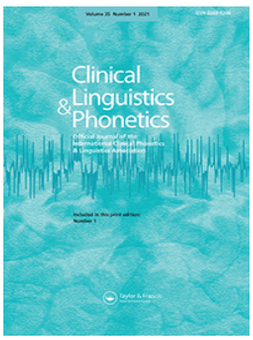

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Spontaneous productions of infinitive clauses by English-speaking children with and without specific language impairment

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ABSTRACT

As a group, children with specific language impairment (SLI) have presented with lower levels of proficiency with infinitive clauses relative to comparison groups with typical language (TL). The presence of considerable individual variability within those affected by SLI, however, remains unexplained. Furthermore, the status of infinitive clause productions in children with language impairments that do not meet criteria for SLI, because of either low nonverbal abilities or other concomitant conditions, is unknown. Previous studies focused on children with SLI and have not included children who would fit into a broader developmental language disorder (DLD) designation. In this study, spontaneous language samples were collected on 30 children with DLD and 30 children with typical language skills, including those with low nonverbal abilities or other neurodevelopmental disorders (age range: 5;1–7;7). Samples were analyzed to examine potential predictors of children's infinitive clause use and their infinitive TO omission rates. Significant group differences were found for the number and accuracy of infinitive clauses produced. Consistent with previous reports examining children with SLI, considerable variability was found across cases of DLD. Maternal education and mean length of utterance (MLU) were significant predictors for children's infinitive clause use. Finite verb morphology composite scores and MLU were significant predictors of children's infinitive TO omission rates.

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Complex syntax; infinitives; specific language impairment; developmental language disorder

Introduction

Specific language impairment (SLI) represents a common communication disorder, affecting 7-8% of the school-age population (Beitchman et al., 1986; Norbury et al., 2016; Tomblin et al., 1997) As the name suggests, SLI cannot be explained by hearing loss, neurological damage, low nonverbal intelligence, or any other developmental disorder (L. B. Leonard, 2014). Children with SLI typically encounter difficulties in multiple aspects of language; however, difficulty with finite verbal forms is one of the central manifestations of the disorder in English-speaking children (L. B. Leonard, 2014), and as a result, this area has received considerable attention. Although control of complex syntax has received less attention in the research literature, this represents another vulnerable area for some children with SLI (Johnston & Kamhi, 1984; Marinellie, 2004; Schuele & Dykes,

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2005). Persistent difficulties with complex syntax can have adverse effects on both children's reading comprehension and their academic achievement (Scott & Balthazar, 2013).

The term developmental language disorder (DLD) represents a recently suggested alternative to the SLI designation. DLD expands its coverage to include children with co-occurring weaknesses in nonverbal IQ that fall below the normal range of performance but who do not reach conventional criteria for intellectual disability (i.e., a standard score of 70) (D. V. M. Bishop et al., 2016). The terms SLI and DLD are not synonymous because this adjustment brings in an additional 3.4% – 6.9% of the school-age population into the broader DLD category (M. L. Rice et al., 2004; Norbury et al., 2016). This subgroup of children with concomitant low-average nonverbal IQ and language impairment has previously been referred to in the literature as having 'nonspecific language impairment' (NLI; Fey et al., 2004; M. L. Rice et al., 2004; Weismer et al., 2000). Historically, cases of NLI have not been included in study samples examining complex syntax. However, this gap leaves open the possibility that limitations in children's nonverbal abilities and other areas of development may have been contributors to variable infinitive use among children affected by language impairments. Detecting these influences requires expanding study samples to include children who do not meet the previously used, conventional criteria for SLI (L. B. Leonard, 2014; Stark & Tallal, 1981). It also requires expanding the composition of comparison groups of children with typical language skills, so they include children with nonverbal weaknesses. Addressing this gap was the primary motivation of the current study.

Infinitive clauses represent the earliest form of complex syntax to develop in both children with typical language skills and children with language disorders (Bloom et al., 1984; Brown, 1973; Diessel, 2004; Schuele & Dykes, 2005). Several studies of English-speaking children have shown that some children with SLI present with compromised proficiency with infinitive clauses (Arndt & Schuele, 2012; Eisenberg, 2003, 2004; Owen & Leonard, 2006; Steel et al., 2016). All studies so far have shown considerable variability across cases of SLI; some study participants were proficient with infinitive clause productions, while others produced either few infinitive clauses or consistently produced them with errors. Omission of obligatory infinitive TO morphemes (e.g., **The girl is going go home*) has been the most common error reported in affected children with omission rates ranging from 20–68% (Arndt & Schuele, 2012; L. B. Leonard, 1995; Bliss, 1989; Leonard et al., 1997).

Development of infinitive clause production in typically developing children

English-speaking children with typically developing language begin to produce infinitive clauses around age 2 (Bloom et al., 1984; Diessel, 2004). The first form of infinitive clauses that emerge are reduced or contracted infinitives, e.g., '*gonna*' (Bloom et al., 1984; Brown, 1973). Children's early infinitive clauses appear in first-person present tense noun phrase-verb -verb (NP-V-V) constructions and initially consist of a small group of matrix verbs, most frequently '*I wanna*' and '*I hafta*' (Diessel, 2004). Early infinitive clauses function semantically like modal verbs, used to express wants, obligations, or intentions (Bloom et al., 1984; Brown, 1973), but are syntactically different from modal verbs (Diessel, 2004). True infinitives (e.g., '*I like to play*') are expected to emerge around age 2;5 (Diessel, 2004) or when children's mean length of utterance (MLU) values reaches 2.5 (Bloom et al., 1984). These infinitive clauses

appear initially in NP-V-to-V constructions, followed by NP-V-NP-to-V, or infinitive clauses with different subjects, between ages 2;5–2;11 (Diessel, 2004) or when MLU reaches 3.5 (Bloom et al., 1984). Unmarked infinitives, representing infinitive structures where the TO morpheme is not licensed in English, appear around age 2;7 and are used initially as imperatives or reduced questions, e.g., '*Help me open it*' (Diessel, 2004). Finally, WH infinitive clauses emerge after the 3rd birthday, beginning with the verbs '*tell*' and '*show*,' e.g., '*Show me what to do*' (Diessel, 2004).

Eisenberg and Cairns (1994) examined the development of infinitives in a cross-sectional study sample of typically developing children ages 3;7–5;4. They found that all 25 study participants were producing infinitive clauses. However, development of infinitive clause use was not complete, even for the 5-year-old children in the study. Incomplete development was shown with a task designed to elicit productions of infinitive clauses using different matrix verbs, which require different argument structures. All the participants, even the older 5-year-old children, were either unable to produce infinitive clauses with some verb types or produced infinitive clauses with errors in some verb types. These results suggest that acquisition of infinitive clauses develops on a verb-by-verb basis and is not fully complete by age 5 in typically developing children.

