Reflections on language development in children with DLD

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Overview

- Late talkers and late bloomers
- Environmental effects on language development
- How is language development in those children who are not late bloomers? - the case of DLD
- Linguistic and cognitive characteristics of children with DLD
- How about bilingual children?

What does the label “LT” imply?

The role of phonological working memory and environmental factors in lexical development in Italian-speaking late talkers: A one year follow up study

Andrea Marini,[a,b] Milena Ruffino,[c] Maria Enrica Sali,[c] and Massimo Molteni[c]

	Late Talkers (N=33)	TLD (N=260)
General information		
Age (months)	32.49 (2.29); Range: 28-35	32.27 (2.60); Range: 26-35
Sex	Males: N = 22 (66.7%)	Males: N = 140 (53.8%)
Socio-Economic Status (SES)	High: N=11 (33.3%); Middle: N=17 (51.5%); Low: N=4 (12.1%)	High: N=116 (44.6%); Middle: N=113 (43.5%); Low: N=21 (8.1%)
Weight at birth (gr.)	3287.10 (401.33); Range: 2360-4350	3239.84 (530.91); Range: 1010-4540
Weeks at birth	38.82 (1.74); Range: 35-41	39.18 (2.21); Range: 28-42
Language exposure	Bilinguals: N=10 (30.3%)	Bilinguals: N=60 (23.1%)
Family history of language delay*	At risk: N=11 (33.3%)	At risk: N=34 (13.1%)
Breastfeeding	Yes: N=14 (42.4%)	Yes: N=106 (40.8%)
Complications during delivery	Yes: N=6 (18.2%)	Yes: N=30 (11.5%)
Complications during pregnancy	Yes: N=6 (18.2%)	Yes: N=54 (20.8%)
HLEQ*	41.53 (6.34); Range: 29-56	47.52 (6.82); Range: 26-62
Cognitive and linguistic profile		
Cube Design (WIPPSI)	9.55 (4.82); Range: 1-19	9.84 (3.71); Range: 1-26
Information (WIPPSI)*	8.12 (2.83); Range: 0-13	10.94 (2.44); Range: 4-19
Non-word repetition*	3.76 (3.08); Range: 0-11	7.36 (3.90); Range: 0-15
LDS_Words_scores*	104.67 (49.74); Range: 0-166	259.29 (46.13); Range: 95-310

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General information		
Age (months)	32.40 (2.29); Range: 28-35	32.27 (2.60); Range: 26-35
Sex	Males: N = 22 (66.7%)	Males: N = 140 (53.8%)
Socio-Economic Status (SES)	High: N=11 (33.3%); Middle: N=17 (51.5%); Low: N=4 (12.1%)	High: N=116 (44.6%); Middle: N=113 (43.5%); Low: N=21 (8.1%)
Weight at birth (gr.)	3287.10 (401.33); Range: 2360-4150	3239.84 (530.91); Range: 1010-4540
Weeks at birth	38.82 (1.74); Range: 35-41	39.18 (2.21); Range: 28-42
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Familiarity 2.5 times more common in LTs

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HLEQ predicted 54% of variability at LDS

Reading Aloud to Children: Benefits and Implications for Acquiring Literacy Before Schooling Begins

DOMINIC W. MASSARO
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American Journal of Psychology
Spring 2017, Vol. 130, No. 1 pp. 63–72

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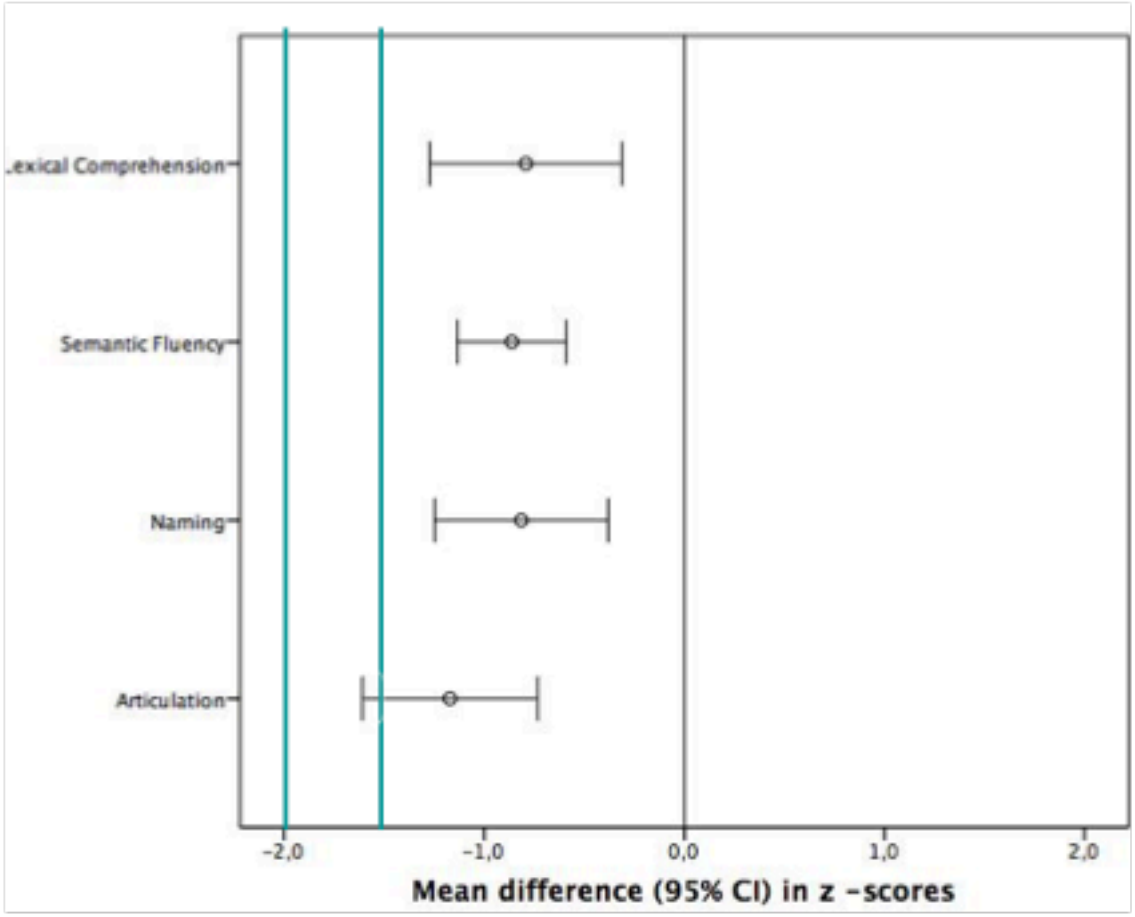

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LTs had deficitarian phonological working memory

OK, then WM plays a key role in language development …

… but in what terms?

Working Memory Mediates the Effects of Gestational Age at Birth on Expressive Language Development in Children

Valentina Riva and Chiara Cantiani
IRCCS Eugenio Medea, Lecco, Italy

Ginette Dionne
Université Laval

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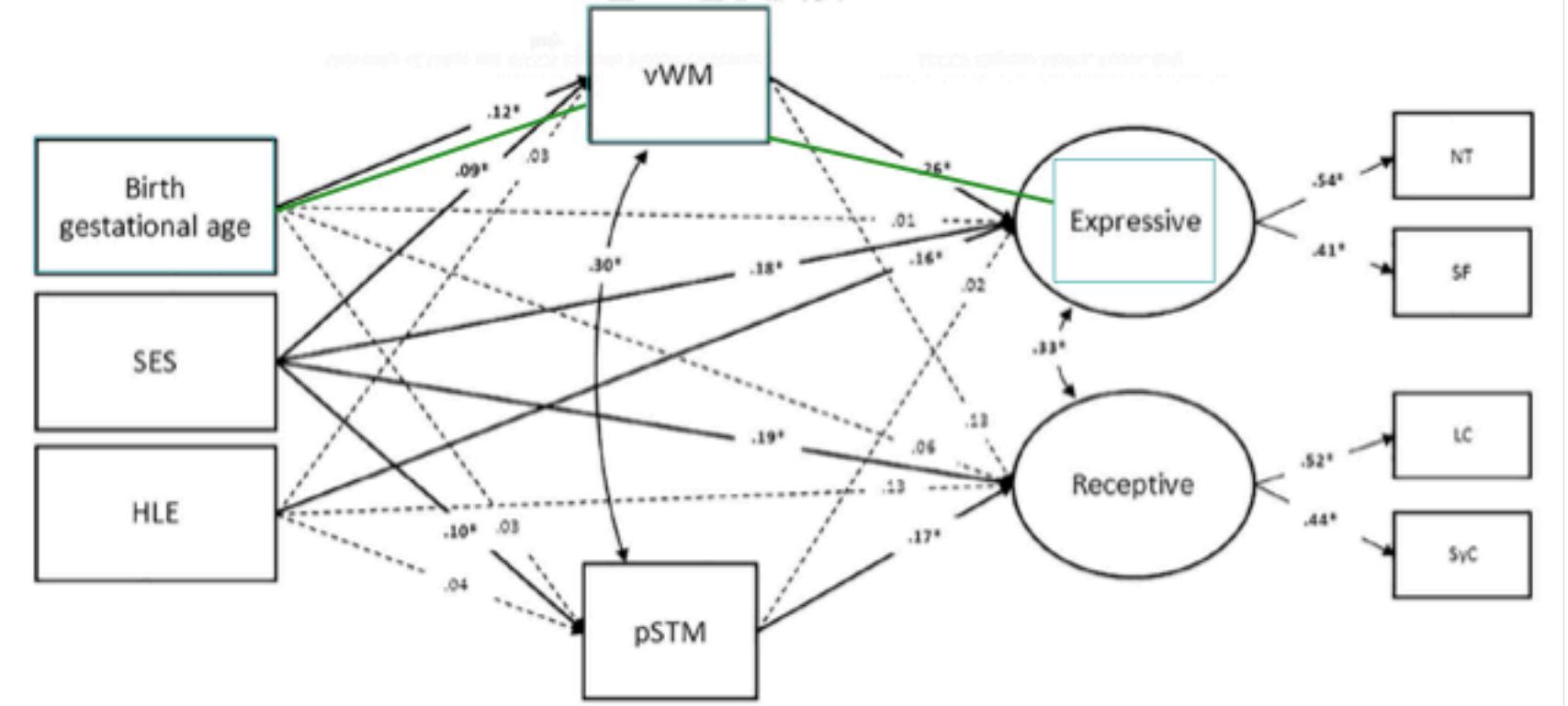

