# Assessment, Diagnosis, and Recovery From Language Disorder at Kindergarten Age: Research Review and Clinical Discussion

# Évaluation, diagnostic et récupération du trouble du langage chez les enfants en âge de commencer la maternelle : revue de la littérature et discussion clinique

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## Abstract

The research literature reveals two seemingly contradictory findings about the trajectory of developmental language disorders identified in the preschool years. Some studies suggest that many children achieve normal language by about the age of kindergarten entry. Other studies, however, indicate that most language disorders persist over a much longer time frame. Scarborough and Dobrich (1990) suggested that the apparent inconsistency in findings might arise as the result of patterns of illusory recovery at around kindergarten age. Periods of plateau in typical language development may allow children with language disorders to appear to have caught up to their peers, only to experience renewed challenges in the school years. The purpose of the current paper was to examine the literature for evidence in support of or inconsistent with the illusory recovery hypothesis and to discuss the clinical implications that follow from the evidence.

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On retrouve, dans la littérature, deux résultats apparemment différents quant à la trajectoire des enfants ayant un trouble développemental du langage identifié pendant la période préscolaire. En effet, les résultats de certaines études suggèrent que de nombreux enfants vont présenter des habiletés langagières dans les limites de la normale lorsque ceux-ci seront en âge de commencer la maternelle. Cependant, les résultats d'autres études suggèrent que la plupart des enfants vont présenter un trouble du langage qui va persister sur une période beaucoup plus longue. Scarborough et Dobrich (1990) ont suggéré que ces résultats apparemment différents pourraient découler d'un patron de récupération illusoire (*illusory recovery*) qui se produirait lorsque les enfants sont en âge de commencer la maternelle. Les périodes où les enfants au développement typique atteignent un plateau dans le développement de leurs habiletés langagières pourraient permettre aux enfants ayant un trouble du langage de donner l'impression de rattraper leurs pairs sur le plan du langage, pour néanmoins connaître de nouveaux défis après l'entrée à l'école. Le présent article avait pour objectif d'investiguer la littérature afin d'identifier les sources de support, ou encore, les sources inconsistantes avec l'hypothèse de récupération illusoire, en plus de discuter des implications cliniques qui en découlent.

An important part of the work done by speech-language pathologists (S-LPs) in early childhood settings is the assessment and identification of children in need of support for language development. S-LPs use the information obtained from assessments to advocate for their clients' access to timely and appropriate services and to support children to maximize their potential. In many jurisdictions, the time spanning entry to kindergarten and Grade 1 involves transitions in educational setting, service provision, and/or funding source. Children previously identified as having a language delay, impairment, or disorder—acknowledging that different clinicians may adopt different terms—are often reassessed during this transition period. The conclusions that follow from these assessments have consequences for the nature and extent of supports that children receive as formal schooling begins—or even whether supports are identified as needed at all. This paper will discuss challenges and considerations for assessment and diagnostic decisions at kindergarten age, with a particular focus on implications when assessment results suggest that a child's language disorder has resolved.

This review and discussion is motivated by a well-known paradox in the literature on children with early-identified language disorders. While some research indicates that a substantial proportion of children will "recover" or achieve normal language status by about kindergarten age (Bishop & Edmundson, 1987; LaParo, Justice, Skibbe, & Pianta, 2004), other research indicates that language disorders tend to persist for much longer (Aram, Ekelman, & Nation, 1984; Stark et al., 1984; see Nippold & Schwarz, 2002, for further discussion). Several decades ago, Scarborough and Dobrich (1990) identified a possible explanation for this apparent paradox: They suggested that much of the recovery seen around age 5 may in fact be illusory. They argued that such a situation could arise as a result of the non-linear nature of language growth in typical development, characterized by alternating periods of growth and plateau in skills. When typical development plateaus, children who are following a slower course of development may appear to catch up, only to be left behind when typical language development once again accelerates. This characterization may be particularly fitting around kindergarten age as this is a time of some transition with respect to language achievements and needs. In typical development, many of the building blocks of language have largely been mastered, such as grammatical morphemes and control of most of the sentence structures of the language, including both simple sentences (e.g., *Michael was crying*) and complex sentences (e.g., *Michael was crying because he dropped his ice cream*).

During the school years, however, language is increasingly used as a tool for learning, requiring increasingly sophisticated content, form, and use (e.g., Pence-Turnbull & Justice, 2012). The development of reading, writing, and using written language as a basis for learning also requires extension of language skills. The prospect of kindergarten-age illusory recovery presents the risk that some children will be prematurely identified as no longer in need of language supports right at the time that they are transitioning to the more demanding context of formal schooling. As a result, they will potentially miss out on crucial years of support and/or have academic, social, or other challenges be misunderstood.