Infinitive TO omissions in typically developing children

The most common error seen in English-speaking children's infinitive clause productions is the omission of obligatory infinitive TO (Diessel, 2004; Eisenberg & Cairns, 1994). Although overt marking of infinitive TO may be considered optional with certain matrix verbs in certain dialects, including African American English (e.g., *'I'm coming get you'*; Rivière et al., 2018), marking infinitive TO is considered obligatory in General American English (Sugisaki & Snyder, 2013). Using language sample analysis (LSA), Bloom et al. (1984) found that the use of infinitive TO emerged when children's MLU reached 2.5 and was used in at least 75% of obligatory contexts when their MLU reached 3.5. Bliss (1989) reported a 55% infinitive TO omission rate in children with typical language skills ages 2;1–3;4. L. B. Leonard (1995) reported a 54% rate of omission in children with typically developing language ages 2;11–3;4. Eisenberg (2003) found that 8 out of 25 participants ages 3;7–5;4 with typical language omitted TO in obligatory contexts. However, Eisenberg found that except for one participant, all the children who omitted TO were 4;0 years or younger. Arndt and Schuele (2012) reported an omission rate of < 1% in a sample of 19 English-speaking children with typical language ages 3;0–5;9. The results of these studies suggest that some children with typical language go through a brief period of omitting obligatory infinitive TO and that this period ends for most children between 3–4 years of age.

Development of infinitive clauses in children with language disorders

A longitudinal case study (Schuele & Dykes, 2005), which followed the acquisition of complex syntax in one boy with SLI over a five year span, reported the presence of reduced infinitive and simple infinitive clauses at age 3;3. Unmarked infinitive clauses (e.g., '*he made the cup fall*') first appeared at age 3;7, followed by WH infinitive clauses (e.g., '*I know what to do*') at age 6;2. The rate of omission of infinitive TO within

obligatory contexts was 100% for ages 3;3–4;0, 93% at age 4;8, 47% at age 5;3, and remained at 48% at age 7;10. Infinitive TO omissions continued to be a problem for this child even as other indices of grammatical development, such as MLU, composite tense measures, and complex syntax density, suggested improvements.

Another longitudinal study (Conti-Ramsden & Jones, 1997) followed three boys with language impairment and a history of anoxia at birth. All three boys had nonverbal IQ scores in the average range (Leiter International Performance Scale scores = 89, 105, and 115). Language samples were collected from the participants (ages 3;9, 5;3, and 5;8) every three months over two years and compared to language samples collected from MLU-matched typically developing children. Results indicated that omission rates of infinitive TO in the clinical group were higher than expected based on their MLU. At the end of the study, correct use of infinitive TO remained at zero for the affected participants but reached 100% for the TD participants when their MLUs reached 3.2–3.8.

Several cross-sectional studies have used LSA to look at differences in infinitive clause productions between children with SLI and younger, typically developing, language-matched children (Arndt & Schuele, 2012; L. B. Leonard, 1995; Bliss, 1989; Eisenberg, 2003; Johnston & Kamhi, 1984; Leonard et al., 1997). None of the six reviewed studies found significant differences in the number of infinitive clauses produced between children with SLI and TD children except for Leonard et al. (1997), which found significant group differences in their experimental probes but not in children's language samples. One of the studies included age-matched samples (Leonard et al., 1997), while the other five included only younger, language-matched samples. All studies found significant group differences in the frequency of TO omissions except for Eisenberg (2003). All studies found significant variability in individual performance among SLI children for the number of infinitive productions and the frequency of their TO omissions. Two studies examined this variability and found conflicting results. Eisenberg (2003) found no relation to age or MLU, while Arndt and Schuele (2012) reported a relationship between the frequency of TO omission, MLU, and Tense Composite score (See Table 1 for details from these six studies).

Three additional studies used an elicitation task to examine infinitive clause use in children with SLI (Eisenberg, 2004; Owen & Leonard, 2006; Steel et al., 2016). Only one (Owen & Leonard, 2006) of three studies that used an elicitation task to examine infinitive clause productions found significant group differences in the number of infinitive clauses

Table 1. Studies examining infinitive clause use in children with SLI using LSA.

Study	Length of Sample	Participant Type	n	Age	# Inf. clauses	TO Omissions
Arndt & Schuele (2012)	133 utterances	Clinical SLI	19	5;2–7;10	M 15 SD 6	20% SD 29
		MLU-match	19	3;0–5;9	M 12 SD 8	<1% SD 0.9
Eisenberg (2003)	variable	Clinical SLI	8	5;1–5;11	M 14	1/8
		TD	25	3;7–5;4	M 13	8/25
Leonard et al. (1997)	Variable	Clinical SLI	9	3;7–5;9	No significant group	55%
	+ probes	Age-match	9	3;6–5;8	differences	12%
		MLU-match	9	2;5–3;3		12%
L. B. Leonard (1995)	Variable	Clinical SLI	10	3;8–5;7	M 10 SD 11	66%
	520-1140	MLU-match	10	2;11–3;4	M 17 SD 13	55%
Bliss (1989)	50	SLI	10	4;3–6;4	– –	68%
		MLU-match	10	2;1–3;4	– –	55%
Johnston and Kamhi (1984)	100	Clinical SLI	10	4;6–6;0	– –	Typical
		MLU-match	10	2;8–3;4	– –	Never

produced and the number of syntactic errors. Owen and Leonard (2006) also noted that MLU was not a significant predictor of children's syntactic errors, which is consistent with the results of Eisenberg (2003) but contrasts with the results of Arndt and Schuele (2012).

Variables related to infinitive clause production

Severity levels of language deficits are likely related to children's proficiency with infinitive clauses. The severity of children's grammatical deficits can be defined in two ways. First, accuracy rates can be calculated based on average use of tensed forms within obligatory contexts. A second measure of severity considers how much of the tense marking system, or the grammatical system as a whole, is affected. For example, a child may have deficits in marking past tense, yet have no problems with other structures in the tense system such as third-person singular – *s*, question formation, or elements outside of the tense marking system such as articles, infinitive TO, or nominative case-marking for pronouns. In addition to overall severity levels of their grammatical deficits, other factors might influence children's proficiency with infinitive clauses.

Demographic variables

Parental education has been shown to influence the overall development of children's control of complex syntax. Vasilyeva et al. (2008) examined the syntactic development of a group of 45 English-speaking children with typically developing language and diverse SES backgrounds from ages 22 months through 42 months. The children were divided into three groups based on parental education: group 1 = high school diploma, group 2 = four-year college degree, and group 3 = postgraduate degree. For this study, complex syntax was defined as utterances containing more than one verb phrase. However, the authors did not include simple or unmarked infinitive clauses in the analysis, only infinitive clauses with different subjects and WH infinitive clauses. The authors found a pronounced similarity across groups for mastery of morphosyntax and simple sentence structures, yet significant differences between group 1 and groups 2 and 3 for mastery of complex syntax. These findings suggest that simple syntax acquisition may be less dependent on environmental influences, while the development of complex syntax may benefit from input provided by enriched environments. In another study, Van Kleeck et al. (2011) found main effects of maternal education levels on complex syntax use in kindergarten children with typical language skills during a story retell task. The children of mothers who had post-high school education produced higher rates of complex forms than the children of mothers who did not. Most of the studies previously reviewed here did not specify the socioeconomic status (SES) or parental education level of the participants, which may play an important role in children's development of complex syntax.

