

CATALISE\_2

11 Feb 2017

1

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

4 Dorothy V. M. Bishop<sup>1\*</sup>, Margaret J. Snowling<sup>1</sup>, Paul A. Thompson<sup>1</sup>, Trisha Greenhalgh<sup>2</sup> &  
5 the CATALISE-2 consortium<sup>^</sup>

6

7 <sup>1</sup>Department of Experimental Psychology, University of Oxford, Oxford, Oxon, UK.

8 <sup>2</sup>Nuffield Department of Primary Care Health Sciences, University of Oxford, Oxford, Oxon,  
9 UK.

10 \*Corresponding author

11 Email: [dorothy.bishop@psy.ox.ac.uk](mailto:dorothy.bishop@psy.ox.ac.uk)

12 <sup>^</sup>Membership of the CATALISE-2 Consortium is provided in the Acknowledgements

13 RUNNING HEAD: Delphi consensus on terminology for language problems

14

## Abstract

15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48

**Background:** Lack of agreement about criteria and terminology for children's language problems affects access to services as well as hindering research and practice. We report the second phase of a study using an online Delphi method to address these issues. In the first phase, we focused on criteria for language disorder. Here we consider terminology.

**Methods:** The Delphi method is an iterative process in which an initial set of statements is rated by a panel of experts, who then have the opportunity to view anonymised ratings from other panel members. On this basis they can either revise their views or make a case for their position. The statements are then revised based on panel feedback, and again rated by and commented on by the panel. In this study, feedback from a second round was used to prepare a final set of statements in narrative form. The panel included 57 individuals representing a range of professions and nationalities.

**Results:** We achieved at least 78% agreement for 19 of 21 statements within two rounds of ratings. The term 'Language Disorder' is recommended to refer to a profile of difficulties that causes functional impairment in everyday life and is associated with poor prognosis. The term, 'Developmental Language Disorder' (DLD) was endorsed for use when the language disorder was not associated with a known biomedical aetiology. It was also agreed that (1) presence of risk factors (neurobiological or environmental) does not preclude a diagnosis of DLD, (2) DLD can co-occur with other neurodevelopmental disorders (e.g., ADHD), and (3) DLD does not require a mismatch between verbal and nonverbal ability.

**Conclusions:** This Delphi exercise highlights reasons for disagreements about terminology for language disorders and proposes standard definitions and nomenclature.

**Keywords:** Developmental Language Disorder, Specific Language Impairment, Terminology, Risk factors, Definitions

### Abbreviations:

**ADHD: Attention-Deficit Hyperactivity Disorder**

**ASD: Autism Spectrum Disorder**

**DLD: Developmental Language Disorder**

**DSM5: Diagnostic and Statistical Manual of the American Psychiatric Association, version 5**

**ICD-11: International Classification of Diseases, version 11**

**SPCD: Social (Pragmatic) Communication Disorder**

49

## 50 Introduction

51 Language problems are common in children, with prevalence estimates ranging from 3 to 7  
 52 per cent, depending on age and definition (Norbury et al., 2016; Tomblin, Records, et al.,  
 53 1997; Weindrich, Jennen-Steinmetz, Laucht, Esser, & Schmidt, 2000). In relation to their  
 54 severity and prevalence, children's language problems receive considerably less research  
 55 funding than other conditions such as attention-deficit hyperactivity disorder (ADHD) or  
 56 autism spectrum disorder (ASD), with which they frequently co-occur (Bishop, 2010). The  
 57 term Specific Language Impairment (SLI) has been widely used to refer to children whose  
 58 language development is not following the usual course despite typical development in other  
 59 areas. However, professionals and lay people alike appear to be far less familiar with SLI  
 60 compared with dyslexia or autism (Kamhi, 2004). Of more concern, Ebbels (2014)  
 61 described how use of the term SLI had become controversial, because it seemed not to reflect  
 62 clinical realities and excluded many children from services.

63 Bishop, Snowling, Thompson, Greenhalgh, & The CATALISE Consortium (2016) used an  
 64 online version of the Delphi technique (Hasson, Keeney, & McKenna, 2000) with the aim of  
 65 achieving consensus on these issues. Because of the complexity of the subject matter, we  
 66 divided the task into two phases: the first, described by Bishop et al. (2016) focused on  
 67 criteria for identifying significant language problems in children, and a second phase, where  
 68 the same panel focused on the issue of terminology for children's language problems. Here  
 69 we describe this second phase.

## 70 Materials and Methods

### 71 Ethics approval

72 This research was approved by The Medical Sciences Interdisciplinary Research Ethics  
 73 Committee, University of Oxford (approval number: MS-IDREC-C1-2015-061). Panel  
 74 members gave written consent for their ratings to be used to derive a consensus statement.

### 75 Delphi panel

76 Table 1

### 77 Professional group and country\* of panel members

Profession	N and Country	Gender
Speech-Language Therapist/Pathologist	31 (15 UK, 6 USA, 3 NZ, 3 Ire, 1 Can, 3 Aus)	6 M, 25 F
Joint SLT/SLP and Psychologist	7 (3 Can, 2 Aus, 2 UK)	1 M, 6 F
Psychologist/Educational Psychologist	8 (3 UK, 1 US, 3 Can, 1 Aus)	3 M, 5 F
Paediatrician	3 (3 UK)	1 M, 2 F
Psychiatrist	1 (1 Can)	1 F
Audiologist	1 (1 NZ)	1 F
Specialist teacher	2 (2 UK)	2 F
Charity representative	4 (4 UK)	4 F
Total	57	57

78 \*Country where panel member was based at start of Delphi studies.

79

CATALISE\_2

11 Feb 2017

80 We approached the same panel members who had formed part of the CATALISE consortium  
81 for our previous Delphi on criteria. As detailed by Bishop et al. (2016), we restricted  
82 consideration to English-speaking countries, and there was a predominance of speech-  
83 language therapists/pathologists (SLT/Ps). Of the original panel, two declined to take part in  
84 CATALISE-2 for personal reasons, leaving a panel of 57 individuals, whose characteristics  
85 are shown in Table 1. Nine panel members had a close relative with impaired language  
86 development.

87 The first two authors (DVMB and MJS), both psychologists with considerable experience in  
88 the area of children's language problems, acted as moderators: they did not contribute  
89 rankings, but agreed on modifications to statements on the basis of feedback from the panel.  
90 The third author (PT) set up the online Delphi, controlled the anonymization, and analysed  
91 responses to produce reports for panel members. The fourth (TG), an expert in primary health  
92 care who was familiar with the Delphi method acted as methodological advisor.

### 93 **Delphi consensus process**

94 We started with a set of statements about terminology accompanied by a background  
95 document (Appendix 1) that put these in context. These were new statements that were  
96 different from those in the prior Delphi exercise on criteria, though they were informed by  
97 issues that arose in that study (Bishop et al., 2016). Panel members were asked to rate the  
98 statements on a 5-point scale from 1 (strongly disagree) to 5 (strongly agree).

99 Participant responses to Round 1 were collated. The distribution of responses and associated  
100 anonymised comments were then fed back to all panel members and scrutinised by the  
101 moderators. One difference from our previous Delphi was that we held a one-day meeting to  
102 present and discuss preliminary results from CATALISE-2 before proceeding to Round 2. All  
103 panel members were invited to this, as well as additional stakeholders. The meeting was  
104 attended by the first four authors and 22 of the CATALISE-2 consortium, as well as 23  
105 individuals representing a range of fields: eight from speech and language therapy, eight from  
106 psychology, one paediatrician, two representatives from charities, one expert in special  
107 educational needs, one geneticist, one general practitioner and one psychiatrist.

108 On the basis of ratings, qualitative comments, and discussions at the meeting, the two  
109 moderators agreed on rewording of some items and revision of the background document.  
110 The set of items and background document used in Round 2 are shown in Appendix 2.

111 There is no agreed criterion for when a Delphi consensus is deemed adequate for an item – in  
112 the literature, values from 51% to 80% agreement have been used (Hasson et al., 2000). We  
113 aimed for 75% agreement as a reasonable goal.

114 After Round 2, the moderators made some further revisions to the statements to improve  
115 clarity and readability, to take into account specific comments provided by the panel, and to  
116 reconsider the two problematic items. Some statements with good agreement were  
117 consolidated to give a single longer statement (see Appendix 3), giving a total of 13  
118 statements. A draft of the current paper, including finalised statements in the Results section,  
119 was circulated for comments and approval by the panel. Further revisions were made to  
120 address points raised by reviewers, including the dropping of one redundant statement, and  
121 the paper was again circulated to all panel members for comment. The current paper  
122 represents the final agreed version.