Neuropsychology

0894-4105/17/$12.00 http://dx.doi.org/10.1037/neu0000376

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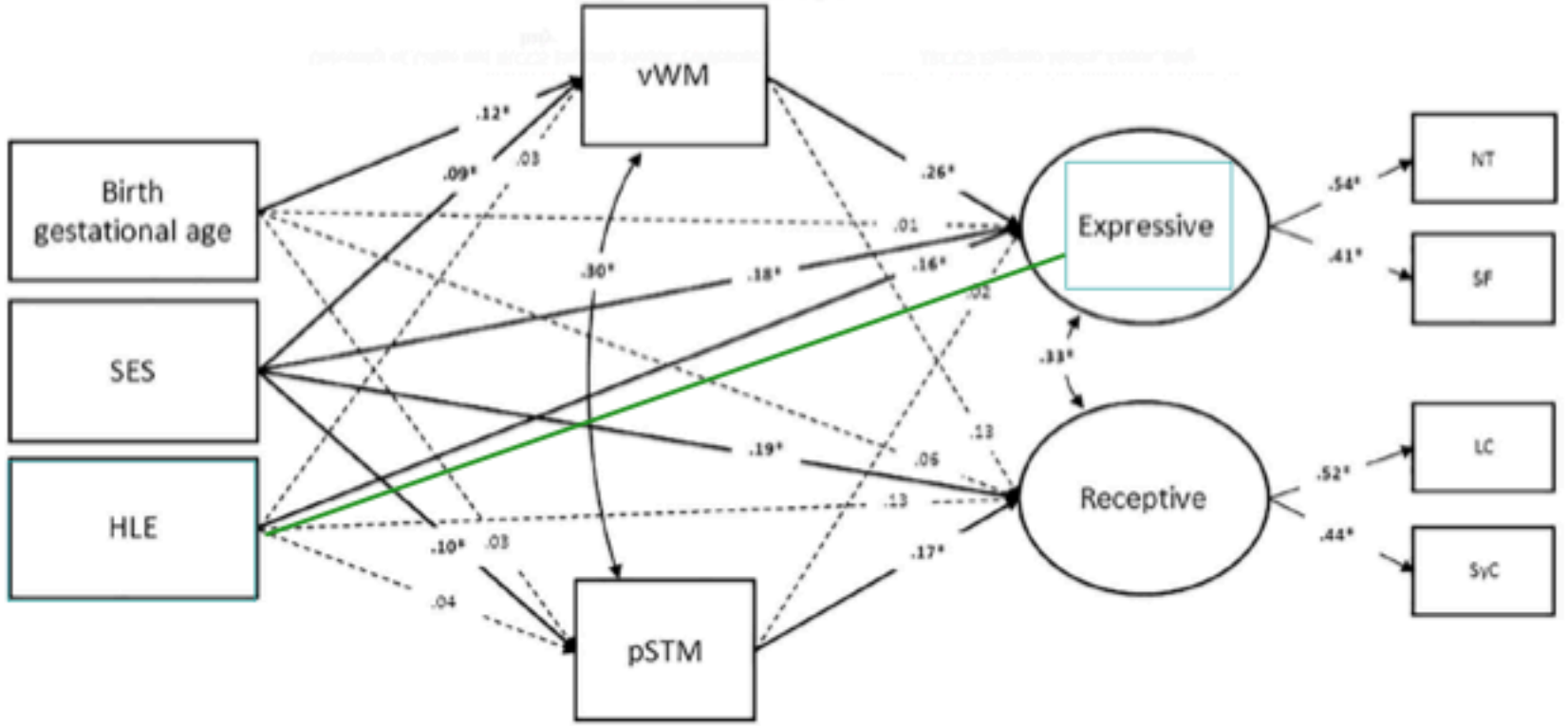

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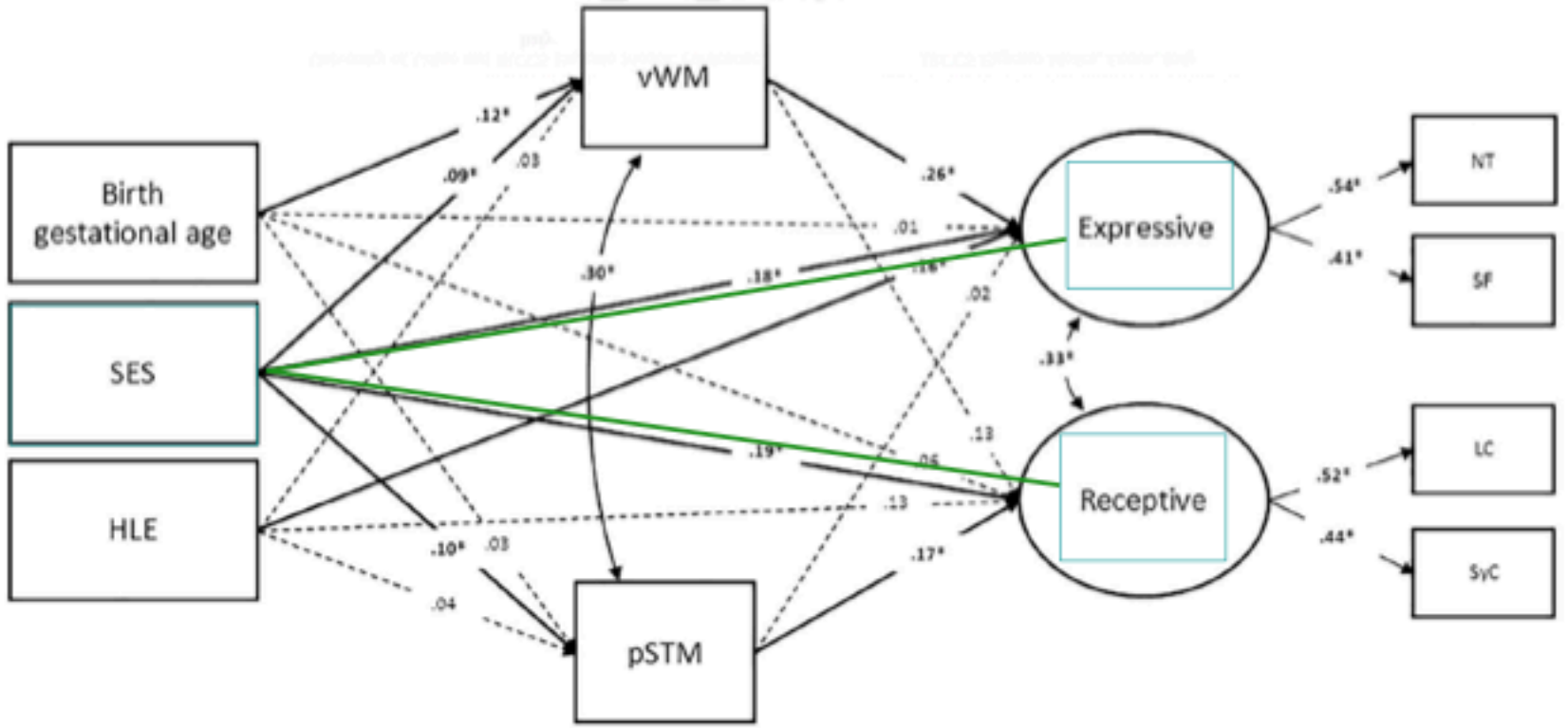