Language variables

MLU has been validated as a measure of general syntactic complexity for English-speaking children up to an MLU of 4.5, but its use might be more limited in older children with typical language skills and language disorders (Blake et al., 2004; Blake, Quartaro, & Onorati, 1993; Kemper et al., 1995). M. L. Rice et al., 2006). Findings are mixed regarding whether children's MLU is related to their accuracy with infinitive clause productions. Arndt and Schuele (2012) found a relationship between MLU and accuracy of infinitive

clause productions, while Eisenberg (2003), as well as Owen and Leonard (2005), did not find a relationship.

Tense-marking composite scores (e.g., Bedore & Leonard, 1998; Rice & Wexler, 1996) represent another measure of grammatical proficiency that targets an attested area of weakness for children affected by SLI (L. B. Leonard, 2014). Arndt and Schuele (2012) found a relationship between tense composite scores and accuracy of infinitive clause productions suggesting children with higher accuracy rates of inflecting verbs for tense, will have higher accuracy for producing infinitive clauses. A relationship between tense marking and infinitive TO marking is theoretically motivated as both operations occur on the head of the tense phrase (Radford, 2016). Another measure, the number of different verbs used by individual children, could be associated with the amount and type of infinitive clauses produced.

Nonword repetition tasks are processing-dependent measures designed to assist with the identification of language disorder in children (Dollaghan & Campbell, 1998; Jackson et al., 2019; Petruccelli et al., 2012; Rispensa & Bakera, 2012). According to The Surface Account (L. B. Leonard, 1989), children with SLI may have limited phonological processing capacity that affects their accurate production of grammatical morphemes. Therefore, children's performance on a nonword repetition task (Dollaghan & Campbell, 1998) could be related to their ability to produce grammatical infinitive clauses. Likewise, a sentence recall task (e.g., S. M. Redmond, 2005), which like the nonword repetition task deploys children's working memory skills (Conti-Ramsden et al., 2001; Kamhi & Catts, 1986; D. v. Bishop et al., 1996), may be related to children's ability to produce grammatically correct infinitive clauses.

Other variables

Nonverbal IQ has been shown to be moderately associated with morphosyntactic abilities (Dethorne & Watkins, 2006). Results of a longitudinal study (M. L. Rice et al., 2004) showed kindergarten children with nonspecific language impairment (NLI) presented with lower tense composite scores and over time displayed different growth curves than children with SLI. This gap between groups remained up to the fourth grade.

Research questions

Previous reports offer mixed findings on the presence and nature of infinitive clause deficits in children affected by SLI. The development of infinitive clauses in children included in the broader designation of developmental language disorders (DLD) relative to children without DLD warrants investigation. In this study, we addressed the following questions:

(1) Are there significant differences between children with DLD and children without DLD in the number of infinitive clauses they produce when language samples are matched for the number of utterances? (2) Are there significant group differences in the types of infinitive clauses children produce? (3) Are there group differences in the number of different matrix verbs used within infinitive clauses? (4) Are there group differences in the amount and/or types of grammatical errors children produce within their infinitive clauses? (5) To what extent do MLU, maternal education level, and general language measures predict observed variability within affected children's infinitive clause productions?

Previous studies (Arndt & Schuele, 2012; Eisenberg, 2003; Leonard et al., 1997) did not find significant group differences for the number of infinitive clauses produced, the types of infinitive clauses produced, or the number of different matrix verbs produced. However, these studies used the narrower SLI designation. It is possible under a broader designation that includes children with NLI and other concomitant conditions that children affected by DLD might show weaknesses in these areas. Previous studies have found group differences between children with SLI and their typically developing peers for the number of errors with infinitive clause productions. We likewise expected group differences between children with DLD and their age-matched peers. Finally, based on the previous findings of Arndt & Schuele (2012), we predicted there would be a significant, positive relationship between children's obligatory infinitive TO use, their MLU, and their tense composite scores. Other potential predictors of infinitive clause proficiency, including maternal education level, vocabulary, non-verbal IQ, and sentence repetition scores, were exploratory.

Method

Approval was obtained from the University of Utah's Institutional Review Board for all the following procedures.

Participants

Language samples (n = 60) used for this study were collected over the course of a previous investigation into the integrity of school-based language screening protocols (Redmond et al., 2019). In the language screening study (n = 254), which involved K-3rd-grade students, children in regular education classes, and children receiving school-based services for language disorders, speech disorders, reading disabilities, learning disabilities, or emotional or behavioural disturbances were recruited. From the screening study sample, conversationally-based language samples were collected on all kindergarten and first-grade participants that came in for confirmatory assessments (n = 119). From that subgroup, we identified every participant who met our criteria for language impairment (see below; n = 30). We then matched participants with language impairment to participants without language impairments on the basis of age (within one month) and sex.

Race was reported by parents for 58 of the 60 participants. The study sample consisted of 51 Caucasian, two African American, three Asian, one Hawaiian/Pacific Islander, and one child with mixed racial status, according to parental report. The distribution across groups was 25 Caucasian, four non-Caucasian in the TL group and 26 Caucasian, three non-Caucasian in the DLD group. Ethnicity was reported for 58 of the 60 participants, which included one Hispanic and 27 non-Hispanic in the TL group, and one Hispanic and 27 non-Hispanic in the DLD group. Other participant characteristics, including sex, nonverbal IQ, maternal education, and descriptive language measures, are presented in Table 2. Potential participants with multilingual status or those who had failed a hearing screening or a phonological screening were excluded from this study. One potential participant was excluded from this study due to failure to complete nonverbal intelligence testing.

Table 2. Participant characteristics group means, (standard deviations) and ranges.

	Sex	Age	Mother's Ed[a]	Nonverbal IQ	TEGI	Sentence recall	Nonword repetition	CELF-4	MLU[b]	Tense Comp. Score[c]
TL	19 M	73.63	4.03*	110.37**	101.66***	107.27***	102.87***	107.40***	95.92***	96.98***
n = 30	11 F	(6.46)	(0.85)	(11.76)	(12.35)	(11.08)	(12.76)	(10.80)	(17.82)	(1.90)
		66-87	2-5	82-130	78-119	84-129	73-131	81-130	73-151	92-99
TD	15 M	73.84	4.00	111.60	102.84	108.60	104.63	108.52	97.27	97.00**
n = 25	10 F	(6.24)	(0.91)	(9.41)	(12.54)	(10.84)	(11.87)	(11.02)	(19.08)	(1.99)
		66-85	2-5	89-130	78-119	86-129	82-131	81-130	73-151	92-99
CoTL	4 M	72.60	4.20	104.20	95.75	100.60	94.09	101.80	89.14	96.84
n = 5	1 F	(8.20)	(0.45)	(20.34)	(10.42)	(10.90)	(14.86)	(8.32)	(7.05)	(1.54)
		67-87	4-5	82-129	81-106	84-114	73-109	91-112	79-97	95-99
DLD	19 M	73.83	3.27*	98.53**	38.58***	73.63***	65.11***	74.23***	83.70***	85.41***
n = 30	11 F	(7.37)	(0.94)	(14.33)	(39.26)	(13.36)	(16.11)	(19.59)	(14.51)	(16.65)
		61-91	1-5	73-122	1-114	40-99	40-93	40-108	54-112	28-98
SLI	14 M	72.76	3.24	104.52**	48.55*	76.05	66.76	79.86*	88.85	87.62
n = 21	7 F	(6.72)	(0.94)	(11.76)	(38.13)	(12.53)	(14.54)	(17.45)	(12.55)	(14.22)
		61-85	2-5	86-122	1-114	58-99	40-86	40-108	67-112	40-98
CoLI	5 M	76.33	3.33	84.56**	15.34*	68.00	61.25	61.11*	71.76	80.27**
n = 9	4 F	(8.59)	(1.00)	(9.22)	(32.95)	(14.28)	(19.69)	(18.80)	(11.69)	(21.38)
		67-91	1-4	73-104	1-99	40-83	40-93	40-91	54-89	28-97