## 123 **Results and Discussion**

### 124 **Round 1**

125 The response rate by panel members for Round 1 was 93%. Appendix 4 shows quantitative  
126 and qualitative responses to the Round 1 statements; a personalised copy of this report  
127 containing these data was sent to all panel members, showing how their own responses  
128 related to the distribution of responses from other (anonymised) panel members. The  
129 percentage agreement (combining strongly agree with agree) ranged from 30% to 98% for the  
130 16 items, with a median value of 74%.

131  
132 Kruskal-Wallis tests were conducted on each item to test whether agreement was related to  
133 either geographical location (6 countries) or professional status (SLT/P vs others), using a  
134 Bonferroni-corrected p-value of .001. None of these comparisons was statistically significant  
135 after correction for multiple comparisons. Given the small sample size, we cannot rule out an  
136 effect of these two factors on ratings, but the analysis offers some reassurance that responses  
137 did not simply pattern according to professional background or geographical location.  
138

### 139 **Round 2**

140 The response rate by panel members for Round 2 was 91%. Appendix 5 contains the data that  
141 were incorporated in a personalised report sent to all panel members for Round 2. The  
142 percentage agreement (combining ratings of strongly agree with agree) ranged from 46% to  
143 98% across items, with a median value of 90%. Of the 21 items, 19 had agreement of 78% or  
144 more, which we regarded as adequate to accept that statement. Items 19 and 20, both  
145 concerned with terms for subtypes of language disorder, had 68% and 46% agreement  
146 respectively, indicating a need for further revision or omission.

### 147 **Consensus statements**

148 In this section, we present final statements, with supplementary comments that reflect  
149 reasoning behind them, based on qualitative comments and discussion, supported by  
150 references where appropriate.

151 **Statement 1:** *It is important that those working in the field of children's language problems*  
152 *use consistent terminology*

153 **Supplementary comment:** In Round 2, a version of this statement was included to orient the  
154 panel to our common goal. Although the terminology we propose is not novel, its adoption  
155 will require many people to change their practices, which will be difficult where there is a  
156 long-standing preference for other terms. Nevertheless, panel members were strongly  
157 motivated to achieve a consensus, because the lack of consistency was recognised as a major  
158 problem for the field.

159 **Statement 2:** *The term 'language disorder' is proposed for children who are likely to have*  
160 *language problems enduring into middle childhood and beyond, with a significant impact on*  
161 *everyday social interactions or educational progress.*

162 **Supplementary comment:** This statement clarifies that prognosis should be a key factor in  
163 the definition of language disorder, i.e. the term should include those with language problems  
164 that lead to significant functional impairments unlikely to resolve without specialist help.  
165 There is no sharp dividing line between language disorder and typical development, but we  
166 can use relevant information from longitudinal studies to help determine prognosis (see  
167 Statement 3).

168 Arguments for preferring the term ‘disorder’ to ‘impairment’ included the greater seriousness  
169 and importance associated with the term; consistency with other neurodevelopmental  
170 disorders (autism spectrum disorder, developmental co-ordination disorder, attention deficit  
171 hyperactivity disorder); and compatibility with the two main diagnostic systems, DSM-5  
172 (American Psychiatric Association, 2013) and ICD-11 (Baird, personal communication).

173 Some panel members expressed concerns that the term ‘disorder’ had medical connotations  
174 and placed the problem ‘inside the child’, when it might be contextually dependent. It was  
175 thought to have negative associations for teachers and there were concerns that such a label  
176 could lead to low expectations. For this reason, our definition explicitly excludes children  
177 who have limited language skills because of lack of exposure to the language of instruction,  
178 or are likely to grow out of their problems. These children often benefit from educational  
179 interventions, and may require monitoring, but they should not be identified as language  
180 disordered.

181 Another objection to the term ‘disorder’ is that historically it has been interpreted as referring  
182 to a large mismatch between language and nonverbal ability. This interpretation has been  
183 widely adopted in some circles, but is discredited and is not part of our definition (Bishop et  
184 al., 2016) (see also Statement 8).

185 **Statement 3:** *Research evidence indicates that predictors of poor prognosis vary with a*  
186 *child’s age, but in general language problems that affect a range of skills are likely to persist.*

187 **Supplementary comment:** Prognostic indicators will vary with age. Our focus here is on  
188 what we know about learning English.

189 Under 3 years. Prediction of outcome is particularly hard in children under 3 years of age.  
190 Many toddlers who have limited vocabulary at 18-24 months catch up, and despite much  
191 research, it can be difficult to identify which late talkers are likely to have longer-term  
192 problems (Reilly et al., 2010). Children who fail to combine words at 24 months appear to  
193 have worse outcomes than those who do not produce any words at 15 months, though this is  
194 still a far from perfect predictor (Rudolph & Leonard, 2016). Prognosis is also poorer for  
195 children with comprehension problems, those who do not communicate via gesture (Ellis &  
196 Thal, 2008), or do not imitate body movements (Dohmen, Bishop, Chiat, & Roy, 2016). Roy  
197 and Chiat (2014) administered a preschool measure of social responsiveness and joint  
198 attention to 2- to 4-year-olds referred for speech-language therapy, and found it was  
199 predictive of persisting problems, also indicative of social communication problems at 9  
200 years. A positive family history of language or literacy problems is an additional risk factor  
201 (Rudolph & Leonard, 2016; Zambrana, Pons, Eadie, & Ystrom, 2014). Overall, however, the  
202 prediction from late language emergence to subsequent language disorder at school age is  
203 surprisingly weak: in part because many late talkers catch up, but also because some school-  
204 aged children with language disorder were not late to talk (Snowling, Duff, Nash, & Hulme,  
205 2016; Zambrana et al., 2014).

206 3 to 4 years. Prediction improves as children grow older; in 4-year-olds, the greater the  
207 number of areas of language functioning that are impaired, the higher the likelihood that the  
208 problems will persist into school age (Bishop & Edmundson, 1987). Note that this finding  
209 contradicts the idea that intervention should be focused on children with a ‘spiky’ language  
210 profile rather than a more even pattern of impairment. When individual language tests are  
211 considered, sentence repetition has been identified as a relatively good marker for predicting  
212 outcomes (Everitt, Hannaford, & Conti-Ramsden, 2013).



213 In contrast, there is generally a good prognosis for pre-schoolers whose problems are  
214 restricted to expressive phonology (Beitchman, Wilson, Brownlie, Walters, & et al., 1996;  
215 Bishop & Adams, 1990).

216 5 years and over. Language problems that are still evident at 5 years and over are likely to  
217 persist (Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998). Children who start school  
218 with oral language problems are at risk of reading problems and poor academic attainment  
219 (Bishop & Adams, 1990; Catts, Fey, Tomblin, & Zhang, 2002; Thompson et al., 2015) with  
220 little evidence that the language gap closes over time (Rice & Hoffman, 2015). Prognosis  
221 appears particularly poor when receptive language is impaired (Beitchman, Wilson,  
222 Brownlie, Walters, & Lancee, 1996; Clark et al., 2007), and when nonverbal ability is  
223 relatively low (Catts et al., 2002; Johnson, Beitchman, & Brownlie, 2010; Rice & Hoffman,  
224 2015).

225 Family factors. There has been some debate over the predictive value of family factors. As  
226 noted above, several studies found that a positive family history of language problems is a  
227 predictor (albeit weak) of persisting problems in late talkers, and family history is also  
228 associated with poor literacy outcomes (Snowling & Melby-Lervåg, 2016), but it is less clear  
229 whether social background is independently predictive, once other risk factors have been  
230 taken into account (Botting, Faragher, Simkin, Knox, & Conti-Ramsden, 2001).

231 For further discussion of the range of language skills under consideration, see Statement 11.

232 **Statement 4.** *Some children may have language needs because their first or home language*  
233 *differs from the local language, and they have had insufficient exposure to the language used*  
234 *by the school or community to be fully fluent in it. This should not be regarded as language*  
235 *disorder, unless there is evidence that the child does not have age-appropriate skills in any*  
236 *language.*

237 **Supplementary comment:** This statement makes it clear that a low score on a language test  
238 does not necessarily mean that a child has any kind of disorder. It is important to consider  
239 whether the child has adequate proficiency in any language. In general, multilingualism does  
240 not lead to language problems (Paradis, 2016), but where there has been limited experience  
241 with the language used at school, the child may require extra help (Cattani et al., 2014). This  
242 also applies to hearing-impaired children whose native language is a signed language. In  
243 practice, however, for many languages, we lack suitable (normed) assessments (Jordaan,  
244 2008).

245 **Statement 5.** *Rather than using exclusionary criteria in the definition of language disorder,*  
246 *we draw a three-fold distinction between differentiating conditions, risk factors and co-*  
247 *occurring conditions.*

248 **Supplementary comment:** Use (and misuse) of exclusionary factors in definitions of  
249 language disorder was a major issue leading to dissatisfaction with terminology in this field.  
250 Panel members were concerned that, instead of being used for diagnostic differentiation,  
251 exclusionary criteria were sometimes interpreted as criteria for denying services to children.  
252 On the other hand, grouping together all children with a language problem, regardless of  
253 cause, and without regard to type of intervention required, would, in many contexts, be  
254 counterproductive.