In support of the idea that challenges may disappear around kindergarten age only to reappear later, Scarborough and Dobrich (1990) presented the data of four children from a longitudinal sample who were retrospectively identified with significant expressive language delays at 30 months based on the absence of word combinations at that age. By 5 years of age, they became essentially indistinguishable from a control group of children on measures of mean length of utterance (MLU), lexical diversity, grammatical complexity (as measured by the Index of Productive Syntax; Scarborough, 1990), and pronunciation accuracy. These children were considered to have typical language at age 5 according to the measures employed in that study. Data from the control children showed plateaus in these language measures over the course of the preschool years. By Grade 2, three of the four children with a history of language delay presented with severe reading disabilities. A similar pattern of low oral language scores showing normalization at age 5 was reported for a larger group of children who were later identified with dyslexia (Scarborough, 1991).

The data that Scarborough and Dobrich (1990) and Scarborough (1991) reported focused on reading outcomes, and indeed there is much evidence that language disorders are associated with elevated risk for later difficulties with reading and writing, stemming both from challenges with decoding and challenges with comprehension of what has been read (Botting, 2007; Catts, Fey, Tomblin, & Zhang, 2002). The illusory recovery hypothesis is not specific to later reading outcomes—it can be applied to both oral and written language. The primary focus of the current review is on oral language outcomes, although where appropriate both are reported. The concept of illusory recovery raises

several important questions: How frequent or likely is recovery from preschool-identified language disorders? Is such recovery typically maintained when assessments are conducted at later ages? Does the risk of false or apparent recovery apply across language broadly, or is it dependent on how language is measured? The following sections will review evidence regarding recovery and persistence of language disorders before turning to consider language measures that may be sensitive to language needs and risk at kindergarten age.

There is evidence that the likelihood of recovery is lower when concerns extend to non-verbal cognition (Bishop & Edmundson, 1987). The review that follows thus focuses on children with language difficulties but with no identified impairments to non-verbal cognition. There are a number of different terms that have been used over the years to refer to children who fit this general profile. The most common term used in recent decades for research purposes is *specific language impairment*, although it is used much less often clinically (Bishop, 2014). More recently, a consortium of experts has proposed adopting the term *developmental language disorder* (DLD) to refer to children with unexplained language difficulties (Bishop, Snowling, Thompson, Greenhalgh, & the CATALISE-2 consortium, 2017). The sections that follow use DLD, except where the term *delay* is arguably appropriate, such as in reference to late talkers. For excellent overviews of the issues surrounding terminology, readers are referred to Bishop (2014) and Bishop et al. (2017).

## Trajectories and Outcomes of Developmental Language Disorder

Several seminal studies of language outcomes in DLD concluded that DLD identified in childhood is often persistent, with language-based difficulties lasting into the school years and beyond (Aram et al., 1984; Stark et al., 1984; see Nippold & Schwarz, 2002, for further discussion). For example, Aram et al. (1984) reported on the 10-year outcomes of children who had originally been identified as having language disorders between the ages of 3;5 (years; months, the youngest child at initial assessment) and 6;11 (the oldest child at initial assessment). The children had been diagnosed with a language disorder by a certified S-LP and were all receiving some form of intervention. At ages 13–16, the primary language outcome measure was the Test of Adolescent Language (Hammill, Brown, Larsen, & Wiederholt, 1980). Of the 16 participants who had broadly normal-range nonverbal IQs (all with full scale IQs above 70), 13 scored well below the average range on

the Test of Adolescent Language (Hammill et al., 1980) composite: 10 scored more than 2 standard deviations below the mean, and three scored between 1.75 and 2 standard deviations below the mean. The remaining three children obtained composite *z* scores of -0.73, -0.67, and 1.13. Similarly, Stark et al. (1984) examined outcomes at ages 8 to 12 of children originally tested at ages 4.5 to 8 and reported that 22 out of 29 children with DLD still met the study's clinical criterion for language disorder (a criterion based on discrepancy between an estimated "mental performance age" and language age estimates, considered appropriate at the time).

The conclusion that language disorders are persistent also holds in more recent studies that examined trajectories from kindergarten age onward. Studies show that the majority of children with language disorders documented at age 5 or later can be expected to show language-based difficulties throughout the school years or into adulthood (Beitchman et al., 1994; Botting, Faragher, Simkin, Knox, & Conti-Ramsden, 2001; Johnson et al., 1999; Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998; Tomblin, Zhang, Buckwalter, & O'Brien, 2003).

In research examining younger age groups with outcomes measured at around kindergarten age, a somewhat different picture emerges. In studies that have focused on late talkers identified at age 2, the general picture that emerges is one in which the majority of children move into the typical range by about age 5 (Paul, 1996; Whitehurst & Fischel, 1994; see Paul & Roth, 2011, for further discussion). However, as a group, the children continue to perform at the lower end of the typical range through the school years and obtain significantly lower scores on language and literacy measures relative to age peers matched for socioeconomic status (Rescorla, 2002, 2005).

