Lingue e Linguaggi
Lingue Linguaggi 54 (2022), 195-222
ISSN 2239-0367, e-ISSN 2239-0359
DOI 10.1285/i22390359v54p195


# READING COMPREHENSION IN YOUNG ADULT LEARNERS OF ENGLISH WITH AND WITHOUT DYSLEXIA

GLORIA CAPPELLI
UNIVERSITÀ DI PISA

**Abstract** – Reading comprehension skills are essential for academic success and social inclusion. Although word-level decoding difficulties are the distinctive marker of dyslexia at all ages, issues with text understanding are considered a common secondary consequence of the primary deficit. The study investigates such issues in young adult learners of English. More specifically it explores whether, given their characteristic cognitive and communicative profile, the type of questions (i.e., factual vs. inferential questions) and the language of the text (i.e., L1 vs. English as a foreign language) may be factors of increased difficulty for learners with this condition and may consequently result in reduced accuracy. Data point to significant differences between the focus and the control group with respect to inferential processing of texts. Neurotypical learners were found to systematically outperform their dyslexic peers in accurately answering questions relying on either local or global coherence inferencing, and their performance was less influenced by reading in a foreign language. Pedagogical implications are discussed, and suggestions for future research are made.

**Keywords**: developmental dyslexia; reading comprehension; English as a foreign language; inference making; pragmatic processing.

## 1. Introduction

Dyslexia is a specific learning disorder that primarily impacts the acquisition of literacy skills even when appropriate learning opportunities are provided. It manifests itself with a variety of symptoms ranging both in quality and severity. It causes difficulties in acquiring accurate and fluent word-level decoding and reduced graphemic competence (Ramus *et al.* 2003). It has a neurobiological origin (Sand, Bolger 2019) and a growing body of research has shown cognitive and behavioural correlates (Moll *et al.* 2014; Snowling *et al.* 2020a). Although the most affected domain seems to be the phonological component of language, a multidimensional and multifactorial view of dyslexia has emerged over the past decade: differences in people with this disorder have been identified in several domains, including but not limited to working memory functioning, verbal short-term memory, rapid automatized naming, and executive functions (Araújo, Faísca 2019; Araújo *et*

*al.* 2020; Lonergan *et al.* 2019; Meisinger *et al.* 2021; Smith-Spark *et al.* 2003, 2016; Smith-Spark, Fisk 2007). Moreover, direct and indirect effects can emerge at all levels of the linguistic system (Cappelli, Noccetti 2022).

Although dyslexia is a lifelong condition, its manifestations in adulthood may be more varied than in childhood. Some dyslexic people in fact manage to compensate for the difficulties in reading accuracy, but fluency and speed tend to remain impaired, as do spelling and non-word reading (Fidler, Everatt 2012).

The present article focuses on reading comprehension, which is one of the disorder's "secondary consequences" according to the International Dyslexia Association (2002). It investigates the ability of Italian-speaking university students with and without this condition to understand a set of texts in their L1 and in English as a foreign language (EFL) and explores their inference making skills.

Reading is a dynamic process in which several systems and components interact (Perfetti, Stafura 2014). Inferential abilities are central to this process as they are needed to recover implicit information, derive the meaning of unfamiliar lexical items, connect parts of the text to the readers' background knowledge as well as building a coherent mental model of the text by creating meaningful links between its parts (Kendeou *et al.* 2014; Perfetti, Stafura 2014). Reading comprehension tasks, including those that are part of standardized tests (e.g., IELTS, Cambridge Assessment English B2 First, etc.), typically involve inferential questions focusing on cause-effect relations, general topic recognition, and lexical inferences (Hamouda, Tarlochan 2015). These are known to pose challenges to L2 readers and to be cognitively demanding, especially in a foreign language (Horiba 1996, 2000; Jang 2009; Samiei, Ebadi 2021). Recent studies have shown that when texts are modified to reflect L2 readers' culture and when they are simplified to meet their proficiency level, pragmatic processing is supported and therefore, reading is more successful (Alptekin 2006; Khataee, Davoudi 2018).

Others have found that people with dyslexia are less efficient in processing pragmatic meanings than their neurotypical peers (Cappelli *et al.* 2018, 2022; Cardillo *et al.* 2018; Ferrara *et al.* 2020; Griffiths 2007). They are also known to struggle with foreign language learning (Downey *et al.* 2000; Ganshow, Sparks 2001; Kormos 2020; Nijakowska 2020; Schneider, Crombie 2012). For this reason, it is plausible to assume that reading in a foreign language may pose additional obstacles to pragmatic processing in this population (Cappelli 2019). This may have severe repercussions on dyslexic learners' academic success, since reading in a foreign language, especially in English, plays a major role in the globalized academic life.

Although the development of literacy in dyslexic children is a widely researched topic (Morken *et al.* 2017), literacy abilities in dyslexic adults have only recently started to be thoroughly explored (Fidler, Everatt 2012;

Gagliano *et al.* 2015; Santulli, Scagnelli 2017, 2022; Scagnelli *et al.* 2018). Yet, since they are crucial for their educational and professional success, understanding the role of dyslexia both in decoding and in comprehending L1 and foreign language texts at all ages is necessary to ensure appropriate support is provided to those who still struggle in higher education and in the work environment.

## 2. Reading comprehension and dyslexia

### *2.1. Reading comprehension as a complex task*

Reading is a complex task, whose ultimate goal is not merely converting graphemes into phonemes, but rather extracting and building meaning from text (Grabe 2014; Perfetti, Stafura 2014). The two processes are of course connected: adequate word decoding is essential for understanding text. However, reading involves many other linguistic and cognitive abilities, whose coordination is essential for successful comprehension (Cain, Oakhill 2012; Oakhill *et al.* 2015; Perfetti, Adolf 2012;).