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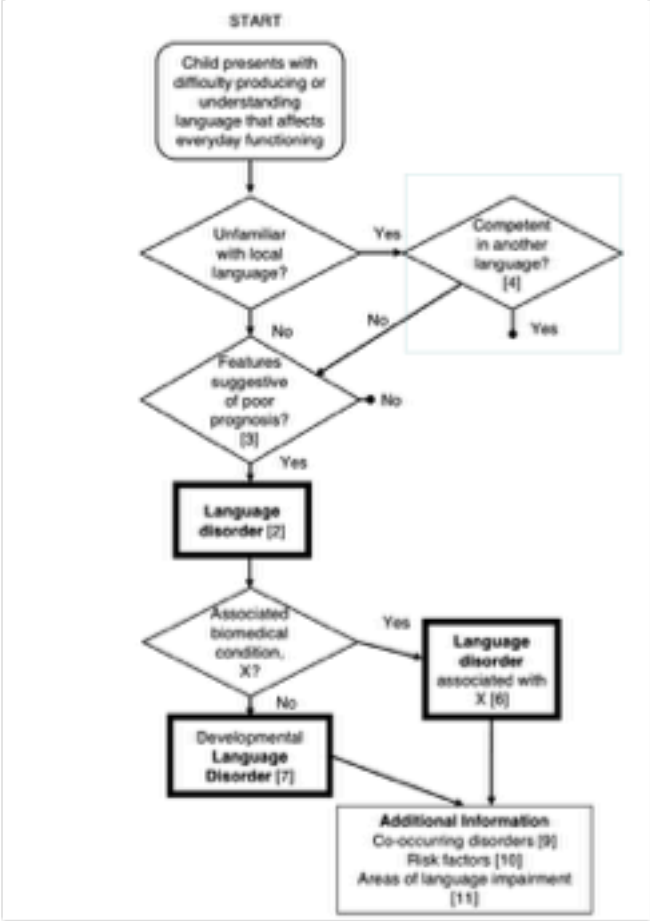
How is language development in children who are not “late bloomers”?

The case of Developmental Language Disorder

Phase 2 of CATALISE: a multinational and multidisciplinary Delphi consensus study of problems with language development: Terminology

Dorothy V.M. Bishop,[1] Margaret J. Snowling,[1] Paul A. Thompson,[1] Trisha Greenhalgh,[2] and the CATALISE-2 consortium



- Multilingualism does NOT lead to language problems
- With limited experience with the language used at school the child may require extra help

Journal of Child Psychology and Psychiatry 58:10 (2017), pp 1068–1080

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- Predictors of poor prognosis vary with a child's age

< 3 years (prediction of outcome particularly hard)

Children who fail to combine words at 24 months appear to have worse outcomes than those who do not produce any words at 15 months (Rudolph & Leonard, 2016)

Lower levels of social responsiveness and joint attention at 2 to 4-years predict persisting social communication problems at 9 years (Roy & Chiat, 2014)

Poorer prognosis in children with comprehension issues

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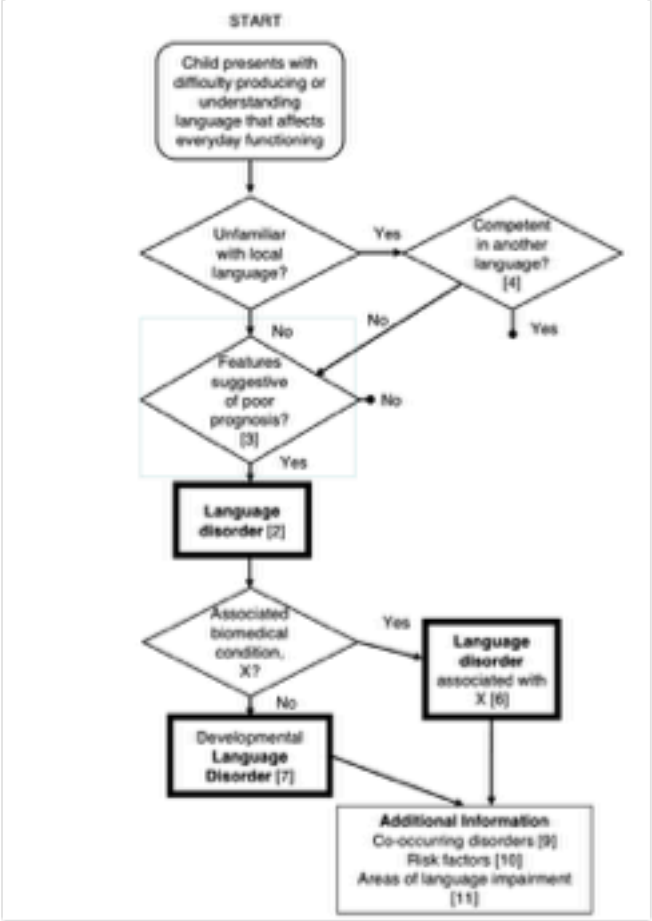

- Predictors of poor prognosis vary with a child's age

3-4 years (prediction of outcome improves)

The greater the number of impaired areas of language functioning, the higher the likelihood that the problems will persist into school age (Bishop & Edmundson, 1987)

Sentence repetition is a relatively good marker for predicting outcomes (Everitt, Hannaford, & Conti-Ramsden, 2013)

Good prognosis for preschoolers whose problems are restricted to expressive phonology (Beitchman, Wilson, Brownlie, Walters et al., 1996; Bishop & Adams, 1990).

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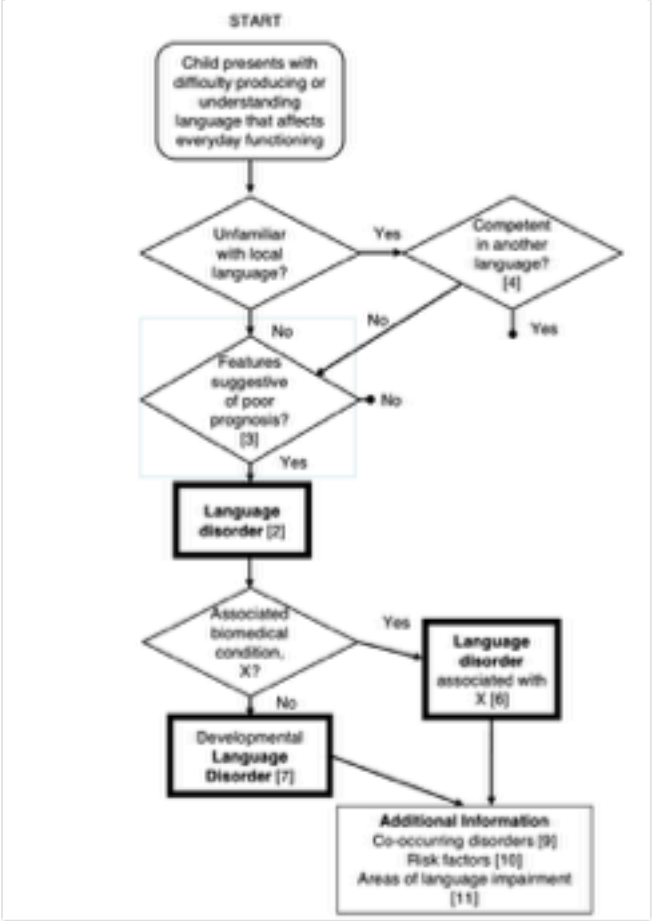

- Predictors of poor prognosis vary with a child's age

> 5 years (prediction of outcome improves)

Problems still evident at 5 years and over are likely to persist (Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998)

Children who start school with oral language problems are at risk of reading problems and poor academic attainment (Bishop & Adams, 1990; Catts,Fey, Tomblin, & Zhang, 2002; Thompson et al., 2015)

Prognosis appears particularly poor when receptive language is impaired (Beitchman et al., 1996; Clark et al., 2007), and when nonverbal ability is relatively low (Catts et al., 2002; Johnson et al., 2010; Rice & Hoffman, 2015)