In studies of children who have identified language disorders at 3 and 4 years, yet another picture emerges. The proportion of those that score within the normal range on language assessments as they approach kindergarten is somewhat lower than the proportion reported for late talkers, yet substantial nonetheless. In three studies published almost 30 years apart, approximately 45% of children identified with DLD as preschoolers were considered to have typical language skills, according to the studies' different criteria, when assessed around kindergarten age. These proportions were seen in research following children from 4 to 5.5 years (Bishop & Edmundson, 1987), 3 to 4.5 years (LaParo et al., 2004), and 4 to 5 years (Eadie et al., 2014). In the Bishop and Edmundson (1987) study, the participants were referred by pediatricians and S-LPs, meaning that

they came to the study with clinically-identified language concerns or diagnoses. In the LaParo et al. (2004) and Eadie et al. (2014) studies, children categorized as having DLD were identified from a larger cohort on the basis of a test score. Although it may seem questionable to apply the label of DLD on the basis of test scores alone, in the absence of previously identified concerns or functional observations, the results of these studies taken together nonetheless provide some insight into the stability of low language scores.

On the surface, the data seem to point to positive kindergarten-age outcomes for many preschool-aged children with previously-identified language delays or disorders, and raise the interesting question of how to predict which children are likely to resolve their language difficulties. There is some evidence that the likelihood of recovery is greater when challenges are relatively circumscribed and becomes less likely with more broad-based difficulties or when receptive language is implicated (Bishop & Edmundson, 1987; Eadie et al., 2014; LaParo et al., 2004). Eadie et al. (2014), for example, classified children as having a language disorder or typical language at age 4 based on performance on the Clinical Evaluation of Language Fundamentals: Preschool–Second Edition (CELF:P-2; Semel, Wiig, & Secord, 2004), and then at age 5 based on the Clinical Evaluation of Language Fundamentals–Fourth Edition (CELF-4; Semel, Wiig, & Secord, 2003). The results demonstrated considerable movement in diagnostic classification. Of the children that scored below the cutoff (-1.25 *SD*) on both the Receptive and Expressive Indices of the CELF:P-2 (classified as having a mixed impairment), 45% maintained the same status a year later, 23% no longer tested in the impaired range, 21% tested below cutoff on the Expressive Index only, and 11% tested below cutoff on the Receptive Index only. Of those testing below cutoff on a single index at age 4, changes were even more notable. Specifically, of those testing below cutoff at age 4 on the Receptive Index only, 16% maintained that status at age 5, 66% no longer tested in the impaired range, 10% tested in the impaired ranged for both Receptive and Expressive Indices, and 8% tested in the impaired range on the Expressive Index only. Finally, of those testing below the cutoff at age 4 on the Expressive Index only, 23% maintained that status at 5 years, 50% no longer tested in the impaired range, 12% tested in the impaired ranged for both Receptive and Expressive Indices, and 15% tested in the impaired range on the Receptive Index only.

LaParo et al. (2004) examined the persistence of DLD from 3 to 4.5 years of age. At 4 years, children were classified as having DLD if they obtained a standard score of 80 (-1.33 *SD*) or less on the Auditory Comprehension scale, the Expressive Communication scale, or both scales of the Preschool Language Scale (Zimmerman, Steiner, & Pond, 1979). A particularly strong oral language predictor of status at age 4.5 was the receptive language score on the Reynell Developmental Scales (Reynell, 1991) at age 3. In the data that Bishop and Edmundson (1987) reported, a pattern of strong recovery was more clearly evident in the group of children classified as not showing disorders in language comprehension. Furthermore, in the data that Scarborough and Dobrich (1990) reported, the patterns observed for receptive language were much less systematic than those observed for expressive language—that is, there was no clear evidence of plateau and recovery. However, in both the Bishop and Edmundson (1987) and Scarborough and Dobrich (1990) studies, receptive language testing was less comprehensive and consistent than expressive language, limiting the strength of conclusions.

One caveat to the conclusion that improvement in language scores is often seen toward kindergarten age is the observation that the opposite pattern can and does occur: Children may test in the average range at one point in a study and then test below the cutoff for DLD at a later point. In the Eadie et al. (2014) study, while 45% of children classified with DLD (either Receptive Expressive, Receptive-only, or Expressive-only) at age 4 were classified as having typical language at age 5 (*n* = 59/132), 5% of those classified as having typical language at age 4 were classified with DLD at age 5 (*n* = 41/813). The difference between these two values becomes far less striking when viewed as raw numbers (59 vs. 41) or proportions out of the total sample of 945: 8% of the total sample scored in the DLD range at age 4 and the typical range at age 5, and 6% showed the reverse pattern. Thus, movement of scores in both directions can be seen. It should be noted, however, that these data were obtained from a population-based sample on the basis of a test score alone. They certainly demonstrate that classifications based on test score cut-points can change across time intervals. For children with clinically-identified DLD, however, the change in assessment outcomes that is most relevant to the current discussion is that in which scores move from the impaired to the typical range at kindergarten age. The available evidence suggests that such a change may occur relatively frequently.

