Supporting Adjective Learning by Children with DLD: Enhancing Metalinguistic Approaches

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Abstract

Background: Adjectives are essential for communication, conceptual development, and academic success. However, they are semantically and syntactically complex and can be particularly challenging for children with Developmental Language Disorder. Surprisingly, language interventions have not typically focused on this important word class.

Aims: 1) To provide a supportive and accessible primer on adjectives for practitioners; 2) to explore how the SHAPE CODING™ system can be adapted to support adjective learning in DLD; and 3) to provide practical recommendations on how to support adjective learning in clinical practice and education.

Methods/procedure: We synthesise linguistic and psychological research on adjective semantics, clinical insights into DLD, and pedagogical practice supporting this population.

Main contribution: We address the lack of specific training in the nature and acquisition of adjectives for SLTs by providing an accessible primer. We provide an innovative, detailed, and practical guide to adapting an established metalinguistic intervention to support adjective learning.

Conclusions/Implications: Without targeted support for adjective learning, the communicative potential of children with DLD is compromised. Our guide can be used across a range of therapeutic and educational contexts to enable SLTs and teaching staff to improve their understanding and practice in this area and, ultimately, to develop robust, effective interventions for children with DLD.

What this paper adds

What is already known on this subject

Adjectives are an essential word class needed for effective communication. They are also vital to successfully achieve academic objectives across all curriculum areas. For example, most subjects require children to be able to describe, evaluate, compare and discriminate different events, objects, or techniques. Children with Developmental Language Disorder (DLD) have deficits in various domains of language that can affect adjective learning and use.

What this article adds

Despite the importance of adjectives, speech and language therapists (SLTs) and other professionals supporting language development rarely receive specific training regarding their structure and meanings, and how to teach and support their use. This article provides an accessible primer on the many subtypes of adjectives and how these behave syntactically and semantically. It explores how adjective teaching can be enhanced for children with DLD by adapting an established metalinguistic technique, and provides practical recommendations for implementing this approach.

Clinical implications of this study

By raising awareness of the complexities of adjectives and providing strategies to support their acquisition by children with DLD, this article will enable SLTs and teaching staff to improve their understanding and practice in this area and, ultimately, to develop robust, effective interventions for children with DLD. This will contribute to enhancing the long term academic, social and employment success of children with DLD.

84 **Declaration of interest**

85 Susan Ebbels developed the SHAPE CODING™ system. Susan Ebbels and Hilary Nicoll
86 develop and deliver courses and develop resources on the SHAPE CODING™ system for their
87 employer Moor House Research and Training Institute, which is part of the charity Moor House
88 School & College. There are no further conflicts of interest.

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91 **1. Introduction**

92 Producing and understanding referring expressions is a key ability within communicative
93 development. Alongside the naming abilities that emerge during the preschool years, children
94 learn to refine these labels using adjectives, e.g., *the big one* or *the sock that's pink*. This lexical
95 expansion allows them to specify, evaluate, and discriminate between entities by highlighting
96 certain properties. Although adjectives are not usually among the first words in children's
97 vocabulary (Sandhofer & Smith, 2007), typically developing children usually master a range of
98 adjectives by the time they enter formal education around their fifth birthday.

99 Children's emerging skills in descriptive language are also essential for academic success. For
100 example, a key target in mathematics at Key Stage 1 (UK Years 1 and 2; 5-7 year-olds) is to
101 describe, compare and sort different shapes, and to compare different quantities such as length,
102 mass, time, and money using appropriate vocabulary (DfE, 2014). In science, children must
103 contrast familiar plants and animals, describe how to identify and group them, and compare
104 different textures, sounds, and smells (DfE, 2014). Similar objectives exist across other subject

105 areas, e.g., geography, history, arts, in which adjectives are used to discuss colour, size, texture,
106 and other properties. Children must also incorporate them into longer grammatical structures
107 (i.e., syntax), modify adjectives using suffixes (i.e., morphology), and use them in appropriate
108 contexts (i.e., pragmatics). Together, these skills are essential for a wide range of academic skills
109 across a range of subject areas.

110 Not all children follow the same developmental path; some struggle to learn certain aspects of
111 language. Adjectives can be particularly challenging for children with Developmental Language
112 Disorder (DLD) due to their combinatorial properties and restrictions stemming from different
113 subtypes of adjectives. These complexities are rarely taught explicitly. An additional contributor
114 to the challenge is that language interventions and clinical research have tended to focus on
115 nouns or verbs, with only a handful of interventions targeting adjective learning (Justice et al.,
116 2014; Ricks & Alt, 2016), despite them being crucial for opening up the full range of meaning,
117 sophistication in grammar, and access to the curriculum. Compounding this issue, speech and
118 language therapists (SLTs) may not have received specific training in the semantic and syntactic
119 rules governing adjective use. Consequently, practitioners may not be able to explicitly model or
120 explain these rules during teaching or intervention.

121 Considering the importance of adjectives in communicative and conceptual development, the
122 linguistic complexity they present, and their relative rarity in intervention, we argue that
123 adjectives should be specifically targeted in populations that find them challenging. To enable
124 practitioners to support adjective development, this article provides an accessible primer on the
125 various types of adjectives and the relationship between their semantics and the syntactic
126 structures in which they appear (section 2). We then review research highlighting the challenges
127 that DLD presents for adjective learning, and make the case for greater attention on semantic

aspects of the disorder to benefit adjective learning (section 3). Drawing from our primer, we then explore how metalinguistic interventions can be adapted to incorporate the many subtypes of adjectives (section 4). We focus on how the SHAPE CODING™ system (a widely-used strategy for visually capturing language structure; Ebbels, 2007) can be extended to support adjective learning. Finally, we present recommendations for SLTs and teachers introducing adjectives across a range of therapeutic and educational contexts (section 5). In summary, we provide a user-friendly guide to the theory and practice of targeted support for adjective learning, and argue that without this discrete focus, children with DLD miss out on a crucial aspect of language that not only supports their communication, but is critical for academic success.

2. Adjective distribution and meaning: A linguistic primer for SLTs

In this section, we present a primer on adjectives - what they are and what they mean. We first identify what counts as an adjective by examining the distribution of adjectives relative to other words - where do they appear within sentences? To delineate what it is about adjectives that proficient language users must acquire, we then turn to what adjectives mean. We focus on four main features of adjective meaning: GRADABILITY, ENDURANCE, SUBJECTIVITY, and ANIMACY, and look at how adjectives can form SEMANTIC DOMAINS - groups of lexically related items. Having considered the distributional and semantic profiles of adjectives, we then bring these two lines together to illustrate an important fact for SLTs: that the distribution of adjectives is informative about their meaning, precisely because adjective meaning constrains their distribution. Furthermore, children recruit this information when acquiring word meaning. Integrating this bidirectional link between distribution and meaning into instruction and clinical

150 interventions could help equip children with the knowledge they need for success across the
 151 curriculum.

152 2.1 What counts as an adjective? Where do they appear in the input?

153 Although we all learn that adjectives describe, this definition only goes so far. By looking at
 154 *where* adjectives appear in the input, we gain a deeper understanding of the properties of
 155 adjectives; specifically, how their position helps to convey their meaning.

156 Adjectives appear alongside articles like *a* or *the*, quantifiers like *every*, and numerical
 157 expressions like *two*. They also appear immediately alongside the noun they modify. Most
 158 adjectives in English can appear in both prenominal position (before nouns: 1a), and in
 159 predicative position (after a copular or a linking verb: 1b).

- 160 (1) a. That is a {**tall, strong, impressive**} gymnast.
 161 b. That gymnast {is, appears} {**tall, strong, impressive**}.

