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2   **CATALISE: a multinational and multidisciplinary Delphi consensus study**

3   **of problems with language development. Phase 2. Terminology**

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12   ^Membership of the CATALISE-2 Consortium is provided in the Acknowledgements

13   RUNNING HEAD: Delphi consensus on terminology for language problems

14

15   **Abstract**

16   **Background:** Lack of agreement about criteria and terminology for children's language

17   problems affects access to services as well as hindering research and practice. We report the

18   second phase of a study using an online Delphi method to address these issues. In the first

19   phase, we focused on criteria for language disorder. Here we consider terminology.

20   **Methods:** The Delphi method is an iterative process in which an initial set of statements is

21   rated by a panel of experts, who then have the opportunity to view anonymised ratings from

22   other panel members. On this basis they can either revise their views or make a case for their

23   position. The statements are then revised based on panel feedback, and again rated by and

24   commented on by the panel. In this study, feedback from a second round was used to prepare

25   a final set of statements in narrative form. The panel included 57 individuals representing a

26   range of professions and nationalities.

27   **Results:** We achieved at least 78% agreement for 19 of 21 statements within two rounds of

28   ratings. The term 'Language Disorder' is recommended to refer to a profile of difficulties that

29   causes functional impairment in everyday life and is associated with poor prognosis. The

30   term, 'Developmental Language Disorder' (DLD) was endorsed for use when the language

31   disorder was not associated with a known biomedical aetiology. It was also agreed that (1)

32   presence of risk factors (neurobiological or environmental) does not preclude a diagnosis of

33   DLD, (2) DLD can co-occur with other neurodevelopmental disorders (e.g., ADHD), and (3)

34   DLD does not require a mismatch between verbal and nonverbal ability.

35   **Conclusions:** This Delphi exercise highlights reasons for disagreements about terminology

36   for language disorders and proposes standard definitions and nomenclature.

37   **Keywords:** Developmental Language Disorder, Specific Language Impairment,

38   Terminology, Risk factors, Definitions

39   **Abbreviations:**

40   **ADHD: Attention Deficit Hyperactivity Disorder**

41   **ASD: Autism Spectrum Disorder**

42   **DLD: Developmental Language Disorder**

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

44   **version 5**

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

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

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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   We approached the same panel members who had formed part of the CATALISE consortium

77   for our previous Delphi on criteria. As detailed by Bishop et al. (2016), we restricted

78   consideration to English-speaking countries, and there was a predominance of speech-

79   language therapists/pathologists (SLT/Ps). Of the original panel, two declined to take part in

80   CATALISE-2 for personal reasons, leaving a panel of 57 individuals, whose characteristics

81   are shown in Table 1. Nine panel members had a close relative with impaired language

82   development.

83   (Table 1 about here)

84   The first two authors (DVMB and MJS), both psychologists with considerable experience in

85   the area of children's language problems, acted as moderators: they did not contribute

86   rankings, but agreed on modifications to statements on the basis of feedback from the panel.

87   The third author (PT) set up the online Delphi, controlled the anonymization, and analysed

88   responses to produce reports for panel members. The fourth (TG), an expert in primary health

89   care who was familiar with the Delphi method acted as methodological advisor.

90   **Delphi consensus process**

91   We started with a set of statements about terminology accompanied by a background

92   document (Appendix 1) that put these in context. These were new statements that were

93   different from those in the prior Delphi exercise on criteria, though they were informed by

94   issues that arose in that study (Bishop et al., 2016). Panel members were asked to rate the

95   statements on a 5-point scale from 1 (strongly disagree) to 5 (strongly agree).

96   Participant responses to Round 1 were collated, the distribution of responses and associated

97   anonymised comments were fed back to all panel members, and scrutinised by the

98   moderators. One difference from our previous Delphi was that we held a one-day meeting to

99   present and discuss preliminary results from CATALISE-2 before proceeding to Round 2. All

100   panel members were invited to this, as well as additional stakeholders. The meeting was

101   attended by the first four authors and 22 of the CATALISE-2 consortium, as well as 23

102   individuals representing a range of fields: eight from speech and language therapy, eight from

103   psychology, one paediatrician, two representatives from charities, one expert in special

104   educational needs, one geneticist, one general practitioner and one psychiatrist.

105   On the basis of ratings, qualitative comments, and discussions at the meeting, the two

106   moderators agreed on rewording of some items and revision of the background document.

107   The set of items and background document used in Round 2 are shown in Appendix 2.

108   There is no agreed criterion for when a Delphi consensus is deemed adequate for an item – in

109   the literature, values from 51% to 80% agreement have been used (Hasson et al., 2000). We

110   aimed for 75% agreement as a reasonable goal.

