words at the end of line 1, we still include this echo as an example of *mitigated* echolalia (vs. “pure” echolalia), because the prosodic contours of the echoed speech deviate from the model (Schuler & Fletcher, 2002). Sterponi and Shankey (2014) further explained how Aaron used this modification communicatively: in prolonging the word “minute,” he conveyed his desire to prolong the duration of the remaining time in the bath. Not only does this excerpt generally emphasize the communicative potency of mitigated echoes, but some utterances specifically show how mitigated echoes exhibit an underlying understanding of grammar. For example, in line 6, when Aaron produced the question “Is it minute time?”, Aaron demonstrated quite a bit of linguistic knowledge. First, he decomposed the model contraction “it’s” into “it + is,” and then he correctly transposed them to form a yes/no question. Then, he used the word “minute” as a modifier for “time,” and by correctly positioning the modifier before “time,” he further modified the original utterance, in that he inserted a new word in the middle of the sentence.

The previous analysis of Aaron’s language shows how mitigated echolalia is not straightforwardly non-generative. However, this utterance cannot be considered truly generative, either, in that all the words he used were present in at least one of the preceding utterances. Therefore, in our framework, we position mitigated echolalia, along with other types of linguistic formulaicity, like gestalt language, as “transitional,” in between non-generative and generative forms of unconventional language behaviors. We use this positioning to argue that they may simultaneously capture aspects of both generative and non-generative forms.

Not only are such forms *conceptually* transitional between non-generative and generative, but they may in fact be *developmentally* transitional, in that certain theories of grammatical development suggest that the use of formulas help children transition from using completely non-generative, stored utterances to composing novel ones. For example, in early accounts of child language acquisition from both Peters (1983) and Locke (1993, p. 1995), as well as in later work from Wray and Perkins (2000), typically developing children start out storing and using gestalt

forms until about 20–30 months old. At that time, they have usually compiled a sufficiently large number of stored units so that an in-born grammatical system is triggered, which can decompose stored utterances into constituent parts. This process allows children to begin generating novel utterances that depend on an underlying grammatical system, rather than repeating formulaic chunks of language, as they had done previously. Importantly, these forms of formulaic, gestalt language forms are both meaningful and intentional, in contrast to other forms of “automaticity”; for instance, Peters (1983) notes that individuals with brain damage may use chunks of language but that these utterances are neither appropriate nor creative. Thus, the “gestalt” perspectives position formulaicity “at the heart of grammar” (Dobbinson et al., 2003, p. 305) for typical development, in that grammar is initially constructed via analyzing stored, gestalt forms.

Such an account has several implications for linguistic formulaicity in autism. Most fundamentally, it suggests that when individuals on the spectrum rely on linguistic formulae to produce utterances, they are taking advantage of a normative operation, rather than doing something deviant or disordered (Dobbinson et al., 2003). Further, since the use of gestalt language helps typically developing children to transition from non-generative to generative expressive language, the use of gestalt forms in autism may be developmentally transitional as well.⁴ In fact, children on the autism spectrum may be more likely than neurotypical peers to build generative language from formulaic units, using a “gestalt learning style” rather than a hierarchical learning style, to scaffold language learning (Prizant, 1982; Zenko & Hite, 2014). Use of gestalt language and mitigated echolalia facilitate the transition into “emerging grammar” and later productive language use (Schuler & Fletcher, 2002, p. 133). In fact, scholars in psycholinguistics (e.g., Peters, 1983) and speech language pathology, including Prizant (1983) and more recently Blanc (2012a), proposed that language acquisition in autism involves several stages, where mitigated echolalia and gestalt language serve as transitional stages between echolalia and generative language. In these proposals, echolalia is seen as foundational, in that it provides the units from which mitigated echolalia (and eventual productive speech) will be extracted. There is some support for this in first-hand accounts from autistic individuals. Kim (2013) described her method for acquiring French by moving from unmitigated to mitigated echolalia, and then by using an analysis of these echoes to formulate a grammar from which she could produce completely novel utterances. Similarly, in a 2005 interview, Temple Grandin explained her ability to speak productively as an adult (as compared to her being predominantly echolalic as a child) in this way: “... As I get more and more phrases on the hard drive, I can recombine them in different ways, and then it’s less tape-recorder like...” The idea is

that echolalia, as embedded in a gestalt learning style, can promote language learning and propel a language learner toward spontaneous generative language use.