162
 163 While most adjectives appear in both positions, there are exceptions¹ (see 2a, where ‘*’ indicates
 164 an ungrammatical sentence). Note that adjectives with a similar meaning (2b) or similar-
 165 sounding adjectives (2c) can appear in either slot.

- 166 (2) a. The child is {**asleep, afraid**}. vs *The {**asleep, afraid**} child
 167 b. The child is {**sleeping, frightened**}, The {**sleeping, frightened**} child
 168 c. The child is {**amazing, alert**}, The {**amazing, alert**} child

¹ This difference is housed in historical reasons (many of these adjectives being derived from Old English prepositional phrases with ‘a’ plus a noun). While the vast majority of speakers are unaware of this diachronic shift, children somehow learn this difference (Goldberg & Boyd, 2015).

169

170 Finally, adjectives can also be stacked: all of the adjectives in (1b) can appear together before the
 171 noun as in (1a), in a certain order (Scott, 2002).

172 The order that adjectives and nouns appear in varies across languages. In English, adjectives
 173 primarily appear before the noun, but in French they mostly appear after it. In many languages,
 174 there is also morphosyntactic agreement between the adjective and noun. For example, in
 175 Romance languages like French and Spanish, they must agree in number and grammatical
 176 gender, e.g., *une chemise bleue* (a blue shirt, feminine, singular) vs *les chemises bleues*
 177 (feminine, plural) vs *un chapeau bleu* (a blue hat, masculine, singular).

178 Many adjectives allow speakers to make comparisons by placing them in DEGREE
 179 CONSTRUCTIONS, where they are accompanied by additional morphology, such as the
 180 comparative, superlative, and equative in (3), respectively.

- 181 (3) a. She is {**taller**, more **clever**} than her sister.
 182 b. She is the {**tallest**, most **clever**} in her class.
 183 c. She is as {**tall**, **clever**} as her brother.

184 There are some common exceptions to these regular comparatives, e.g., *good*, *better*, *best*.

185 Many ‘how’ questions are also degree constructions, since they measure amounts or quantities of
 186 a property. When adjectives appear in such questions, they commonly appear before the copular
 187 verb (4a), in contrast to (4b) and (4c), which elicit descriptions.

- 188 (4) a. How {**big**, **long**, **heavy**} is it?
 189 b. How does it {feel, taste}?/What does it {feel, taste} like?

190 c. How do you feel?

191 2.2 What forms do adjectives take?

192 The fact that adjectives can appear with comparative morphology (e.g., *-er*, *-est*) shows that they
 193 do not always appear in their root form (e.g., *big*). Like nouns and verbs, adjectives take on
 194 INFLECTIONAL and DERIVATIONAL MORPHOLOGY, which changes not only their form, but in the
 195 latter case, their meaning.

196 Unlike verbs (*walk*, *walking*, *walked*), English adjectives have impoverished inflectional
 197 morphology. However, they do take on inflectional morphology. For example, the comparative
 198 morpheme *-er* and the superlative morpheme *-est* transform the root form to one that explicitly
 199 compares properties, but the word remains an adjective. As mentioned above, in some languages,
 200 adjectives agree in gender and number with their accompanying noun. In neither case does the
 201 morphology change the word's grammatical category.

202 Adjectives can also take on derivational morphology that transforms them into adverbs (e.g.,
 203 *slowly*, *quickly*) or verbs (e.g., *lighten*). Other adjectives have already been formed from other
 204 grammatical categories like nouns (e.g., *spotted*, *bumpy*) or verbs, as shown with the adjectival
 205 passives in (5) and (6).

206	(5)	a. The lecture bored the girl.	(verb, past tense)
207		b. The girl is bored .	(adjectival passive)
208	(6)	a. The tree broke the window.	(verb, irregular past tense)
209		b. The window was broken (by the tree).	(adjectival passive)

Still in other cases, a word can be lexically ambiguous, e.g., *clean*, *dry*, *wet*, functioning as verbs as well as adjectives, disambiguated by the discourse context.

2.3 What do adjectives mean?

Tracking the syntactic distribution of words is not sufficient for understanding the adjective category. We must also know what adjectives mean. Saying that they describe is not enough; this does not do justice to the range of adjective meanings children must acquire. As it turns out, these differences in meaning constrain where these words appear in the syntax, and as a result, the distribution of adjectives can tell us something about their meaning. In fact, children can use syntax to learn semantics; they can track the linguistic environments in which words appear (i.e., the position in a sentence relative to other words) to deduce something about their semantic representation (i.e., their meaning). This phenomenon is known as ‘syntactic bootstrapping’ (Gleitman, 1990) or ‘structure mapping’ (Fisher, 2002), and its power in verb learning is well documented. For example, given a choice between a scene with an agent causally acting on a patient, and a scene with two agents coordinating an action, toddlers reliably look at the former when they have heard a transitive frame *The duck is gorping the bunny* versus a conjoined-subject intransitive frame *The duck and the bunny are gorping* (Naigles, 1990).

Here, we focus on four main features of adjective meaning cued by syntax: GRADABILITY, TEMPORAL ENDURANCE / GENERALISABILITY, SUBJECTIVITY, and ANIMACY. As with the surface-level distributions discussed in 2.1, these features produce distinct semantic domains. These subtypes of adjectives, along with some examples and surface-level patterns that highlight these distinctions, are summarised in Table 1.

232 Table 1. Types of adjectives discussed in this paper

Adjective category	Examples	Characteristics
Gradable	(see subtypes below)	Appearance in degree constructions: - <i>is very/so/extremely/really/too ADJ</i> - <i>is ADJ enough</i> - <i>is as ADJ as</i>
- Relative	<i>big, tall, long, expensive</i>	Restrictions on adverbial modification: - <i>*slightly big</i> - <i>*half big</i> - <i>*completely big</i>
- Absolute minimal	<i>bumpy, spotted, fluffy</i>	Restrictions on adverbial modification: - <i>slightly bumpy</i> - <i>half spotted/ spotted all over</i> - <i>?completely bumpy</i>
- Absolute maximal	<i>full</i>	Restrictions on adverbial modification: - <i>*slightly full</i> - <i>completely full</i>
Non-Gradable	<i>coniferous, wooden, plastic, extinct</i>	Absence in degree constructions: - <i>*is very wooden</i> - <i>*is more plastic than/too plastic</i> - <i>*is as extinct as</i>
Temporary	<i>sleepy, happy, frustrated</i>	Flexible adverbial modification: - <i>is currently sleepy</i> - <i>was happy yesterday</i> No generalisation within kind: - <i>if x is sleepy, no guarantee y might be too</i>
Durative/ enduring	<i>intelligent, British, friendly</i>	Restrictions on adverbial modification: - <i>*is currently intelligent/British</i> - <i>*was intelligent/British yesterday</i> Generalisation within kind: - <i>if x is friendly, y might be too</i>
Colour	<i>red, blue, yellow</i>	Pattern with relative gradable adjectives: - <i>very/too red</i> - <i>red enough</i> - <i>as red as</i> Pattern with absolute minimal gradable adjectives: - <i>slightly red</i> - <i>half red</i>

233 **2.3.1 Gradability**

234 Gradability is one core distinction among adjective meanings that is reflected in the syntax.

235 Gradable adjectives (GAs) convey measurable properties and (in English and in many other
236 languages) encode degrees or extents in their semantic representation, licensing them to appear
237 in ‘degree constructions’ as shown in (7).

238 (7) a. This pine tree is {**tall, old**}.

239 b. This pine tree is {**taller, older**} **than** that juniper tree.

240 c. This oak tree is {**as tall as** that pine tree; **too old to** uproot}.

241 Other adjectives are not gradable: either the entity possesses the property or it does not. As a
242 result, non-gradable adjectives are not licensed in degree constructions as shown in (8).

243 (8) a. This tree is {**coniferous, deciduous**}.