The Simple View of Reading (Gough, Tunmer 1986) sees word reading and language comprehension skills as equally necessary but independent abilities to construe a meaningful "mental model" (Johnson-Laird 1983; Oakhill *et al.* 2015) or "situational model" (Kintsch 1998) of the text. Despite the differences between the conceptualisations of such a model in the literature, studies agree that the result of good reading comprehension is "a mental representation that is created from information in the real, or an imagined, world – i.e., a gist representation of what the comprehender has read" (Oakhill *et al.* 2015, p. 1) which goes beyond the literal information encoded in the text (Kendeou *et al.* 2014).

Both lower-level and higher-level processes are at play in reading comprehension. Lower-level processes include fast and automatic word decoding (Perfetti 1985), lexico-semantic processing and semantic parsing of the immediate cotext to identify main propositional units. The ability to perform these operations must be developed by beginning readers, so that they can efficiently and effectively establish links between forms and sounds and develop the necessary word recognition skills (Grabe 2014). The latter, together with structural knowledge of the language (i.e., morphological and syntactic competence), has a direct impact on reading comprehension.

#### *2.1.1. The role of vocabulary and inference making*

The correlation between vocabulary knowledge and good reading abilities in both the L1 and the L2 is probably one of the most extensively investigated

topics (Droop, Verhoeven 2003; Grabe, Stroller 2011; Perfetti, Stafura 2014). Perfetti and Stafura's (2014) Reading System Framework poses word-to-text integration at the centre of the whole process. Word decoding is only one of the important factors for successful reading comprehension: in their model the word identification system mediates the interaction between form and meaning. If word meanings are unknown or cannot be properly activated, the understanding of a text will be quite difficult (Oakhill *et al.* 2015).

The amount of vocabulary each reader knows is considered a predictor of reading comprehension success (Li, Clariana 2019). It grows with extensive exposure to texts (Stanovich 2000) and keeps growing over time. Vocabulary breadth (i.e., the number of words in the lexical database) is not sufficient for good reading comprehension, though: vocabulary depth (i.e., how much one knows about each word in the lexical database) is also very important (Perfetti, Stafura 2014). Vocabulary depth allows readers to create meaningful associations in the text, to draw inferences, and to build a good mental model of the text, because different aspects of word meaning become more or less relevant when words are combined into phrases and sentences (Oakhill *et al.* 2015). Of course, readers do not necessarily need to know all the words in a text to understand it. The meaning of a few unfamiliar items can normally be inferentially derived from the context. Morphological competence can support word recognition and meaning retrieval in the L1 (Wagner *et al.* 2007), and the same positive effect has been observed for syntactic awareness (Perfetti, Adlof 2012). The latter has also been found to play a significant role in L2 reading (Grabe 2009).

Extracting pieces of propositional information from a text is, however, not enough to understand it properly. They need to be organized and added to a network which will form the basis for a richer and coherent mental model of the text, which will be stored in the reader's memory (Kintsch 2012; Oakhill *et al.* 2015). In its most basic form, this integration requires that sentences be properly linked, for instance by correctly processing connectives. This operation involves both lower-level vocabulary skills and higher-level inferential abilities to understand the logical relation between propositional units. To form a coherent model of the text, in fact, the information extracted from it needs to be supported and complemented by the reader's background knowledge, inferences and attitudes, and choices must be made as to what is relevant and useful (Grabe 2014; Kintsch 2012; Oakhill *et al.* 2015). Higher-level processes such as inference making, executive functions and attention-allocation abilities are therefore also essential for reading comprehension (Kendeou *et al.* 2014).

The ability to generate inferences is quite crucial for the whole process, first and foremost, because it allows readers to establish such meaningful links (Ahmed *et al.* 2016; Oakhill *et al.* 2003, 2017). Inferences are in fact triggered by textual elements but go beyond what is explicitly asserted. This

ability is not limited to the written text and develops over time from the pre-literacy years. Indeed, good listening comprehension is a strong predictor of good reading comprehension, since the higher-level processes involved are the same (Catts *et al.* 2005).

Potentially unlimited inferences can be derived from a text. However, not all of them are equally necessary to build a mental model. Some inferences are necessary, and others enrich the model but, although sometimes helpful, are not essential for understanding (i.e., elaborative inferences). Fundamental connecting inferences are local cohesion inferences, e.g., pronominal and lexical inferences that help readers with anaphora resolution, and global coherence inferences, which allow readers to create a coherent model by linking it with different parts of the text. Oakhill *et al.* (2017) point out that, whereas the former type is always necessary, the relevance of the latter depends on the nature of the text and the reading purpose. Thus, for example, while readers tend to always draw inferences about causality relations, those about character motivations might only be required when reading narrative materials.

Likewise, elaborative inferences may not be essential for understanding. They draw on the background knowledge of the reader and "embellish" the mental model. Thus, a sentence like "The woman threw a stone at the boy" may come with the elaborative inference that she actually hit him with the stone, that she hurt him badly, that he bled, that he died, etc. None of these scenarios, though, may in fact be the case. However, if the text continues "The scar remained visible even in his old age", the reader will need to draw the inference that the stone and the scar are causally connected, and the elaborative inference that the woman actually hit the boy with it will be necessary to build the mental model. Nevertheless, this type of inference "is made backwards, not elaboratively or predictively" (Oakhill *et al.* 2015, p. 39).