111   After Round 2, the moderators made some further revisions to the statements to improve

112   clarity and readability, to take into account specific comments provided by the panel, and to

113   reconsider the two problematic items. Some statements with good agreement were

114   consolidated to give a single longer statement (see Appendix 3), giving a total of 13

115   statements. A draft of the current paper, including finalised statements in the Results section,

116   was circulated for comments and approval by the panel. Further revisions were made to

117 address points raised by reviewers, including the dropping of one redundant statement, and

118 the paper was again circulated to all panel members for comment. The current paper

119 represents the final agreed version.

120 **Results and Discussion**

121 **Round 1**

122 The response rate by panel members for Round 1 was 93%. Appendix 4 shows quantitative

123 and qualitative responses to the Round 1 statements; a personalised copy of this report

124 containing these data was sent to all panel members, showing how their own responses

125 related to the distribution of responses from other (anonymised) panel members. The

126 percentage agreement (combining strongly agree with agree) ranged from 30% to 98% for the

127 16 items, with a median value of 74%.

128

129 Kruskal-Wallis tests were conducted on each item to test whether agreement was related to

130 either geographical location (6 countries) or professional status (SLT/P vs others), using a

131 Bonferroni-corrected p-value of .001. None of these comparisons was statistically significant

132 after correction for multiple comparisons. Given the small sample size, we cannot rule out an

133 effect of these two factors on ratings, but the analysis offers some reassurance that responses

134 did not simply pattern according to professional background or geographical location.

135

136 **Round 2**

137 The response rate by panel members for Round 2 was 91%. Appendix 5 contains the data that

138 were incorporated in a personalised report sent to all panel members for Round 2. The

139 percentage agreement (combining ratings of strongly agree with agree) ranged from 46% to

140 98% across items, with a median value of 90%. Of the 21 items, 19 had agreement of 78% or

141   more, which we regarded as adequate to accept that statement. Items 19 and 20, both

142   concerned with terms for subtypes of language disorder, had 68% and 46% agreement

143   respectively, indicating a need for further revision or omission.

144   **Consensus statements**

145   In this section, we present final statements, with supplementary comments that reflect

146   reasoning behind them, based on qualitative comments and discussion, supported by

147   references where appropriate.

148   ***Statement 1:*** *It is important that those working in the field of children's language problems*

149   *use consistent terminology*

150   **Supplementary comment**: In Round 2, a version of this statement was included to orient the

151   panel to our common goal. Although the terminology we propose is not novel, its adoption

152   will require many people to change their practices, which will be difficult where there is a

153   long-standing preference for other terms. Nevertheless, panel members were strongly

154   motivated to achieve a consensus, because the lack of consistency was recognised as a major

155   problem for the field.

156   ***Statement 2:*** *The term **'language disorder'** is proposed for children who are likely to have*

157   *language problems enduring into middle childhood and beyond, with a significant impact on*

158   *everyday social interactions or educational progress.*

159   **Supplementary comment:** This statement clarifies that prognosis should be a key factor in

160   the definition of language disorder, i.e. the term should include those with language problems

161   that lead to significant functional impairments unlikely to resolve without specialist help.

162   There is no sharp dividing line between language disorder and typical development, but we

163   can use relevant information from longitudinal studies to help determine prognosis (see

164   Statement 3).

165   An argument for preferring the term 'disorder' to 'impairment' was because 'disorder'

166   indicates a problem that should be taken seriously. The term also puts language disorder on a

167   par with other neurodevelopmental disorders (autism spectrum disorder, developmental co-

168   ordination disorder, attention deficit hyperactivity disorder), and is compatible with the two

169   main diagnostic systems, DSM-5 (American Psychiatric Association, 2013) and ICD-11

170   (Baird, personal communication).

171   Some panel members expressed concerns that the term 'disorder' had medical connotations

172   and placed the problem 'inside the child', when it might be contextually dependent. It was

173   thought to have negative associations for teachers and there were concerns that such a label

174   could lead to low expectations. For this reason, our definition explicitly excludes children

175   who have limited language skills because of lack of exposure to the language of instruction,

176   or are likely to grow out of their problems. These children often benefit from educational

177   interventions, and may require monitoring, but they should not be identified as language

178   disordered.

179   Another objection to the term 'disorder' is that historically it has been interpreted as referring

180   to a large mismatch between language and nonverbal ability. This interpretation has been

181   widely adopted in some circles, but is discredited and is not part of our definition (Bishop et

182   al., 2016) (see also Statement 8).