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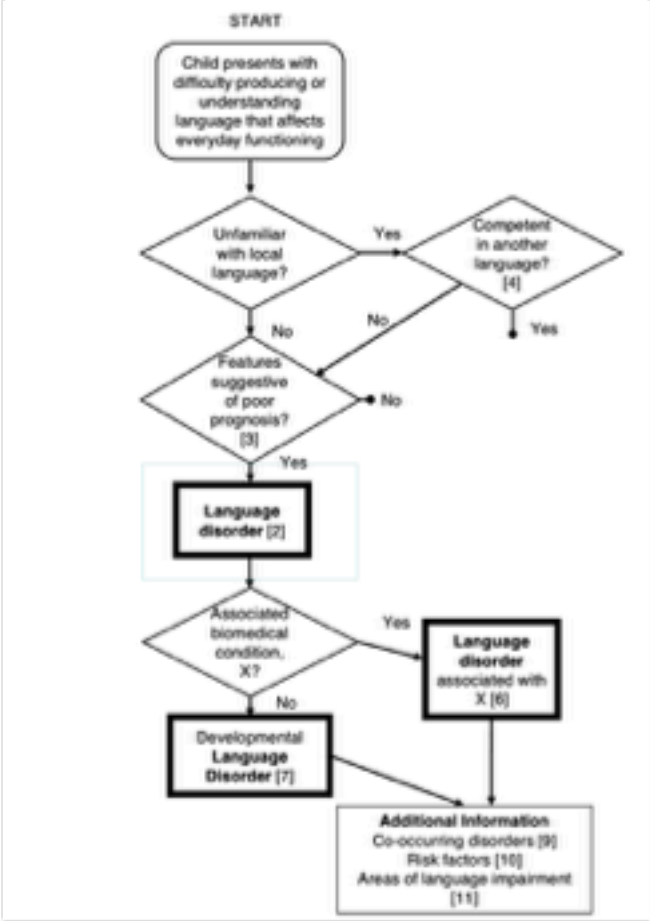

- The term 'language disorder' is proposed for children who are likely to have language problems enduring into middle childhood and beyond, with a significant impact on everyday social interactions or educational progress

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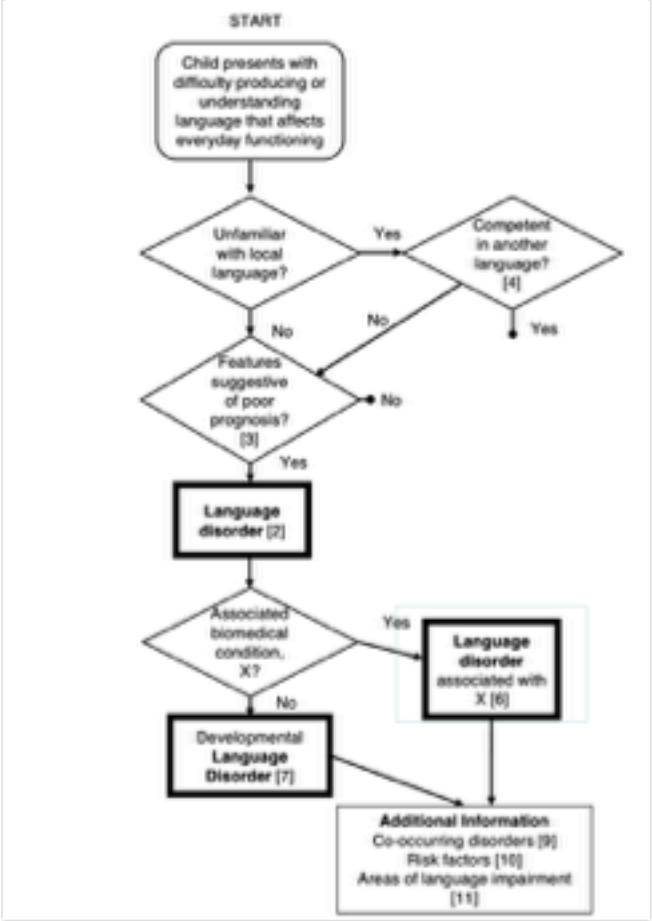

- Differentiating conditions are biomedical conditions in which language disorder occurs as part of a more complex pattern of impairments
  - Brain injury
  - Acquired epileptic aphasia in childhood
  - Neurodegenerative conditions
  - Cerebral palsy
  - Oral language limitations associated with sensory-neural hearing loss
  - Conditions commonly linked to genetic or neurological causes (e.g., Down syndrome, Autism Spectrum Disorders, Intellectual disability)

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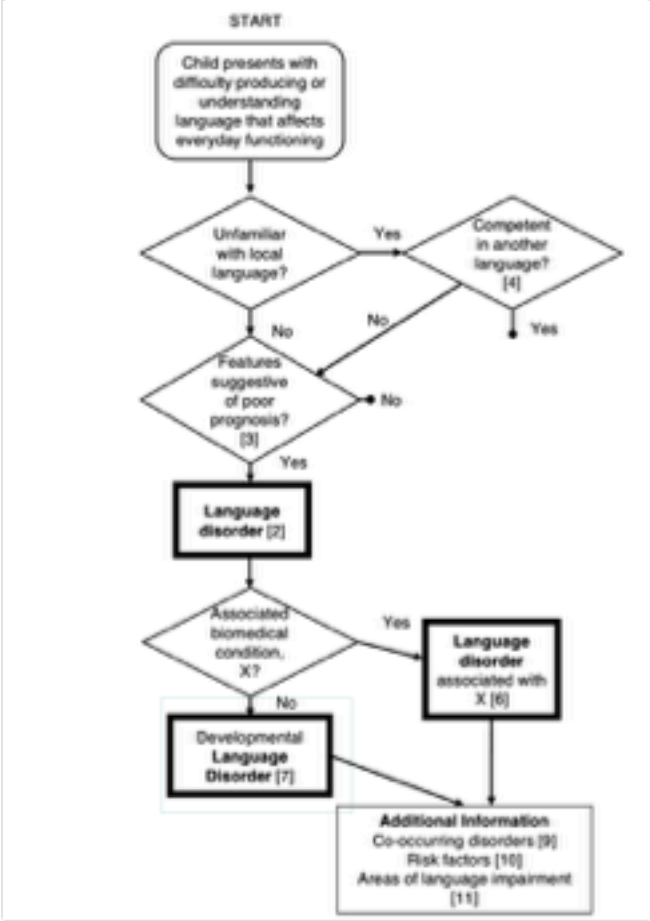

- Developmental Language Disorder (DLD) is proposed to refer to cases of language disorder with no known differentiating condition (as defined in Statement 6)

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- Co-occurring disorders include impairments in cognitive, sensori-motor or behavioural domains that can co-occur with DLD (may affect pattern of impairment and response to intervention), but whose causal relation to language problems is unclear
  - Attentional problems (e.g., ADHD)
  - Developmental coordination disorder (DCD)
  - Reading and spelling problems (developmental dyslexia)
  - Emotional disorders

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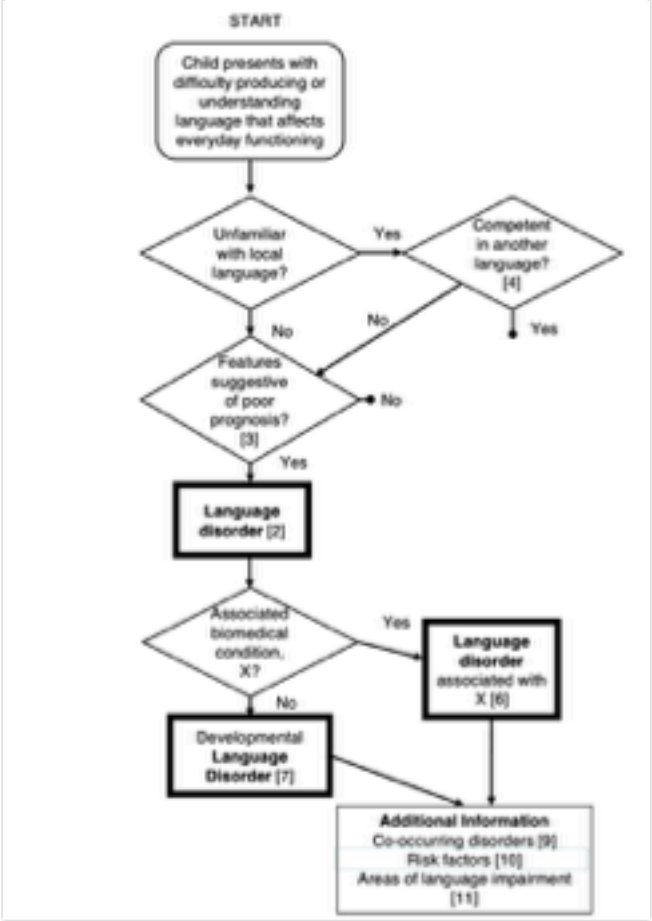

- Risk factors are biological or environmental factors that are statistically associated with language disorder, but whose causal relationship to the language problem is unclear or partial
  - Family history of language disorders or dyslexia
  - Gender (male)
  - Being a younger sibling in a large family
  - Fewer years of parental education