Diagnostic measures converted to standard scores (M = 100, SD = 15)

TL = Typical Language, TD = Typically Developing, CoTL = TL with concomitant impairment in non-language areas, DLD = Developmental language disorder, SLI = Specific Language Impairment, CoLI = LI with concomitant impairments.

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$, with independent samples t-tests.

a- Education levels: 1 = some high school, 2 = high school graduate, 3 = some college, 4 = 4-year degree, 5 = graduate degree

b- MLU standard scores obtained from SALT normative database (Miller & Iglesias, 2008)

c- Tense composite score reported as percent correct.

Children with DLD (n = 30)

Children were identified as having developmental language disorder using the criteria of scoring ≤ 85 standard score (M = 100, SD = 15) on 2 out of 3 of the following clinical indices used in the screening study project: a nonword repetition test (NWR) (Dollaghan & Campbell, 1998), a sentence recall task (SR) (S. M. Redmond, 2005), and the Test of Early Grammatical Impairment (TEGI; Rice & Wexler, 2001). Standard scores were extrapolated from community norms based on children enrolled in regular education. These particular measures were chosen as eligibility criteria because they have been shown to be robust clinical markers for SLI with good levels of sensitivity and specificity (Archibald & Joanisse, 2009; Conti-Ramsden et al., 2001; Estes et al., 2007; S. M. Redmond, 2005; Rice & Wexler, 1996; D. v. Bishop et al., 1996). Because previous research has shown that children with language impairments are frequently overlooked by school-based services (Tomblin & Nippold, 2014), a current diagnosis of language impairment was not required for this study. Additionally, DLD group inclusion required a standard score (M = 100, SD = 15) of ≥ 70 on the Naglieri Nonverbal Achievement Test (NNAT; Naglieri, 1997).

Out of the 30 children identified as having DLD, 15 were receiving speech pathology services at the time of the study, and an additional four had previously been diagnosed as having a speech or language impairment but were not currently receiving services, according to parental report. The presence of unidentified cases of children with DLD within the community sample used in this study was consistent with previous epidemiological studies (Norbury et al., 2016; Tomblin et al., 1997). The DLD group included two

children with independently diagnosed ADHD, two children with other behavioural or emotional disorders, and six children with low nonverbal IQ (70–85). An independent samples *t*-test showed significant differences between the group with typical language skills (TL) and the group with DLD for TEGI scores, $t(58) = 8.23$, $p < .001$; NWR scores, $t(58) = 10.10$, $p < .001$, SR scores, $t(58) = 10.51$, $p < .001$; NNAT scores, $t(58) = 3.50$, $p = .001$ as well as scores on the Clinical Evaluation of Language Fundamentals, Fourth Edition (CELF-4; Semel et al., 2006) CELF-4 core language scores, $t(58) = 8.06$, $p < .001$; and MLU, $t(58) = 2.61$, $p = .012$.

Given the growing interest in reframing the narrow clinical designation of specific language impairment (SLI) into a broader designation of developmental language disorder (DLD) and our interest in possible predictors of variability in children's proficiencies with infinitive clauses, we included an inspection of differences among children who met the criteria for SLI and those who did not due to a co-occurring developmental disorder of low nonverbal IQ (CoLI) for the number of true infinitive clauses produced and the number of obligatory infinitive TO omissions. The main group of children with developmental language disorder (DLD), defined as children with a language disorder not associated with a biomedical aetiology, which may co-occur with other neurodevelopmental disorders (e.g., ADHD), and has no required mismatch between verbal and nonverbal ability, (D. v. M. Bishop et al., 2016) was divided into two subgroups. The first subgroup was labeled children with SLI ($n = 21$) and included children with a language disorder and nonverbal IQ within the average or above-average range (> 85 standard score) and no co-occurring developmental disorders. The second subgroup was labeled Co-LI ($n = 9$) and consisted of children from the DLD group with a nonverbal IQ between 70 and 85 ($n = 6$) and/or a co-occurring developmental disorder, e.g., attention-deficit/hyperactivity disorder (ADHD) ($n = 4$).

An independent samples *t*-test showed significant differences between the SLI and Co-LI subgroups for NNAT scores, $t(28) = 4.99$, $p < .001$; CELF-4 scores, $t(28) = 2.56$, $p = .023$; TEGI scores, $t(28) = 2.41$, $p = .027$, and MLU, $t(28) = 3.61$, $p = .002$. The observed linguistic and nonverbal advantages of the SLI group relative to the Co-LI group was consistent with previous reports (M. L. Rice et al., 2004).

Children with typical language (TL, n = 30)

The typical language group consisted of children who scored 86 or higher on 2 out of 3 standard scores ($M = 100$, SD 15) on the NWR, SR, and TEGI measures. The TL group included two children with autism spectrum disorder (ASD), one child with a behavioural disorder, and two children with low nonverbal IQ (70–85). The main group of children with typical language (TL) skills was also divided into two subgroups: children with typical development (TD, $n = 25$) and children with spared typical language skills in the presence of low nonverbal abilities (NVIQ = 71–85) and/or concomitant clinical conditions (Co-TL, $n = 5$). The Co-TL subgroup includes children with a non-language developmental disorder ($n = 3$) or a low nonverbal IQ ($n = 2$). See Figure 1 for a summary of group and subgroup criteria and Table 2 for a summary of participant characteristics. Statistical comparisons for measures of language and cognition were not performed between the TD and Co-TL subgroups due to the small sample size of the Co-TL group.