183   ***Statement 3:*** *Research evidence indicates that predictors of poor prognosis vary with a*

184   *child's age, but in general language problems that affect a range of skills are likely to persist.*

185   **Supplementary comment:** Prognostic indicators will vary with age. Our focus here is on

186   what we know about learning English.

187   Under 3 years. Prediction of outcome is particularly hard in children under 3 years of age.

188   Many toddlers who have limited vocabulary at 18-24 months catch up, and despite much

189 research, it can be difficult to identify which late talkers are likely to have longer-term

190 problems (Reilly et al., 2010). Children who fail to combine words at 24 months appear to

191 have worse outcomes than those who do not produce any words at 15 months, though this is

192 still a far from perfect predictor (Rudolph & Leonard, 2016). Prognosis is also poorer for

193 children with comprehension problems, those who do not communicate via gesture (Ellis &

194 Thal, 2008), or do not imitate body movements (Dohmen, Bishop, Chiat, & Roy, 2016). Roy

195 and Chiat (Roy & Chiat, 2014) administered a preschool measure of social responsiveness

196 and joint attention to preschoolers referred for SLT, and found it was predictive of persisting

197 problems, also indicative of social communication problems at 9 years. A positive family

198 history of language or literacy problems is an additional risk factor (Rudolph & Leonard,

199 2016; Zambrana, Pons, Eadie, & Ystrom, 2013). Overall, however, the prediction from late

200 language emergence to subsequent language disorder at school age is surprisingly weak: in

201 part because many late talkers catch up, but also because some school-aged children with

202 language disorder were not late to talk (Snowling, Duff, Nash, & Hulme, 2016; Zambrana et

203 al., 2013).

204 3 to 4 years. Prediction improves as children grow older; in 4-year-olds, the greater the

205 number of areas of language functioning that are impaired, the higher the likelihood that the

206 problems will persist into school age (Bishop & Edmundson, 1987). Note that this finding

207 contradicts the idea that intervention should be focused on children with a 'spiky' language

208 profile rather than a more even pattern of impairment. When individual language tests are

209 considered, sentence repetition has been identified as a relatively good marker for predicting

210 outcomes (Everitt, Hannaford, & Conti-Ramsden, 2013).

211   In contrast, there is generally a good prognosis for pre-schoolers whose problems are

212   restricted to expressive phonology (Beitchman, Wilson, Brownlie, Walters, & et al., 1996;

213   Bishop & Adams, 1990).

214   5 years and over. Language problems that are still evident at 5 years and over are likely to

215   persist (Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998). Children who start school

216   with oral language problems are at risk of reading problems and poor academic attainment

217   (Bishop & Adams, 1990; Catts, Fey, Tomblin, & Zhang, 2002; Thompson et al., 2015) with

218   little evidence that the language gap closes over time (Rice & Hoffman, 2015). Prognosis

219   appears particularly poor when receptive language is impaired (Beitchman, Wilson,

220   Brownlie, Walters, & Lancee, 1996; Clark et al., 2007), and when nonverbal ability is

221   relatively low (Catts et al., 2002; Johnson, Beitchman, & Brownlie, 2010; Rice & Hoffman,

222   2015).

223   Family factors. There has been some debate over the predictive value of family factors. As

224   noted above, several studies found that a positive family history of language problems is a

225   predictor (albeit weak) of persisting problems in late talkers, and family history is also

226   associated with poor literacy outcomes (Snowling & Melby-Lervåg, 2016), but it is less clear

227   whether social background is independently predictive, once other risk factors have been

228   taken into account (Botting, Faragher, Simkin, Knox, & Conti-Ramsden, 2001).

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

230   *Statement 4. Some children may have language needs because their first or home language*

231   *differs from the local language, and they have had insufficient exposure to the language used*

232   *by the school or community to be fully fluent in it. This should not be regarded as language*

233   *disorder, unless there is evidence that the child does not have age-appropriate skills in any*

234   *language.*

235   **Supplementary comment:** This statement makes it clear that a low score on a language test

236   does not necessarily mean that a child has any kind of disorder. It is important to consider

237   whether the child has adequate proficiency in any language. In general, multilingualism does

238   not lead to language problems (Bishop et al., 2016), but where there has been limited

239   experience with the language used at school, the child may require extra help (Cattani et al.,

240   2014). This also applies to hearing-impaired children whose native language is a signed

241   language. In practice, however, for many languages, we lack suitable (normed) assessments

242   (Jordaan, 2008).