255 Statements 6 to 10 explain how we draw the distinction between differentiating conditions,  
256 risk factors and co-occurring conditions.

257 **Statement 6.** *Differentiating conditions are biomedical conditions in which language*  
258 *disorder occurs as part of a more complex pattern of impairments. This may indicate a*  
259 *specific intervention pathway. We recommend referring to ‘Language disorder associated*  
260 *with X’, where X is the differentiating condition, as specified above.*

261 **Supplementary comment:** Differentiating conditions include brain injury, acquired  
262 epileptic aphasia in childhood, certain neurodegenerative conditions, cerebral palsy, and oral  
263 language limitations associated with sensori-neural hearing loss (Tomblin et al., 2015) as well  
264 as genetic conditions such as Down syndrome. We also include here children with autism  
265 spectrum disorder (ASD) and/or intellectual disability (Harris, 2013) because these  
266 conditions are commonly linked to genetic or neurological causes (Fitzgerald et al., 2015;  
267 Shevell, Majnemer, Rosenbaum, & Abrahamowicz, 2001), with the numbers with a known  
268 etiology increasing with advances in genetic methods (Bourgeron, 2015; Fitzgerald et al.,  
269 2015; Shevell et al., 2001).

270 These are all cases where an association between a biomedical condition and language  
271 disorder is commonly seen. In such cases, the child requires support for the language  
272 problems, but the intervention pathway will need to take into account the distinctive features  
273 of the biomedical condition. It should be noted, however, that there is little research directly  
274 comparing language intervention approaches across conditions, so this inference is based on  
275 clinical judgement rather than research evidence.

276 **Statement 7.** *The term Developmental Language Disorder (DLD) is proposed to refer to*  
277 *cases of language disorder with no known differentiating condition (as defined in Statement*  
278 *6). Distinguishing these cases is important when doing research on aetiology, and is likely*  
279 *also to have implications for prognosis and intervention.*

280 **Supplementary comment:** The term “Developmental Language Disorder” is consistent with  
281 ICD-11 (Baird, personal communication), though our definition does not include any  
282 nonverbal ability criteria.

283 'Developmental' in this context refers to the fact that the condition emerges in the course of  
284 development, rather than being acquired or associated with a known biomedical cause.  
285 Although many panel members endorsed it, some objections to the term ‘developmental’  
286 were encountered. It was noted that 'developmental' can become less useful, or even  
287 confusing, as individuals grow older. One proposed solution was to drop the 'developmental'  
288 part of the term in adulthood – this is how this issue is typically handled in the case of  
289 (developmental) dyslexia, where affected adults usually refer to themselves as ‘dyslexic’.  
290 Some panel members noted specific meanings of ‘developmental’ that were not intended:  
291 e.g., that this was something that the child might ‘grow out of’, or – quite the converse - that  
292 a developmental problem meant that the child would be unable to develop language. It was  
293 also suggested that this term might be hard for parents to understand – though similar  
294 objections were made for other alternatives that were offered, namely ‘primary’ and  
295 ‘specific’ language disorder.

296 **Statement 8.** *A child with a language disorder may have a low level of nonverbal ability. This*  
297 *does not preclude a diagnosis of DLD.*

298 **Supplementary comment:** It is important to recognise that language can be selectively  
299 impaired in a child with normal nonverbal ability, but this statement confirms that a large  
300 discrepancy between nonverbal and verbal ability is not *required* for a diagnosis of DLD. In  
301 practice, this means that children with low normal-range nonverbal ability can be included as  
302 cases of DLD.



303 **Statement 9. Co-occurring disorders** are impairments in cognitive, sensori-motor or  
304 behavioural domains that can co-occur with DLD and may affect pattern of impairment and  
305 response to intervention, but whose causal relation to language problems is unclear. These  
306 include attentional problems (ADHD), motor problems (developmental co-ordination  
307 disorder or DCD), reading and spelling problems (developmental dyslexia), speech  
308 problems, limitations of adaptive behaviour and/or behavioural and emotional disorders.

309 **Supplementary comment:** The terminology used for neurodevelopmental disorders can  
310 create the impression that there is a set of distinct conditions, but the reality is that many  
311 children have a mixture of problems. Indeed, the same problems may be labelled differently  
312 depending on the professional the child sees. For example, the same child may be regarded as  
313 having DLD by a SLT/P, dyslexia by a teacher, auditory processing disorder by an  
314 audiologist, or ADHD by a paediatrician. Given our focus on DLD, our aim with this  
315 statement is to make it clear that presence of another neurodevelopmental diagnosis does not  
316 preclude DLD.

317 Some panel members noted that a case could be made for including ASD as a co-occurring  
318 disorder, rather than a differentiating factor. One reason for keeping it as a differentiating  
319 factor is that a substantial minority of children with ASD have a clear genetic aetiology:  
320 changes in chromosomes, copy number variants or specific mutations estimated as  
321 accounting for around 25% of cases (Bourgeron, 2015), a figure likely to increase with  
322 advances in genetic methods. This is in contrast with the other neurodevelopmental disorders  
323 listed here, where, although there is evidence for heritability, the aetiology appears to be  
324 complex and multifactorial, see e.g., Bishop (2015) on dyslexia. In addition, communication  
325 problems are a core diagnostic feature of ASD, albeit with wide variation in the severity and  
326 nature of their language problems (Williams, Botting, & Boucher, 2008). Finally, the co-  
327 occurring social and behavioural difficulties suggest the need for a distinctive intervention  
328 approach for ASD and DLD.

329 There was discussion about including auditory processing disorder (APD) as a co-occurring  
330 condition. This category is controversial (Moore, 2006), but this should not lead to it being  
331 ignored. Children who are given this diagnosis often have co-occurring language problems  
332 which require expert evaluation (Dawes & Bishop, 2009; Sharma, Purdy, & Kelly, 2009).

333 Some panel members noted that relatively pure cases without co-occurring problems might  
334 be more common in epidemiological than in clinical samples. However, that this may in part  
335 reflect the criteria used to define cases in epidemiological studies, who may not be screened  
336 for difficulties in domains beyond language and IQ. A focus on 'pure' cases has been  
337 traditional in research settings, because it can clarify which features of a disorder are specific  
338 to language. However, this can make it difficult to generalise research findings to many  
339 children seen in clinical settings, where co-occurring conditions are more commonly  
340 observed. Most panel members agreed that the term DLD should apply whether or not co-  
341 occurring problems are documented.

342 **Statement 10. Risk factors** are biological or environmental factors that are statistically  
343 associated with language disorder, but whose causal relationship to the language problem is  
344 unclear or partial. Risk factors do not exclude a diagnosis of DLD.

345 **Supplementary comment:** These are factors that are not robust predictors of individual  
346 children's language status or outcome, but which are more common in children with language  
347 disorders than typically-developing children (Zubrick, Taylor, & Christensen, 2015). A  
348 systematic review found that commonly documented risk factors include a family history of

349 language disorders or dyslexia, being male, being a younger sibling in a large family, and  
350 fewer years of parental education (Rudolph, 2016). Prenatal/perinatal problems do not seem  
351 to be an important risk factor for language disorders (Tomblin, Smith, & Zhang, 1997;  
352 Whitehouse, Shelton, Ing, & Newnham, 2014).

353 It is important to note that associated risk factors may differ depending on the age of the  
354 child, and whether epidemiological or clinical samples are considered.

355 **Statement 11.** *DLD is a heterogeneous category that encompasses a wide range of problems.*  
356 *Nevertheless, it can be helpful for clinicians to pinpoint the principal areas for intervention,*  
357 *and researchers may decide to focus on children with specific characteristics to define more*  
358 *homogeneous samples for study. We suggest here some guidelines for more in-depth analysis*  
359 *of language problems.*

360 **Supplementary comment:** The panel members did not reach good agreement on  
361 terminology for subgroups, and this may reflect the fact that, although attempts have been  
362 made to develop a classification of subtypes, these have not in general been validated as  
363 categories that are stable over time (Conti-Ramsden & Botting, 1999). The traditional  
364 distinction used in DSM, between receptive and expressive language disorder, is rather gross,  
365 and fails to indicate which aspects of language are proving problematic. We have therefore  
366 opted for an approach that uses specifiers, i.e., the principal dimensions of language  
367 difficulty, with a recommendation that assessment focus on identifying which areas are most  
368 impaired. We outline these briefly below. Note: our focus here is on oral rather than written  
369 language, though reading and writing are commonly affected in DLD.