Different types of inferences come with different processing costs. Local cohesion inferences are usually automatic and, in typical readers, they require few resources. Global coherence inferences may be more taxing on memory and attention. Finally, elaborative inferences greatly depend on the ability of readers to connect textual information to their background knowledge, including knowledge of discursive conventions and text structures (Duke 2004). In other words, inferential processes take place "in real time", that is, while reading, but they may consume time and cognitive resources (Oakhill *et al.* 2015).

Inferential abilities are supported by memory skills (especially working memory) and vocabulary knowledge, and for this reason, they develop over time. Barnes *et al.* (1996) observe that the ability to remember explicit facts and details in a text correlates with the ability to draw necessary inferences in

children. Better memory skills help readers build more accurate and coherent models, thus facilitating inferential processes (Oakhill *et al.* 2015). Vocabulary depth and background knowledge – whose acquisition and development also depend on memory skills – are critical for facilitating inference making too, as is the speed of access to such information (Barnes *et al.* 1996).

It should be pointed out that, in a complex activity such as reading comprehension, there is a reciprocal relationship among these skills. Memory, inferential and attention-allocation resources are fundamental for acquiring vocabulary and background knowledge, which in turn support inference making (Oakhill, Cain 2012; Prior *et al.* 2014). Vocabulary development and reading comprehension are also codependent: readers with limited lexical resources will likely be poor comprehenders and this will hinder vocabulary gain (cf. the "Matthew Effect"; Stanovich 1986).

Another higher-level process that is inextricably related to inferential and lexical abilities is comprehension monitoring, i.e., the ability to check understanding and repair errors. Typical instances of faulty comprehension happen when unfamiliar words are involved or where incorrect inferences are derived. Good comprehenders can control their understanding while reading and strategically solve comprehension errors right away. Of course, in order to do this, they must be able to retain a sufficient memory representation of the text to notice conflicts and resolve them, while suppressing irrelevant information. This means they must have efficient executive functions (e.g., working memory and inhibition; Diamond 2013; Raudzus *et al.* 2017) and cognitive flexibility, which improves with age and practice (Cartwright 2009).

### *2.2. L2 reading comprehension*

There is general agreement that many of the abilities needed for L1 and L2 reading comprehension are the same and that "the reading construct is very similar in terms of underlying cognitive and linguistic components" (Grabe 2014, p. 11). This is especially true for the higher-level processes, which relate to comprehension ability in a general way. However, when it comes to lower-level processes, reading in a foreign language differs from reading in one's mother tongue in some important respects.

L2 readers do not have the same linguistic and cultural competence as L1 readers: their lexical and syntactic resources are usually more limited than those of native speakers, as may be their L2 culture-specific background knowledge and social and cultural assumptions, which may be difficult to understand or accept. This is due, at least in part, to the fact that they rarely have the same reading experience and practice in the foreign language as in their L1. Reduced exposure to (authentic) L2 texts thus results in what could

be called "an L2 Matthew effect": limited encounters with L2 materials will have as a consequence limited L2 vocabulary and background knowledge growth, which in turn might discourage readers from approaching texts of growing difficulty and complexity.

The differences in knowledge of the language may hamper word-to-text integration processes (Jeon, Yamashita 2014; Perfetti, Stafura 2014). L2 vocabulary, in fact, may not only be smaller, but also poorer in terms of semantic representations and more difficult to retrieve (Li, Clariana 2019; Raudszus *et al.* 2018; van den Bosch 2020).

Reading in a foreign language also poses a higher demand on our limited cognitive resources in attention, memory and control (Li, Clariana 2019; Perfetti, Stafura 2014; Raudszus *et al.* 2018). Readers must operate in two different linguistic systems (e.g., accessing their bilingual lexicon; Koda 2005) and might experience both lower and higher-level transfer effects (Grabe 2014), which have both the potential of facilitating and hindering reading comprehension via interference from the L1 (Grabe 2014; Koda 2005).

The proficiency level in the L2 seems to make a difference (Li, Clariana 2019). If the reading skills of more proficient readers have been found to be similar to those of L1 readers, the same is not true for beginners and intermediate learners (Genesee *et al.* 2006; Grabe 2014; Koda 2005). The typological distance between languages can also potentially complicate the reading comprehension process, but this effect appears to be mitigated by proficiency. These findings are compatible with the view that the cognitive processes which support reading comprehension are the same in the L1 and in the L2 (Verhoeven, van Leeuwe 2012), but that linguistic limitations (e.g., in vocabulary knowledge) will deplete resources and reduce the efficiency of the L2 reading process (cf. In'nami *et al.*'s [2021] meta-analysis of the relationship between working memory efficiency and L2 reading). When the learners' proficiency grows, more resources will be available for the reading process and reading in a foreign language will become increasingly similar to L1 reading (Grabe 2014).

### *2.3. Reading comprehension and dyslexia*

Individual differences in all components of the reading process are known to impact the outcome of reading comprehension. Difficulties in understanding a text are not a distinctive manifestation of dyslexia per se (Snowling *et al.* 2020b), but most people with this condition have been found to perform worse than neurotypical peers in reading comprehension tasks (Reis *et al.* 2020). The simple view of reading discussed above predicts this as the result of their characteristic deficit in lower-level processes, namely, poor phonological skills and consequent poor word-level decoding. This is also

compatible with Perfetti and Stafura's (2014) hypothesis that word-text integration relies on limited resources, and issues in decoding would exhaust those otherwise necessary for meaning integration, thus resulting in poor or inaccurate comprehension. Indeed, the multifactorial picture emerging in recent studies points to such a complex interplay of factors.