243   *Statement 5. Rather than using exclusionary criteria in the definition of language disorder,*

244   *we draw a three-fold distinction between differentiating conditions, risk factors and co-*

245   *occurring conditions.*

246   **Supplementary comment:** Use (and misuse) of exclusionary factors in definitions of

247   language disorder was a major issue leading to dissatisfaction with terminology in this field.

248   Panel members were concerned that, instead of being used for diagnostic differentiation,

249   exclusionary criteria were sometimes interpreted as criteria for denying services to children.

250   On the other hand, grouping together all children with a language problem, regardless of

251   cause, and without regard to type of intervention required, would, in many contexts, be

252   counterproductive.

253   Statements 6 to 9 explain how we draw the distinction between differentiating conditions,

254   risk factors and co-occurring conditions.

255   ***Statement 6. Differentiating conditions*** *are biomedical conditions in which language*

256   *disorder occurs as part of a more complex pattern of impairments. This may indicate a*

257   *specific intervention pathway**. We recommend referring to **'Language disorder associated***

258   ***with X'***, *where X is the differentiating condition, as specified above.*

259   **Supplementary comment:** Differentiating conditions include brain injury, acquired

260   epileptic aphasia in childhood, certain neurodegenerative conditions, cerebral palsy, and oral

261   language limitations associated with sensori-neural hearing loss (Tomblin et al., 2015) as well

262   as genetic conditions such as Down syndrome. We also include here children with autism

263   spectrum disorder (ASD) and/or intellectual disability (IQ < 70), because these conditions are

264   commonly linked to genetic or neurological causes (Fitzgerald et al., 2015; Shevell,

265   Majnemer, Rosenbaum, & Abrahamowicz, 2001), with the numbers with a known etiology

266   increasing with advances in genetic methods (Bourgeron, 2015; Fitzgerald et al., 2015;

267   Shevell et al., 2001).

268   These are all cases where an association between a biomedical condition and language

269   disorder is commonly seen. In such cases, the child requires support for the language

270   problems, but the intervention pathway will need to take into account the distinctive features

271   of that condition. It should be noted, however, that there is little research directly comparing

272   language intervention approaches across conditions, so this inference is based on clinical

273   judgement rather than research evidence.

274   *Statement 7. The term **Developmental Language Disorder (DLD)** is proposed to refer to*

275   *cases of language disorder with no known differentiating condition (as defined in Statement*

276   *6). Distinguishing these cases is important when doing research on aetiology, and is likely*

277   *also to have implications for prognosis and intervention.*

278   **Supplementary comment:** The term "Developmental Language Disorder" is consistent with

279   ICD-11 (Baird, personal communication), though our definition does not include any

280   nonverbal ability criteria.

281   'Developmental' in this context refers to the fact that the condition emerges in the course of

282   development, rather than being acquired or associated with a known biomedical cause.

283   Although many panel members endorsed it, some objections to the term 'developmental'

284   were encountered. It was noted that 'developmental' can become less useful, or even

285   confusing, as individuals grow older. One proposed solution was to drop the 'developmental'

286   part of the term in adulthood – this is how this issue is typically handled in the case of

287   (developmental) dyslexia, where affected adults usually refer to themselves as 'dyslexic'.

288   Some panel members noted specific meanings of 'developmental' that were not intended:

289   e.g., that this was something that the child might 'grow out of', or – quite the converse - that

290   a developmental problem meant that the child would be unable to develop language. It was

291   also suggested that this term might be hard for parents to understand – though similar

292   objections were made for other alternatives that were offered, namely 'primary' and

293   'specific' language disorder.

294   *Statement 8. A child with a language disorder may have a low level of nonverbal ability. This*

295   *does not preclude a diagnosis of DLD.*

296   **Supplementary comment:** It is important to recognise that language can be selectively

297   impaired in a child with normal nonverbal ability, but this statement confirms that a large

298   discrepancy between nonverbal and verbal ability is not *required* for a diagnosis of DLD. In

299   practice, this means that children with low normal-range nonverbal ability can be included as

300   cases of DLD.