In the context of the illusory recovery hypothesis, findings of normalized test scores raise the question of how confident we can be in evidence of recovery obtained around kindergarten age. The best data to answer this question are data that report later outcomes of children seen as preschoolers and then again closer to

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kindergarten age. Aside from the data that Scarborough and Dobrich (1990) and Scarborough (1991) reported for school-age reading outcomes, there are to our knowledge a limited number of longitudinal studies with preschool, kindergarten, and school-age measurement points to address this question.

With respect to late talkers or children identified with expressive language delay at age 2, a recent study examined outcomes at ages 7 and 12 of late talkers whose language skills had moved into the typical range by age 4 (Dale, McMillan, Hayiou-Thomas, & Plomin, 2014). This study focused on a very large cohort—3,598 twin pairs in the United Kingdom—and used a combination of parent report, telephone-based interview, and online testing to judge language status. The children identified with expressive language delay all had reported use of 15 or fewer words on a short-form United Kingdom version of the McArthur Communicative Development Inventory (Fenson et al., 1994) at age 2. Overall, the study did not find evidence for illusory recovery. As a group, children in the lower range of oral language ability at age 4 were at somewhat elevated risk for literacy difficulties in the school years, including children from a control group that did not show early expressive delays. But the children from the early delay group who caught up to their peers maintained their recovered status. Thus, these study results suggest that children classified as late talkers do not appear to exhibit illusory recovery.

Turning to consider preschool-aged children with broader language difficulties, the most comprehensive research program to date followed a clinically-referred sample of children with DLD beginning at age 4, with further measurement points at ages 5.5, 8, and 15 (Bishop & Adams, 1990; Bishop & Edmundson, 1987; Stothard et al., 1998). When the children were ages 4 and 5.5, the researchers obtained measures of phonology, receptive and expressive vocabulary (picture naming and picture pointing), the ability to convey information in short narratives (scoring grammatical completeness and the amount of information provided), MLU, receptive grammar, and a general verbal comprehension scale. Children were classified as having satisfactory language if they obtained no score below the 3rd percentile and no more than a single score below the 10th percentile. At the assessment at age 5.5, 44% of the children classified as having DLD at age 4 were categorized as resolved or having good language outcomes (Bishop & Edmundson, 1987). Language and literacy assessments in Grade 2 indicated that the 5.5-year-old outcomes were by and large maintained: As a group, the children who had

shown continued evidence of language disorder at age 5.5 obtained scores that were significantly below those of the control group or normative sample at age 8 on all but one of 11 measures. In contrast, the majority of mean scores at age 8 for the age 5.5 "good outcome" group were not significantly different from the control or normative means. Two scores, receptive syntax and general comprehension, were below that of the control group but still within normal limits (Bishop & Adams, 1990).

When reassessed at 15 years, however, one third of the children who had been classified as resolved at age 5.5 were once again classified with a language disorder (Stothard et al., 1998). Oral language measures at age 15 included word definitions, receptive vocabulary, sentence repetition, picture naming, receptive grammar, and general oral comprehension. The requirements to be considered as having satisfactory language were the same as in the age 4 to 5.5 study: no score below the 3rd percentile and not more than one score below the 10th. At the group level, the average scores of the children with resolved DLD did not differ from those of the control groups on these measures. At the individual level, however, eight of 26 children classified as resolved at age 5;6 failed the established criterion for satisfactory language. Other measures that did not contribute to diagnostic status were also collected, and at the group level, the "resolved" group scored significantly below controls on a reading and spelling composite, phonological awareness, and the ability to repeat novel nonwords.

Thus, the Grade 2 results as interpreted by Bishop and Adams (1990) did not support the idea of recovery as illusory, whereas the age 15 results that Stothard et al. (1998) reported did. There are several challenges, however, that limit interpretation of these results. One puzzle is why renewed challenges were not observed in the Grade 2 study conducted by Bishop and Adams. This may have been because illusory recovery operates across a longer time span than anticipated (Stothard et al., 1998) or, perhaps more likely, because some of the measures in the Grade 2 study failed to capture challenges that were in fact occurring or emerging. On that point, it is important to note that the Grade 2 oral language results in the Bishop and Adams study were only reported at a group level. These results showed significantly lower scores for the resolved group on measures of language comprehension (although not in the impaired range for the group as a whole), but did not indicate the proportion of children in the resolved group with oral language scores within or below the typical range. This is not inconsistent with the group-level results

reported for the age 15 data, while the individual data reported for that age were more revealing of persistent language difficulties.