244 b. *This tree is more {**coniferous, deciduous, living**} than that tree.

245 c. *This tree is as {**coniferous, deciduous, living**} as that tree.

246 d. *This tree is too {**coniferous, deciduous, living**}.

247 As shown in Table 1, there are three main kinds of GAs. First, relative GAs are defined relative
248 to a contextually-set standard of comparison. A hallmark of relative GAs is that they can appear
249 with ‘for’ phrases, which provide the contextual standard (see 9).

250 (9) a. She is **tall** for a gymnast.

251 b. That’s **expensive** for a latte.

252 On the other hand, absolute minimal GAs like *bumpy* or *dirty* hold true when an object has some
253 minimal presence of a property (like some number of bumps or amount of dirt). By contrast,

- 254 absolute maximal GAs like *full* or *healthy* encode a maximal endpoint, relative to the universal
 255 presence of one property and the absence of another (e.g., *full/empty*, *healthy*).
- 256 The different types of gradable adjectives can be highlighted using comparatives. While (10-12a)
 257 below may all be true, only the inference in (10b) is licensed.
- 258 (10) a. This road is **bumpier** than that one. (absolute minimal GA).
 259 b. $\Rightarrow$ This road is **bumpy**
- 260 (11) a. This child is {**taller**, **older**} than that child. (relative GA)
 261 b. $\Rightarrow$ This child is {**tall**, **old**}
- 262 (12) a. This bottle is {**fuller**, **cleaner**} than that bottle. (absolute maximal GA).
 263 b. $\Rightarrow$ This bottle is {**full**, **clean**}
- 264 Adverbial modification of GAs also reveals these distinctions, due to the selectional restrictions
 265 of adverbs (Kennedy & McNally, 2005). An intensifying adverb such as *very* (or *really* or
 266 *extremely*) can appear with a wide range of adjectives, as shown in (13).
- 267 (13) a. The container is very **tall**. (relative GA)
 268 b. The container is very **full**. (absolute maximal GA)
 269 c. The container is very **dirty**. (absolute minimal GA)
- 270 Toddlers can recruit the presence of these modifiers and the restrictions they encode in adjective
 271 learning (Syrett & Lidz, 2010).
- 272 Since absolute minimal GAs denote the existence of a property, such adjectives can be modified
 273 by *slightly* or *somewhat*, but the same adverbs sound odd with relative GAs like *tall*, or absolute
 274 maximal GAs like *full*, as shown in (14).

275 (14) a. *The container is slightly **tall** (relative GA)

276 b. *The container is slightly **full** (absolute maximal GA)

277 c. The container is slightly **dirty** (absolute minimal GA)

278 Finally, an adverb such as *completely* (or *entirely* or *half*) can modify an absolute maximal GA
279 that has a fixed, endpoint-oriented standard, but not one like *tall*, as shown in (15).

280 (15) a. *The container is completely **tall** (relative GA)

281 b. The container is completely **full** (absolute maximal GA)

282 c. ?The container is completely **dirty** (absolute minimal GA)

283

284 2.3.2 Temporal endurance and generalisability

285 Adverbial modifiers are also important for highlighting another aspect of meaning: endurance.

286 Some adjectives encode properties in their semantics that are relevant to time, and may or may

287 not allow for broader generalisations. Some of these properties are transient, as in (16a), while

288 others express properties that are long lasting, as in (16b).

289 (16) a. The toddler {is (currently) **sleepy** (right now)/was **sleepy** yesterday}.

290 b. *Her father {is (currently) **British** (right now)/was **British** yesterday}.

291 Some adjectives license both meanings, giving rise to lexical ambiguity, as shown in (17).

292 Firefighters have the generic property of being available to fight fires when needed (18a), but

293 individual firefighters stationed nearby could be described as being available for the job they

294 have been dispatched to do (18b). Once again, adverbial modification serves to highlight this

295 semantic distinction.

296 (17) Firefighters are **available**.

297 (18) a. Firefighters are always **available**.

298 b. Firefighters are **available** right now.

299 These adjectives also diverge when making inferences about other instances of a kind. For

300 example, knowing that a dog from a particular breed is **friendly** or **loyal** might invite an

301 inference that others of the same breed are as well. However, knowing that the same dog is

302 **sleepy** or **hungry** does not invite the same inference about others.

303

304 2.3.3 Subjectivity

305 Some relative GAs carry the further semantic feature of expressing an agent's subjective view

306 about something, as in (19).

307 (19) a. {I think} this casserole is **delicious**.

308 b. This game is **fun** {for the whole family, for children}.

309 The importance of this perspective-taking can be highlighted using a dialogue like (20). Two

310 speakers can deliver assertions with seemingly opposite truth values, and *both* can be taken to be

311 asserting something true. This phenomenon is known as 'faultless disagreement'.

312 (20) A: This game is **fun**!

313 B: No, this game is not **fun**! It's **boring**!

314 Some of these adjectives allow a ‘for’ phrase to express an agent’s perspective or disposition
 315 relative to an action or event, expressed by the optional infinitival ‘to’ phrase, both in
 316 parentheses in (21) (Becker, 2017).

317 (21) This game is {**tough, fun**} (for him) (to play).

318 Learners can also recruit the meaning of words that appear alongside adjectives to deduce
 319 something about the semantics of adjectives. For example, there are times when the noun that an
 320 adjective modifies actually specifies the meaning of the adjective, because the adjective itself is
 321 indeterminate, as in (22a). What counts as being ‘good’ or ‘talented’ at these professions varies
 322 wildly. For this reason, these adjectives can also be followed by a ‘for’ phrase featuring these
 323 nouns.

324 (22) a. She is a {**good, talented**} {dancer, butcher, accountant, pilot}.

325 b. She is {**good, talented**} for a {dancer, butcher, accountant, pilot}.

326 c. She is {**tall, clever**} for a 7-year-old.

327

328 2.3.4 Animacy

329 Co-occurring words can also be informative about another feature of adjective meaning:
 330 animacy. The adjectives appearing in (23a) denote emotions or dispositions, and therefore can
 331 only be true of animate (or anthropomorphised) beings, making (23b) sound odd². A learner must
 332 first know something about the entity referred to by the noun to know which adjectives can

² Here, we use ‘#’ rather than ‘*’ to indicate that while these sentences are grammatical (i.e., the syntax can generate them), their meaning is infelicitous.

333 appear with it, or whether the verb *feel* can appear with both. They could, in principle, use such
334 information to make deductions about novel adjectives (Shablack et al., 2019).

335 (23) a. She is (feeling) very {**sad, happy, tired**}.

336 b. #This chair is (feeling) very {**sad, happy, tired**}.

337 Animacy restrictions can also be informative when learning new nouns. A learner might not
338 know what a ‘dax’ is in (24), but they could tell it is animate from the other words (Ferguson et
339 al., 2014; Syrett et al., 2019).

340 (24) a. The dax is very {**sad, tired**}.

341 b. The dax is {**crying, sleeping**}.

342

343 2.3.5 Semantic domains

344 These distinctions in distribution and meaning allow adjectives that pattern similarly to form
345 semantic networks or domains (Clark, 2018). Adjectives with similar meanings (synonyms) e.g.,
346 *big, large, huge*, are linked together, but those with opposite meanings (antonyms) e.g., *long*,
347 *short*, are also related because they share similarities at their core, e.g., extension along the
348 dimension of length. Caregivers may provide surface-level cues about inferences related to these
349 meanings via discourse connectives, as shown in (25).

350 (25) a. She is **small**, but she is **strong**.

351 b. She is **smart**, if not **brilliant**.