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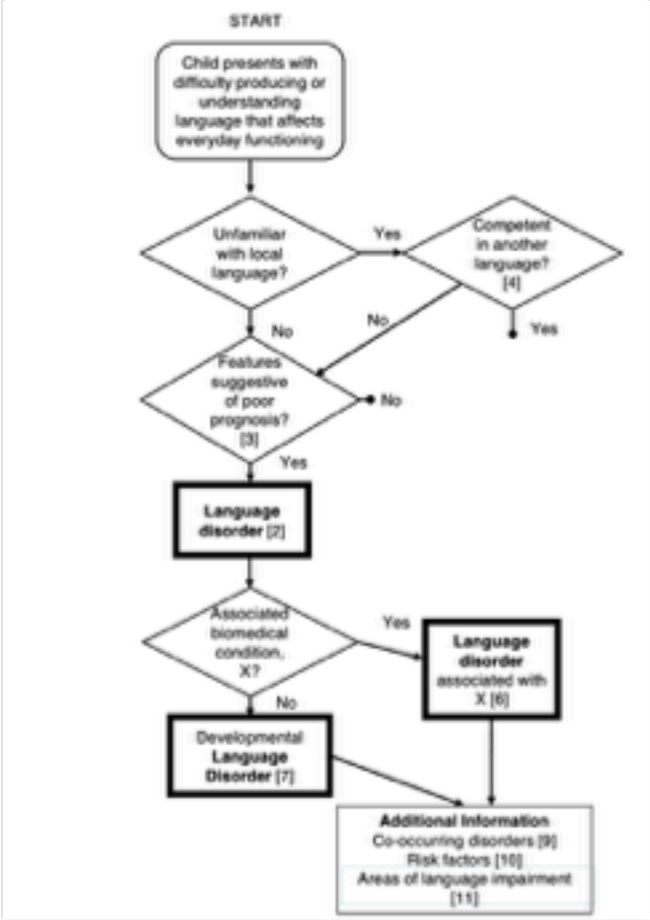

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In the meanwhile in Italy…

https://www.disturboprimariolinguaggio.it/

Systematic Review

Developmental Language Disorder: Early Predictors, Age for the Diagnosis, and Diagnostic Tools. A Scoping Review

Alessandra Sansavini [1,2,*,†], Maria Elena Favilla [3], Maria Teresa Guasti [4], Andrea Marini [5,6], Stefania Millepiedi [7], Maria Valeria Di Martino [8], Simona Vecchi [9], Nadia Battajon [10], Laura Bertolo [11], Olga Capirci [12], Barbara Carretti [13], Maria Paola Colatei [14], Cristina Frioni [15], Luigi Marotta [16], Sara Massa [17], Letizia Michelazzo [18], Chiara Pecini [19], Silvia Piazzalunga [20], Manuela Pieretti [18], Pasquale Rinaldi [12], Renata Salvadorini [21], Cristiano Termine [22], Mariagrazia Zuccarini [1], Simonetta D'Amico [1,23,†], Anna Giulia De Cagno [18], Maria Chiara Levorato [1,24,†], Tiziana Rossetto [18] and Maria Luisa Lorusso [25]

Abstract: *Background*. Developmental Language Disorder (DLD) is frequent in childhood and may have long-term sequelae. By employing an evidence-based approach, this scoping review aims at identifying (a) early predictors of DLD; (b) the optimal age range for the use of screening and diagnostic tools; (c) effective diagnostic tools in preschool children. *Methods*. We considered systematic reviews, meta-analyses, and primary observational studies with control groups on predictive, sensitivity and specificity values of screening and diagnostic tools and psycholinguistic measures for the assessment of DLD in preschool children. We identified 37 studies, consisting of 10 systematic reviews and 27 primary studies. *Results*. Delay in gesture production, receptive and/or expressive vocabulary, syntactic comprehension, or word combination up to 30 months emerged as early predictors of DLD, a family history of DLD appeared to be a major risk factor, and low socioeconomic status and environmental input were reported as risk factors with lower predictive power. Optimal time for screening is suggested between age 2 and 3, for diagnosis around age 4. Because of the high variability of sensitivity and specificity values, joint use of standardized and psycholinguistic measures is suggested to increase diagnostic accuracy. *Conclusions*. Monitoring risk situations and employing caregivers' reports, clinical assessment and multiple linguistic measures are fundamental for an early identification of DLD and timely interventions.

Brain Sci. **2021**, *11*, x. https://doi.org/10.3390/xxxxx

Linguistic characteristics in children with DLD

Assessment of linguistic abilities in Italian children with Specific Language Impairment

Andrea Marini[a,b,*], Alessandro Tavano[b], Franco Fabbro[a,b]

	(N=195) TLD	F 80.2 SLI (N=62)
Chronological age	7.5 (1.7)	7.6 (1.6)
Education	2.5 (1.7)	1.6 (1.6)

	Mean (S.D.)	Range
Full-Scale IQ	88 (10.7)	68–120
Performance IQ	95 (12.3)	74–134
Verbal IQ	83.3 (12.8)	61–122

A. Marini et al. / Neuropsychologia 46 (2008) 2816–2823

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Andrea Marini[a,b,*], Alessandro Tavano[b], Franco Fabbro[a,b]

	1 (5-6 y.o.)	2 (6-7 y.o.)	3 (7-8 y.o.)	4 (8-9 y.o.)	5 (9-10 y.o.)	6 (10-11 y.o.)
SF	15.9(4.8)	18.3(6.8)	20.6(6.9)	22.5(6.7)	23.2(6.2)	26 (5.7)
NT	31.3(2.6)	30.1(4.5)*	30.9(4.2)*	31.9(3.4)	33.1(2.1)	33.5 (2)
NWR	8.9(5.2)**	10.2(3.7)**	13.1(2.4)**	12.9(3.4)**	13.6(2.3)**	13.3 (2)**
WR	9.9(3.7)**	11.5(2.7)**	13.2(2.5)**	13.6(2.6)**	14 (2)**	14.1(1.4)**
SR	10.2(7.5)**	9.6 (5.5)**	10.4(2.2)**	11.1(3.1)**	9.9 (2.6)**	10.8(3.9)**
TCGB	18.9(8.8)**	15.2(11.6)**	9.5 (4.6)**	10.6 (6.7)**	7.9 (4.3)**	6.5 (3.9)**
Token	13.3(4.1)**	12.5(4.4)**	16.1(3.1)*	16 (3.2)**	17 (1.4)**	17.8(2.5)*
BPVS	16.5(1.8)	17.7(4.8)	19.2(3.7)	21.6 (3)	23.1(3.7)	23.9(2.6)
Art	119.4(43.8)**	142.2(29.4)**	151.6(37.3)	160 (30.6)	159.8(19.5)	166.7 (8.4)
S-D	26.6(3.4)**	25.1(5.3)**	29.1 (2)	28.8(2.9)	28.3(3.4)	29 (1.9)

A. Marini et al. / Neuropsychologia 46 (2008) 2816–2823

Assessment of linguistic abilities in Italian children with Specific Language Impairment

Andrea Marini[a,b,*], Alessandro Tavano[b], Franco Fabbro[a,b]

	SLI	TLD
Words	70.5 (33.6)	71.4 (31.8)
Speech rate*	77.9 (28.5)	109.9 (30.8)
% Phonological paraphasias*	4.8 (9)	.2 (.7)
% Semantic paraphasias*	1.3 (2.2)	.4 (1)
% Omissions of content words*	28.2 (18.6)	1.9 (5.6)
% Omission of function words*	11.1 (20)	1.8 (5.9)
% Substitution of free morphemes*	1.6 (2.1)	.3 (.8)
% Substitution of bound morphemes*	1 (1.5)	.3 (1.1)
Mean length of utterance*	6 (1.5)	7.7 (2.3)
Syntactic complexity*	.8 (.3)	1.3 (.3)

Asterisks (*) indicate when the group-related difference is significant.

A. Marini et al. / Neuropsychologia 46 (2008) 2816–2823

Linguistic assessment of children with Specific Language Impairment with the BVL_4-12

Andrea Marini[1,2]

Table 5 – Results of the assessment of macrolinguistic skills during the narrative production task in the groups of participants with SLI and typical language development. The table reports also significance level (t-tests)

Assessment of narrative skills – Macrolinguistic processing	SLI	TLD	t-value	df	p-value	Cohen's d
% Errors of Local Coherence	30.74 (16.71)	5.29 (6.88)	4.454	18	.001*	1.99
% Lexical Informativeness	75.16 (12.55)	86.53 (6.56)	–2.539	18	.021*	–1.14

Note. p<.025*

Legend: SLI: children with Speech Language Impairment; TLD: children with Typical Language Development.

Bollettino di Psicologia Applicata
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The Complex Relation between Executive Functions and Language in Preschoolers with Developmental Language Disorders

Andrea Marini [1,2,*], Barbara Piccolo [3], Livia Taverna [4], Moira Berginc [5] and Martina Ozbič [2]

General Information	TD ($N = 24$)	DLD ($N = 16$)
Age	5.43 (0.46)	5.19 (0.03)
Gender	M = 15 (63%)	M = 12 (75%)
Raven's Matrices	22.33 (4.40)	18.75 (4.75)

Note: TD = children with typical development; DLD = children with developmental language disorders.