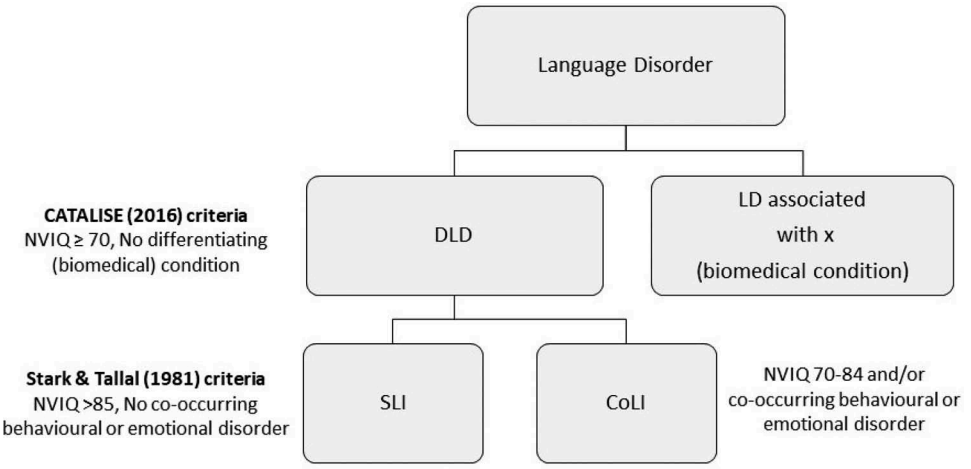

Figure 1. Language disorder subgroups.

Language sample elicitation transcription and coding

Thirty-minute play-based conversational samples were elicited by graduate student clinicians using a standard toy kit that included a house, a barn, six little people, a horse, two cows, two cats, two sheep, two pigs, a bird, as well as furniture for the house and barn. The examiners were trained in facilitative elicitation procedures, including speaking in short sentences, pausing, and limiting their use of yes/no questions (Hadley, 1998). Examiners were instructed to use open-ended prompts to elicit language from the child.

Language samples were transcribed by research assistants following the transcription protocol provided in the University of Utah child language lab manual (S.M. Redmond, 2013). Utterances were divided into C units with utterances containing embedded clauses, and subordinate clauses kept intact. Language samples were coded for morphosyntax and complex syntax by research assistants. All transcription and coding were checked by a second research assistant. For the current study, all transcripts were reviewed to ensure correct identification of all infinitive clauses. See Table 3 for infinitive clause coding criteria.

Language samples were analyzed using Systematic Analysis of Language Transcripts (SALT) software (Miller & Iglesias, 2008). The total utterance set (including partially intelligible and abandoned utterances) provided by each participant was used to identify all utterances containing infinitive clauses. For frequency variables, language samples were cut at 135 utterances. This cut point was based on the smallest number of complete and intelligible utterances provided across our participants and allowed us to equate sample length. The total number of infinitive clauses produced was then calculated as well as totals disaggregated by infinitive clause type. The data set of infinitive clauses was combined first into 'all infinitives,' which included all types of infinitive clauses, and then divided into 'true infinitives,' which excluded contracted infinitives (e.g., *'wanna,' 'gonna'*). The number of different matrix verbs used in infinitive clauses was counted. Errors in utterances containing infinitive clauses were examined (see Table 4).

Table 3. Infinitive clause criteria.

Infinitive clause types included in analysis	Example
Reduced infinitive clauses (RIC)	I'm gonna go.
Same subject infinitive clauses (SSIC)	I'm going to go.
Different subject infinitive clauses (DSIC)	I told her to go.
Unmarked infinitive clauses (UIC)	I made him go.
WH infinitive clauses (WHIC)	I know where to go.
Excluded utterances	
Utterances without a matrix verb	To go there.
Utterances without a complement verb	I have to.

Adapted from Arndt and Schuele (2012).

Table 4. Infinitive clause error types.

Errors included in analysis	Example	% of all errors
Omission of infinitive TO	*I need go potty.	52%
Finite verb used in infinitive clause	*Let's make the baby runned into the house.	10%
Other errors (e.g., word order errors, omission of other obligatory grammatical structures)	*It's time for to go her (her) to Hawaii. *It doesn't have (like) a bed underneath but it used to be.	38%
Errors that were not within the infinitive clause structure were not counted.	*He want to play. *She not gonna go.	–

*Examples from our data set produced by children with SLI and CoLI.

Tense composite scores were calculated using all obligatory contexts for copula and auxiliary BE, third-person singular *-s*, regular past tense *-ed*, and irregular past tense (M. L. Rice et al., 1998). Overregularizations of irregular past tense verbs (e.g., *runned*) and irregular third-person (e.g., *haves*) were included in the numerator as marked for finiteness. The number of verbs marked for finiteness was divided by the total number of obligatory contexts.

Reliability

Twenty percent of the language samples were randomly selected and independently transcribed a second time. A point-by-point comparison revealed 88% agreement between the first and second transcriptions for the number of morphemes, 86% agreement for word tokens, and 86% agreement for utterance boundaries. These samples were also re-coded by the second transcriber for infinitive clauses and compared against the original transcription. Pearson correlations showed high levels of interrater reliability for the number of infinitive clauses identified (r = .97), the number of errors identified within the infinitive clauses, (r = .96), the number of different matrix verbs used with infinitive clauses, (r = .96) and the number of different total verbs used within participant's language samples (r = .96).

Statistical analysis

Non-normal distributions for the number, type, and accuracy of infinitive clause productions motivated the use of Kruskal-Wallis tests with group as the between-subjects factor and number of infinitive clauses, type of infinitive clauses, number of

different matrix verbs and infinitive clause accuracy rate as within-subject factors. Effect sizes were calculated using partial eta-squared and interpreted using the following benchmarks: 0.01 'small,' 0.06 'medium,' and 0.14 'large' (Cohen, 1994). Standard deviations were calculated to determine the amount of variance within the DLD group for the number of true infinitives produced and the omission rates of obligatory infinitive TO. Because the CoTL and CoLI subgroups were small and had unequal number of participants, along with non-normal distributions and unequal variances, statistical comparisons involving the four subgroups were not warranted. Consistencies across individual data were examined instead.

Pearson product-moment correlations were run to identify significant first-order associations among predictor variables and the number of infinitive clauses produced by the participants and their TO omission rates. Predictor variables included NNAT scores along with the language measures mentioned above, as well as vocabulary scores, calculated as the number of different verbs used in the 135-utterance sample cut, and maternal education, measured using the following scale: 1 = some high school, 2 = high school graduate, 3 = some college, 4 = 4-year degree, 5 = graduate degree. Predictor variables that were significantly correlated at $p < .05$ and with r values ≥ 0.30 were selected to be included in a backward stepwise regression analysis. The probability of F was used for stepping method criteria with removal set at ≥ 0.10.

Results

Question 1: Are there significant differences between children with DLD and children without DLD in the number of infinitive clauses they produce when language samples are matched for the number of utterances? The DLD group produced fewer total infinitive clauses than the TL group; however, the group difference was not significant [$H(1) = 3.21$, $p = .073$, $\eta^2 = 0.038$]. The DLD group produced significantly fewer true infinitive clauses (excluding reduced infinitive clauses e.g., '*I wanna play*') than the TL group [$H(1) = 4.901$, $p = .027$, $\eta^2 = 0.067$] (Table 5, Figure 2). An examination of the individual data reveals all participants in the TD, CoTL, and SLI subgroups used five or more infinitive clauses in their 30-minute language samples (with the exception of one TD participant who used only 3). However, four of the nine participants in the CoLI group used only one or two infinitive clauses (see Table 6).