Many authors have made a strong argument for the transitional properties of mitigated echolalia, but very little work has addressed this empirically. One study by Fay and Butler (1968) reported that children who used mitigated echoes at age three years had better language outcomes at age four years than children who were predominantly using “pure echoes” -- echoes that were equivalent in form to the model -- at three years old. Thus, their findings did provide empirical support for the idea that mitigated echoes (and, perhaps, other types of gestalt language) fit developmentally between non-generative and generative forms. However, because these authors did not study children who were explicitly diagnosed with ASD but rather generally “echolalic children” (and because of significant epidemiological shifts in ASD over these past several decades; e.g., Rice et al., 2012), we cannot be sure that these findings would extend to the spectrum as we now understand it. Fay (1967) specifically encouraged future research to measure the presence of mitigated echolalia longitudinally in children to help uncover its role in the development of spontaneous language use. However, we do not know of other research – cross-sectional or longitudinal – that has attempted to replicate these findings.

The fact that there is such limited research analyzing how the use of mitigated echolalia and/or the use of linguistic formulas contributes to the development of spontaneous language later may be due, in part, to measurement challenges and the vast array of terminology used (e.g., Wray & Perkins, 2000). There is a lack of language assessments (including caregiver questionnaires and checklists) that measure mitigated echolalia separately from other types of echolalia and/or ones that measure gestalt language use.⁵ Thus, researchers who are interested in exploring this topic must sample children’s language directly, categorize it, and then measure longitudinal effects. In our following section, we discuss how improving the clarity and consistency of definitions may help improve the breadth of assessment tools, among other practical implications.

Conclusions

Our aim here has been to revitalize and expand on the seminal work of Prizant and Rydell (1993); our hope is that a clear taxonomy and common operationalizations will facilitate effective study and discourse about the diverse forms of language that are deemed “unconventional.” We believe that there are important implications of this work for both theoretical and clinical endeavors. In advancing our understanding of the intersection of language development and autism, it is essential to acknowledge that unconventional language is not unique to autism, and as such, we recommend that the study of unconventional

language should be transdiagnostic. The question of whether and how various forms of unconventional language differentiate autism from other non-spectrum populations (including neurodevelopmental disorders) is worth careful examination. When exploring that topic, it will be important to consider other individual characteristics, including developmental and language level. Relatedly, future work may explore whether unconventional language seems to correlate with autism features and/or structural language skills, or – alternatively – whether it is a “third axis” that is orthogonal to these other individual characteristics. A rich characterization of the heterogeneity in conventional and unconventional language, as well as other corollary areas like nonverbal cognition, is essential to capture the wide variability of profiles seen across those individuals on the autism spectrum; it will require good measurement tools, large samples and advanced statistical modeling techniques. Approaches that identify latent, multidimensional communication profiles may be particularly useful (e.g., Zheng et al., 2021).

One important application of this work is to develop a richer understanding of the “norms” for unconventional language. In the case of non-generative unconventional language, for instance, it is worth noting that echoed and repeated utterances may be excluded from standardized assessments of language and language-sample analysis (e.g., Tager-Flusberg et al., 2009), because those measures prioritize generative forms of spoken language. As a result, we do not have normative developmental data about the relative frequency of non-generative forms in non-spectrum children. And even for children on the autism spectrum, we do not yet have adequate tools to help capture the frequency and types of unconventional language used over the course of development. Instead, we often rely on tools like the ADI-R and ADOS which provide a rough, general measure of current or past unconventional language use. A more fine-grained approach to measuring unconventional language (by type and by token), applied across development, would be particularly informative for non-speaking individuals⁶ on the autism spectrum, for whom there is already an acknowledged dearth of and need for language metrics (Kasari et al., 2013). It is likely that a relatively high proportion of non-speaking individuals’ language output is unconventional, and as such, we stress the importance of including unconventional language as part of the assessment of their language.

Finally, we hope this work will pave the way for future researchers to ask a range of important applied questions, including whether the early use of generative and/or non-generative types of unconventional language may differentially predict long-term language outcomes. We consider these questions to be of utmost importance to evaluate rigorously, because – based on arguably little study – there is wide variation in existing clinical approaches, with some providers espousing the importance of these

features for bootstrapping language development (e.g., Stiegler, 2015) and others proposing their extinguishment (e.g., Neely et al., 2016). In a time of emerging emphasis on evidence-based practice, it is essential to provide empirical findings to guide clinical decision making. There are many open questions to examine: (a) What are the developmental/communicative contexts in which the varied forms of unconventional language occur? (b) How frequently is unconventional language used (across development) and/or how variable is use of unconventional language between individuals with varying types of neurodevelopmental disorders and varying skill levels? (c) For a given individual, what proportion of their output is unconventional (whether spoken, manual, or via a speech generating device) and does the proportion of use have implications for later language production? (d) Do certain types of early unconventional language predict better long-term language outcomes than others? In considering these questions, it will be important to bridge the literature on the heterogeneity of timing and trajectory of “conventional” language development with the emerging literature on patterns of change in unconventional language in autism. Longitudinal studies suggest high levels of change in conventional spoken language before age 6, followed by relatively high stability (e.g., Pickles et al., 2014) of language development after age 6; on the other hand, retrospective studies have indicated relatively *low* stability of unconventional language in middle childhood and adolescence (Kang et al., 2020). It may be that these two areas of language – conventional and unconventional – have unique patterns of change and/or intersect in important ways over development, and that a complementary consideration of both would enrich our understanding of how spoken language emerges and shifts over time in autism.