Finally, colour adjectives also form a semantic domain, as captured in (26). And like size adjectives, they are relative GAs as shown in (27), although they pattern with both relative (27a) and absolute minimal GAs (27b). However, we typically ask different kinds of questions about colour than we do about size, as shown in the contrast between (28) and (29) (Sandhofer & Smith, 1999) - another form of syntactic bootstrapping.

- (26) a. It is not **big**. It's **small**.
 b. It is not **red**. It's **blue**.
- (27) a. My sunburn is as **red** as yours.
 b. The door is {**slightly, completely**} red.
- (28) a. ?How **red** is it?
 b. What colour is it?
- (29) a. How **big** is it?
 b. ?What size is it?

3. Adjective production and comprehension in Developmental Language Disorder

This section briefly reviews research investigating the challenges that children with DLD experience in word learning, morphology, and syntax - all of which are likely to affect their understanding and use of adjectives. Due to space constraints, we focus on surface manifestations of DLD across these linguistic domains. For key theoretical explanations of DLD, see e.g., Leonard et al., 1997; Rice et al., 1995; Ullman & Pierpont, 2005.

DLD has been defined as a language impairment that affects everyday life but is not associated with a known biomedical condition (Bishop et al., 2017). Children with DLD tend to show impairments in various domains of language including vocabulary and morphosyntax. As a consequence, these children may struggle to achieve academic objectives. Longer-term, DLD-related language difficulties can persist into adulthood, affecting academic and professional development (Conti-Ramsden et al., 2018).

3.1 Vocabulary in DLD

Word learning can be particularly problematic for children with DLD. They tend to have smaller vocabularies (Leonard & Deevy, 2020) and a shallower understanding of the words they know (McGregor et al., 2013). When learning new words, children with DLD need a higher number of exposures to the novel label and its referent (Rice et al., 1994), meaning that they may learn words more slowly than their typically developing peers. They also show disproportionate difficulties identifying visual properties such as colour, pattern, or shape, especially when the visual information has to be processed in parallel with language (Alt & Plante, 2006).

3.2 Morphology in DLD

Morphological deficits (i.e., challenges with the internal structure of words such as word stems and affixes) are pervasive in DLD (Leonard & Deevy, 2020). In English, children with DLD tend to show errors of omission and commission when producing inflectional morphology such as past tense (-ed), third person singular (-s), and possessive ('s) (e.g., Bishop, 2014; Calder et al., 2021). These problems extend to adjective-noun agreement in gender and number (Bedore & Leonard, 2001; Leonard et al., 2001). For example, French-speaking children with DLD show

393 more gender agreement errors in picture descriptions compared to their age-matched peers, e.g.,
 394 *la grenouille(f) vert(m)* (the frog(f) green(m)) (Royle & Reising, 2019).

395 Children with DLD produce more stem truncation errors (e.g., *tider*, *heavest*) when producing
 396 comparative (e.g., *tidier*) and superlative (e.g., *heaviest*) adjectives, and show more errors (e.g.,
 397 *rocksy* instead of *rocky*) when producing adjectives with derivational morphology than their
 398 language-matched, typically developing peers (Marshall & van der Lely, 2007). They also tend
 399 to produce fewer comparatives and adverbial modifiers (e.g., *extremely*, *quite*) than age-matched,
 400 typically developing children (Tribushinina & Dubinkina, 2012). When asked to produce
 401 antonyms, Russian-speaking children with DLD gave more irrelevant answers (e.g., *big* - *with*
 402 *flowers*), produced more negations using ‘not’ rather than an antonym (e.g., *empty* - *not empty*),
 403 and more gender agreement errors than age-matched, typically developing children (Tribushinina
 404 & Dubinkina, 2012).

405 3.3 Syntax in DLD

406 Children with DLD are challenged by a range of syntactic constructions. While many children
 407 with DLD can comprehend and use sentences with a simple subject-verb-object order, sentences
 408 containing more complex structures such as modified noun phrases can cause communication
 409 breakdowns (Gillam et al., 2019). For example, children with DLD are less likely to produce
 410 complement clauses (Owen Van Horne & Lin, 2011), adverbial modifiers, and relative and
 411 coordinate clauses, which often incorporate adjectives (Marinellie, 2004), e.g., *the cow that’s*
 412 *big*.

3.4 Summary

A large body of research on DLD focuses on children's lexical and morphosyntactic abilities, providing useful theoretical and practical insights into their use of adjectives. In addition to solid lexical and morphosyntactic skills, good semantic skills are required to fully understand the meaning of adjectives and to use them appropriately. Much less attention has been given to how children with DLD manage this aspect of vocabulary. However, as we showed in section 2, children need a firm understanding of adjective semantics, for example to correctly ask questions about object properties, make comparisons, or use adverbial modifiers. Given the complex nature of adjective semantics, and the ways that it interfaces with syntax, this relative lack of research drastically limits our understanding of language processing in DLD. For children with DLD, this interplay of syntax and adjective semantics is likely to be particularly challenging, so it is essential that practitioners understand these processes.

4. Interventions to support adjective learning

Because adjective teaching for children with DLD is typically linked to curricular content, the types of adjectives introduced are often determined by the needs of the children based on what is happening in class. However, certain fundamental principles are key to the development of adjective skills across the board. Children need to know where adjectives appear in sentences, what kinds of meanings they convey, how they relate to other words - both other adjectives (e.g., synonyms and antonyms) and also to those linked via inflectional and derivational morphology e.g., *noise* -> *noisy*, *create* -> *creative*, *frighten* -> *frightening* / *frightened*. They also need to

434 understand not only the general features and processes that apply to all adjectives, but also those
435 that are restricted to specific subtypes of adjectives.

436 We structure this section by considering first the general information that children need to know
437 about adjectives: where they can appear and how they are formed. We then discuss how we
438 might teach adjective semantics, incorporating the linguistic features discussed in section 2.
439 Drawing on our combined theoretical, therapeutic, and pedagogical expertise, we describe how
440 the SHAPE CODING system (Ebbels, 2007), a metalinguistic intervention, can be adapted to
441 support adjective learning in children with DLD. We clarify which of these new approaches have
442 been trialled in clinical practice and which are yet to be tried (noting that even those that have
443 been trialled have not yet been fully evaluated in a research study). Our next steps are to trial and
444 assess these ideas with children with DLD, adjusting them according to their response. We
445 encourage clinicians to join us in these efforts and to share their results.

446 **4.1 Teaching children with DLD where adjectives appear**

447 Children need to know where adjectives appear for both expressive and receptive purposes, i.e.,
448 so they can describe and specify objects, and so they can identify adjectives in sentences. As for
449 all unfamiliar words, they need to be able to form hypotheses about a word's meaning, drawing
450 on its position in the sentence (to work out its word class and to enable syntactic bootstrapping),
451 the context (discourse, physical, and visual), and its inflectional and derivational morphology.

452 Children with DLD may have particular difficulties using morphosyntactic cues to work out the
453 meanings of new adjectives. They might also struggle to use meaning to form syntactically
454 accurate sentences, perhaps because they had difficulty using syntactic bootstrapping to learn
455 adjective meanings in the first place. Therefore, they may need to be explicitly taught the rules

governing where adjectives can appear within sentences, the limitations on which adjectives (with which semantic features) can appear in which structures, and how these limitations can be informative about adjective meanings and use.

The SHAPE CODING system (Ebbels, 2007) is an explicit metalinguistic approach to intervention that uses shapes, colours, lines, and arrows to depict and teach the rules of grammar (see also Balthazar et al., 2020 for an introduction). This system helps children to literally see the rules, thus enabling an adult to explain complex grammatical rules in an accessible way with minimal use of language. The SHAPE CODING system has been used successfully with children with DLD to enhance their understanding and production of a range of constructions including production of verb argument structure (Ebbels et al., 2007), comprehension of coordinating conjunctions within noun, verb and adjective phrases (Ebbels et al., 2014), and use of regular past tense (e.g., Calder et al., 2021).