Children with dyslexia struggle with learning to read, and their word reading is neither accurate nor fluent. Such difficulties are a lifelong condition, although the behavioural manifestations of the disorder change over time (Miller-Shaul 2005; Swanson, Hsieh 2009). Adult dyslexia has started to be systematically investigated only recently, sometimes with conflicting results, since many adults with a childhood diagnosis manage to compensate for their deficits and develop sufficiently good reading skills, whereas others do not (Cavalli *et al.* 2017; Eloranta *et al.* 2019). The compensatory mechanisms are not fully known yet, but it is believed that some people come to rely on intact abilities (e.g., morphological knowledge) to compensate for their phonological impairment.

Reis *et al.*'s (2020) metanalytical overview of studies on adults' reading abilities has revealed that the most persistent markers of dyslexia are poor reading fluency and spelling. Even though most of the studies included in their analysis focus on highly functional and possibly well compensated adults (i.e., higher education students), they still point to significant differences from typically developed peers in many respects beyond decoding, including reading comprehension measures and related cognitive skills (e.g., phonological awareness, verbal working memory, rapid automatised naming and vocabulary), as well as some general cognitive skills (e.g., processing speed). However, the authors observe that behavioural symptoms remain "more severe for reading and writing abilities [...] than for the cognitive processing skills associated with literacy" (p. 359). They also report that the difference in vocabulary knowledge and reading comprehension outcomes without time constraints are small, although generalized (see also Swanson, Hsieh 2009). This may be explained by the choice of participants in the studies (i.e., compensated adults) or by the possibility that in adulthood reading is less dependent on the cognitive processing abilities that support it in childhood and is supported instead by the improved lexical resources developed through exposure to the printed text over the years. The latter also appears to mitigate accuracy issues over time, whereas speed and fluency remain impaired (Eloranta *et al.* 2019).

Reis *et al.* (2020) also found orthographic transparency to be a relevant factor in this regard: whereas accuracy seems to improve with age in transparent orthographies, fluency remains "a major problem in adult dyslexia across orthographies" (p.360). Somewhat counterintuitively if we assume the validity of the simple view of reading, comprehension accuracy does not seem to be impacted by orthographic opaqueness in adults. This may

be because they have learnt to rely more on print-to-meaning connections and phonological awareness may play a smaller role in more experienced readers.

Processing and lexical retrieval speed remain impaired in adults regardless of the type of orthography, and the severity of the deficit correlates with differences in compensation. A severe deficit in rapid naming endures in adults with persisting poor reading fluency and, under time constraints, it is also associated with reduced comprehension accuracy (Araújo *et al.* 2015; Eloranta *et al.* 2019). Overall, although there is no consensus as to whether vocabulary skills are impacted by dyslexia (Cappelli 2022; Cavalli *et al.* 2016), metanalyses evidence that lexical knowledge in the dyslexic population is reduced compared to that of neurotypical individuals (Reis *et al.* 2020; Swanson, Hsieh 2009) and that vocabulary knowledge and retrieval might be a major factor in reading comprehension difficulties in both children and adults, as slow access to a smaller vocabulary repertoire potentially hinders inference making. This hypothesis is compatible with Perfetti and Stafura's (2014) model of reading comprehension, which sees in vocabulary the crucial pressure point in the system.

To sum up, as far as L1 reading is concerned, adults with dyslexia appear to be less fluent than neurotypical peers, but might reach good levels of compensation, thanks to their experience with texts (Santulli, Scagnelli 2022). Nevertheless, they are generally outperformed by readers without dyslexia in comprehension tasks. This may depend on the fact that deficits in lower-level processes (e.g., decoding and vocabulary knowledge) exhaust the limited resources available for higher-level processes (e.g., attention and working memory) necessary for the creation of a mental model of the text (Perfetti, Hart 2002). Difficulties with vocabulary and general background knowledge could also limit the generation of necessary inferences, which in turns leads to the construction "of impoverished representation of the text [...]" (Kendeou *et al.* 2014) and consequently failure to thoroughly understand it. Another potential source of poor reading comprehension may reside in primary executive function deficits, especially working memory and inhibition (Cain *et al.* 2004a, 2004b). Weaknesses in these areas can also be detrimental to inference making, as well as to comprehension monitoring (Eason *et al.* 2012; Kendeou *et al.* 2014). Finally, the depletion of cognitive resources due to issues in one or more of these areas may limit attention (Kendeou *et al.* 2013).

It should be noted that not all adults with dyslexia exhibit the same reading comprehension behaviour. The high variability is explained by the fact that diverse patterns of deficits can be found in both lower and higher processes, and the cognitive and linguistic profile of dyslexic individuals influences greatly their literacy development and performance, including reading comprehension (Cain, Oakhill 2006; Oakhill *et al.* 2015). Differences

in the results reported in the literature may also be the consequence of insufficiently fine-grained selection of the participants. Most studies, in fact, do not distinguish between participants with dyslexia and participants with dyslexia and associated developmental language disorder. Snowling *et al.* (2020b) have indeed found that reading comprehension difficulties are more common in the case of comorbidity and that, although children with "pure" dyslexia show mild deficits in text understanding, their global performance was still within the normal range if comprehension was assessed orally. Written questions may produce a wider gap between readers with and without dyslexia as observed in some of the studies included in Reis *et al.*'s (2020) metanalysis and in Keenan *et al.* (2008). The differences between dyslexic and typically developing comprehenders could therefore be ascribed to decoding difficulties and lower levels of vocabulary, rather than qualifying them as poor comprehenders proper.

### *2.3.1. Reading in English*

Given the demands posed by reading in a foreign language described in section 2.2 and the characteristics of learners with dyslexia, it is reasonable to assume that L2 reading comprehension might be at least as challenging as L1 reading comprehension for adults with dyslexia, and possibly more. This is compatible with Sparks and Ganschow's (1993) Linguistic Coding Differences Hypothesis stating that L2 development and proficiency is dependent on abilities in the L1. In other words, deficits in the L1 will have repercussions on L2 development (Sparks 2013).