301   ***Statement 9. Co-occurring disorders*** *are impairments in cognitive,sensori-motor or*

302   *behavioural domains that can co-occur with DLD and may affect pattern of impairment and*

303   *response to intervention, but whose causal relation to language problems is unclear. These*

304   *include attentional problems (ADHD), motor problems (developmental co-ordination*

305   *disorder or DCD), reading and spelling problems (developmental dyslexia), speech*

306   *problems, limitations of adaptive behaviour and/or behavioural and emotional disorders.*

307   **Supplementary comment:** The terminology used for neurodevelopmental disorders can

308   create the impression that there is a set of distinct conditions, but the reality is that many

309   children have a mixture of problems. Indeed, the same problems may be labelled differently

310   depending on the professional the child sees. For example, the same child may be regarded as

311   having DLD by a SLT/P, dyslexia by a teacher, auditory processing disorder by an

312   audiologist, or ADHD by a paediatrician. Given our focus on DLD, our aim with this

313   statement is to make it clear that presence of another neurodevelopmental diagnosis does not

314   preclude DLD.

315   Some panel members noted that a case could be made for including ASD as a co-occurring

316   disorder, rather than a differentiating factor. One reason for keeping it as a differentiating

317   factor is that a substantial minority of children with ASD have a clear genetic aetiology:

318   changes in chromosomes, copy number variants or specific mutations estimated as

319   accounting for around 25% of cases (Bourgeron, 2015), a figure likely to increase with

320   advances in genetic methods. This is in contrast with the other neurodevelopmental disorders

321   listed here, where, although there is evidence for heritability, the aetiology appears to be

322   complex and multifactorial, see e.g., Bishop (2015) on dyslexia. In addition, communication

323   problems are a core diagnostic feature of ASD, albeit with wide variation in the severity and

324   nature of their language problems (Williams, Botting, & Boucher, 2008). Finally, the co-

325   occurring social and behavioural difficulties suggest the need for a distinctive intervention

326   approach for ASD and DLD.

327   There was discussion about including auditory processing disorder (APD) as a co-occurring

328   condition. This category is controversial (Moore, 2006), but this should not lead to it being

329   ignored. Children who are given this diagnosis often have co-occurring language problems

330   which require expert evaluation (Dawes & Bishop, 2009; Sharma, Purdy, & Kelly, 2009).

331   Some panel members noted that relatively pure cases without co-occurring problems might

332   be more common in epidemiological than in clinical samples. However, that this may in part

333   reflect the criteria used to define cases in epidemiological studies, who may not be screened

334   for difficulties in domains beyond language and IQ. A focus on 'pure' cases has been

335   traditional in research settings, because it can clarify which features of a disorder are specific

336   to language. However, this can make it difficult to generalise research findings to many

337   children seen in clinical settings, where co-occurring conditions are more commonly

338   observed. Most panel members agreed that the term DLD should apply whether or not co-

339   occurring problems are documented.

340   ***Statement 10. Risk factors*** *are biological or environmental factors that are statistically*

341   *associated with language disorder, but whose causal relationship to the language problem is*

342   *unclear or partial. Risk factors do not exclude a diagnosis of DLD.*

343   **Supplementary comment**: These are factors that are not robust predictors of individual

344   children's language status or outcome, but which are more common in children with language

345   disorders than typically-developing children (Zubrick, Taylor, & Christensen, 2015). A

346 systematic review found that commonly documented risk factors include a family history of

347 language disorders or dyslexia, being male, being a younger sibling in a large family, and

348 fewer years of parental education (Rudolph, 2016). Prenatal/perinatal problems do not seem

349 to be an important risk factor for language disorders (Tomblin, Smith, & Zhang, 1997;

350 Whitehouse, Shelton, Ing, & Newnham, 2014).

351 It is important to note that associated risk factors may differ depending on the age of the

352 child, and whether epidemiological or clinical samples are considered.

353 *Statement 11. DLD is a heterogeneous category that encompasses a wide range of problems.*

354 *Nevertheless, it can be helpful for clinicians to pinpoint the principal areas for intervention,*

355 *and researchers may decide to focus on children with specific characteristics to define more*

356 *homogeneous samples for study. We suggest here some guidelines for more in-depth analysis*

357 *of language problems.*

358 **Supplementary comment**: The panel members did not reach good agreement on

359 terminology for subgroups, and this may reflect the fact that, although attempts have been

360 made to develop a classification of subtypes, these have not in general been validated as

361 categories that are stable over time (Conti-Ramsden & Botting, 1999). The traditional

362 distinction used in DSM, between receptive and expressive language disorder, is rather gross,

363 and fails to indicate which aspects of language are proving problematic. We have therefore

364 opted for an approach that uses specifiers, i.e., the principal dimensions of language

365 difficulty, with a recommendation that assessment focus on identifying which areas are most

366 impaired. Note: the domain of written language, which is commonly affected in DLD, is

367 beyond the scope of this study.

368 The lower section of Figure 1 notes that areas of language impairment should be specified for

369 children with a diagnosis of Language Disorder. We briefly outline these below.