In addition, some of the measures, such as MLU and language comprehension, that were used to determine language status from ages 4 to 5.5 were affected by plateaus or ceiling effects in the performance of the typically developing comparison children (Bishop & Edmundson, 1987). This challenge is entirely in line with the concerns about plateaus raised by Scarborough and Dobrich (1990). The Grade 2 results reported in the Bishop and Adams (1990) study did not allow an estimation of whether or not these plateaus were still operative. There are credible reasons, then, to suspect that the Grade 2 data or analysis strategy may not have been sufficiently sensitive to reveal reemerging challenges. There were some challenges with the age 15 data as well. For example, at least one measure was not normed for 15-year-olds (i.e., Test for Reception of Grammar, normed up to 12;11; Bishop, 1983) and may have suffered from ceiling effects. Despite these challenges, the assessment approach appeared to be sufficiently sensitive to identify lingering challenges in some of the participants.

### Clinical Implications

Given the information obtained from the studies reviewed, what is the best evidence-based course of action to take in the face of typical range language scores at kindergarten age obtained for children with previously-identified language disorders? More research is needed to support firm conclusions. However, we would argue that the accumulated evidence suggests that at the very least, we should be extremely cautious before deciding that a child with a history of language disorder has recovered and is no longer in need of support. Although continued intervention may not be recommended, it may be appropriate to recommend further monitoring. This recommendation is consistent with a recent recommendation by other researchers (e.g., Dale et al., 2014).

Moreover, if assessment results point to age-appropriate abilities, it may be fruitful to consider whether the tools or measures that were used are likely to be sufficiently sensitive to ongoing challenges or whether they are likely to be measuring those areas of ceiling or plateau that may simply mask ongoing needs. Illusory recovery, if it occurs, may well be an artifact of what and how we assess at kindergarten age, rather than a result of the nature of language at kindergarten age in general (Bishop & Edmundson, 1987; Scarborough, 2009; Scarborough &

Dobrich, 1990). Indeed, Bishop and Edmundson (1987), in their interpretation of the age 5.5 results, noted that the outcomes may have differed had they used other measures. On this point, Scarborough (2009) argued that, for any given age, the skills most likely to be sensitive to language disorder are those that are in a period of growth or "ascendancy" in the typically developing population. Thus, by considering skills or tasks that continue to show development and change through the preschool to school-age transition, we can identify language measures as more likely to identify ongoing needs. In addition, there may be measures that continue to be sensitive to DLD at preschool age and school age by virtue of their relevance to the characteristic profile displayed by children with language disorders. The current research literature can offer guidance regarding measures that may be sensitive to ongoing or future challenges with oral and/or written language.

### Language Sample Measures: Mean Length of Utterance, Simple Versus Complex Sentence Structures, Grammatical Morphemes

Language samples, when appropriately collected, provide one of the most ecologically valid and sensitive measures of children's expressive language abilities. They can be analyzed over time to document progress on a goal, and/or they can be analyzed relative to comparison databases within the Systematic Analysis of Language Transcripts (SALT; Heilmann, Miller, & Nockerts, 2010; Miller, Andriacchi, & Nockerts, 2011) to obtain age-comparison *z* scores on a number of skills. There are many useful measures that can be taken from a language sample, and the research literature provides indications of measures that are likely to either decrease in sensitivity or remain sensitive as children get older.

**Mean length of utterance.** While MLU is a clinically informative measure, the magnitude of difference in measured MLU between children with typical language and language disorder—and thus its utility as a marker of language strength and challenge—declines over the preschool years (Goffman & Leonard, 2000; Scarborough & Dobrich, 1990). This may be in part because of declining gains in MLU in typical development. Such plateau effects were reported for typically developing children by Bishop and Edmundson (1987) and Scarborough and Dobrich (1990), and also appeared to be in operation in the data that Goffman and Leonard (2000) reported. However, as we will discuss below, MLU collected from a sufficiently rich or challenging context may not be subject to the same concerns. Looking beyond MLU, clinicians can gain useful clinical information by considering not only the length of children's utterances but

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the range and sophistication of sentence types that they are using.

**Simple versus complex syntax.** Language sample data can be examined not only for global indices such as MLU, but also for specific language forms, such as complex sentences. Complex sentences consist of an independent clause plus one or more dependent clauses (Justice & Ezell, 2016). They serve a number of critical functions, such as (but not limited to) adding specificity and discussing relationships of time, conditionality, and causality. Examples of complex sentence forms include those with complement clauses (e.g., *The girl thought that the airplane was moving*), adverbial clauses (e.g., *The girl got angry because the airplane wasn't moving; The airplane finally took off after the runway was cleared*), and relative clauses that add specific information about a noun (e.g., *The airplane that was about to take off taxied down the runway*). In addition, sentences with nonfinite (i.e., non-tensed) verbs may be considered complex, such as infinitives (e.g., *The girl wanted the airplane to take off; the girl wanted the boy to throw the plane*) and gerund clauses (e.g., *The girl got impatient waiting for her turn*).