Research has especially focused on children with dyslexia, who have been found to struggle with foreign language learning, including reading comprehension (Bonifacci *et al.* 2017; Downey *et al.* 2000; Simon 2000; Suárez-Coalla *et al.* 2020). Bonifacci *et al.* (2017) have observed that Italian primary school learners underperform their typically developing peers in English reading comprehension tasks (although not in the L1). There is no consensus on whether adults face the same challenges, but it seems that, even given appropriate instruction, only well compensated individuals may overcome the main difficulties and reach adequate levels of L2 proficiency (Cappelli, Noccetti 2016; Elbro *et al.* 2012; Noccetti, Cappelli 2018; Soroli *et al.* 2010). However, most of them may struggle to attain the same results of neurotypical peers (Ganschow, Sparks 2001; Łockiewicz, Jaskuulska 2016; Nijakowska 2020; Sparks *et al.* 2006), especially in specific L2 tasks requiring fast phonological processing and lexical retrieval (Ramus, Szenkovits 2008) or inferential processing (Simi 2021).

English and Italian differ in terms of orthographic transparency. Contrary to the latter, the former is an opaque language and therefore especially challenging for readers with dyslexia (Caravolas *et al.* 2013;

Łockiewicz, Jaskuulska; 2016). Decoding deficits are therefore potentially even more detrimental to L2 than to L1 reading comprehension in these learners, even though some studies have found "an English advantage" in some readers and have explained it with a preference for direct lexical access to word reading rather than a phonological route (Miller-Guron, Lundberg 2000). This of course can only happen if the L2 vocabulary is sufficiently broad and deep, which is not always the case (Cappelli 2022). Recent studies have shown that L2 vocabulary acquisition is not an easy task for learners with this condition unless dedicated and appropriate instruction is provided (Noccetti 2022). For this reason, they may not be able to rely on the support of linguistic knowledge as in the L1, and their inference making abilities may be hindered. The strain placed on executive functions might also represent a source of additional difficulty.

In conclusion, it is fair to assume that the deficits associated with dyslexia will be reflected in the outcome of reading comprehension tasks in both L1 and L2 (cf. Landerl *et al.* 1997; Łockiewicz, Jaskuulska 2016; Oren, Breznitz 2004). However, foreign languages are likely to represent a further factor of difficulty when it comes to understanding texts and answering inferential questions. This can be especially expected when the L1 and the L2 differ significantly in orthographic transparency, and the resources necessary for word-to-text integration are depleted by poor decoding skills and deficient executive, inferential and attentional abilities, with no other linguistic resources to support the creation of a coherent model of the text.

## 3. Research questions and methodology

### *3.1. Research questions*

To the best of our knowledge, the way in which dyslexia affects the performance of adult learners in EFL reading comprehension tasks has not been extensively explored. Most studies have focused on children (cf. Bonifacci *et al.* 2017; Helland, Morken 2016; Kim 2012; Snowling *et al.* 2020b), although several articles have recently appeared discussing older participants (Awada, Gutiérrez-Colón Plana 2018; Łockiewicz, Jaskuulskaa 2016).

The present investigation had a behavioural and pedagogical focus. Given the deficits associated with dyslexia, including difficulties in processing pragmatic meaning, and the processing demands which supposedly come with reading in a foreign language, the study wanted to verify how dyslexic and neurotypical readers compare in terms of a) global accuracy in understanding simple short narrative texts, b) their ability to

answer correctly factual and inferential questions and c) their performance in the foreign language compared with the L1.

The study was not conducted with the intention of contributing to defining distinctive features of the reading disorder in the young adult population, it did not include experimental measures of verbal and non-verbal abilities to correlate with the data collected and, therefore, it makes no claims of psycholinguistic generalisability. The final goal of this investigation was instead to identify the role of individual learning differences and discuss their pedagogical implications for common EFL reading tasks, with the intent of supporting and encouraging inclusive teaching in the foreign language classroom.

### *3.2. Participants*

The data for the analysis were obtained from 22 young adults (11 F) who had been diagnosed with developmental dyslexia within the previous 3 years and 22 controls (14 F). The dyslexia group (DYS) had a mean age of 21 years, and the control group (CG) had a mean age of 22. All participants were Italian speaking students at the University of Pisa from different degree programmes, namely Political Sciences, Tourism Sciences, Humanities, Biology, History and Engineering. These undergraduate programmes require students to pass an English exam attesting the CEFR B1 proficiency level (intermediate). All had attained this level at the time of the experiment. The participants with dyslexia had successfully completed a specifically designed course offered to all students with this condition by the University. The participants without dyslexia had fulfilled the foreign language credit requirements for their degree programme.

It was not possible to make fine-grained distinctions between participants with dyslexia and participants with dyslexia plus co-occurring developmental language disorder, since most diagnoses did not report this information. All members of the DYS group had at least a co-occurring specific learning difficulty (e.g., dysgraphia and dyscalculia). Three participants were excluded from this group because they had a history of language delay, which was taken as a possible indicator of developmental language disorder. Two participants were excluded from the control group because they were bilingual (i.e., Italian – Arabic and Italian – Albanian).

Although the diagnosis is indeed an important factor in determining the exact source of specific difficulties (Snowling *et al.* 2020b), establishing causal links was not the main intent of our research. The exact cognitive and linguistic profile of learners is rarely known to EFL teachers at the university level and given the essentially pedagogical focus of the study, a diagnosis of developmental dyslexia was taken as a sufficient criterion for inclusion regardless of comorbidities.