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 A DLD diagnosis is appropriate for phonological problems that persist into school age; these

393 are often accompanied by other language problems and have a poorer prognosis (Bird,

394 Bishop, & Freeman, 1995; Bishop & Edmundson, 1987). Where the child has a mixture of

395 language disorder and motor or structural problems with speech production, a dual diagnosis

396 of DLD with SSD is appropriate.

397 Some children have impairment affecting phonological awareness, i.e. they have difficulty

398 explicitly categorising and manipulating the sounds of language. For instance, they may be

399 unable to identify the three phonemes constituting the word 'cat', or to recognise that 'cat'

400 and 'car' begin with the same phoneme. Phonological awareness has been studied extensively

401 in children with reading disability, where it is commonly impaired, even in children with

402 normal speech production. Although phonological awareness is often deficient in children

403 with DLD, we do not regard it as a defining aspect of phonological disorder, because it is a

404 meta-linguistic skill that is as much a consequence as a cause of literacy problems (Wimmer,

405 Landerl, Linortner, & Hummer, 1991).

406 Syntax: A considerable body of research has focused on documenting syntactic impairments

407 in children with DLD (Van der Lely, 2005). Expressive problems with morpho-syntax are of

408 particular theoretical interest, and there have been contrasting attempts to account for them in

409 terms of linguistic and processing theories (Leonard, 2014). Receptive language impairments

410 affecting syntax can also occur, with children failing to interpret meaning conveyed by

411 grammatical contrasts (Hsu & Bishop, 2014), or showing problems in distinguishing

412 grammatical from ungrammatical sentence forms (Rice, Wexler, & Redmond, 1999).

413 Word finding and semantics: Some children struggle to produce words despite having some

414 knowledge of their meaning – these are known as 'word finding difficulties' (Messer &

415 Dockrell, 2006). Others have limited knowledge of word meanings – a problem that comes

416 under the domain of lexical semantics. The child may be poor at understanding multiple word

417 meanings and/or use a restricted vocabulary. The latter problem has been particularly noted in

19

418   verb use, where the term 'general all-purpose verbs' has been coined to describe this

419   phenomenon (Kambanaros & Grohmann, 2015; Rice & Bode, 1993). Semantic impairments

420   also encompass problems with expressing or understanding meaning from word

421   combinations; e.g. understanding the scope of the quantifier (all/none) in sentences such as

422   'all the pens are in the boxes' or 'none of the pens are in the boxes' (Katsos, Roqueta,

423   Estevan, & Cummins, 2011).

424   <u>Pragmatics/language use</u>: Pragmatic difficulties affect the appropriate production or

425   comprehension of language in a given context. They include such characteristics as providing

426   too much or too little information to a conversational partner, insensitivity to social cues in

427   conversation, being over-literal in comprehension, and having difficulty understanding

428   figurative language (Adams, 2002). These difficulties are hallmarks of the communicative

429   problems seen in ASD, but are also found in children who do not meet criteria for autism.

430   Specific terminology has been proposed for non-autistic children with pragmatic

431   impariments. In ICD-11, the term pragmatic language impairment is used as a descriptive

432   qualifier within DLD. In DSM-5, a new category of social (pragmatic) communication

433   disorder (SPCD) has been introduced – see Baird and Norbury (2016).

434   We considered adopting the DSM-5 term in CATALISE, but decided against this for several

435   reasons. First, in DSM-5, SPCD is seen as a new category of neurodevelopmental disorder,

436   whereas we regard pragmatics as part of language, and hence pragmatic impairment as a type

437   of language disorder. Second, the label SPCD emphasises social communication, rather than

438   language; in contrast, our focus is on linguistic problems.

439   Interventions are being developed that address linguistic as well as social aspects of such

440   communication problems (Adams, 2008), and a focus on pragmatic language as a feature of

441   DLD should help direct children to appropriate intervention.

442   Discourse: In contexts such as narrative, children must learn to process sequences of

443   utterances, so that they form a coherent whole. Children who lack this ability may produce

444   sequences of utterances that appear disconnected and hard to follow. They may also

445   experience comprehension failure if they interpret one sentence at a time, without drawing

446   the necessary inferences to link them together (Karasinski & Weismer, 2010).