In the SHAPE CODING system, adjectives are coded as ‘green words’ that appear in clouds and answer questions of ‘WHAT (look/sound/smell/taste) LIKE?’ and (for animate subjects) ‘HOW FEEL?’ (see Figure 1).

Figure 1. Questions, shape and colour for adjectives

Children with DLD are taught the positions in which adjectives can appear. The first position that we teach is after the copular verb (diamond), where the cloud describes properties of the external argument (oval) – answering WHO or WHAT (see Figure 2). This is usually the subject

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476 of the sentence. The adjective thus describes either WHAT it is LIKE, or (if animate) HOW it
 477 FEELS. We also teach how to negate using *not* after the diamond.

478 Figure 2. Sentence templates for adjectives following copular verb

481 Next, we teach that adjectives can appear inside noun phrases (see Figure 3), whether this is an
 482 external (oval), or internal argument (rectangle). In English this is between the determiner (in
 483 pink) and noun (in red).

484 Figure 3. Sentence templates showing adjectives within noun phrases

487 Coordination and stacking of adjectives might be taught as part of this step, where only identical
 488 shapes can be coordinated (see Figure 4).

489 Figure 4. Sentence templates including coordination and stacking of adjectives

492 Next, we might introduce adjectives after perception verbs (see Figure 5), or in degree
 493 constructions (Figure 6).

494 Figure 5. Sentence template with adjective appearing after perception verbs

496 As explained in 2.3.1, degree constructions can only be used with gradable adjectives, so we
 497 would discuss with the child which adjectives have the required semantic properties (see 4.3).
 498 Degree constructions often answer a question about HOW + ADJ e.g., *tall*) an object is. To show
 499 that the HOW in this case is asking about degree, we have added vertical lines to a black
 500 underline to indicate measurement (this could be thought of as a ruler or callipers). The degree
 501 modifiers are then marked with the same symbol (see Figure 6). This is a new addition to the
 502 SHAPE CODING system and has not been trialled in clinical practice.

503 Figure 6. Coding of degree constructions and questions involving “how ADJ?”

506 The last two examples in Figure 6 often appear in structures such as those in (30a) and (31a), as
 507 the *too* and *not enough* express the degree relative to an agent and/or activity. Such structures
 508 can be very complex. Indeed, in (30a) *the tree* is both the subject of the main clause and the
 509 (unexpressed) object of the embedded clause. Thus, while these structures might be useful for
 510 typically developing children, they are likely to be too syntactically complex to be helpful for
 511 children with DLD. Therefore, we recommend that in order to provide the same information in a
 512 less complex form, such sentences should be simplified, for example to (30b) and (31b), or even
 513 further to those in (30c) and (31c).

- 514 (30) a. *The tree is too tall for the boy to climb.*
 515 b. *The boy wants to climb the tree, but the tree is too tall.*
 516 c. *The boy (is sad. He) can't climb the tree. The tree is too tall.*
- 517 (31) a. *The boy is not tall enough to reach the sweets.*

b. *The boy wants to get the sweets, but he is not tall enough.*

c. *The boy wants the sweets. He can't get the sweets. He is not tall enough.*

For equatives (e.g., *the tree is as tall as the man*) and comparatives, we split the black measurement symbol between {*as...as*; *-er...than*; *more/less ...than*} (Figure 7). This allows us to show the children why **more taller than* would be incorrect as there are too many degree markers (three instead of two). In clinical practice, we have previously worked with comparatives and equatives using the shapes, though without the black measurement symbol - this had previously been coded green as part of the adjective. We hope that this innovation will improve clinical outcomes in this area and help children link comparatives and equatives to other degree modifiers, which may in turn help them to use and understand these in the curriculum.

Figure 7. Sentence templates and coding for equative and comparative constructions

4.2 Teaching children with DLD what forms adjectives take

In the SHAPE CODING system, different word classes appear in different colours. For words which are superficially ambiguous as to their word class, we show children that they can be different colours and hence go in different positions in the sentence. For example, *clean* could appear in blue (verb) or green (adjective), and *metal* can appear in red (noun) or green (adjective); see Figure 8.

Figure 8. Distinguishing word classes using the SHAPE CODING system

Adjectives with inflectional morphology (e.g., for gender and number in languages with agreement) do not change word class from the root form and hence still appear in green.

546 However, where it is helpful to show plurality and/or gender, we use double vs single and/or
 547 solid vs dashed (vs dotted) lines. Likewise, adjectives with inflectional morphology for
 548 comparison do not change word class. Here the comparative affix or degree modifier is shown
 549 with the black measurement symbol, as in Figure 7.

550 Because adding derivational morphology changes the word class, the modified word appears in a
 551 new colour. So, we teach children with DLD rules such as;

- 552 ● Adding *-ly* turns a word from green (adjective) to brown (adverb): *slowly, quickly*
- 553 ● Adding *-en, -ise* turns a green word into a blue word (verb): *lighten, modernise*
- 554 ● Adding *-ness* or changing *-t* to *-ce* turns a green word into a red word (noun): *darkness,*
 555 *silence*
- 556 ● Adding *-y, -ic, -ous, -ly, -ful, -less* turns a red word into a green word: *bumpy, dangerous,*
 557 *dramatic, friendly, beautiful, powerless*
- 558 ● Green words can be created from blue words, but these are tricky - adding *-ive, -ing*
 559 describes the person (in the oval) doing the action: *creative, accepting, interesting,*
 560 *boring*, whereas adding *-able, -ed, -en*, describes the person or thing in the rectangle:
 561 *acceptable, interested, bored, broken.*

562 We then teach them to find and separate any suffixes in unknown words, as this may lead them
 563 to a familiar root word, which they could use to guess the meaning of the new derived word from
 564 the root plus suffix, e.g., “*bumpy* looks like a word I recognise: *bump*, plus a suffix I have
 565 learned: *-y*, so I can guess that *bumpy* means it has some bumps” (see Ebbels et al., under review;
 566 Glisson et al., in prep).

In the SHAPE CODING system, for transitive verbs, the external argument (in the oval) is the AGENT and the internal argument (in the rectangle) the PATIENT. Thus we can show that some adjectives relate to the participant in the oval of the sentence containing the transitive verb and that some relate to the one in the rectangle (see Figure 9). We can also show that the adjectival passive is linked to the passive sentence where the Patient (in the rectangle) has moved to the front of the sentence and the Agent (in the oval) to the end and the passive morphology is added to the verb.

Figure 9. The relationship between verbs in active and passive and adjectives

4.3 Teaching children with DLD what adjectives mean, how they are related to each other, and their links with syntax

Section 2.3 described the semantic properties of adjectives in terms of animacy, temporal endurance, subjectivity, gradability, and semantic domains. Here we discuss how these linguistic phenomena could be taught to children with DLD, together with a suggested order.

4.3.1. Animacy and Temporal Endurance

As introduced in 4.1, children need to learn that only animate subjects (answering WHO) can have emotions and therefore can combine with adjectives which answer a HOW FEEL question. For example, people and animals, but not towers or trees can feel *hungry*, *tired*, or *bored*.

As noted in 2.3.2, only adjectives that signal temporally-bound (not enduring) properties may be used with certain adverbial modifiers. For example, *hungry* is a transient property that can be true at a certain time, but false at others. When using temporal adverbials with children with DLD, we use arrows to indicate tense (blue arrows on verbs) and time (black arrows on the time adverbial triangle): on the left for past and in the middle for present tense and time (see Figure 10). Some children might need to be taught that enduring adjectives such as *British* or *intelligent* cannot be modified by certain temporal adverbials (e.g., *currently* or *last week*).