### 3.3. Materials

The participants' English proficiency level was assessed through the locally-developed entry test in use at the Language Centre of the University of Pisa. A vocabulary knowledge test measuring both vocabulary breadth and depth was specifically designed to verify if the key English lexical items in the texts included in the experiment were known to the learners. The test was modelled on Read's (1998) Word Associates Test and focused especially on the lexical items necessary for inference making.

The reading test included 8 short narrative texts (average length: 110 words), four in Italian and four in English. The English texts were adaptations of short passages found on a reading instruction website (www.ereadingworksheets.com) in the section dedicated to teaching inferencing to English speaking children (grade 3-5). The Italian texts were adapted translations of texts from the same site which did not include references that were specific to the Anglophone world. The texts were modified to include vocabulary typically known to intermediate learners of English and to make the length and the readability measures comparable in the two languages. Table 1 shows some of the parameters that were controlled in choosing and preparing the texts.

| | Sentences | Words | Sentence length | Syllables per sentence |
|---|---|---|---|---|
| TEXTS $^{EN}$ | 9.25 | 107.25 | 11.77 | 15.49 |
| TEXTS $^{IT}$ | 10 | 129 | 12.87 | 19.86 |

Table 1
Average number of sentences and words, average sentence length and average number of syllables per sentence in the English and Italian texts.

As for vocabulary measures, lexical density was verified for the Italian texts (*M* = 76,35%) through *DyLan TextTools v2.1.9*,[1] an online text readability analyser developed by the Dynamics of Language unit of the Italian National Research Centre in Pisa. Lexical diversity (M = 59.05) was measured for the English texts with *Text Inspector*,[2] an online tool developed by the Centre for Research in English Language Learning and Assessment (CRELLA) at the University of Bedfordshire. Both indicators are typical of easily readable texts. The English texts were also assessed in terms of CEFR vocabulary levels, to ensure that most lexical items were accessible to intermediate learners (97%). General indexes of readability were calculated for both languages. The average Flesch Reading Ease score for the English texts was

[1] http://www.ilc.cnr.it/dylanlab/apps/texttools/ (25.8.2022).
[2] https://textinspector.com/ (25.8.2022)

83.2, whereas the equivalent average Flesch-Vacca Reading Ease score for Italian was 79.75. This means that all texts could be classified as "easy" and were considered suitable for readers over 14 years old. We additionally confirmed the readability level of the Italian texts with a measure specifically developed for this language (GULPEASE; $M = 69.75$).

### *3.4. Methodology*

The proficiency test and the vocabulary test were administered six weeks prior to the experimental session. All participants who demonstrated poor understanding of relevant lexical items received specific instruction so they could learn the unfamiliar words and their acquisition was verified 10 days prior to the reading comprehension test. These steps were meant to reduce differences in the participants' EFL proficiency and in their relevant vocabulary knowledge as much as possible.

Participants were asked to take the reading test in the computer laboratory of the University of Pisa Linguage Centre. The task consisted in reading each text and answering questions on a computer. No time limits were imposed. Audio recordings of the texts were available to learners with dyslexia in both languages, so as to reduce the impact of decoding difficulties. However, none of the participants chose to listen to them.

The questions had different formats: some were multiple choice questions and others were open questions. In order to answer them, participants had to identify factual information or to draw either local coherence inferences (e.g., anaphoric resolution and lexical inferences) or global coherence inferences (e.g., inferences which required the integration of information from various parts of the text or resort to general background knowledge).

Multiple choice questions were attributed 1 point for each correct answer and 0 points for errors or missing answers. Open questions were given 1 point for a complete correct answer, 0.5 points for partially correct answers (e.g., if participants did not draw all the required inferences) and 0 points for incorrect (e.g., wrong or no inference or answers that reported part of the text) or missing answers. In order to reduce bias in evaluating open answers and to increase the reliability of point attribution, the assessment procedure was carried out independently by the author and two graduate students in English linguistics, who also helped in the data collection. Results were consistent across evaluators (overall Intraclass Correlation Coefficient 0.88). Language mistakes were not considered, and participants were allowed to answer in Italian questions about the English texts if they so wished, since the focus was on their understanding and not their EFL writing skills.

Results as to the accuracy in retrieving factual information, and in local and global inference making were analysed both quantitatively, and

qualitatively for each group and the performance of the two groups was compared. The statistical significance of the differences between factual information understanding and local and global inferencing in each group was assessed through *t*-tests, whereas the differences between groups and conditions were assessed through two-way ANOVA tests. The answers to each question were then qualitatively assessed in order to identify potential sources of significant differences.

## 4. Results and Discussion

Results showed differences between the performance of the DYS group and that of the Control Group. It did not differ significantly in terms of average completion time ($p$ = .886074), although greater intragroup variation was observed in DYS (s = 9' 7" vs. 7' 41") than in CG. The same variance was observed in global accuracy scores, in which, however, the difference between groups was statistically significant ($p$ < .00001). The control group outperformed the participants with dyslexia, thus pointing towards probable difficulties in inferential processing of texts in the latter population (Table 2).

| | *M* time | *Sd* | *M* total score | *Sd* |
|---|---|---|---|---|
| DYS | 28' 57" | 9' 7" | 31.68 | 5.98 |
| CG | 28' 36" | 7' 41" | 43.45 | 1.23 |

Table 2
Average times and total scores for the two groups.

The minimal difference in average completion times was unexpected, given the deficit in reading fluency and processing speed associated with dyslexia in adulthood. The larger standard deviation confirmed instead the typical intragroup variability found in most studies on people with the disorder.