447   Verbal learning and memory: The research literature has shown that many children with DLD

448   have problems in retaining sequences of sounds or words over a short delay (verbal short-

449   term memory), learning associations between words and meaning, or learning statistical

450   patterns in sequential input (Archibald & Gathercole, 2006; Bishop, North, & Donlan, 1996;

451   Campbell, Dollaghan, Needleman, & Janosky, 1997; Conti-Ramsden, 2003; Ellis Weismer,

452   1996; Gillam, Cowan, & Day, 1995; Leonard et al., 2007; Lum, Conti-Ramsden, Page, &

453   Ullman, 2011; Lum & Zarafa, 2010; Montgomery, 2002). Their language limitations are

454   different from those due to poor hearing or auditory discrimination, or to lack of knowledge

455   due to unfamiliarity with the ambient language.

456   Statements 2-11 are synthesised in Figure 1.

457   (Figure 1: Diagnostic flowchart about here)

458

459   *Statement 12. It can be useful to have a superordinate category for policymakers, because*

460   *the numbers of children with specific needs in the domain of speech, language and*

461   *communication has resource implications. The term* **Speech, Language and Communication**

462   **Needs (SLCN),** *already in use in educational services in the UK, is recommended for this*

463   *purpose.*

464   **Supplementary comment:** DLD can be viewed as a subset within a broad category that

465   covers the whole range of problems affecting speech, language and communication,

466   regardless of the type of problem or putative aetiology.

467   As shown in Figure 2, this is a very broad category that encompasses children with DLD (as

468   defined above), but also includes cases where problems have a clear physical basis (e.g.

469   dysarthria), or affect speech fluency or voice. Also included here are children who have needs

470   due to limited familiarity with the language used in the classroom, and those who have

471   communication difficulties as part of other differentiating conditions.

472   It is not anticipated that this terminology will be useful for those doing research on the nature

473   or causes of language disorders, nor will it be helpful in explaining a child's difficulties to

474   parents or in determining a treatment pathway. It could, however, serve a purpose for those

475   who need to plan services, who may need to estimate how many children are likely to require

476   additional support, and to bridge across professional divides (McKean et al., in press). In

477   addition, it recognises children who have language needs that may require extra help or

478   accommodations in the classroom, even if they do not have a language disorder. These

479   would include those who are shown in pathways terminating in ● in the Flowchart in Figure

480   1, i.e., children with milder difficulties who should respond well to classroom modification,

481   children with hearing loss who use sign language, or children who have had limited exposure

482   to the ambient language.

483

484   Figure 2 about here: Depiction of DLD as nested within the broader SLCN category

485

General Discussion

487   Despite the geographical and professional diversity of the panel there were some points of

488   broad agreement, as follows:

489   a)   Some children have language problems that are severe and persistent enough to create

490   long-term functional challenges, in daily communication and/or educational attainment.

491   b)   There is no clear dividing line between normality and disorder.

492   c)   Within the domain of language, children's problems do not neatly segregate into

493   subtypes, and there may be overlap between problems in speech, language and

494   communication.

495   A complicating factor in the nosology of language disorders is that it has in the past been

496   based on information from a mixture of different levels of description: (i) information about

497   the severity and type of presenting problems with language; (ii) co-occurring problems in

498   non-language domains, such as nonverbal ability, social interaction, or attention; and (iii)

499   putative biological and environmental causes, such as brain damage, a genetic syndrome, or

500   social disadvantage. Implicit in this approach has been the view that the constellation of

501   verbal and nonverbal skills will map onto natural subtypes with distinct causes, such that we

502   can use the linguistic, cognitive and behavioural profile to distinguish the child whose

503   language problems have environmental or genetic origins. However, this approach has not

504   worked. As research has progressed, it has become evident that causes of language disorders

505   are complex and multifactorial, and there is no neat one-to-one mapping between aetiology

506   and phenotype.

507   In many ways, the results of this consensus exercise may seem unsurprising. The principal

508   recommended term, DLD, has a long history in the field, and is compatible with planned

509   usage in ICD-11 and close to the term (Language Disorder) used in DSM-5. It was one of

510   four possible terms considered in Bishop's (2014) original review of terminology, and already

511   had reasonable representation in a Google Scholar search. For many of those working in this

512   area, however, this represents quite a radical departure from previous practice. The term

513   Specific Language Impairment, which was the most frequent in the research literature, was

514   the subject of substantial disagreement among the panel, with strong arguments being put

515   forward both for its retention and its rejection. Ultimately, the decision was made to reject the

516   term. A major drawback of this decision is that it creates a discontinuity with prior literature,

517   which could affect future meta-analyses and systematic reviews. On balance, however, it was

518   concluded that the term 'specific' had connotations that were misleading and confusing and

519   that, rather than redefining the term it would be better to abolish it.

520   There are other aspects of terminology where the Delphi process exposed points of

521   disagreement, but also clarified reasons for these and so allowed us to identify ways forward.