Table 5. Infinitive clause productions in a 135-utterance sample: group means, (standard deviations) and ranges.

Group	Number of all inf. clauses	Number of true inf. clauses	# Different Matrix Verbs
TL	11.97	**8.27***	**5.23*****
$n = 30$	(7.13)	(4.94)	(1.96)
	2-3	1-18	2-11
DLD	8.80	**5.37***	**3.43*****
$n = 30$	(5.62)	(3.15)	(1.38)
	1-21	1-12	1-7

All inf. = all types of infinitive clauses, True inf. = excludes reduced infinitives (e.g., 'gonna')

*$p < 0.05$, ***$p < 0.001$ with Kruskal-Wallis tests.

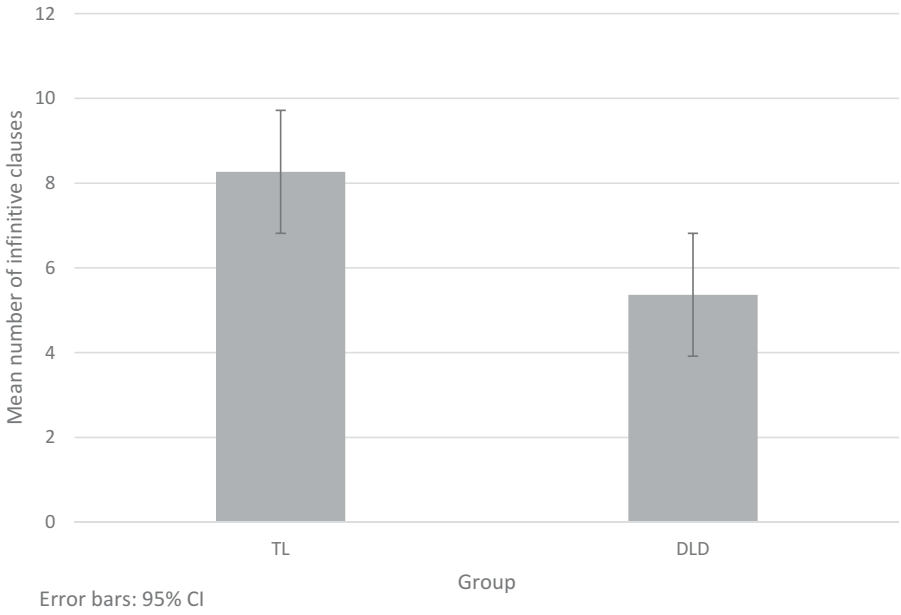

Figure 2. Mean number of true infinitive clauses produced in a 135-utterance language sample by group.

Question 2: Are there significant group differences in the types of infinitive clauses children produce? The DLD group produced significantly fewer unmarked infinitive clauses (e.g., '*She made me lose.*' than the TL group [$H(1) = 9.361$, $p = .002$, $\eta^2 = 0.144$]. However, means for both groups were low for unmarked infinitives. This was the case for different subject infinitives and wh-infinitives as well (see Table 7).

Question 3: Are there group differences in the number of different matrix verbs used within infinitive clauses? The DLD group used significantly fewer matrix verb types in their infinitive clauses than the TL group [$H(1) = 13.504$, $p < .001$, $\eta^2 = 0.216$] (see Table 5).

Question 4: Are there group differences in the amount and/or types of grammatical errors children produce within their infinitive clauses? The DLD group had a significantly lower accuracy rate than the TL group in their productions of all infinitive clauses [$H(1) = 5.671$, $p = .017$, $\eta^2 = 0.081$] (see Table 8, Figure 3). When looking specifically at the omission of obligatory infinitive TO, the most common error, the DLD group had a significantly lower rate of infinitive TO inclusion than the TL group [$H(1) = 7.319$, $p = .007$, $\eta^2 = 0.109$]. An inspection of the data at the individual level for infinitive TO omissions revealed all participants in the TD subgroup were at mastery level (> 90%) for the inclusion of infinitive TO and all participants in the CoTL subgroup were at mastery level with the exception of one participant with 88% accuracy. The SLI subgroup ranged from 50 to 100% accuracy with 16 of the 19 participants at mastery level. In the CoTL subgroup, six of the nine participants were at mastery levels, one was near mastery at 83%, and the remaining two participants had 0% accuracy (see Table 6).

Table 6. Number of true infinitive clauses and percent correct use of infinitive TO in obligatory contexts in a 30-minute sample by subgroup.

	Typical Language				DLD		
Sub-group	Age	TO inclusion	Percent correct	Sub-group	Age	TO inclusion	Percent correct
TD	5;6	17/17	100	SLI	5;1	18/23	78
	5;6	3/3	100		5;5	15/15	100
	5;6	31/31	100		5;5	18/18	100
	5;7	15/15	100		5;6	48/49	98
	5;8	25/25	100		5;6	3/6	50
	5;9	8/8	100		5;7	77/85	91
	5;9	24/24	100		5;7	4/6	67
	5;9	8/8	100		5;8	12/12	100
	5;10	8/8	100		6;0	6/7	86
	5;10	25/25	100		6;0	9/10	90
	5;10	16/16	100		6;0	18/19	95
	5;11	9/10	90		6;3	18/18	100
	6;0	64/65	98		6;3	46/46	100
	6;2	17/17	100		6;3	5/5	100
	6;3	36/36	100		6;4	6/10	60
	6;3	30/30	100		6;6	11/11	100
	6;4	22/22	100		6;7	16/16	100
	6;6	31/31	100		6;9	18/18	100
	6;7	40/40	100		6;9	26/28	93
	6;7	32/32	100		6;10	24/25	96
	6;10	23/23	100		7;1	7/7	100
	6;10	11/11	100	SLI subgroup mean accuracy			90.7 (14.7)
	7;0	20/20	100	SLI subgroup mean number			20.62 (19.0)
	7;0	34/34	100	CoLI	5;7	0/1	0
	7;1	11/12	92		5;9	6/6	100
TD subgroup mean accuracy			99.2 (2.6)		5;9	1/1	100
TD subgroup mean number			22.52 (13.4)		6;0	0/2	0
CoTL	5;7	13/14	93		6;1	1/1	100
	5;8	13/13	100		6;4	12/12	100
	5;10	7/8	88		7;1	10/12	83
	5;11	13/13	100		7;1	11/11	100
	7;3	13/13	100		7;7	6/6	100
CoTL subgroup mean accuracy			96.2 (5.7)	CoLI subgroup mean accuracy			75.9 (43.4)
CoTL subgroup mean number			12.20 (2.4)	CoLI subgroup mean number			5.78 (4.8)
	TL Group				DLD Group		
mean accuracy			98.68 (3.4)	mean accuracy			86.20 (26.7)
mean number			20.80 (12.8)	mean number			16.17 (17.4)

Table 7. Number of infinitive clause productions in a 135-utterance sample by type: group means, (standard deviations) and ranges.