Assessment of Updating Skills	TD	DLD
Forward Digit Recall *	6.00 (1.25)	4.75 (1.73)
Backward Digit Recall *	3.04 (0.95)	2.00 (1.10)
Composite Digit Recall *	9.04 (1.71)	6.75 (2.15)

Note: TD = children with typical development; DLD = children with developmental language disorders. *: The asterisk signals when a group-related difference is significant.

Int. J. Environ. Res. Public Health **2020**, *17*, 1772; doi:10.3390/ijerph17051772

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Inhibition A (errors)	TD	DLD
>75	16 (67%)	5 (31%)
51–75	2 (8%)	6 (38%)
26–50	4 (17%)	0 (–)
11–25	2 (8%)	5 (31%)
6–10	0 (–)	0 (–)
2–5	0 (–)	0 (–)
Inhibition B (errors)		
>75	19 (79%)	3 (19%)
51–75	2 (8%)	4 (25%)
26–50	1 (4%)	2 (13%)
11–25	1 (4%)	5 (31%)
6–10	1 (4%)	1 (6%)
2–5	0 (–)	1 (6%)

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Assessment of Articulation and Phonological Discrimination	TD (Raw Score)	DLD (Raw Score)	DLD (z-Score)
Articulation *	143.92 (5.91)	126.06 (20.29)	−0.91 (1.02) – Range: -2/1
Phonological Discrimination *	97.71 (4.66)	80.94 (24.65)	−0.47 (1.18) – Range: -2/2

Note: DLD = children with developmental language disorders; TD = children with typical language development.
*: The asterisk signals when a group-related difference is significant.

Assessment of Lexical Skills	TD (Raw Score)	DLD (Raw Score)	DLD (z-Score)
Naming	69.00 (4.75)	66.06 (6.08)	0.06 (1.17) – Range: -2/2
Lexical Comprehension	16.04 (1.43)	15.38 (1.82)	−0.63 (0.87) – Range: -2/1

Note: DLD = children with developmental language disorders; TD = children with typical language development.

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Assessment of Grammatical Skills	TD (Raw Score)	DLD (Raw Score)	DLD (z-Score)
% Complete Sentences *	52.33 (13.10)	41.00 (14.20)	−0.47 (0.65) – Range: -1.5/0
Grammatical Comprehension *	34.00 (4.05)	26.13 (8.96)	−0.69 (0.93) – Range: -2/1

Note: DLD = children with developmental language disorders; TD = children with typical language development.
*: The asterisk signals when a group-related difference is significant.

Assessment of Narrative Skills	TD (Raw Score)	DLD (Raw Score)	DLD (z-score)
% Errors of Global Coherence	4.89 (6.07)	9.42 (13.14)	0.22 (.60) – Range: 0 / 2
% Lexical Informativeness *	86.19 (7.07)	76.77 (13.46)	−0.13 (.70) – Range: -1.5/1

Note: DLD = children with developmental language disorders; TD = children with typical language development.
*: The asterisk signals when a group-related difference is significant.

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Correlations

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The Complex Relation between Executive Functions and Language in Preschoolers with Developmental Language Disorders

Andrea Marini [1,2,*], Barbara Piccolo [3], Livia Taverna [4], Moira Berginc [5] and Martina Ozbič [2]

- Digit Span overall recall
  - Articulation ($r = 0.411$; $p < 0.008$)
  - Phonological discrimination ($r = 0.406$; $p < 0.009$)
  - Grammatical comprehension ($r = 0.613$; $p < 0.001$)
  - % Lexical informativeness ($r = 0.318$; $p < 0.045$)

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- Inhibition Errors (Part B)
  - Phonological discrimination ($r = -0.767$; $p < 0.001$)
  - Grammatical comprehension ($r = -0.699$; $p < 0.001$)
  - % Complete Sentences ($r = -0.470$; $p < 0.002$)
  - % Lexical informativeness ($r = -0.549$; $p < 0.001$)

Int. J. Environ. Res. Public Health 2020, *17*, 1772; doi:10.3390/ijerph17051772

Differential verbal working memory effects on linguistic production in children with Specific Language Impairment

Andrea Marini [a,b,*], Cinzia Gentili [c], Massimo Molteni [c], Franco Fabbro [a,b]

Table 1
Means (and standard deviations) showing demographic data of the two groups of participants and their performance on the non-word repetition task.

	SLI ($N = 32$)	TLD ($N = 32$)
Age	8.77 (1.58) – range: 7–11.11	8.61 (1.41) – range: 7–11.11
Education	3.2 (1.6) – range: 1st–6th grade	3.5 (1.3) – range: 1st–6th grade
Sex	$M = 19$	$M = 17$
Non-word repetition*	13.34 (2.21)	14.69 (1.00)

SLI: children with Specific Language Impairment; TLD: children with Typical Language Development.
* Group-related difference on this task was significant ($p < 05$).

Table 2
Results of the analysis of Lexical skills in the groups of participants with SLI and typical language development. The table reports also significance levels before (*t*-tests) and after (ANCOVAs) covariation.

Lexical skills	SLI	TLD	*t*-Value	df	*p*-Value	Cohen's *d*	NWR Covariate (*p*-value)
Naming	58.89 (3.41)	61.47 (3.46)	−2.920	59	.005*	−.75	.009§
Semantic Fluency	23.63 (6.61)	28.50 (7.96)	−2.667	62	.010*	−.67	.163
Speech Rate	88.97(26.11)	108.07 (23.21)	−3.070	61	.003*	−.77	.036
% Semantic paraphasias	1.68 (1.52)	.39 (.75)	4.290	44	.001*	1.08	.001§

SLI: children with Specific Language Impairment; TLD: children with Typical Language Development.
* Group-related differences significant after Bonferroni correction for multiple comparisons ($p < .0125$).
§ Group-related differences still significant after covariation for NWR.

Research in Developmental Disabilities 35 (2014) 3534–3542

Differential verbal working memory effects on linguistic production in children with Specific Language Impairment

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Table 3
Results of the analysis of grammatical skills in the groups of participants with SLI and typical language development. The table reports also significance level before (*t*-tests) and after (ANCOVAs) covariation.

Grammatical skills	SLI	TLD	*t*-Value	df	*p*-Value	Cohen's *d*	NWR Covariate (*p*-value)
MLU	4.74 (1.36)	5.72 (1.27)	−2.934	61	.005*	−.74	.038
Sentence Completion	10.28 (2.98)	12.03 (2.19)	−2.679	62	.009*	−.67	.155
% Paragrammatic errors	1.58 (1.83)	.33 (.75)	3.562	61	.001*	.89	.029
% Complete Sentences	49.39 (20.97)	67.65 (17.51)	−3.756	61	.001*	−.95	.010§

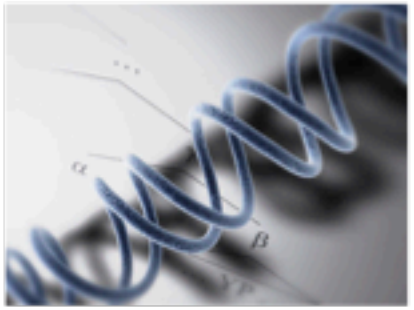
SLI: children with Specific Language Impairment; TLD: children with Typical Language Development.
* Group-related differences significant after Bonferroni correction for multiple comparisons ($p < .0125$).
§ Group-related differences still significant after covariation for NWR.

Table 4
Results of the analysis of narrative skills in the groups of participants with SLI and typical language development. The table reports also significance level before (*t*-tests) and after (ANCOVAs) covariation.

Narrative skills	SLI	TLD	*t*-Value	df	*p*-Value	Cohen's *d*	NWR Covariate (*p*-value)
% Global Coherence Errors	14.10 (11.45)	5.44 (7.36)	3.580	61	.001*	.90	.001§
% Lexical Informativeness	75.23 (11.53)	86.03 (10.98)	−3.806	61	.001*	−.96	.003§
% Thematic Selection	31.12 (11.35)	36.20 (11.12)	−1.808	62	.075	−.45	.733

SLI: children with Specific Language Impairment; TLD: children with Typical Language Development.
* Group-related differences significant after Bonferroni correction for multiple comparisons ($p < .0166$).
§ Group-related differences still significant after covariation for NWR.

Research in Developmental Disabilities 35 (2014) 3534–3542



How about bilingual children with DLD?

The issue of misdiagnosis in bilinguals

Misdiagnosis can take two forms

(Grimm & Schulz, 2014)

Table 1 Cross-classification of diagnosis and identification of SLI

		Identification via language test	
		SLI	TD
Diagnosis	as SLI	√	Overdiagnosis
	as TD	Underdiagnosis	√

- Overdiagnosis (mistaken identity): children with TLD may be incorrectly diagnosed as DLD (Genesee et al. 2004)

- Underdiagnosis (missed identity): children with DLD may not be diagnosed as impaired and this often causes late referral to language intervention (Genesee et al. 2004; Salameh, Nettelbladt, Håkansson, & Gullberg, 2002)

Bilingualism: a risk factor for language development?