Figure 10. Sentence templates including time adverbials

4.3.2 Gradability, semantic domains, and subjectivity

Due to their close interrelationships, we consider gradability, semantic domains (especially synonyms and antonyms), and subjectivity together. We suggest a possible order for teaching adjectives involving these features. It will be important for professionals to show children with DLD how adjectives are divided into gradable (particularly useful in maths and science) versus

non-gradable and relative versus absolute categories, and how these affect the syntactic structures in which they appear. This section contains wholly innovative ideas: the visuals and ideas below have not yet been trialled with children with DLD.

We propose that non-gradable adjectives may be the easiest to learn because the properties are either present or not; there is no degree, comparison or subjectivity involved. We suggest starting with non-gradable adjectives with no single antonym, so that the child only needs to decide if the property is present or not. Science-based adjectives could be particularly useful here, for example describing the materials that an object is made of, e.g., *this chair is (not) plastic/wooden/ metal* (see Figure 11). In this visual, we show antonyms on opposite sides of a hard dividing line.

Figure 11. Visuals for non-gradable adjectives

Some children might need to be explicitly taught that these adjectives cannot appear in degree or comparative constructions (see Figure 7). For contrast, this might best be done after gradable adjectives have been introduced.

Gradable adjectives (GAs) are crucial to maths and the areas of science that require measurement. Children need to understand and use these in degree, equative (*as ... as*) and comparative constructions (*more/less...than*). We suggest a stepped approach to teaching these, starting with absolute minimal GAs (section 2.3.1). Because these have a minimal presence of a property required (e.g., *dirty, sick, bumpy*), they might be easier to explain semantically; if there

is even a small amount of dirt, sickness, or bumps present, then these adjectives can be used. The derivational morphology link between the noun and adjective could also be highlighted where relevant; see section 4.2.

A first step would be to show the difference between having and not having the property (see dotted boundary in Figure 12) and then showing that there can be increasing and decreasing degrees of the property (arrows in Figure 12). Degree modifiers such as *slightly* and *very* can be taught to indicate the degree (note that *completely/ almost/ nearly* can't be used as there is no maximal constraint - see below). Synonyms (below the arrow in Figure 12) could then be associated with the degree. Figure 12 shows that there is no limit to how *dirty* an object can become (no double line at the right-hand side), whereas there is a limit to how *not dirty* it can be (double line at left-hand side). The dividing line is less definite (dashed) when compared with the non-gradable adjectives (solid line), as there is a certain level of subjectivity and comparison to other similar objects (e.g., football kits vs wedding dresses) when deciding whether something is *dirty* or not.

Figure 12. Visual for absolute minimal gradable adjectives

Once these adjectives have been introduced, it would be possible to introduce comparatives (*X is dirtier than Y*) and equatives (*X is as dirty as Y*; see Figure 7). We recommend introducing these with absolute minimal GAs first because these entail that the object in subject position has the property, e.g., *X is dirtier than Y* entails *X is dirty*, which is not the case for all GAs.

A next step might be to introduce absolute maximal GAs such as *clean*, *healthy*. We can show the maximal constraint with a double line at the end of the arrow (see Figure 13) and explain that this licenses the degree modifiers *completely*/*almost*/*nearly*. We could also discuss that since most of the variation is on the *not clean* side, comparatives where one object is *more clean* than the other, do not necessarily entail that either object is actually *clean*, just that one is closer to the *clean* side of the boundary than the other.

Figure 13. Visual for absolute maximal gradable adjectives

Next we could introduce antonyms for GAs that have a single antonym (such as *clean* vs. *dirty*), by showing how they vary along the same dimension, but in opposite directions (see Figure 14, which shows the addition of *dirty* and its synonyms to Figure 13, which has been greyed out for clarity). This would be clearer to explain initially with antonyms where the boundary is in the same place, such that *clean* = *not dirty* and *dirty* = *not clean*.

Figure 14. Visual for gradable adjectives with a single antonym with a boundary in the same place

Other pairs of absolute maximal and minimal GA antonym pairs could then be introduced where the boundaries do not fall in the same place (e.g., *healthy* and *sick*). Using a visual such as Figure 15, we could show that *not sick* $\neq$ *healthy*, and *not healthy* $\neq$ *sick* as there is a gap where it is possible to be both *not sick* and *not healthy*. This also means that in comparatives, if *X* is *sicker/healthier than Y*, neither *X* nor *Y* need to be *healthy/sick*.

Figure 15. Visual for antonym pairs where boundaries are in different places

Some antonym pairs are both absolute maximal GAs (such as *full/empty*). This can be shown by the double lines at both ends of the distribution (see Figure 16). Because both ends of the distribution are limited, it is possible to have fractional modifiers such as *half* and also to use the degree modifiers *completely* / *almost* / *nearly* for both of the antonyms.

Figure 16. Visual for antonym pairs where both are absolute maximal gradable adjectives

Relative GAs (section 2.3) are likely to be the most difficult for children with DLD to use and understand accurately as the boundaries change with context and relative to typical cases (so a *tall jockey* is probably still shorter than a *short basketball player*, as shown by the use of *tall for a jockey*, or *short for a basketball player*) and also with the subjective judgement of the speaker. Because these have no maximal constraints (no double lines in Figures 17 or 18), it is not possible to use the degree modifier *completely*, or fractional modifiers such as *half*. In Figure 17, we show that an individual could be described as both *tall/not short* and *short/not tall*, depending on who you compare them to.

Figure 17. Visual for relative gradable adjectives, showing many different possible boundary positions

Because the boundaries can move dramatically with context, we would recommend starting with individual objects to establish the concept of the adjective meaning and the dimension along which it varies. For example, regarding size, we should start with a single object (such as a pencil) and present an average length pencil and then decide from a selection of other pencils, which are *long* and which are *not long* and which are *a bit long* or *very long*. Then a range of other items with different prototypical lengths could be introduced, showing that the boundary is relative to a typical item and does not relate to an absolute value. In addition, it may be necessary to show that the boundary can move relative to a purpose, for example: *the boy wants to climb the tree, but it is too tall (for him to climb)*.

Synonyms of GAs could be taught where they relate to different degrees (Figure 18). Whether these synonyms themselves have minimal or maximal constraints (e.g., *completely devastated*) could also be discussed. Antonyms could then be introduced; it will be necessary to show that

there could be non-overlapping boundaries, so there is a “gap”, where someone could be neither *happy* nor *sad* (see Figure 18).

Figure 18. Visual for relative gradable adjectives, including synonyms and antonyms

Later stages of adjective teaching could include discussing subjective adjectives with speaker-oriented boundaries such as *fun/boring* or *delicious/disgusting*, highlighting the fact that two different speakers can have different views on these and both be telling the truth (see section 2.3.3). This might be particularly important for children with pragmatic difficulties who may have difficulty interpreting the differing perspectives of different speakers.

Vague subjective GAs (such as *good*) could also be discussed, perhaps in the context of English lessons where use of such adjectives is often discouraged. The child could be shown that the dimension on which they vary is determined by the noun rather than by the adjective. For example, while the minimum absolute GA *dirty* depends on the presence of dirt, *good* depends on the positive aspects of the object denoted by the noun, whatever that may be, and however

714 assessed by a speaker: a *good* cake is tasty, a *good* book is gripping/funny/short, a *good* holiday
 715 is relaxing/active/fun, etc. Therefore, when precision is encouraged, alternative adjectives are
 716 preferred.

717 Once children have learned the rules and patterns for some adjectives, they may be able to
 718 extend these to deduce the meaning of new adjectives used in similar linguistic environments.
 719 For example, if they hear that an object is *completely blicked*, they can infer from presence of the
 720 degree modifier *completely*, that *blicked* is gradable and an absolute maximal GA. From the
 721 derivational morphology, they can infer that it may also be an adjectival passive derived from the
 722 verb *to blick*. Conversely, once they are familiar with the nuanced semantics of an adjective, they
 723 can harness this knowledge to use it in appropriate linguistic environments.