Complex sentence forms develop over the preschool years and continue to show growth in use over the school years. It is important for clinicians to consider whether they are seeing evidence of complex sentence forms in the speech of children on their caseloads, particularly before deciding that a kindergarten-age child's language development is on track. In typical language development, the early development of complex sentence structures begins soon after children begin to combine words into simple utterances (Arndt & Schuele, 2013). By school age, typically developing children produce many, if not all, complex sentence types facilitating efficient communication about an expanded range of relationships. Thus, they enter school with the ability to combine clauses in complex ways and use this tool increasingly as they get older (see Arndt & Schuele, 2013; Frizelle, Thompson, McDonald, & Bishop, 2018; Nippold, 2007). Researchers have begun to pay attention to the complex sentence abilities of children with DLD. The emergence of complex sentence structures is linked to MLU (e.g., Tyack & Gottsleben, 1986), and thus it is not surprising that this occurs at a somewhat older age in children with DLD (Arndt & Schuele, 2013). In addition to the late emergence, there is evidence that children with DLD may demonstrate a limited range and/or less frequent use of these forms (Tuller, Henry, Sizaret, & Barthez, 2012) and ongoing grammatical errors within complex sentences long after they have disappeared from the speech of typical children (Schuele & Dykes, 2005).

Thus, a child who produces grammatical but simple sentences may very well have ongoing difficulties with language learning and use that will limit his or her academic and social success. Researchers have noted that many clinicians may feel ill-prepared to work with complex syntax (for introductions, see Arndt & Schuele, 2013, or Eisenberg, 2013). In addition, the SALT software package (Miller et al., 2011) makes it possible to compare a language transcript to a typical sample with respect to the complexity of the sentences produced, using a measure called the subordination index. The Edmonton Narrative Norms Instrument (Schneider, Hayward, & Dubé, 2006) provides a scoring system for complex sentences called the Complexity Index as well as a local normative database from narrative samples from children aged 4 to 9.

**Grammatical errors.** Relatively persistent difficulty with the omission of grammatical morphemes is a hallmark of children with DLD (Leonard, 2014). These include finite verb forms such as past tense *–ed*, third person singular *–s*, and copula and auxiliary forms of be (*is, are, am, was, were*). By kindergarten age, children with typical language development produce these forms at mastery levels, whereas children with language disorders continue to show omissions into the school years (Rice, Wexler, & Hershberger, 1998). Children with DLD often continue to produce grammatical morphemes at rates well below their typically developing peers, as production in typical development reaches a ceiling. Indeed, composite indices of grammatical morpheme errors can reliably differentiate children with DLD from their typically developing peers at ages 5 and 6 (Gladfelter & Leonard, 2013; Guo & Schneider, 2016; Souto, Leonard, & Deevy, 2014). Thus, lingering difficulties with the use of grammatical morphemes at the end of the preschool years, even if they appear to be relatively isolated, may signal ongoing challenges with language learning and use. It is worth noting that the overall percentage of utterances in a sample showing some form of grammatical error has also been found to reliably distinguish children with DLD from their peers into the school years (Guo & Schneider, 2016). For a given elicitation context (e.g., conversation or narration), a comparison of the percentage of utterances within a language sample that contain error, relative to same-age peers, can be obtained using the SALT program (Miller et al., 2011).

## Narrative Comprehension and Production

There are a number of good reasons to consider how effectively children are able to work with units of connected text as they are reaching the end of the preschool years. Narrative discourse entails greater cognitive demands than conversation or isolated word and sentence production.

Narrative discourse skills continue to undergo considerable development from preschool to the school years (Schneider et al., 2006), and narrative contexts tend to elicit language that is more representative of emerging or higher-level abilities, such as longer and more syntactically complex sentences or phrases (MacLachlan & Chapman, 1988; Wagner, Nettelbladt, Sahlén, & Nilholm, 2000; Westerveld, Gillon, & Miller, 2004). For these reasons, narrative tasks may be sensitive to ongoing language difficulty, even if simpler or earlier-developing language skills appear to be relatively strong. Indeed, several research studies have shown narrative-based measures to be strong predictors of later language and academic outcomes (Bishop & Edmundson, 1987; Botting et al., 2001; Stothard et al., 1998). In the longitudinal research conducted by Bishop and colleagues (Bishop & Adams, 1990; Bishop & Edmundson, 1987; Stothard et al., 1998), for example, narrative ability at age 4 was the best predictor of oral language outcomes at age 5;6 and reading at age 8. Narrative abilities at age 5;6 also predicted which children would be reclassified from resolved DLD at age 5;6 to impaired at 15 (Stothard et al., 1998).