Group	RIC	SSIC	DSIC	UIC	WHIC
TL	10.63	19.03	1.57	1.67*	0.33
n = 30	(10.98)	(11.78)	(1.52)	(1.73)	(0.66)
	0-55	3-59	0-7	0-5	0-2
DLD	8.90	14.80	0.90	0.83*	0.47
n = 30	(8.66)	(16.87)	(1.03)	(1.51)	(0.94)
	0-35	1-84	0-4	0-7	0-3

RIC = reduced infinitive clause, SSIC = same subject infinitive clause,
DSIC = different subjects infinitive clause, UIC = unmarked infinitive clause, WHIC = wh infinitive clause
*$p < 0.01$, with Kruskal-Wallis tests.

Question 5: To what extent do MLU, maternal education level, and general language measures predict observed variability within affected children's infinitive clause productions? The range for the number of true infinitive clauses in a 135-utterance sample for the DLD

Table 8. Infinitive clause accuracy rates in a 30-minute sample by group.

Group	% correct use all inf. clauses	% correct use true inf. clauses	Inf. TO inclusion rate
TL	**97.96***	**97.50****	**98.68****
n = 30	(2.65)	(3.39)	(3.36)
	92-100	89-100	88-100
DLD	**90.20***	**83.04****	**86.20****
n = 30	(13.10)	(26.90)	(26.75)
	43-100	0-100	0-100

*$p < 0.05$, **$p < 0.01$, with Kruskal-Wallis tests.

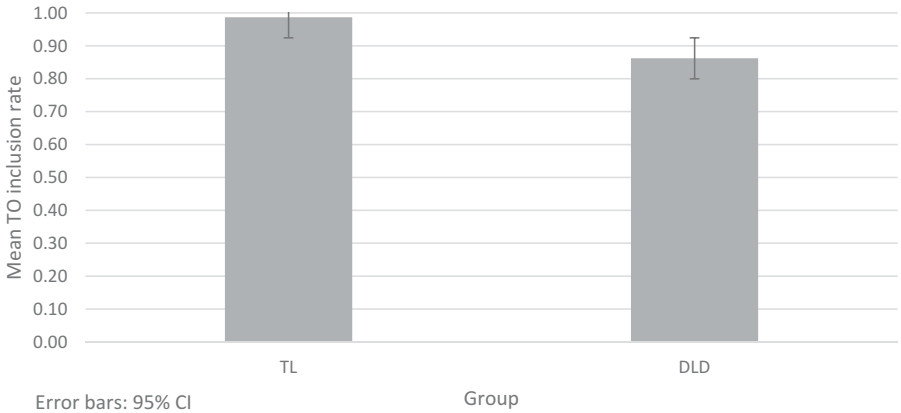

Figure 3. Percent inclusion of obligatory infinitive TO by group.

Table 9. Pearson product-moment correlations among the number of true infinitive clause productions, infinitive TO omission rates, participant characteristics, and diagnostic measures.

	Matrn Ed.	CELF	NWR	SR	Tense Comp.	TEGI	MLU	NNAT	Vocab
#True Inf.	**.429****	**.327***	**.307***	**.340***	.252	.197	**.362****	.130	.067
TO omit	−.158	**−.455****	**−.324***	**−.367****	**−.561****	**−.452****	**−.384****	**−.327***	−.220

*$p < .05$, **$p < .01$

group was 1–12, with a standard deviation of 3.15. Pearson product-moment correlation revealed statistically significant associations ($p < .05$) between the number of true infinitives produced and the mother's education level, CELF-4 core language score, nonword repetition score, sentence recall score, and MLU (see Table 9). Backward stepwise regression showed that the combination of the mother's education and MLU represented the best set of predictors for the number of true infinitive clauses produced. This model accounted for 25% of the variance (Table 10).

The range for infinitive TO omission rates among the DLD group was 0-100%, with a standard deviation of 26.75. Pearson product-moment correlation revealed statistically significant associations between TO omission rates and children's CELF-4 core language scores, nonword repetition scores, sentence recall scores, tense composite scores, TEGI scores, MLU, and nonverbal IQ (Table 11). Backward stepwise regression showed that tense composite scores and MLU were the best predictors of

Table 10. Backward regression model summary for variables predicting the number of true infinitive clause productions.

Model	B	SE B	ß	*t*	*p*	R^2	R^2 Change
Model 1: (constant)	−24.57	11.04		−2.23	.03		
Mother's Ed.	5.46	2.08	.34	2.62	.01		
CELF	.047	.19	.07	.25	.80	.26	.26
NWR	−0.37	.14	-.06	-.26	.80		
SR	.087	.21	.12	.41	.69		
MLU	.172	.13	.19	1.30	.20		
Model 2: (constant)	−24.78	10.91	−2.27	.03			
Mother's Ed.	5.39	2.04	.33	2.64	.01		
NWR	-.03	.14	-.05	-.22	.83	.26	−.001
SR	.12	.16	.16	.76	.45		
MLU	.18	.13	2.00	1.45	.15		
Model 3: (constant)	−24.52	10.76		−2.28	.03		
Mother's Ed.	5.30	1.99	.33	2.67	.01	.26	−.001
SR	.10	.10	.13	.92	.36		
MLU	.18	.12	.20	1.46	.15		
Model 4: (constant)	−22.16	10.44		−2.12	.04		
Mother's Ed.	5.69	1.94	.35	2.94	.005	.25	−.011
MLU	.24	.11	.26	2.16	.04		

Table 11. Backward regression model summary for variables predicting infinitive TO omissions.

Model and predictor variables	B	SE B	ß	*t*	*p*	R^2	R^2 Change
Model 1: (constant)	1.08	.25		4.39	.00	.40	.40
CELF	.002	.003	.21	.62	.54		
NWR	.001	.002	.12	.62	.54		
SR	.000	.003	.03	.10	.92		
Tense Comp.	−.78	.24	−.51	−3.31	.002		
TEGI	−.001	.001	−.23	−1.00	.32		
MLU	−.003	.002	−.27	−2.02	.05		
NNAT	−.002	.002	−.15	−1.11	.27		
Model 2: (constant)	1.08	.23		4.65	.000	.40	.000
CELF	.002	.003	.23	.75	.46		
NWR	.001	.001	.13	.77	.48		
Tense Comp.	−.78	.23	−.51	−3.44	.001		
TEGI	−.001	.001	−.23	−1.01	.32		
MLU	−.003	.002	−.27	−2.04	.05		
NNAT	−.002	.002	−.14	−1.11	.27		
Model 3: (constant)	1.06	.23		4.61	.000	.39	−.006
NWR	.002	.001	.18	1.18	.25		
Tense Comp.	−.74	.22	−.49	−3.38	.001		
TEGI	−.001	.001	−.11	−.68	.50		
MLU	−.003	.001	−.24	−1.9	.06		
NNAT	−.002	.002	−.11	−.91	.37		
Model 4: (constant)	1.14	.20		5.74	.000	.39	−.005
NWR	.001	.001	.14	.99	.33		
Tense Comp.	−.80	.20	−.53	−4.04	.000		
MLU	−.003	.001	−.25	−2.10	.04		
NNAT	−.002	.002	−.12	−.98	.33		
Model 5: (constant)	1.04	.17		6.16	.000	.38	−.011
NWR	.001	.001	.11	.80	.43		
Tense Comp.	−.83	.20	−.54	−4.22	.000		
MLU	−.003	.001	−.27	−2.31	.03		
Model 6: (constant)	1.00	.16		6.16	.000	.37	−.007
Tense Comp.	−.75	.17	−.49	−4.45	.000		
MLU	−.003	.001	−.24	−2.17	.03		

children's TO omission rates. This model accounted for 37% of the variance (Table 11).