724

725 **5. Recommendations and conclusions**

726 By highlighting the importance of adjectives in communication and education, their linguistic
 727 complexity, and their specific challenge for children with DLD, we have made the case for
 728 developing interventions that target adjectives. To enable this, we first provided a primer for
 729 practitioners on how adjectives function, and second, a detailed explanation of how the SHAPE
 730 CODING system can be adapted to incorporate the complexities of adjectives. As a final step for
 731 SLTs and teachers, here we present operational recommendations for teaching adjectives.

732 Section 4.3.2 describes a stepped approach to introducing the gradability of adjectives to children
 733 (see also Table 1, section 2.3), starting with non-gradable adjectives with no single antonym
 734 (e.g., *plastic*) and progressing to relative gradable adjectives (e.g., *tall*) as the most challenging.

735 Although presently untested, SLTs and teachers may find this sequence useful to try out when
 736 teaching adjectives.

737 There should be a focus on securely teaching curriculum-related adjectives using strategies
 738 which extend existing vocabulary approaches. For example, identifying phonological features
 739 (e.g., initial sound, number of syllables, rhyming words), linking new words to previously learnt
 740 words (both via semantics and derivational morphology, e.g., *bump/bumpy*), and building
 741 accurate motor programmes through repetition and use within different grammatical contexts.
 742 Questions such as *What does [noun] look like?* can be adapted for adjectives as *What things*
 743 *could this describe?* Degree modifiers such as *very*, *a bit*, or *slightly* can be used to teach
 744 children whether an adjective is gradable, e.g., stating *This is only **a bit** ADJ, but this is **very***
 745 *ADJ*. Figures 11-18 provide further inspiration for this, e.g., sorting physical objects into wooden
 746 vs. non-wooden (Figure 11), or placing a counter along a continuum to judge absolute minimal
 747 gradable adjectives (Figure 12).

748 At an individual, small-group, or whole-class level, elements of the SHAPE CODING system
 749 can be used to explicitly teach adjectives. Initially, a green line and a cloud shape for adjectives
 750 can be introduced, contrasted with a black cross to show the absence of a quality (e.g., Figure 2).
 751 For gradable adjectives, degree constructions can be indicated using a ‘black ruler’ visual (e.g.,
 752 Figure 6).

753 SLTs working in schools who directly commission regular SLT input (e.g., White & Spencer,
 754 2018) may be afforded time to work with teachers within the classroom. During these sessions
 755 adjectives can be taught using the activities described above via a collaborative model (e.g.,
 756 Throneburg et al., 2000). Other SLTs may hold large caseloads across a number of schools,

working within a consultative model whereby intervention is delegated to school staff (e.g., Law et al., 2002). For this model, we propose that the above recommendations be incorporated into whole-school SLT training, and teachers supported in selecting appropriate curriculum-based adjectives to target.

In conclusion, adjectives represent a complex and varied word-class and are often overlooked in SLT interventions, yet have a key role to play in language development and academic learning. By developing an increased understanding of the complexity of adjectives, and their importance for children's learning, we hope that SLTs and teachers can begin to adopt more nuanced and robust methods of teaching adjectives to children to improve their language skills and academic attainment.

References

- ALT, M. and PLANTE, E., 2006, Factors that influence lexical and semantic fast mapping language impairment, *Hearing Research*, 49(October), pp. 941–954.
- BALTHAZAR, C.H., EBBELS, S. and ZWITSERLOOD, R., 2020. Explicit grammatical intervention for developmental language disorder: Three approaches. *Language, speech, and hearing services in schools*, 51(2), pp. 226-246.
- BECKER, M., 2017, Learning the tough construction, *Contact Magazine*, pp. 16-21.

- 775 BEDORE, L. M. and LEONARD, L. B., 2001, Grammatical Morphology Deficits in Spanish-
 776 Speaking Children with Specific Language Impairment, *Journal of Speech, Language, and*
 777 *Hearing Research*, 44(1–4), pp. 905–924.
- 778 BISHOP, D.V., 2014. Problems with tense marking in children with specific language
 779 impairment: not how but when. *Philosophical Transactions of the Royal Society B: Biological*
 780 *Sciences*, 369(1634), pp. 20120401.
- 781 BISHOP, D.V., SNOWLING, M.J., THOMPSON, P.A., GREENHALGH, T., Catalise-2
 782 Consortium, ADAMS, C., ARCHIBALD, L., BAIRD, G., BAUER, A., BELLAIR, J. and
 783 BOYLE, C., 2017, Phase 2 of CATALISE: a multinational and multidisciplinary Delphi
 784 consensus study of problems with language development: Terminology, *Journal of Child*
 785 *Psychology and Psychiatry and Allied Disciplines*, 58(10), pp. 1068–1080.
- 786 CALDER, S.D., CLAESSEN, M., LEITÃO, S. and EBBELS, S., 2021. A profile of expressive
 787 inflectional morphology in early school-age children with developmental language disorder.
 788 *Clinical Linguistics & Phonetics*, pp.1-18.
- 789 CLARK, E. V., 2018. Word meanings and semantic domains in acquisition. In K. Syrett and S.
 790 Arunachalam, eds. *Semantics in language acquisition*. Amsterdam/Philadelphia: John Benjamins
 791 Publishing Company. pp. 22-43.
- 792 CONTI-RAMSDEN, G., DURKIN, K., TOSEEB, U., BOTTING, N. and PICKLES, A., 2018,
 793 Education and employment outcomes of young adults with a history of developmental language
 794 disorder, *International Journal of Language and Communication Disorders*, 53(2), pp. 237–255.

- 795 DEPARTMENT FOR EDUCATION, 2014, *National curriculum in England: Framework for*
 796 *key stages 1 to 4*. Available at [https://www.gov.uk/government/publications/national-](https://www.gov.uk/government/publications/national-curriculum-in-england-framework-for-key-stages-1-to-4/the-national-curriculum-in-england-framework-for-key-stages-1-to-4)
 797 [curriculum-in-england-framework-for-key-stages-1-to-4/the-national-curriculum-in-england-](https://www.gov.uk/government/publications/national-curriculum-in-england-framework-for-key-stages-1-to-4/the-national-curriculum-in-england-framework-for-key-stages-1-to-4)
 798 [framework-for-key-stages-1-to-4](https://www.gov.uk/government/publications/national-curriculum-in-england-framework-for-key-stages-1-to-4/the-national-curriculum-in-england-framework-for-key-stages-1-to-4) (Accessed 18 June 2021)
- 799 EBBELS, S., 2007, Teaching grammar to school-aged children with specific language
 800 impairment using Shape Coding, *Child Language Teaching and Therapy*, 23(1), pp. 67–93.
- 801 EBBELS, S.H., BANNISTER, L., HOLLAND, B. & CAMPBELL, C. (under review).
 802 Effectiveness of interventions focused on vocational course vocabulary in post-16 students with
 803 (Developmental) Language Disorder.
- 804 EBBELS, S.H., MARIĆ, N., MURPHY, A. and TURNER, G., 2014. Improving comprehension
 805 in adolescents with severe receptive language impairments: A randomized control trial of
 806 intervention for coordinating conjunctions. *International Journal of Language & Communication*
 807 *Disorders*, 49(1), pp. 30-48
- 808 EBBELS, S.H., VAN DER LELY, H.K. and DOCKRELL, J.E., 2007. Intervention for verb
 809 argument structure in children with persistent SLI: A randomized control trial. *Journal of*
 810 *Speech, Language, and Hearing Research*, 50, pp. 1330–1349
- 811 FERGUSON, B., GRAF, E. and WAXMAN, S., 2014, Infants use known verbs to learn novel
 812 nouns: Evidence from 15- and 19-month-olds, *Cognition*, 131(1), pp. 139-146.
- 813 FISHER, C., 2002, Structural limits on verb mapping: the role of abstract structure in 2.5-year-
 814 olds' interpretations of novel verbs. *Developmental Science*, 5(1), pp. 55-64.