There are several formal tools available to examine narrative abilities in preschool and/or kindergarten-aged children. The Test of Narrative Language (Gillam & Pearson, 2004) has norms from age 5;0, and the Test of Narrative Language–Second Edition (Gillam & Pearson, 2017) from 4;0[1]. These tests examine both receptive and expressive abilities. The Edmonton Narrative Norms Instrument (Schneider et al., 2006) examines narrative production and provides local norms from age 4;0. Both the Test of Narrative Language and the Edmonton Narrative Norms Instrument have the advantage that the collected narrative samples can be used as language samples to analyze word- and sentence-level aspects of production within SALT (Miller et al., 2011), as there are reference databases for both of these tools. Examining narrative language samples in this way has the potential advantage that plateaus in measures obtained from typically developing children, sometimes seen in conversational or play contexts, may be less likely in narratives. In contrast to conversation, children's stories have been found to exhibit longer sentences, more syntactically complex language, and more phrasal expansions (MacLachlan & Chapman, 1988; Wagner et al., 2000; Westerveld et al., 2004).

## Sentence Repetition

Sentence repetition, while quite removed from functional, everyday communication, has been shown to be an excellent marker of language-based difficulties (e.g., Archibald & Joanisse, 2009). Sentence repetition scores obtained in kindergarten have been shown to predict reading outcomes in Grade 2 (Catts, Fey, Zhang, & Tomblin, 2001). Additionally, in a study focused on preschool-aged children with expressive language delays, sentence repetition at age 3 to 4 was the best predictor of whether or not children would continue to show delays when assessed a year later (Everitt, Hannaford, & Conti-Ramsden, 2013). Sentence repetition has also been shown to be a particularly sensitive marker of language disorder in school-age children (Conti-Ramsden, Botting, & Faragher, 2001). The sensitivity of sentence repetition may stem from the fact that it likely draws on a number of abilities that are challenged in language disorder such as memory and facility with language forms (Wiig, Semel, & Secord, 2013). For this reason, difficulty with sentence repetition may be an indicator that a child continues to struggle to work with language efficiently, and thus is likely to struggle as academic and social demands of language use increase, even if he or she shows relative strengths in single word or sentence production, or everyday conversation. Scaled sentence repetition scores are available for several commonly used commercially available tests, including the CELF:P-2 (Semel et al., 2004) and the CELF-5 (Wiig et al., 2013).

## Literacy Predictors

Although children heading off to kindergarten may not be reading and writing just yet, they have been building, and continue to build, emergent literacy skills. There are a number of skills that, when assessed at kindergarten age, have been shown to predict later challenges with literacy in children with language disorders. These include rapid automatized naming (repeatedly naming a set of letters, digits, or objects as quickly as possible), phonemic awareness measures, the ability to identify letters of the alphabet (Catts et al., 2001, 2002), and narrative skills (Bishop & Edmundson, 1987; Botting et al., 2001). For these reasons, it may be fruitful for clinicians to closely consider these abilities at kindergarten age in children who continue to struggle with language development, but also in those children who may appear to have resolved their language difficulties.

[1] Clinicians are encouraged to read the manual for the Test of Narrative Language-2 carefully before interpreting obtained scores, as sensitivity of the test to DLD at -1 *SD* is quite low, and the authors recommend a standard score of 92 (-0.5 *SD*) as the optimal threshold for identification.

To summarize, the research literature points to measures that may be particularly useful in the identification of ongoing language needs at kindergarten age or risks of future language and literacy challenges. These include measures of grammatical morphology use, use of complex syntax, narrative production and/or comprehension, phonological awareness, sentence repetition, and rapid naming. Clinicians may want to consider including these measures in kindergarten-age assessments, if not already doing so, particularly for children who have shown gains in their language ability in play/conversation or when tested at the word or sentence level.

It is important to acknowledge that these measures, highlighted as sensitive to language disorder or language/literacy needs have not, by and large, been examined specifically within the context of predicting future outcomes in children whose oral language difficulties seem to have resolved at kindergarten age. More research is needed to examine whether these measures continue to point to language needs or risk, even if other measures (e.g., language measures at the single word or sentence level, or in everyday play or conversation) indicate no concerns.

## Limitations

Before concluding, it is important to acknowledge several limitations to the current review and existing literature. First, the classifications that inform research outcomes are typically based on test score cutoffs, a practice that supports consistency and objectivity but also comes with limitations. There may be differences among studies or research and clinical contexts in the cutoff scores that are taken as evidence of impaired or satisfactory language development. The current review described the criteria adopted in some of the more prominent studies. However, it was not intended to report in detail on differences among studies or to adjudicate among different classification schemes. It is clear that different criteria will produce different results with respect to the number of children that appear to have continued language difficulties or appear to have resolved.