Discussion

Previous research examining the nature of infinitive deficits in cases of language impairment has focused on children with Specific Language Impairment (SLI). As a collection, studies on the issue suggest that infinitive deficits can be a long-standing weakness for some children with SLI, but there has also been considerable unexplained heterogeneity. Recent suggestions to replace the designation SLI with an expanded phenotype that includes cases of low nonverbal IQ and other developmental deficits (e.g., CATALISE: D. v. M. Bishop et al., 2016) encouraged us to revisit the issue of infinitive deficits in children with language impairments in light of these adjustments. While some consider DLD as simply a replacement term for SLI, we feel there is value in examining these groups separately. It has not been fully established whether the addition of low-average nonverbal IQ and/or concomitant disorders contributes to performance differences across affected children in their complex sentence use or other areas of language development.

Our results provided confirmation from previous reports (Arndt & Schuele, 2013; Eisenberg, 2003) that children with language disorders are using infinitive clauses in their conversational speech at around the same rate as their peers with typical language. However, in contrast with previous reports, we found children with DLD were using true infinitive clauses (excluding reduced infinitives, e.g., '*wanna*') less frequently than age-matched children with typical language. These results may have been due to expanding our sample beyond the more restrictive SLI criteria used in previous studies and suggest children with DLD may be relying more on these earlier learned reduced infinitive clauses when formulating complex sentences.

Consistent with Eisenberg (2003), we found children in the DLD group used significantly fewer types of matrix verbs with infinitive clauses than children with typical language. This reduced number of different verbs may have contributed to the reduced number of true infinitive clauses used by children in the DLD group.

Children in the DLD group had a significantly lower mean accuracy rate for the inclusion of obligatory infinitive TO. These results are consistent with previous studies comparing children with SLI and TD children. The individual data for infinitive TO omission rates show further that children with TL have essentially mastered the use of this morpheme by this age. In contrast, only children within the DLD group continued to demonstrate difficulty with infinitive TO. Similar to previous results of children with SLI (Arndt & Schuele, 2012; L. B. Leonard, 1995; Eisenberg, 2003), variability within our DLD study sample was large. An inspection of the CoLI subgroup suggests some of this variability might be a function of the presence of concomitant conditions. The two participants with 0% accuracy rates both had nonverbal IQ scores placing them in the below-average range (76 and 79 NNAT SS, $M = 100$, $SD = 15$), suggesting a possible relationship between nonverbal IQ and infinitive TO marking.

Our results extended previous findings by identifying factors predictive of the rate of children's infinitive clause use in conversational speech. Maternal education and MLU were the two strongest predictors for the number of true infinitive clauses children produced in a 135-utterance language sample. Individually, maternal education accounted for 17.5%, and MLU accounted for 12.2% of the variability. The finding of mother's education contributing to productions of infinitive clauses was consistent with Vasilyeva et al. (2008) and Van Kleeck et al. (2011), which found that maternal education predicted

children's development of complex syntax. MLU has previously been shown to have a direct relationship with clausal density, a measure of complex syntax use (Nippold et al., 2005) These two factors, together, accounted for 23% of the variability, which still leaves most of the variability in the current study sample unexplained. Another factor to consider when investigating the number of productions of infinitive clauses in conversational speech is that the children who have mastered more advanced complex structures may use fewer infinitive clauses than children who have not mastered more advanced structures and are relying more heavily on the use of this early developing structure to express complex propositions.

Consistent with previous studies, a large amount of variability in children's rates of infinitive TO omission was found among children with language disorders. Tense composite scores and mean length of utterance (MLU) were identified as the best predictors of infinitive TO omission rates. Individually, tense composite scores accounted for 31.5%, and MLU accounted for 14.7% of the variability. The finding that tense composite scores were predictive of infinitive TO omission was consistent with Arndt and Schuele (2012) and suggests that the ability to mark non-finiteness is related to children's ability to mark finiteness. The finding of MLU as a predictive factor for infinitive TO omission was also consistent with the findings of Arndt and Schuele (2012) but in contrast to the findings of Eisenberg (2003) and Owen and Leonard (2005). Together, these two variables accounted for 36.7% of the variability for infinitive TO omission rates in our study sample, which again leaves much of the variability unexplained.

In summary, children with DLD, as a group, used fewer true infinitive clauses and produced more errors with infinitive clauses than children with TL. Children with DLD also used fewer types of matrix verbs with infinitive clauses. Within the DLD group, children with low non-verbal IQ and/or concomitant conditions were especially prone to use fewer infinitive clauses and produce more obligatory infinitive TO omissions than children within the DLD group without concomitant conditions (i.e., SLI). Maternal education was the best predictor of the number of infinitive clauses children produced, while children's tense composite score was the most predictive for infinitive TO omissions.

The results of this study should be considered in light of its limitations. Elicitation tasks would have provided more experimental control in the number and range of obligatory infinitive clause contexts available to children. As a result, we may have either underestimated or overestimated children's proficiencies. However, this limitation is offset by some of the virtues associated with language sample-based measures. For example, language sample measures provide bona fide estimates of children's use in naturally occurring contexts. They are unaffected by priming, fatigue, disinterest, and other potential testing artifacts. Language sample-based measures also do not require children to understand task prompts. Most importantly, the use of language sample analysis with this study sample allowed for direct comparison to previous study samples (Arndt & Schuele, 2012; Eisenberg, 2003). Our examination was also limited to children's use of infinitival clauses at a single point in time. Longitudinal data would provide a clearer picture of how the predictors are associated with children's infinitive clause development. Finally, this study had few participants in the COTL (n = 5) and COLI (n = 9) subgroups. Replications with larger samples are needed to confirm our findings.

The results of this study showed that although many children with DLD did not seem to have particular difficulty with infinitive clauses by age 6 to 7 years, there was still a significant

number of affected children who continued to show deficits with this grammatical structure. Those children who struggled with infinitive clauses were more likely to have concomitant conditions, low nonverbal IQ, and relatively lower levels of verb finiteness marking. This suggests that, to some extent, the grammatical profiles of children with SLI and other children captured by broader clinical designations might be different in important ways. The grammatical deficits of children with co-occurring conditions and/or low nonverbal IQ may be more severe in both senses of the term; relative to their peers with SLI profiles, these children may, within a particular grammatical form, produce higher error rates. In addition, children with concomitant conditions and may also have a broader range of grammatical structures affected. The continued study of complex syntax use in children with a variety of clinical conditions will likely reveal new areas of strength and weakness for children with and without additional developmental limitations. A better understanding of the nature of grammatical variability will help clarify phenotypic boundaries across clinical designations and potentially lead to more individualised approaches to treatment.

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