- 815 GILLAM, R.B., MONTGOMERY, J.W., EVANS, J.L. and GILLAM, S.L, 2019, Cognitive
816 predictors of sentence comprehension in children with and without developmental language
817 disorder: Implications for assessment and treatment, *International Journal of Speech-Language*
818 *Pathology*, 21(3), pp. 240–251.
- 819 GLEITMAN, L. R., 1990, The structural sources of verb meaning, *Language Acquisition*, 1(1),
820 pp. 3-55.
- 821 GLISSON, L., HEINE, C., TUTTY, R., BURKE, C. & EBBELS, S.H., (in preparation).
822 Morphemes Matter - An Early Stage RCT Investigating the Effects of Paired Morphological
823 Awareness Training for Secondary-Age Students with Developmental Language Disorder.
- 824 GOLDBERG, A. and BOYD, J., 2015, A-adjectives, statistical preemption, and the evidence: A
825 reply to Yang, *Language*, 91(4), pp. E184-e197.
- 826 JUSTICE, L.M., SCHMITT, M.B., MURPHY, K.A., PRATT, A. and BIANCONE, T., 2014.
827 The ‘robustness’ of vocabulary intervention in the public schools: targets and techniques
828 employed in speech–language therapy. *International Journal of Language & Communication*
829 *Disorders*, 49(3), pp. 288-303.
- 830 KENNEDY, C. and MCNALLY, L., 2005, Scale structure, degree modification, and the
831 semantics of gradable adjectives, *Language*, 81(2), pp. 345-381.
- 832 LAW, J., LINDSAY, G., PEACEY, N., GASCOIGNE, M., SOLOFF, N., RADFORD, J. and
833 BAND, S., 2002, Consultation as a model for providing speech and language therapy in schools:
834 a panacea or one step too far? *Child Language Teaching and Therapy*, 18 (2), pp. 145-163.

- 835 LEONARD, L. B. and DEEVY, P., 2020, Retrieval practice and word learning in children with
 836 specific language impairment and their typically developing peers, *Journal of Speech, Language,*
 837 *and Hearing Research*, 63(10), pp. 3252–3262.
- 838 LEONARD, L.B., EYER, J.A., BEDORE, L.M. and GRELA, B.G., 1997. Three accounts of the
 839 grammatical morpheme difficulties of English-speaking children with specific language
 840 impairment. *Journal of Speech, Language, and Hearing Research*, 40(4), pp.741-753.
- 841 LEONARD, L. B., SALAMEH, E. K. and HANSSON, K., 2001, Noun phrase morphology in
 842 Swedish-speaking children with specific language impairment, *Applied Psycholinguistics*, 22(4),
 843 pp. 619–639.
- 844 MARINELLIE, S. A., 2004, Complex syntax used by school-age children with specific language
 845 impairment (SLI) in child-adult conversation, *Journal of Communication Disorders*, 37(6), pp.
 846 517–533.
- 847 MARSHALL, C. R. and VAN DER LELY, H. K. J., 2007, Derivational morphology in children
 848 with Grammatical-Specific Language Impairment, *Clinical Linguistics and Phonetics*, 21(2), pp.
 849 71–91.
- 850 MCGREGOR, K.K., OLESON, J., BAHNSEN, A. and DUFF, D., 2013, Children with
 851 Developmental Language Impairment Have Vocabulary Deficits Characterized by Limited
 852 Breadth and Depth, *International Journal of Language & Communication Disorders*, 48(3), pp.
 853 307–319.
- 854 NAIGLES, L. R., 1990, Children use syntax to learn verb meanings. *Journal of Child Language*,
 855 17, pp. 357–374.

- 856 OWEN VAN HORNE, A. J. and LIN, S., 2011, Cognitive state verbs and complement clauses in
857 children with SLI and their typically developing peers, *Clinical Linguistics and Phonetics*,
858 25(10), pp. 881–898.
- 859 RICE, M.L., OETTING, J.B., MARQUIS, J., BODE, J. and PAE, S., 1994, Frequency of input
860 effects on word comprehension of children with specific language impairment, *Journal of*
861 *Speech and Hearing Research*, 37(1), pp. 106–122.
- 862 RICE, M.L., WEXLER, K. and CLEAVE, P.L., 1995. Specific language impairment as a period
863 of extended optional infinitive. *Journal of Speech, Language, and Hearing Research*, 38(4),
864 pp.850-863.
- 865 RICKS, S. L. and ALT, M., 2016, Theoretical principles to guide the teaching of adjectives to
866 children who struggle with word learning: Synthesis of experimental and naturalistic research
867 with principles of learning theory, *Language, Speech, and Hearing Services in Schools*, 47(July),
868 pp. 181–190.
- 869 ROYLE, P. and REISING, L., 2019, Elicited and spontaneous determiner phrase production in
870 French-speaking children with developmental language disorder, *Canadian Journal of Speech-*
871 *Language Pathology and Audiology*, 43(3), pp. 167–187.
- 872 SANDHOFER, C. and SMITH, L. B., 2007, Learning Adjectives in the Real World: How
873 Learning Nouns Impedes Learning Adjectives, *Language Learning and Development*, 3(3), pp.
874 233–267.
- 875 SANDHOFER, C.M. and SMITH, L.B., 1999. Learning color words involves learning a system
876 of mappings. *Developmental Psychology*, 35(3), pp. 668-679.

- 877 SCOTT, G.J., 2002. Stacked adjectival modification and the structure of nominal phrases. In G.
878 Cinque (eds), *Functional structure in DP and IP: The cartography of syntactic structures* (Oxford:
879 Oxford University Press) 1, pp. 91-120.
- 880 SHABLACK, H., BECKER, M. and LINDQUIST, K., 2019, How do children learn novel
881 emotion words? A study of emotion concept acquisition in preschoolers, *Journal of*
882 *Experimental Psychology: General*, 149(8), pp. 1537-1553.
- 883 SYRETT, K., LATOURRETTE, A., FERGUSON, B., & WAXMAN, S. R., 2019, Crying helps,
884 but being sad doesn't: Infants constrain nominal reference online using known verbs, but not
885 known adjectives. *Cognition*, 193, pp. 104033.
- 886 SYRETT, K. and LIDZ, J., 2010, 30-month-olds use the distribution and meaning of adverbs to
887 interpret novel adjectives, *Language Learning and Development*, 6(4), pp. 258-282.
- 888 THRONEBURG, R.N., CALVERT, L.K., STURM, J.J., PARAMBOUKAS, A.A. and PAUL,
889 P.J., 2000. A comparison of service delivery models: Effects on curricular vocabulary skills in the
890 school setting. *American Journal of Speech-Language Pathology*, 9(1), pp. 10-20.
- 891 TRIBUSHININA, E. and DUBINKINA, E., 2012, Adjective production by Russian-speaking
892 children with specific language impairment, *Clinical Linguistics and Phonetics*, 26(6), pp. 554–
893 571.
- 894 ULLMAN, M. T. and PIERPONT, E. I., 2005, Specific language impairment is not specific to
895 language: The procedural deficit hypothesis, *Cortex*, 41(3), pp. 399–433.

- 896 WHITE, S. and SPENCER, S., 2018, A school-commissioned model of speech and language
897 therapy. *Child Language Teaching and Therapy* 34 (2), pp. 141-153.