370 Phonology: Phonology is the branch of linguistics concerned with the organisation of speech  
371 sounds into categories. Different languages use different articulatory features to signal  
372 contrasts in meaning, and when learning language, the child has to learn which features to  
373 ignore and which to focus on (Kuhl, 2004).

374 In both research and clinical practice, most emphasis has been placed on expressive  
375 phonological problems: difficulties with speech production that are linguistic in origin, rather  
376 than due to motor impairment or physical abnormality of the articulators. This kind of  
377 problem is identified when a child fails to make a speech distinction between sounds that are  
378 used to contrast meaning in the language being learned, as when a child says 'tea' rather than  
379 'key', substituting /t/ for /k/. Phonological errors of this kind are common in early  
380 development, but can persist and, when numerous, impair intelligibility of speech.  
381 Phonological problems in pre-schoolers that are not accompanied by other language problems  
382 are a relatively common reason for referral to a SLT/P and often respond well to specialist  
383 intervention (Law, Garrett, & Nye, 2003). Thus they would not meet our criteria for DLD  
384 because the prognosis is good. The more general term 'Speech Sound Disorder' (SSD) can be  
385 used for such cases: this is an umbrella term that also includes problems with speech  
386 production that have motor or physical origins, or involve misarticulations such as a lisp,  
387 where a sound is produced in a distorted way without losing the contrast with other sounds.  
388 The classification of and terminology for disorders of speech sound production is a subject of  
389 considerable debate (Waring & Knight, 2013). In practice, even for those with specialist  
390 skills, it is not always easy to distinguish between phonological disorders and other types of  
391 speech production problem.

392 Where phonological problems continue beyond 5 years of age it is important to assess the  
393 child's broader language skills, as persisting phonological difficulties are usually  
394 accompanied by other language problems and have a poorer prognosis (Bird, Bishop, &

CATALISE\_2

11 Feb 2017

395 Freeman, 1995; Bishop & Edmundson, 1987; Hayiou-Thomas, Carroll, Leavett, Hulme, &  
396 Snowling, 2017), so would merit a diagnosis of DLD. Where the child has a mixture of  
397 language disorder and motor or structural problems with speech production, a dual diagnosis  
398 of DLD with SSD is appropriate.

399 Some children have impairment affecting phonological awareness, i.e. they have difficulty  
400 explicitly categorising and manipulating the sounds of language. For instance, they may be  
401 unable to identify the three phonemes constituting the word 'cat', or to recognise that 'cat'  
402 and 'car' begin with the same phoneme. Phonological awareness has been studied extensively  
403 in children with reading disability, where it is commonly impaired, even in children with  
404 normal speech production. Although phonological awareness is often deficient in children  
405 with DLD, we would not diagnose DLD on the basis of poor phonological awareness alone,  
406 because it is a meta-linguistic skill that can be as much a consequence as a cause of literacy  
407 problems (Wimmer, Landerl, Linortner, & Hummer, 1991).

408 Syntax: A considerable body of research has focused on documenting syntactic impairments  
409 in children with DLD (Van der Lely, 2005). Expressive problems with morpho-syntax are of  
410 particular theoretical interest, and there have been contrasting attempts to account for them in  
411 terms of linguistic and processing theories (Leonard, 2014). Receptive language impairments  
412 affecting syntax can also occur, with children failing to interpret meaning conveyed by  
413 grammatical contrasts (Hsu & Bishop, 2014), or showing problems in distinguishing  
414 grammatical from ungrammatical sentence forms (Rice, Wexler, & Redmond, 1999).

415 Word finding and semantics: Some children struggle to produce words despite having some  
416 knowledge of their meaning – these are known as 'word finding difficulties' (Messer &  
417 Dockrell, 2006). Others have limited knowledge of word meanings – a problem that comes  
418 under the domain of lexical semantics. The child may be poor at understanding multiple word  
419 meanings and/or use a restricted vocabulary. The latter problem has been particularly noted in  
420 verb use, where the term 'general all-purpose verbs' has been coined to describe this  
421 phenomenon (Kambanaros & Grohmann, 2015; Rice & Bode, 1993). Semantic impairments  
422 also encompass problems with expressing or understanding meaning from word  
423 combinations; e.g. understanding the scope of the quantifier (all/none) in sentences such as  
424 'all the pens are in the boxes' or 'none of the pens are in the boxes' (Katsos, Roqueta,  
425 Estevan, & Cummins, 2011).

426 Pragmatics/language use: Pragmatic difficulties affect the appropriate production or  
427 comprehension of language in a given context. They include such characteristics as providing  
428 too much or too little information to a conversational partner, insensitivity to social cues in  
429 conversation, being over-literal in comprehension, and having difficulty understanding  
430 figurative language (Adams, 2002). Prosodic abnormalities, in which cues such as intonation  
431 and stress are used idiosyncratically, so speech sounds robotic, stereotyped or otherwise  
432 atypical to the context, can also be disruptive to social communication. These difficulties are  
433 hallmarks of the communicative problems seen in ASD, but are also found in children who  
434 do not meet criteria for autism.

435 Specific terminology has been proposed for non-autistic children with pragmatic  
436 impairments. In ICD-11, the term pragmatic language impairment is used as a descriptive  
437 qualifier within DLD. In DSM-5, a new category of social (pragmatic) communication  
438 disorder (SPCD) has been introduced – see Baird and Norbury (2016).

439 We considered adopting the DSM-5 term in CATALISE, but decided against this for several  
440 reasons. First, in DSM-5, SPCD is seen as a new category of neurodevelopmental disorder,

441 whereas we regard pragmatics as part of language, and hence pragmatic impairment as a type  
442 of language disorder. Second, the label SPCD emphasises social communication, rather than  
443 language; in contrast, our focus is on linguistic problems.

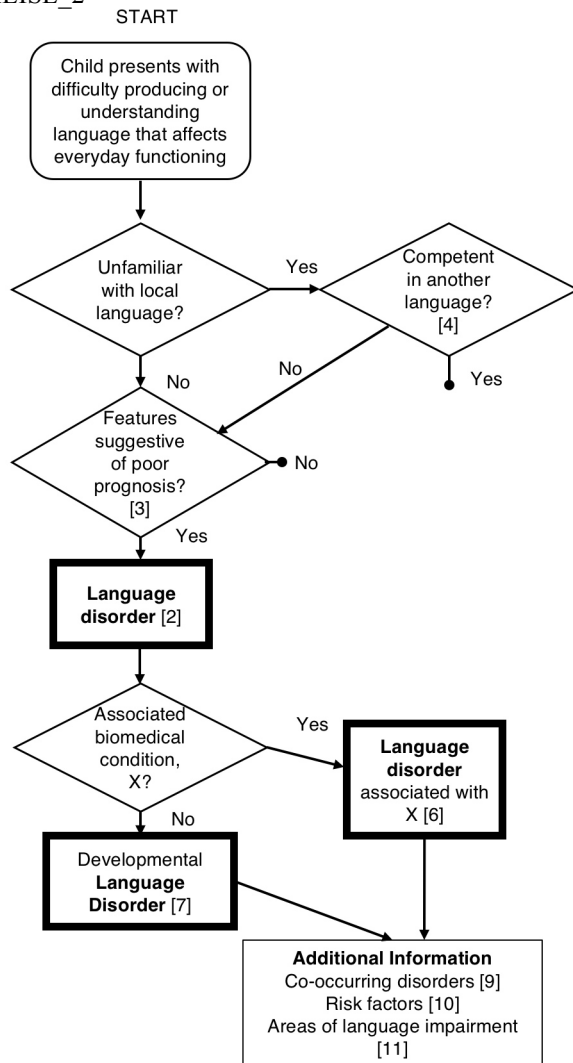
444 Interventions are being developed that address linguistic as well as social aspects of such  
445 communication problems (Adams, 2008), and a focus on pragmatic language as a feature of  
446 DLD should help direct children to appropriate intervention.

447 Discourse: In contexts such as narrative, children must learn to process sequences of  
448 utterances, so that they form a coherent whole. Children who lack this ability may produce  
449 sequences of utterances that appear disconnected and hard to follow. They may also  
450 experience comprehension failure if they interpret one sentence at a time, without drawing  
451 the necessary inferences to link them together (Karasinski & Weismer, 2010).

452 Verbal learning and memory: The research literature has shown that many children with DLD  
453 have problems in retaining sequences of sounds or words over a short delay (verbal short-  
454 term memory), learning associations between words and meaning, or learning statistical  
455 patterns in sequential input (Archibald & Gathercole, 2006; Bishop, North, & Donlan, 1996;  
456 Campbell, Dollaghan, Needleman, & Janosky, 1997; Conti-Ramsden, 2003; Ellis Weismer,  
457 1996; Gillam, Cowan, & Day, 1995; Leonard et al., 2007; Lum, Conti-Ramsden, Page, &  
458 Ullman, 2011; Lum & Zarafa, 2010; Montgomery, 2002). Their language limitations are  
459 different from those due to poor hearing or auditory discrimination, or to lack of knowledge  
460 due to unfamiliarity with the ambient language.