Converging evidence suggests that

- the exposure to a bilingual context is not a risk factor for linguistic development …

The role of phonological working memory and environmental factors in lexical development in Italian-speaking late talkers: A one year follow up study

	Late Talkers (N=33)	TLD (N=260)
General information		
Age (months)	32.49 (2.29). Range: 28-35	32.27 (2.60). Range: 24-35
Sex	Males: N = 22 (66.7%)	Males: N = 140 (53.8%)
Socio-Economic Status (SES)	High: N=11 (33.3%); Middle: N=17 (51.5%); Low: N=4 (12.1%)	High: N=116 (44.6%); Middle: N=113 (43.5%); Low: N=21 (8.1%)
Weight at birth (gr.)	3287.10 (401.31). Range: 2300-4350	3239.84 (530.91). Range: 1010-4540
Weeks at birth	38.82 (1.74). Range: 35-41	39.18 (2.21). Range: 28-42
Language exposure	Bilinguals: N=10 (30.3%)	Bilinguals: N=60 (23.1%)
Family history of language delay*	At risk: N=11 (33.3%)	At risk: N=54 (20.8%)
Breastfeeding	Yes: N=18 (62.8%)	Yes: N=106 (40.8%)
Complications during delivery	Yes: N=6 (18.2%)	Yes: N=30 (11.5%)
Complications during pregnancy	Yes: N=6 (18.2%)	Yes: N=54 (20.8%)
HLSQ*	41.53 (8.16). Range: 29-56	47.52 (8.82). Range: 26-62
Cognitive and linguistic profile		
Cubo Design (WIPPSI)	8.55 (4.82). Range: 1-19	9.84 (3.71). Range: 1-20
Information (WIPPSI)*	8.12 (2.83). Range: 6-13	10.94 (2.46). Range: 4-19
Non-word repetition*	3.70 (3.08). Range: 0-11	7.36 (3.90). Range: 0-15
LDI_Words_scores*	104.67 (49.74). Range: 0-160	239.29 (46.11). Range: 95-310

Converging evidence suggests that

- the exposure to a bilingual context is not a risk factor for linguistic development …
- and that in children with TLD who have been adequately exposed to two languages the developmental milestones for both L1 and L2 may be similar to those observed in monolingual peers (e.g., Paradis et al., 2011; Marini, Eliseeva, & Fabbro, 2016)

Impact of early second-language acquisition on the development of first language and verbal short-term and working memory

Andrea Marini[a,b], Nadezda Eliseeva[a] and Franco Fabbro[b,c]

	Monolingual School ($N = 31$)	Bilingual School ($N = 31$)
Age	4.61 (.50) – Range: 4.02–5.11	4.60 (.50) – Range: 4.02–5.11
Years of formal education	2.48 (.51) – Range: 2–3	2.48 (.51) – Range: 2–3
Parental education	16.71 (2.22) – Range: 13–18	16.71 (2.22) – Range: 13–18
Sex	$M = 12$ (38.7%)	$M = 13$ (41.9%)
Handedness	Right-handed = 28 (90.3%)	Right-handed = 28 (90.3%)
Raven's matrices	17.48 (3.88) – Range: 12–26	15.61 (3.92) – Range: 8–26

Verbal short-term and working memory	Monolingual school	Bilingual school
Forward Digit Recall*	5.15 (2.09) – Range: 0–11	7.16 (1.46) – Range: 5–10
Non-word repetition*	13.23 (2.31) – Range: 7–15	14.55 (1.34) – Range: 8–15
Backward digit recall*	1.10 (1.33) – Range: 0–4	1.55 (1.34) – Range: 0–4

Note: Asterisks (*) show when the group-related differences were significant.

INTERNATIONAL JOURNAL OF BILINGUAL EDUCATION AND BILINGUALISM, 2016
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Impact of early second-language acquisition on the development of first language and verbal short-term and working memory

Andrea Marini[a,b], Nadezda Eliseeva[a] and Franco Fabbro[b,c]

Linguistic production	Monolingual school	Bilingual school
Articulation	137.74 (9.27) – Range: 103–150	136.71 (11.71) – Range: 108–152
Naming	64.16 (4.45) – Range: 57–73	62.03 (5.86) – Range: 53–75
Sentence completion	7.61 (2.29) – Range: 4–12	7.97 (3.14) – Range: 3–14

Linguistic comprehension	Monolingual school	Bilingual school
Phonological discrimination	27.29 (4.50) – Range: 10–30	28.55 (2.77) – Range: 17–30
Lexical comprehension*	15.32 (1.14) – Range: 13–18	14.48 (1.48) – Range: 11–17
Grammatical comprehension	29.58 (5.33) – Range: 10–37	29.10 (7.73) – Range: 10–37

Note: The asterisk (*) shows when the group-related differences were significant after Bonferroni correction for multiple comparisons ($p < .017$).

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http://dx.doi.org/10.1080/13670050.2016.1238865

A characterization of language development in heritage speakers

Nadja Ruhl [a,b], Darya Polkina[c], Elena Gorobets[b], Martina Ozbič[d] and Andrea Marini [a,d]

Conceptual lexicon	Monolinguals_Russian	Bilinguals
Animals	12.71 (4.7) Range: 2–22	12.95 (5.29) Range: 5–22
Things at home	13.48 (3.64) Range: 4–19	16.00 (5.24) Range: 5–25
Animals+ things at home	26.19 (7.01) Range: 13–41	28.95 (7.77) Range: 14–43

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Are bilingual children with DLD more impaired than monolingual peers?

How bilingualism affects cognitive and linguistic skills in children with developmental language disorders

Andrea Marini[1], Sara Andreetta[1], Alda Mita[2], Barbara Piccolo[3], Moira Berginc[4] and Martina Ozbič[2]

- Type of study → Behavioral
- Participants → two groups of children with DLD
  - Monolinguals (Italian)
  - Bilinguals (Italian/Slovenian)
- Target → detect potential difficulties triggered by the exposure to two languages

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How bilingualism affects cognitive and linguistic skills in children with developmental language disorders

Bilingualism: Language and Cognition CAMBRIDGE UNIVERSITY PRESS 2025

Andrea Marini[1], Sara Andreetta[1], Alda Mita[2], Barbara Piccolo[3], Moira Berginc[4] and Martina Ozbič[2]

General information	Monolingual DLD	Bilingual DLD
	(N = 15)	(N = 15)
Age	5.20 (.33)	5.05 (.39)
Gender	M = 11 (73%)	M = 6 (40%)
Parental education	Low = 11 (73%)	Low = 8 (53%)
Raven's Matrices	18.73 (4.92)	18.93 (3.67)
Visual attention (standard scores)	10.20 (3.12)	10.67 (2.06)

Legend: DLD = (children with) developmental language disorders.

The two groups are balanced for a number of potentially confounding variables

How bilingualism affects cognitive and linguistic skills in children with developmental language disorders

Bilingualism: Language and Cognition CAMBRIDGE UNIVERSITY PRESS 2025

Andrea Marini[1], Sara Andreetta[1], Alda Mita[2], Barbara Piccolo[3],

	Monolingual DLD	Bilingual DLD (Italian)	Bilingual DLD (Slovenian)
% Phonological errors	8.95 (8.65)	9.06 (7.79)	13.02 (13.65)
Phonological discrimination	81.00 (25.51)	93.00 (9.02)	83.00 (22.90)
Naming[§]	65.80 (6.20)	61.93 (9.81)	39.80 (16.09)
Lexical comprehension[§]	15.27 (1.83)	16.33 (1.72)	14.73 (2.15)

Legend: DLD: (children with) developmental language disorders; [§] shows when within-group differences between performance in Italian and Slovenian were significant in the bilingual group.

How bilingualism affects cognitive and linguistic skills in children with developmental language disorders

Bilingualism: Language and Cognition CAMBRIDGE UNIVERSITY PRESS 2025

Andrea Marini[1], Sara Andreetta[1], Alda Mita[2], Barbara Piccolo[3], Moira Berginc[4] and Martina Ozbič[2]

	Monolingual DLD	Bilingual DLD (Italian)	Bilingual DLD (Slovenian)
% Complete sentences	40.96 (14.70)	32.90 (26.15)	20.05 (22.85)
Grammatical comprehension*§	25.47 (8.86)	33.47 (2.67)	30.60 (3.22)
% Errors of global coherence	9.50 (13.60)	4.24 (6.39)	9.22 (10.09)
% Lexical informativeness	76.31 (13.80)	83.70 (6.60)	80.28 (7.26)

How bilingualism affects cognitive and linguistic skills in children with developmental language disorders

Bilingualism: Language and Cognition CAMBRIDGE UNIVERSITY PRESS 2025

Andrea Marini[1], Sara Andreetta[1], Alda Mita[2], Barbara Piccolo[3], Moira Berginc[4] and Martina Ozbič[2]

	Monolingual DLD	Bilingual DLD (Italian)	Bilingual DLD (Slovenian)
Forward digit recall*	4.60 (1.68)	6.00 (1.41)	5.80 (1.47)
Backward digit recall*	2.00 (1.13)	2.93 (1.03)	2.47 (1.06)

Legend: DLD = (children with) developmental language disorders. The asterisk (*) shows when group-related differences in Italian were significant. No significant differences were found in bilinguals between the two languages.