522   Discussions about the term 'disorder' revealed principled objections by those who were

523   concerned about medicalisation of normal developmental variation. At the same time,

524   concerns were expressed that other terminology might trivialise the problems of children who

525   had persistent problems that interfered with their social and educational development. The

526   solution we adopted was to retain 'disorder' but define it in a way that required functional

527   problems with a poor prognosis. This may seem a small change, but it does have major

528   implications. In particular, it cautions against defining language disorder solely in terms of

529   statistical cut-offs on language tests. Note also that we reject any attempt to use discrepancy

530   scores to draw a distinction between 'disorder' and 'delay': the term 'language delay' was

531   widely rejected by our panel members as confusing and illogical.

532   The main challenge facing those attempting to use the concept of language disorder that we

533   advocate is that there are few valid assessments of functional language and relatively limited

534   evidence regarding prognostic indicators. More longitudinal research is needed, using designs

535   that allow us to predict individual outcomes rather than just characterise group averages.

536   A further case where the Delphi process helped identify sticking points was the treatment of

537   'exclusionary factors'. We hope that our distinction between differentiating conditions, risk

538   factors and co-occurring disorders will be helpful here. Only differentiating conditions, which

539   correspond to biomedical disorders that are clearly associated with language problems, are

540   distinguished diagnostically from DLD. Risk factors and co-occurring disorders are noted but

541   do not preclude a diagnosis of DLD. This contrasts with prior practice in some quarters,

542   where a child's social background or presence of problems in other developmental areas

543   could leave a child without a diagnosis, and hence without access to support.

544   Finally, although it was generally agreed that there is considerable heterogeneity in children

545   with DLD, we failed to reach consensus about possible terminology for linguistic subtypes of

546   DLD. It is possible that as research advances the situation may change, but another possibility

547   is that it is a consequence of the phenomenon of interest: quite simply, children with DLD do

548   not neatly divide into subtypes along linguistic lines. It is likely that there is substantial

549   aetiological as well as linguistic heterogeneity, just as has been found for the related

550   conditions of ASD (Coe, Girirajan, & Eichler, 2012) and developmental dyslexia (Raskind,

551   Peter, Richards, Eckert, & Berninger, 2013). In addition, the boundaries between DLD and

552   other neurodevelopmental disorders are not clearcut (Bishop & Rutter, 2008). In our current

553   state of knowledge, we propose that the appropriate course of action is to document the

554   heterogeneity rather than attempting to apply a categorical nosology that fails to

555   accommodate a large proportion of children.

556   An obvious limitation of this study is that we restricted our focus to the English language

557   because of the difficulties of devising terms that would be applicable across different

558   language and cultures. We recommend the use of the Delphi method to researchers working

559   with language disorders in other languages, as a good way to achieve better consensus.

560   As with our previous Delphi study, this exercise has revealed the urgent need for further

561   research on children's language disorders, including studies on intervention, models of

562   service delivery, epidemiology, prognosis, linguistic profiles, and functional limitations over

563   time. We hope that by clarifying terminology in this area we will also make it easier to raise

564   awareness of children's language problems.

565

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818 **Key Points**

819 •   Some children have problems with language development that cause significant

820 interference with everyday life or educational progress. Terminology for describing such

821 problems has been inconsistent, hampering communication, leading to inequity over access to

822 services, and confusion in synthesising research.

823 •   A group of experts representing a range of professions and English-speaking countries

824 using the Delphi method, came to a consensus that 'Developmental Language Disorder'

825 (DLD) is the preferred term for language problems that are severe enough to interfere with

826 daily life, have a poor prognosis, and are not associated with a clear biomedical aetiology.

827 •   We replace the traditional exclusionary criteria in the definition of language disorder,

828 with a three-fold distinction between differentiating conditions, risk factors and co-occurring

829 conditions.

830 •   We provide guidelines about terminology in this area that can be used in clinical and

831 research contexts

832 The recommended term 'Developmental Language Disorder (DLD) is consistent with
833 terminology in DSM-5 (Language Disorder) and the proposed term for use in ICD-11.

834 **Appendices**

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

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

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

838   Appendix 3. Relationship between Round 2 statements and final statements reported in

839   Results section.

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

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

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845   Table 1

846   **Professional group and nationality of panel members**

Profession	N and Nationality	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

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850   **Figure captions**

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852   Figure 1: Flowchart illustrating pathways to diagnosis of language disorder. Numbers in

853   square brackets refer to Statements in the Results section

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

855

856   Figure 1

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