461 Statements 2-11 are synthesised in Figure 1.

462 *Figure 1: Flowchart illustrating pathways to diagnosis of language disorder. Numbers in*  
463 *square brackets refer to Statements in the Results section*



464

465 **Statement 12.** It can be useful to have a superordinate category for policymakers, because  
 466 the numbers of children with specific needs in the domain of speech, language and  
 467 communication has resource implications. The term **Speech, Language and Communication**  
 468 **Needs (SLCN)**, already in use in educational services in the UK, is recommended for this  
 469 purpose.

470 **Supplementary comment:** DLD can be viewed as a subset within a broad category that  
 471 covers the whole range of problems affecting speech, language and communication,  
 472 regardless of the type of problem or putative aetiology.

473 As shown in Figure 2, this is a very broad category that encompasses children with DLD (as  
 474 defined above), but also includes cases where problems have a clear physical basis (e.g.  
 475 dysarthria), or affect speech fluency or voice. Also included here are children who have needs  
 476 due to limited familiarity with the language used in the classroom, and those who have  
 477 communication difficulties as part of other differentiating conditions.

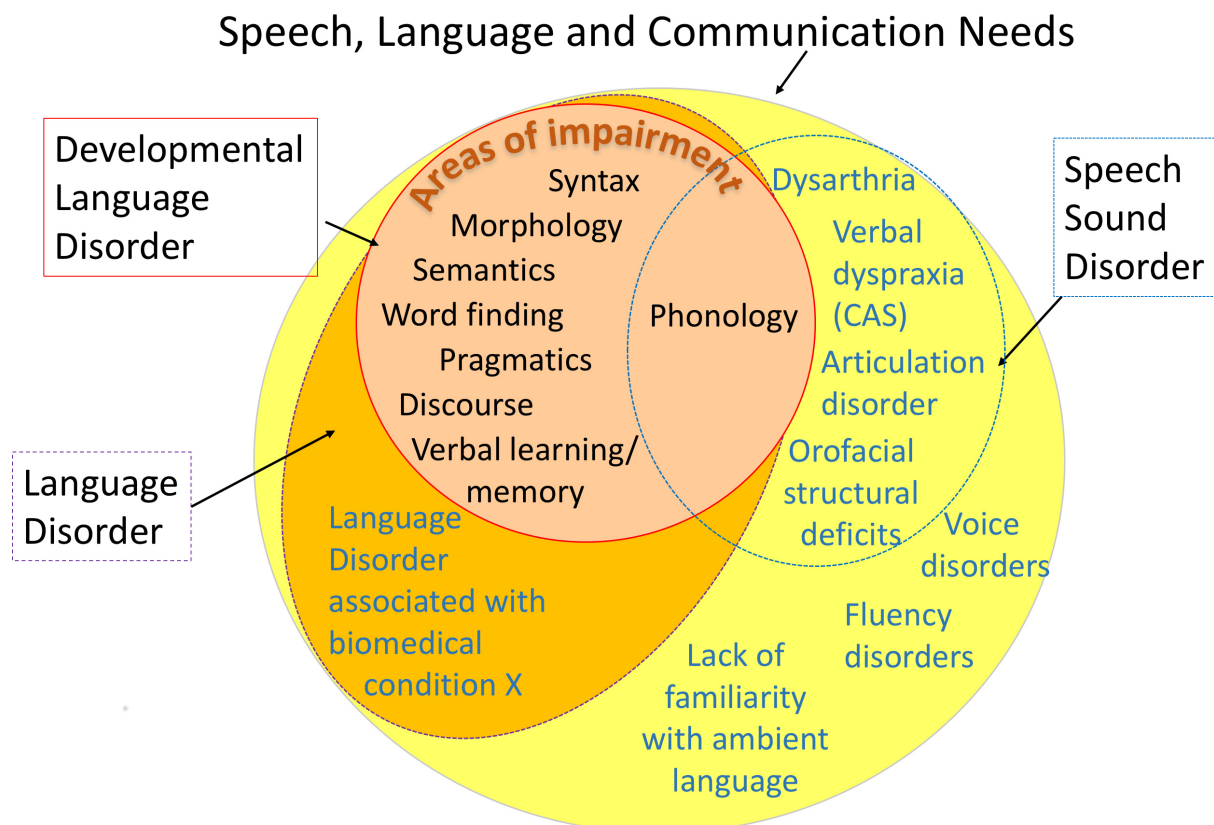
478 It is not anticipated that this terminology will be useful for those doing research on the nature  
 479 or causes of language disorders, nor will it be helpful in explaining a child's difficulties to  
 480 parents or in determining a treatment pathway. It could, however, serve a purpose for those  
 481 who need to plan services, who may need to estimate how many children are likely to require  
 482 additional support, and to bridge across professional divides (McKean et al., in press). In  
 483 addition, it recognises children who have language needs that may require extra help or



484 accommodations in the classroom, even if they do not have a language disorder. These  
 485 would include those who are shown in pathways terminating in ● in the Flowchart in Figure  
 486 1, i.e., children with milder difficulties who should respond well to classroom modification,  
 487 children with hearing loss who use sign language, or children who have had limited exposure  
 488 to the ambient language.

489 Figure 2: Venn diagram illustrating relationship between different diagnostic terms

490



491

1

492

### General Discussion

493 Despite the geographical and professional diversity of the panel there were some points of  
 494 broad agreement, as follows:

- 495 a) Some children have language problems that are severe and persistent enough to create  
 496 long-term functional challenges, in daily communication and/or educational attainment.
- 497 b) There is no clear dividing line between normality and disorder.
- 498 c) Within the domain of language, children's problems do not neatly segregate into  
 499 subtypes, and there may be overlap between problems in speech, language and  
 500 communication.

501 A complicating factor in the nosology of language disorders is that it has in the past been  
 502 based on information from a mixture of different levels of description: (i) information about  
 503 the severity and type of presenting problems with language; (ii) co-occurring problems in  
 504 non-language domains, such as nonverbal ability, social interaction, or attention; and (iii)  
 505 putative biological and environmental causes, such as brain damage, a genetic syndrome, or

506 social disadvantage. Implicit in this approach has been the view that the constellation of  
507 verbal and nonverbal skills will map onto natural subtypes with distinct causes, such that we  
508 can use the linguistic, cognitive and behavioural profile to distinguish the child whose  
509 language problems have environmental or genetic origins. However, this approach has not  
510 worked. As research has progressed, it has become evident that causes of language disorders  
511 are complex and multifactorial, and there is no neat one-to-one mapping between aetiology  
512 and phenotype.

513 In many ways, the results of this consensus exercise may seem unsurprising. The principal  
514 recommended term, DLD, has a long history in the field, and is compatible with planned  
515 usage in ICD-11 and close to the term (Language Disorder) used in DSM-5. It was one of  
516 four possible terms considered in Bishop's (2014) original review of terminology, and already  
517 had reasonable representation in a Google Scholar search. For many of those working in this  
518 area, however, this represents quite a radical departure from previous practice. The term  
519 Specific Language Impairment, which was the most frequent in the research literature, was  
520 the subject of substantial disagreement among the panel, with strong arguments being put  
521 forward both for its retention and its rejection. Ultimately, the decision was made to reject the  
522 term. A major drawback of this decision is that it creates a discontinuity with prior literature,  
523 which could affect future meta-analyses and systematic reviews. On balance, however, it was  
524 concluded that the term 'specific' had connotations that were misleading and confusing and  
525 that, rather than redefining the term it would be better to abolish it.

526 There are other aspects of terminology where the Delphi process exposed points of  
527 disagreement, but also clarified reasons for these and so allowed us to identify ways forward.  
528 Discussions about the term 'disorder' revealed principled objections by those who were  
529 concerned about medicalisation of normal developmental variation. At the same time,  
530 concerns were expressed that other terminology might trivialise the challenges experienced  
531 by children who had persistent problems that interfered with their social and educational  
532 development. The solution we adopted was to retain 'disorder' but define it in a way that  
533 required functional problems with a poor prognosis. This may seem a small change, but it  
534 does have major implications. In particular, it cautions against defining language disorder  
535 solely in terms of statistical cut-offs on language tests. Note also that we reject any attempt to  
536 use discrepancy scores to draw a distinction between 'disorder' and 'delay': the term 'language  
537 delay' was widely rejected by our panel members as confusing and illogical.

538 The main challenge facing those attempting to use the concept of language disorder that we  
539 advocate is that there are few valid assessments of functional language and relatively limited  
540 evidence regarding prognostic indicators. More longitudinal research is needed, using designs  
541 that allow us to predict individual outcomes rather than just characterise group averages.