Finally, we hope to support the creation of useful clinical tools and perspectives. For instance, clinicians may find it informative to review a child’s use of unconventional language in order to enrich their understanding of that child’s semantic and/or syntactic development (e.g., repetition of an utterance with some modification – omissions, additions, expansions, or changes in intonation – may indicate a developing grammatical system) (Schuler, 1979). Pruccoli et al. (2021, p. 6) also highlight the importance of studying the accompanying “behavioral and paralinguistic features” of unconventional language in the interest of identifying its communicative value; they note that “the suppression of a purposeful behavior would deprive ASD-affected individuals of a potentially useful interactive tool.” The adverse first-person experience of this is noted by autistic blogger J. Sinclair (2019), who points to “reports of autistic people with echolalia becoming mute after a life of being ignored and misunderstood. This just gives you more reason to listen to the autists with this symptom. Remember, echolalia isn’t nonsense, it’s us trying to run before we can walk.” Clinicians may also continue to

expand their understanding of unconventional language as part of language development by through self-study and continuing education (e.g., Blanc, 2021b, 2021c).

There are some limitations to this review. We have focused our attention on spoken language; it will be important for future explorations to consider whether and how these features manifest in other forms of expressive language, including written language or language that is produced using an augmentative and alternative communication (AAC) device. Moreover, we have prioritized language form, whereas there is much more to be considered in terms of language function and communicative intent (i.e., non-intentional, pre-intentional, intentional). It will be important for researchers and practitioners alike to consider whether an assessment of unconventional language needs to be accompanied by careful attention to communicative intent (e.g., Schuler & Fletcher, 2002), a question which is beyond the scope of the present work.

In closing, we hope that by presenting a common framework and set of operational definitions, we can support future efforts to cohere and advance this important body of research exploring unconventional language in populations on and off the autism spectrum. With regards to the nature of language in autism, specifically, there are still important fundamental questions to be asked and answered, including how best to support the spoken language skills of individuals on the autism spectrum across the lifespan. This proposed taxonomy offers a method by which these questions can be framed.

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Notes

1. The terms autism, autism spectrum and autism spectrum disorder (ASD) will be used interchangeably. Moreover, considering recent dialog (e.g., Botha et al., 2021) around diverse preferences for person-first versus identity-first language, the term “on the autism spectrum” will be used to refer to individuals with a confirmed diagnosis of ASD per the DSM-5 (APA, 2013). Finally, rather than referring to comparison samples as “typically developing,” we will use the term “non-spectrum”.
2. Kanner (1943) also noted the tendency of some of his patients to use ‘verbal rituals’, which involved the child desiring to complete fixed sequences of utterances in a to-and-fro with a conversation partner. This feature is also addressed in the Autism Diagnostic Interview – Revised (ADI-R, Rutter et al., 2003), but (to our knowledge) it has not generally received further attention in the literature characterizing language in autism.
3. For a comparison in the linguistics literature, note that Crystal (2003) defines a neologism as a word that has been adopted by a linguistic community; whereas a novel linguistic form invented (purposely or accidentally) by a speaker that is used on a single occasion is called a “nonce word” or “nonce formation.”
4. This mirrors early descriptions of mitigated echolalia in adults with aphasia (Pick, 1924), in which the presence of mitigated echolalia signaled a return of spontaneous language.
5. One possible method for capturing a reliance on stored forms is by adapting instruments that measure syntactic complexity, like the index of productive syntax (IPSyn) (Scarborough, 1990). The IPSyn works by awarding a point for each utterance that contains one of 56 morphosyntactic forms, and it has been applied to the language of individuals on the autism spectrum in previous work (Eigsti et al., 2007). As it is traditionally designed, it provides points for tokens (i.e., a participant will receive a point for a given structure, even if that participant has re-used that structure multiple times), but one could easily calculate a type-token ratio of morphosyntactic structures. A relatively low type-token IPSyn ratio would signal (over)reliance on certain morphosyntactic structures.
6. Botha et al. (2021) recommended the term “non-speaking” to refer to individuals who are non-verbal and those who are often referred to as “minimally-verbal”.

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