Moreover, research using discrete cut-points may not take into account the error inherent in all test scores to qualify or temper conclusions. The research studies cited in this review used discrete cut-points, whereas in clinical practice it is important to consider the confidence interval around a given score (based on the standard error of measurement and given in the test manual) as an indication of the range within which the child's "true score" is likely to lie. Eadie et al. (2014) noted that the potential variability in test scores from ages 4 to 5 (based on the 95% limits to agreement from their

dataset, calculated between the CELF:P-2 used at age 4 and the CELF-4 used at age 5) exceeded what would be expected based on the reported standard error of measurement for the tools they used. Future studies in this area would benefit from considering the test-reported standard error of measurement for the scores used for classification at different time points as an indication of confidence in the classifications that were made. Simply put, discrete cut-points may indicate that a child falls within the impaired range at one point and within the average range at another. If the confidence intervals around the scores, however, overlap, then one could be less confident that the scores truly differed.

Clinicians making use of the findings of a particular study may want to consider the likely reliability of the classification system adopted in the study. Did it rely on a single test score for classification or use a number of measures? Did it take into account standard error of measurement for the measures used? Did it adopt a lenient or conservative criterion to identify children as resolved? This paper has presented the argument that more research on kindergarten and later outcomes is needed. For researchers pursing this line of inquiry, conclusions may be strengthened by consideration of outcomes taking into account confidence intervals for the tools used, and/or how outcomes might vary according to the criterion set for a diagnosis of DLD (e.g., -1.25 *SD* vs -2 *SD*; cf. Eadie et al., 2014).

It is also important to keep in mind that the use of test scores in isolation is unlikely to reflect the range of factors that contribute to diagnostic decisions in clinical contexts. Test scores may not reveal functional challenges that also inform diagnoses in clinical contexts (see Charest et al., 2019, for further discussion). The information provided in this review is intended to assist clinicians as they interpret test scores within the context of their functional observations. It may also provide a context to interpret and further investigate any noted discrepancies between test score and functional observations.

Second, one of the main arguments of this review is that assessment outcomes, and the picture of recovery versus continuing disorder, may vary considerably according to the measures used. Clinicians making use of the literature on illusory recovery may want to bear in mind the fact that much of the relevant literature is now several decades old and may have used tools that are no longer current or whose psychometric properties may not have been as extensively developed and documented as more current tools. A larger body of research is needed, using more current tools that have documented acceptable diagnostic accuracy (e.g., see Spaulding, Plante, & Farinella, 2006, regarding sensitivity and specificity).

Finally, this review has not discussed the role of intervention in the trajectory of language disorders and outcomes or how intervention may affect the interpretation of recovery data. When a clinician has collected assessment data from a child that has been receiving intervention, it would be reasonable to assume that the outcomes have been influenced by the treatment. However, while the intervention may have been successful in accelerating learning of treated forms, it may not have resolved the underlying factors contributing to the language disorder (Paul & Norbury, 2012). Thus, normal-range scores on reassessment could reflect at least three realities: (a) true resolution of learning challenges, (b) the illusion of recovery due to the course of typical language development or the nature of the measures used, or (c) treatment-supported gains in learning that may or may not be sustainable once learning supports are removed. The research studies reviewed in this paper were not designed to control the amount or nature of interventions received over the course of the study period. Typical-range scores maintained over some interval within a research study may have been obtained with or without ongoing treatment, and so clinicians and researchers may want to exert extra caution before assuming that a child is likely to maintain gains following the withdrawal of services.

Our research team recently surveyed S-LPs working in Alberta about their practices, perspectives, and questions related to assessment and diagnosis of language disorders (Charest et al., 2019). One of the survey respondents commented: "*Can children with a diagnosed language delay or disorder recover? It may seem simple, but I'm not sure that I even know the answer to this question.*" Following the literature review presented in this paper, we would suggest that the question is not at all simple, but reflects the uncertainty that researchers have acknowledged for a number of years. The challenge with this uncertainty is that clinicians are often faced with interpreting assessment results taken at a specific point in time and using that information to make decisions or predictions regarding children's likely need for supports as they move into new programs or educational settings. The issues raised by the illusory recovery hypothesis (i.e., Scarborough & Dobrich, 1990) bring to mind questions of how lingering (but unidentified) language-based challenges might affect academic and social success in the school years, and whether we can mitigate such effects by continuing to provide language learning or other classroom supports.

The research literature can nonetheless support clinicians in their decisions about assessment and diagnosis at the transition from preschool to school age. The current state of the literature is in line with the view that children with preschool-identified language disorder who test in the average range at kindergarten age may indeed have ongoing language needs. More research is definitely needed. In the absence of clear guidelines, clinicians may want to proceed very cautiously before discharging children from services or monitoring. In children who have made great strides at the word or sentence level or in their communicative success in everyday play and conversation, it may be fruitful to examine skills that are continuing to develop from preschool into the school years in typical development and those that have been shown to be predictive of later language and literacy outcomes.

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## Acknowledgments

## Disclosures

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