542 A further case where the Delphi process helped identify sticking points was the treatment of  
543 'exclusionary factors'. We hope that our distinction between differentiating conditions, risk  
544 factors and co-occurring disorders will be helpful here. Only differentiating conditions, which  
545 correspond to biomedical disorders that are clearly associated with language problems, are  
546 distinguished diagnostically from DLD. Risk factors and co-occurring disorders are noted but  
547 do not preclude a diagnosis of DLD. This contrasts with prior practice in some quarters,  
548 where a child's social background or presence of problems in other developmental areas  
549 could leave a child without a diagnosis, and hence without access to support.

550 Finally, although it was generally agreed that there is considerable heterogeneity in children  
551 with DLD, we failed to reach consensus about possible terminology for linguistic subtypes of

CATALISE\_2

11 Feb 2017

552 DLD. It is possible that as research advances the situation may change, but another possibility  
553 is that it is a consequence of the phenomenon of interest: quite simply, children with DLD do  
554 not neatly divide into subtypes along linguistic lines. It is likely that there is substantial  
555 aetiological as well as linguistic heterogeneity, just as has been found for the related  
556 conditions of ASD (Coe, Girirajan, & Eichler, 2012) and developmental dyslexia (Raskind,  
557 Peter, Richards, Eckert, & Berninger, 2013). In addition, the boundaries between DLD and  
558 other neurodevelopmental disorders are not clearcut (Bishop & Rutter, 2008). In our current  
559 state of knowledge, we propose that the appropriate course of action is to document the  
560 heterogeneity rather than attempting to apply a categorical nosology that fails to  
561 accommodate a large proportion of children.

562 An obvious limitation of this study is that we restricted our focus to the English language  
563 because of the difficulties of devising terms that would be applicable across different  
564 language and cultures. We recommend the use of the Delphi method to researchers working  
565 with language disorders in other languages, as a good way to achieve better consensus.

566 As with our previous Delphi study, this exercise has revealed the urgent need for further  
567 research on children's language disorders, including studies on intervention, models of  
568 service delivery, epidemiology, prognosis, linguistic profiles, and functional limitations over  
569 time. We hope that by clarifying terminology in this area we will also make it easier to raise  
570 awareness of children's language problems.

571

572 **Correspondence to:** Professor Dorothy Bishop, Department of Experimental Psychology,  
573 South Parks Road, Oxford, OX1 3UD. Phone: +44 1865 271369; fax: +44 1865 281255;  
574 email: dorothy.bishop@psy.ox.ac.uk

575

### 576 **Acknowledgements**

577 We thank Holly Thornton and Denise Cripps for their help in running the CATALISE project  
578 and Pauline Frizelle, Helen Murrell and Yvonne Wren for comments on an earlier draft.

### 579 **Members of the CATALISE-2 consortium**

580 Catherine Adams (University of Manchester, UK), Lisa Archibald (University of Western  
581 Ontario, Canada), Gillian Baird (NHS, UK), Ann Bauer (Language Resource Provision, Vyne  
582 Community School), Jude Bellair (NHS, UK), Christopher Boyle (University of Exeter),  
583 Elizabeth Brownlie (University of Toronto, Canada), Glenn Carter (NHS, UK), Becky Clark  
584 (RALLI, ClarkSLT, UK), Judy Clegg (University of Sheffield, UK), Nancy Cohen  
585 (University of Toronto, Canada), Gina Conti-Ramsden (University of Manchester, UK), Julie  
586 Dockrell (Institute of Education, University College London, UK), Janet Dunn (Meath  
587 School, Surrey, UK), Susan Ebbels (Moor House School and College, Surrey, UK;  
588 University College London), Aoife Gallagher (University of Limerick, Ireland), Simon Gibbs  
589 (Newcastle University, UK), Emma Gore-Langton (University College London, UK), Mandy  
590 Grist (ICAN, UK), Mary Hartshorne (ICAN, UK), Alison Hüneke (Afasic, UK), Marc  
591 Joannis (University of Western Ontario, Canada), Sally Kedge (University of Auckland,  
592 New Zealand), Thomas Klee (University of Hong Kong, Hong Kong), Saloni Krishnan  
593 (University of Oxford, UK), Linda Lascelles (Afasic, UK), James Law (Newcastle  
594 University, UK), Laurence Leonard (Purdue University, USA), Stephanie Lynham (NHS,  
595 UK), Elina Mainela Arnold (University of Toronto, Canada), Narad Mathura (NHS, UK),

CATALISE\_2

11 Feb 2017

596 Elspeth McCartney (University of Strathclyde, Scotland), Cristina McKean (Newcastle  
597 University, UK), Brigid McNeill (University of Canterbury, New Zealand), Angela Morgan  
598 (Murdoch Children's Research Institute, Australia), Carol-Anne Murphy (University of  
599 Limerick, Ireland), Courtenay Norbury (Royal Holloway University of London, UK), Anne  
600 O'Hare (University of Edinburgh, Scotland), Janis Oram Cardy (University of Western  
601 Ontario, Canada), Ciara O'Toole (University College Cork, Ireland), Rhea Paul (Sacred Heart  
602 University, USA), Suzanne Purdy (University of Auckland, New Zealand), Sean Redmond  
603 (University of Utah, USA), Laida Restrepo (Arizona State University, USA), Mabel Rice  
604 (University of Kansas, USA), Vicky Slonims (NHS, UK), Pamela Snow (La Trobe  
605 University, Australia), Jane Speake (NHS, UK), Sarah Spencer (University of Sheffield, UK),  
606 Helen Stringer (Newcastle University, UK), Helen Tager-Flusberg (Boston University,  
607 USA), Rosemary Tannock (University of Toronto, Canada), Cate Taylor (University of  
608 Western Australia, Australia), Bruce Tomblin (University of Iowa, USA), Joanne Volden  
609 (University of Alberta, Canada), Marleen Westerveld (Griffith University, Australia),  
610 Andrew Whitehouse (Telethon Kids Institute, University of Western Australia, Australia).

611

612 **Correspondence to:** Prof Dorothy V. M. Bishop, Department of Experimental Psychology,  
613 University of Oxford, Oxford, OX1 3UD; [dorothy.bishop@psy.ox.ac.uk](mailto:dorothy.bishop@psy.ox.ac.uk).

614

615 **References**

- 616 Adams, C. (2002). Practitioner review: The assessment of language pragmatics. *Journal of*  
617 *Child Psychology and Psychiatry and Allied Disciplines*, 43(8), 973-987.  
618 doi:10.1111/1469-7610.00226
- 619 Adams, C. (2008). Intervention for children with pragmatic language impairments:  
620 frameworks, evidence and diversity. In C. F. Norbury, J. B. Tomblin, & D. V. M.  
621 Bishop (Eds.), *Understanding Developmental Language Disorders*. Hove:  
622 Psychology Press.
- 623 American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental*  
624 *disorders (5th ed.)*. Arlington, VA: American Psychiatric Publishing.
- 625 Baird, G., & Norbury, C. F. (2016). Social (pragmatic) communication disorders and autism  
626 spectrum disorder. *Archives of Disease in Childhood*. doi:10.1136/archdischild-2014-  
627 306944
- 628 Beitchman, J., Wilson, B., Brownlie, E. B., Walters, H., & Lancee, W. (1996). Long-term  
629 consistency in speech/language profiles: I. Developmental and academic outcomes.  
630 *Journal of the American Academy of Child and Adolescent Psychiatry*, 35, 804-814.
- 631 Beitchman, J.-H., Wilson, B., Brownlie, E. B., Walters, H., & et al. (1996). Long-term  
632 consistency in speech/language profiles: II. Behavioral, emotional, and social  
633 outcomes. *Journal of the American Academy of Child and Adolescent Psychiatry*,  
634 35(6), 815-825.
- 635 Bird, J., Bishop, D. V. M., & Freeman, N. (1995). Phonological awareness and literacy  
636 development in children with expressive phonological impairments. *Journal of*  
637 *Speech and Hearing Research*, 38, 446-462.
- 638 Bishop, D., & Rutter, M. (2008). Neurodevelopmental disorders: conceptual approaches. In  
639 M. Rutter, D. Bishop, D. Pine, S. Scott, J. Stevenson, E. Taylor, & A. Thapar (Eds.),  
640 *Rutter's Child and Adolescent Psychiatry* (pp. 32-41). Oxford: Blackwell.
- 641 Bishop, D. V. M. (2010). Which neurodevelopmental disorders get researched and why?  
642 *PLOS One*, 5(11), e15112. doi:10.1371/journal.pone.0015112
- 643 Bishop, D. V. M. (2014). Ten questions about terminology for children with unexplained  
644 language problems. *International Journal of Language & Communication Disorders*,  
645 49(4), 381-415. doi:10.1111/1460-6984.12101
- 646 Bishop, D. V. M. (2015). The interface between genetics and psychology: lessons from  
647 developmental dyslexia. *Proceedings of the Royal Society B-Biological Sciences*,  
648 282(1806). doi:10.1098/rspb.2014.3139
- 649 Bishop, D. V. M., & Adams, C. (1990). A prospective study of the relationship between  
650 specific language impairment, phonological disorders and reading retardation. *Journal*  
651 *of Child Psychology and Psychiatry*, 31, 1027-1050.
- 652 Bishop, D. V. M., & Edmundson, A. (1987). Language-impaired four-year-olds:  
653 distinguishing transient from persistent impairment. *Journal of Speech and Hearing*  
654 *Disorders*, 52, 156-173.
- 655 Bishop, D. V. M., Snowling, M. J., Thompson, P. A., Greenhalgh, T., & The CATALISE  
656 Consortium. (2016). CATALISE: a multinational and multidisciplinary Delphi  
657 consensus study. Identifying language impairments in children. *PLOS One*, 11(7),  
658 e0158753. doi:doi:10.1371/journal.pone.0158753
- 659 Botting, N., Faragher, B., Simkin, Z., Knox, E., & Conti-Ramsden, G. (2001). Predicting  
660 pathways of specific language impairment: what differentiates good and poor  
661 outcome? *Journal of Child Psychology and Psychiatry*, 42, 1013-1020.
- 662 Bourgeron, T. (2015). From the genetic architecture to synaptic plasticity in autism spectrum  
663 disorder. *Nature Reviews Neuroscience*, 16(9), 551-563. doi:10.1038/nrn3992