A qualitative analysis of the individual times and scores was carried out to verify whether the score might indicate high levels of compensation in the participants of the DYS group. The lowest completion times in DYS were however found in association with the lowest scores and the highest number of unanswered questions, whereas the opposite was true for the control group. It appears therefore that, as far as the focus group is concerned, low average times cannot be taken as a measure of compensation and reading fluency, but rather as the sign that at least some participants with dyslexia struggled to answer certain questions and decided to skip them altogether.

Data were then analysed to identify differences in factual information retrieval and local coherence and global coherence inference making accuracy. Both groups were very accurate in answering factual questions in

both languages (Table 3), and the language of the text appears to make no significant statistical difference for either group (DYS $p$ = .572 vs. CG $p$ = .393). A two-way ANOVA was performed to analyse the effect of condition on group. It revealed that there was no statistically significant interaction between the effects of condition and group (p > 0.5) and no significant difference between groups (p > 0.5).

| | *M* Factual info | *M* Factual $^{IT}$ | *M* Factual $^{EN}$ |
|---|---|---|---|
| DYS | 0.92 | 0.93 | 0.91 |
| CG | 0.97 | 0.98 | 0.97 |

Table 3
Average score for reading comprehension accuracy in factual questions.

A qualitative assessment confirmed that all participants were comparably accurate in answering factual questions both in Italian and in English, even though the dyslexic readers were less correct when the information to retrieve appeared in complex sentences or relied on vocabulary knowledge (e.g., synonymy). This is in line with the issues reported for some people with dyslexia in lower-level processes (i.e., structural and lexical knowledge) and working memory.

Learners with dyslexia were systematically outperformed by the control group in both types of inferential questions (Table 4). Furthermore, whereas no statistically significant difference was observed in the control group in terms of accuracy in factual vs. inferential questions ($p$ = .550), this was not the case for the DYS group ($p$ < .01). In this case, a two-way ANOVA revealed a statistically significant interaction between the effects of condition (e.g., factual vs. inferential questions) and group (F(1, 84) = 35,58, p <.001). A simple main effects analysis showed a significant difference between groups (F(1, 84) = 89,36, p <.001). In other words, neurotypical learners were equally accurate in answering factual and inferential questions. On the other hand, learners with dyslexia were better at answering factual rather than inferential questions and were less accurate than controls in this task.

These observations provide support to the hypothesis that young adults with dyslexia are not impaired in retrieving explicit information in texts. Rather, their primary deficit in decoding and inefficiency in several higher-level processes supporting reading comprehension may reduce their ability to construe a proper mental model when processing demands are higher. This explains why this effect is most evident in inferential questions, and global coherence inferences in particular (Table 4).

| | *M* Local | *M* Global | *M* Local $^{IT}$ | *M* Global $^{IT}$ | *M* Local $^{EN}$ | *M* Global $^{EN}$ |
|---|---|---|---|---|---|---|
| DYS | 0.81 | 0.65 | 0.89 | 0.74 | 0.71 | 0.55 |
| CG | 0.98 | 0.96 | 0.96 | 0.98 | 0.99 | 0.94 |

Table 4
Mean scores for total local and global inferencing and for local and global inferencing in English and Italian.

Local and global coherence inference making was then compared and contrasted infralinguistically and crosslinguistically. The data in Table 3 show that the DYS group was less accurate in answering questions relying on global coherence inferences ($M$ = 0.65; $s$ = 0.207) than those requiring local coherence inferences ($M$ = 0.81; $s$ = 0.187), $p$ = .002. No statistically significant difference was found in the controls' scores for local coherence ($M$ = 0.98; $s$ = 0.043) and global coherence inferences ($M$ = 0.96; $s$ = 0.057), $p$ = .411469. This is compatible with the cognitive profile associated with dyslexia discussed in the literature, and, more specifically, with the deficits in working memory and executive functions, whether inherent or resulting from the depletion of cognitive resources due to difficulties in decoding. Global coherence inferences require, in fact, being able to understand and keep in memory different pieces of information found in the text and integrating them in the mental model to update the existing one in real time. This also requires good attentional skills and the ability to inhibit non-relevant information. Most local coherence inferences, on the other hand, could be made just by identifying relevant lexical items or by assigning anaphoric reference correctly. Sufficient vocabulary knowledge might have provided support for this type of question. Some of the global coherence inference questions entailed, instead, resorting to general background knowledge (i.e., extra-textual information) to answer correctly. Besides sufficient vocabulary and general knowledge, participants therefore needed efficient higher-level processing. The difference between the performance of the two groups and between the two types of inference was therefore not unexpected.

Data were then analysed to investigate the role of the text language in inferential reading comprehension accuracy. The accuracy of the control group in deriving local coherence and global coherence inferences did not differ significantly intralinguistically. The score obtained in questions relying on local inferences (M = 0.96; s = 0.034) and in those relying on global inference (M = 0.98; s = 0.055) in the Italian texts did not differ in a relevant way (p = .153). The same was found for the difference in local (M = 0.99; s = 0.048) and global (M = 0.94; s = 0.053) inferences in English (p = .339). In contrast, participants with dyslexia showed reduced accuracy in global coherence inference making in both Italian (p = .034) and in English (p =

.046). A two-way ANOVA was performed to analyse the effect of condition on group for both English and Italian. It revealed that there was a statistically significant interaction between the effects of condition (type of inference in English) and group ($F(1, 84) = 8,257$, $p < 0.01$). Simple main effects analysis showed that there is a significant difference between groups ($F(1, 84) = 105,941$, $p < 0.001$). The same was done for the two types of inference in Italian, and in this case too the two-way ANOVA revealed that a statistically significant (although smaller) interaction between the effects of condition (types of inference in Italian) and group ($F(1, 84) = 5,822$, $p < 0.05$), and a significant difference between groups ($F(1, 84) = 81,99$, $p < 0.001$). This means that for neurotypical learners the type of inference made no difference in either Italian or English. On the other hand, learners with dyslexia were consistently better at deriving local coherence rather than global coherence inferences in both languages. The discrepancy between groups in Italian partially contrasts with the findings of Bonifacci *et al.* (2017). Although DYS and CG diverged less in reading comprehension in their L1 than in English, the latter still outperformed the former, in contrast with what was observed in children. It is possible that growing up, the gap between inferential reading comprehension accuracy in dyslexic and neurotypical adults widens because the disparity in vocabulary and general background knowledge increases. Further research is necessary to confirm and possibly explain this emerging picture.