How bilingualism affects cognitive and linguistic skills in children with developmental language disorders

Bilingualism: Language and Cognition CAMBRIDGE UNIVERSITY PRESS 2025

Andrea Marini[1], Sara Andreetta[1], Alda Mita[2], Barbara Piccolo[3], Moira Berginc[4] and Martina Ozbič[2]

	Monolingual DLD	Bilingual DLD
Inhibition A (errors)		
>75	5 (33.3%)	14 (93.3%)
51–75	5 (33.3%)	1 (6.7%)
26–50	0 (0%)	0 (0%)
11–25	5 (33.3%)	0 (0%)
6–10	0 (0%)	0 (0%)
2–5	0 (0%)	0 (0%)
Z-Scores*	.00 (.85)	.93 (.26)
Inhibition B (errors)		
>75	3 (20.0%)	14 (93.3%)
51–75	4 (26.7%)	0 (0%)
26–50	2 (13.3%)	1 (6.7%)
11–25	4 (26.7%)	0 (0%)
6–10	1 (6.7%)	0 (0%)
2–5	1 (6.7%)	0 (0%)
Z-Scores *	-.40 (1.12)	.93 (.26)

Notably, bilingual DLDs outperform monolinguals on tasks assessing monitoring and inhibition (delivered in Italian)

Therefore ...

… exposure to more than one language does not make things worse!

On the contrary …

… it enhances executive skills!

Are the two languages equally affected in bilinguals with DLD?

Linguistic skills in bilingual children with Developmental Language Disorders: a pilot study

Andrea Marini[1, 2*], Paola Sperindè[2], Isabella Ruta[2], Christian Savegnago[2, 3], Francesco Avanzini[3, 4]

General characteristics of the two groups of children	TLDs (N=11)	DLDs (N=11)
Age	8.79 (.78); Range: 8.02-10.06	8.59 (1.35); Range: 7.00-10.03
Education	2nd grade=0% (N=0) 3rd grade=64% (N=7) 4th grade=9% (N=1) 5th grade=27 (N=3)	2nd grade=9% (N=1) 3rd grade=36% (N=4) 4th grade=36% (N=4) 5th grade=19% (N=2)
Gender	M=55% (N=6)	M=55% (N=6)
Manual dominance	Right: 100% (N=11)	Right: 82% (N=9)
Parent's Education	High: 45% (N=5)	High: 18% (N=2)
Reading in Families (number of books)	<80: 46% (N=5) >81: 54% (N=6)	<80: 73% (N=8) >81: 27% (N=3)
Language of major exposure of the children	Italian: 27% (N=3) German: 46% (N=5)	Italian: 9% (N=1) German: 36% (N=4)

Linguistic skills in bilingual children with Developmental Language Disorders: a pilot study

Andrea Marini[1, 2*], Paola Sperindè[2], Isabella Ruta[2], Christian Savegnago[2, 3], Francesco Avanzini[3, 4]

General characteristics of the two groups of children	TLDs (N=11)	DLDs (N=11)
	Both: 27% (N=3)	Both: 55% (N=6)
The father talks to his child in	Italian: 73% (N=8) German: 9% (N=1) Both: 18% (N=2)	Italian: 82% (N=9) German: 18% (N=2) Both: 0% (N=0)
The child answers to his/her father in	Italian: 73% (N=8) German: 9% (N=1) Both: 18% (N=2)	Italian: 73% (N=8) German: 18% (N=2) Both: 9% (N=1)
The mother talks to her child in	Italian: 18% (N=2) German: 73% (N=8) Both: 9% (N=1)	Italian: 27% (N=3) German: 73% (N=8) Both: 0% (N=0)
The child answers to his/her mother in	Italian: 18% (N=2) German: 73% (N=8) Both: 9% (N=1)	Italian: 27% (N=3) German: 73% (N=8) Both: 0% (N=0)
Raven's Matrices (raw)	30.46 (2.54); Range: 41-34	28.36 (3.56); Range: 21-36
Digit Span Forward (span)*	5.64 (.81); Range: 5-7	4.64 (.81); Range: 4-6

Linguistic skills in bilingual children with Developmental Language Disorders: a pilot study

Andrea Marini[1, 2*], Paola Sperindè[2], Isabella Ruta[2], Christian Savegnago[2, 3], Francesco Avanzini[3, 4]

Lexical Skills	TLDs	DLDs
Naming*	ITA: 61.27 (3.41); Range: 56-66 DEU: 61.09 (4.11); Range: 53-67	ITA: 54.00 (7.78); Range: 39-65 DEU: 52.73 (6.75); Range: 43-61
% Semantic Paraphasias*	ITA: 1.69 (3.16); Range: 0-10.34 DEU: 1.47 (2.17); Range: 0-5.88	ITA: 2.60 (2.30); Range: 0-6.45 DEU: 5.91 (5.71); Range: 0-16.67
Lexical Comprehension*	ITA: 34.27 (4.08); Range: 27-41 DEU: 37.91 (1.64); Range: 35-41	ITA: 32.09 (4.32); Range: 24-38 DEU: 33.64 (3.61); Range: 28-39

Linguistic skills in bilingual children with Developmental Language Disorders: a pilot study

Andrea Marini[1, 2*], Paola Sperindè[2], Isabella Ruta[2], Christian Savegnago[2, 3], Francesco Avanzini[3, 4]

Morphosyntactic Skills	TLDs	DLDs
% Paragrammatisms[§]	ITA: 1.68 (1.49); Range: 0-3.88 DEU: 3.88 (3.59); Range: 0-9.47	ITA: 2.49 (1.75); Range: 0-5.43 DEU: 4.99 (2.44); Range: 1.12-8.33
% Complete Sentences	ITA: 59.59 (23.47); Range: 28.57-100 DEU: 58.36 (14.59); Range: 36.36-83.33	ITA: 55.84 (21.07); Range: 18.52-94.12 DEU: 45.44 (20.29); Range: 16.67-75
Grammatical Comprehension	ITA: 37.36 (2.11); Range: 33-40 DEU: 37.55 (2.46); Range: 32-40	ITA: 36.27 (3.47); Range: 27-39 DEU: 35.09 (3.21); Range: 30-39

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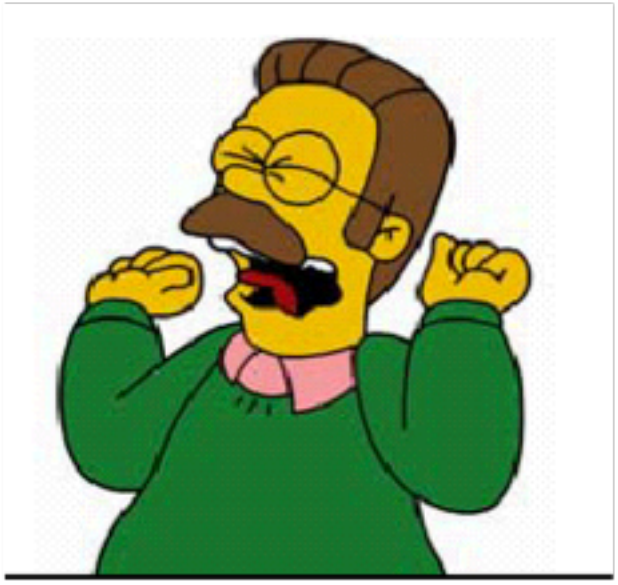
Narrative skills	TLDs	DLDs
% Errors of Local Coherence*	ITA: 24.38 (20.06); Range: 0-60 DEU: 25.35 (14.79); Range: 8.33-50	ITA: 39.66 (21.02); Range: 7.14-75.00 DEU: 53.71 (13.73); Range: 32.14-70.00
% Errors of Global Coherence	ITA: 8.19 (8.23); Range: 0-25.00 DEU: 4.77 (11.64); Range: 0-38.88	ITA: 9.92 (9.31); Range: 0-25.00 DEU: 13.93 (10.49); Range: 0-28.57
% Lexical Informativeness*	ITA: 85.57 (9.26); Range: 67.39-97.78 DEU: 84.73 (13.06); Range: 50.00-100	ITA: 83.27 (5.99); Range: 72.83-94.35 DEU: 69.13 (13.69); Range: 44.44-83.02



Thanks for your attention!!!

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