CATALISE\_2

11 Feb 2017

- 664 Cattani, A., Abbot-Smith, K., Farag, R., Krott, A., Arreckx, F., Dennis, I., & Floccia, C.  
665 (2014). How much exposure to English is necessary for a bilingual toddler to perform  
666 like a monolingual peer in language tests? *International Journal of Language &*  
667 *Communication Disorders*, 49(6), 649-671. doi:10.1111/1460-6984.12082
- 668 Catts, H. W., Fey, M. E., Tomblin, J. B., & Zhang, X. (2002). A longitudinal investigation of  
669 reading outcomes in children with language impairments. *Journal of Speech,*  
670 *Language and Hearing Research*, 45, 1142-1157.
- 671 Clark, A., O'Hare, A., Watson, J., Cohen, W., Cowie, H., Elton, R., . . . Seckl, J. (2007).  
672 Severe receptive language disorder in childhood-familial aspects and long-term  
673 outcomes: results from a Scottish study. *Archives of Disease in Childhood*, 92(7),  
674 614-619.
- 675 Coe, B. P., Girirajan, S., & Eichler, E. E. (2012). The genetic variability and commonality of  
676 neurodevelopmental disease. *American Journal of Medical Genetics Part C-Seminars*  
677 *in Medical Genetics*, 160C(2), 118-129. doi:10.1002/ajmg.c.31327
- 678 Conti-Ramsden, G., & Botting, N. (1999). Classification of children with specific language  
679 impairment: Longitudinal considerations. *Journal of Speech, Language, and Hearing*  
680 *Research*, 42(5), 1195-1204.
- 681 Dawes, P., & Bishop, D. (2009). Auditory processing disorder in relation to developmental  
682 disorders of language, communication and attention: a review and critique.  
683 *International Journal of Language and Communication Disorders*, 44, 440-465.
- 684 Dohmen, A., Bishop, D. V., Chiat, S., & Roy, P. (2016). Body movement imitation and early  
685 language as predictors of later social communication and language outcomes: A  
686 longitudinal study. *Autism & Developmental Language Impairments*, 1.  
687 doi:10.1177/2396941516656636
- 688 Ebbels, S. (2014). Introducing the SLI debate. *International Journal of Language &*  
689 *Communication Disorders*, 49(4), 377-380. doi:10.1111/1460-6984.12119
- 690 Ellis, E. M., & Thal, D. J. (2008). Early language delay and risk for language impairment.  
691 *Perspectives on Language Learning and Education*, 15(3), 93-100.  
692 doi:10.1044/11e15.3.93
- 693 Everitt, A., Hannaford, P., & Conti-Ramsden, G. (2013). Markers for persistent specific  
694 expressive language delay in 3-4-year-olds. *International Journal of Language &*  
695 *Communication Disorders*, 48(5), 534-553. doi:10.1111/1460-6984.12028
- 696 Fitzgerald, T. W., Gerety, S. S., Jones, W. D., van Kogelenberg, M., King, D. A., McRae, J., .  
697 . . . Deciphering Dev Disorders, S. (2015). Large-scale discovery of novel genetic  
698 causes of developmental disorders. *Nature*, 519(7542), 223-+.  
699 doi:10.1038/nature14135
- 700 Harris, J. C. (2013). New terminology for mental retardation in DSM-5 and ICD-11. *Current*  
701 *Opinion in Psychiatry*, 26(3), 260-262. doi:10.1097/YCO.0b013e32835fd6fb
- 702 Hasson, F., Keeney, S., & McKenna, H. (2000). Research guidelines for the Delphi survey  
703 technique. *Journal of Advanced Nursing*, 32(4), 1008-1015. doi:10.1046/j.1365-  
704 2648.2000.01567.x
- 705 Hayiou-Thomas, M. E., Carroll, J. M., Leavett, R., Hulme, C., & Snowling, M. J. (2017).  
706 When does speech sound disorder matter for literacy? The role of disordered speech  
707 errors, co-occurring language impairment and family risk of dyslexia. *Journal of*  
708 *Child Psychology & Psychiatry*, 58, 197-205. doi:10.1111/jcpp.12648
- 709 Hsu, H. J., & Bishop, D. V. M. (2014). Training understanding of reversible sentences: a  
710 study comparing language-impaired children with age-matched and grammar-  
711 matched controls. *PeerJ*, 2, e656-e656. doi:10.7717/peerj.656

- 712 Johnson, C. J., Beitchman, J. H., & Brownlie, E. B. (2010). Twenty-year follow-up of  
713 children with and without speech-language impairments: family, educational,  
714 occupational, and quality of life outcomes. *American Journal of Speech Language*  
715 *Pathology*, 19(1), 51-65.
- 716 Jordaan, H. (2008). Clinical intervention for bilingual children: An international survey.  
717 *Folia Phoniatrica et Logopaedica*, 60(2), 97-105. doi:10.1159/000114652
- 718 Kambanaros, M., & Grohmann, K. K. (2015). More general all-purpose verbs in children  
719 with specific language impairment? Evidence from Greek for not fully lexical verbs in  
720 language development. *Applied Psycholinguistics*, 36(5), 1029-1057.  
721 doi:10.1017/s0142716414000034
- 722 Kamhi, A. G. (2004). A meme's eye view of speech-language pathology. *Language Speech*  
723 *and Hearing Services in Schools*, 35(2), 105-111.
- 724 Karasinski, C., & Weismer, S. E. (2010). Comprehension of inferences in discourse  
725 processing by adolescents with and without Language Impairment. *Journal of Speech*  
726 *Language and Hearing Research*, 53(5), 1268-1279. doi:10.1044/1092-  
727 4388(2009/09-0006)
- 728 Katsos, N., Roqueta, C. A., Estevan, R. A., & Cummins, C. (2011). Are children with  
729 Specific Language Impairment competent with the pragmatics and logic of  
730 quantification? *Cognition*, 119(1), 43-57.
- 731 Kuhl, P. K. (2004). Early language acquisition: cracking the speech code. *Nature Reviews*  
732 *Neuroscience*, 5, 831-843.
- 733 Law, J., Garrett, Z., & Nye, C. (2003). Speech and language therapy interventions for  
734 children with primary speech and language delay or disorder (Cochrane Review). *The*  
735 *Cochrane Library*, 3.
- 736 Leonard, L. B. (2014). *Children with specific language impairment, 2nd edition*. Cambridge,  
737 MA: MIT Press.
- 738 McKean, C., Law, J., Laing, K., Cockerill, M., Allon-Smith, J., McCartney, E., & Forbes, J.  
739 (in press). A qualitative case study in the social capital of co-professional  
740 collaborative co-practice for children with speech language and communication  
741 needs. *International Journal of Language and Communication Disorders*.
- 742 Messer, D., & Dockrell, J. E. (2006). Children's naming and word-finding difficulties:  
743 Descriptions and explanations. *Journal of Speech Language and Hearing Research*,  
744 49(2), 309-324. doi:10.1044/1092-4388(2006/025)
- 745 Moore, D. R. (2006). Auditory processing disorder (APD): Definition, diagnosis, neural  
746 basis, and intervention. *Audiological Medicine*, 4, 4-11.
- 747 Norbury, C. F., Gooch, D., Wray, C., Baird, G., Charman, T., Simonoff, E., . . . Pickles, A.  
748 (2016). The impact of nonverbal ability on prevalence and clinical presentation of  
749 language disorder: evidence from a population study. *Journal of Child Psychology*  
750 *and Psychiatry*, n/a-n/a. doi:10.1111/jcpp.12573
- 751 Paradis, J. (2016). The development of English as a second language with and without  
752 Specific Language Impairment: Clinical implications. *Journal of Speech Language*  
753 *and Hearing Research*, 59(1), 171-182. doi:10.1044/2015\_jslhr-l-15-0008
- 754 Raskind, W. H., Peter, B., Richards, T., Eckert, M. M., & Berninger, V. W. (2013). The  
755 genetics of reading disabilities: from phenotypes to candidate genes. *Frontiers in*  
756 *Psychology*, 3. doi:10.3389/fpsyg.2012.00601
- 757 Reilly, S., Wake, M., Ukoumunne, O. C., Bavin, E., Prior, M., Cini, E., . . . Bretherton, L.  
758 (2010). Predicting language outcomes at 4 years of age: Findings from Early  
759 Language in Victoria Study. *Pediatrics*, 126(6), E1530-E1537.  
760 doi:10.1542/peds.2010-0254

- 761 Rice, M. L., & Bode, J. V. (1993). GAPS in the verb lexicons of children with specific  
762 language impairment. *First Language*, 13(37), 113-131.  
763 doi:10.1177/014272379301303707
- 764 Rice, M. L., & Hoffman, L. (2015). Predicting vocabulary growth in children with and  
765 without Specific Language Impairment: A longitudinal study from 2;6 to 21 years of  
766 age. *Journal of Speech, Language and Hearing Research*, 58(2), 345-359.  
767 doi:10.1044/2015\_jslhr-l-14-0150
- 768 Rice, M. L., Wexler, K., & Redmond, S. M. (1999). Grammaticality judgments of an  
769 extended optional infinitive grammar: Evidence from English-speaking children with  
770 specific language impairment. *Journal of Speech Language and Hearing Research*,  
771 42(4), 943-961.
- 772 Roy, P., & Chiat, S. (2014). Developmental pathways of language and social communication  
773 problems in 9–11 year olds: Unpicking the heterogeneity. *Research in Developmental*  
774 *Disabilities*, 35, 2534-2546.
- 775 Rudolph, J. (2016 ). Case history risk factors for Specific Language Impairment: A  
776 systematic review and meta-analysis. *American Journal of Speech - Language*  
777 *Pathology*, in press.
- 778 Rudolph, J. M., & Leonard, L. B. (2016). Early language milestones and Specific Language  
779 Impairment. *Journal of Early Intervention*, 38(1), 41-58.  
780 doi:10.1177/1053815116633861
- 781 Sharma, M., Purdy, S. C., & Kelly, A. S. (2009). Comorbidity of Auditory Processing,  
782 Language, and Reading Disorders. *Journal of Speech Language and Hearing*  
783 *Research*, 52(3), 706-722. doi:10.1044/1092-4388(2008/07-0226)
- 784 Shevell, M. I., Majnemer, A., Rosenbaum, P., & Abrahamowicz, M. (2001). Etiologic  
785 determination of childhood developmental delay. *Brain Development*, 23, 228-235.
- 786 Snowling, M. J., Duff, F. J., Nash, H. M., & Hulme, C. (2016). Language profiles and  
787 literacy outcomes of children with resolving, emerging, or persisting language  
788 impairments. *Journal of Child Psychology and Psychiatry*, 57, 1360-1369.  
789 doi:10.1111/jcpp.12497
- 790 Snowling, M. J., & Melby-Lervåg, M. (2016). Oral language deficits in familial dyslexia: A  
791 meta-analysis and review. *Psychological Bulletin*, 142(5), 498-545.  
792 doi:10.1037/bul0000037
- 793 Thompson, P. A., Hulme, C., Nash, H. M., Gooch, D., Hayiou-Thomas, E., & Snowling, M.  
794 J. (2015). Developmental dyslexia: predicting individual risk. *Journal of Child*  
795 *Psychology and Psychiatry*, 56(9), 976-987. doi:10.1111/jcpp.12412
- 796 Tomblin, J. B., Harrison, M., Ambrose, S. E., Walker, E. A., Oleson, J. J., & Moeller, M. P.  
797 (2015). Language outcomes in young children with mild to severe hearing loss. *Ear*  
798 *and Hearing*, 36, 76S-91S. doi:10.1097/aud.0000000000000219
- 799 Tomblin, J. B., Records, N. L., Buckwalter, P., Zhang, X., Smith, E., & O'Brien, M. (1997).  
800 Prevalence of specific language impairment in kindergarten children. *Journal of*  
801 *Speech and Hearing Research*, 40(6), 1245-1260.
- 802 Tomblin, J. B., Smith, E., & Zhang, X. (1997). Epidemiology of specific language  
803 impairment: Prenatal and perinatal risk factors. *Journal of Communication Disorders*,  
804 30, 325-344.
- 805 Van der Lely, H. K. J. (2005). Domain-specific cognitive systems: insight from Grammatical-  
806 SLI. *Trends in Cognitive Sciences*, 9, 53-59.
- 807 Waring, R., & Knight, R. (2013). How should children with speech sound disorders be  
808 classified? A review and critical evaluation of current classification systems.

CATALISE\_2

11 Feb 2017

- 809 *International Journal of Language & Communication Disorders*, 48(1), 25-40.  
810 doi:10.1111/j.1460-6984.2012.00195.x
- 811 Weindrich, D., Jennen-Steinmetz, C., Laucht, M., Esser, G., & Schmidt, M. H. (2000).  
812 Epidemiology and prognosis of specific disorders of language and scholastic skills.  
813 *European Child and Adolescent Psychiatry*, 9(3), 186-194.
- 814 Whitehouse, A. J. O., Shelton, W. M. R., Ing, C., & Newnham, J. P. (2014). Prenatal,  
815 perinatal, and neonatal risk factors for Specific Language Impairment: A prospective  
816 pregnancy cohort study. *Journal of Speech Language and Hearing Research*, 57(4),  
817 1418-1427. doi:10.1044/2014\_jslhr-1-13-0186
- 818 Williams, D., Botting, N., & Boucher, J. (2008). Language in autism and specific language  
819 impairment: Where are the links? *Psychological Bulletin*, 134(6), 944-963.  
820 doi:10.1037/a0013743
- 821 Wimmer, H., Landerl, K., Linortner, R., & Hummer, P. (1991). The relationship of phonemic  
822 awareness to reading acquisition: More consequence than precondition but still  
823 important. *Cognition*, 40, 219-249.
- 824 Zambrana, I. M., Pons, F., Eadie, P., & Ystrom, E. (2014). Trajectories of language delay  
825 from age 3 to 5: persistence, recovery and late onset. *International Journal of*  
826 *Language & Communication Disorders*, 49(3), 304-316. doi:10.1111/1460-  
827 6984.12073
- 828 Zubrick, S. R., Taylor, C. L., & Christensen, D. (2015). Patterns and predictors of language  
829 and literacy abilities 4-10 years in the Longitudinal Study of Australian Children.  
830 *PLOS One*, 10(9). doi:10.1371/journal.pone.0135612

831

832

833 **Key Points**

834 • Some children have problems with language development that cause significant  
835 interference with everyday life or educational progress. Terminology for describing such  
836 problems has been inconsistent, hampering communication, leading to inequity over access to  
837 services, and confusion in synthesising research.

838 • A group of experts representing a range of professions and English-speaking countries  
839 using the Delphi method, came to a consensus that ‘Developmental Language Disorder’  
840 (DLD) is the preferred term for language problems that are severe enough to interfere with  
841 daily life, have a poor prognosis, and are not associated with a clear biomedical aetiology.

842 • We replace the traditional exclusionary criteria in the definition of language disorder,  
843 with a three-fold distinction between differentiating conditions, risk factors and co-occurring  
844 conditions.

845 • We provide guidelines about terminology in this area that can be used in clinical and  
846 research contexts

847 **Appendices**

848 All appendices are available for download on Open Science Framework: <https://osf.io/p85kb/>

849 Appendix 1. Background document, with the statements for round 1

850 Appendix 2. Background document, with the statements for round 2

851 Appendix 3. Relationship between Round 2 statements and final statements reported in  
852 Results section.

853 Appendix 4. Report showing quantitative and qualitative responses to Round 1 statements

854 Appendix 5. Report showing quantitative and qualitative responses to Round 2 statements

855

856



CATALISE\_2

11 Feb 2017

857 Figure 1

858

859