The crosslinguistic comparison of local and global coherence inferencing in Italian and in English revealed instead a significant effect of the language in both groups, although smaller in the controls' scores. The latter were less accurate in answering questions based on local coherence inferences in English than in Italian ($p = .038$) and the same happened with the questions involving global coherence inferences ($p = .035$). The same, but larger effect was observed in the DYS group's scores ($Local^{IT}$ vs. $Local^{EN}$ $p = .009$; $Global^{IT}$ vs. $Global^{EN}$ $p = .011$). The language of the text seems, therefore, to impact the accuracy of all readers, although the effect on people with dyslexia appears greater.

## 5. Concluding remarks

This study hopes to contribute to the debate about reading comprehension abilities and developmental dyslexia in young adult learners of English. Reading skills in the native language as well as in a foreign language are a very important factor in academic success as well as in social inclusion. Developmental dyslexia may hinder or significantly slow down their acquisition, and this may in turn result in negative attitudes towards foreign language learning (Dimililer, Istek 2018), and, most importantly, provoke

feelings of inadequacy and even result in early school leaving (Daniel *et al.* 2006; Donato *et al.* 2021; Livingston *et al.* 2018.

Most EFL learners with dyslexia in higher education are presumably well compensated individuals, and therefore, the data resulting from their testing may return only a partial picture of the impact of the disorder on reading comprehension abilities. Nevertheless, the research did not aim at defining the distinctive features of young adult dyslexia. The design of the behavioural experiment described in the previous sections was planned to highlight the role of different types of questions (i.e., factual, local coherence and global coherence inferential questions) and of the language of the text (e.g., L2 vs. L1) in the comprehension of learners with dyslexia. Although the focus was on reading in English, the participants were also tested in Italian to verify whether reduced accuracy may be ascribed to individual differences or to proficiency issues in the foreign language. The final aim was therefore to investigate whether, given the deficits associated with this specific learning difficulty, including the limitations observed in vocabulary knowledge (Cappelli 2022), pragmatic inefficiency (Cappelli *et al.* 2018, 2022) and difficulties in foreign language learning (Kormos 2020), the demands of reading comprehension tasks – commonly used in the EFL classroom – would make them as accessible for these learners as for their neurotypical peers.

Results revealed significant differences in accuracy between groups. Although learners with the disorder were as fast as their typically developed peers in completing the test, low completion times corresponded to accurate and fluent processing of the text only for the control group. The participants with dyslexia who finished quickly simply ended up skipping the most challenging questions. The type of question did not make any relevant difference for neurotypical readers: they were equally accurate in answering factual and inferential questions, both involving local and global coherence inferences. Readers with dyslexia, instead, showed better understanding of factual rather than inferential information, and were more accurate in deriving local inferences than global inferences. Overall, inferential reading comprehension seems therefore a more challenging task for dyslexic than for neurotypical readers, especially when questions require combining several pieces of textual and extra-textual information into an increasingly complex model of the text. However, the fact that no significant differences were observed between the focus and the control group in answering factual questions supports the hypothesis that poor understanding of texts is indeed a secondary consequence of dyslexia, since they were efficient and accurate in answering questions focusing on explicit information. It is reasonable to conclude that comprehension difficulties may emerge in some dyslexic

readers as a result of their primary deficit in decoding and of inefficiency in several higher-level processes supporting reading comprehension.

As to the role of the language of the text, both dyslexic and non-dyslexic participants were better at deriving inferences in Italian (i.e., their L1) than in English. This is compatible with the hypothesis that L2 reading is more taxing on executive functions than L1 reading (Prehn *et al.* 2018), since readers must compensate for lower proficiency, including more shallow vocabulary knowledge (Raudszus *et al.* 2018). Interestingly, though, this effect of the L2 was more marked in the scores of readers with dyslexia, providing support to the idea that the disorder adds to the intrinsic demands imposed by reading in a foreign language.

The study has no pretence of exhaustivity. The small number of participants and the fact that no fine-grained distinctions in their diagnoses was possible are limitations. Repeating the testing on a larger sample of participants with no comorbidities may offer a different picture. A larger sample would also allow for the effects of the individual differences in L2 language proficiency to be surmounted. Although the general competence was assessed and vocabulary knowledge was controlled, all studies focusing on L2 abilities are inevitably influenced by the uniqueness of the path followed in language development by each learner, which are presumably more influential in smaller focus groups.

Nevertheless, the results offer some interesting insights on the impact of dyslexia in reading comprehension tasks beyond the well-known decoding deficits. Too often, the only adjustment offered to these learners in the language classroom, both during teaching and testing, is providing extra time or resorting to multiple choice questions. If this is certainly helpful, it is per se not sufficient. Competent EFL teachers must be able to analyse and evaluate the complexity of reading comprehension materials with the awareness that highly inferential texts or questions may pose additional obstacles to learners with dyslexia. From a pedagogical point of view, a distinction should be made between reading comprehension tasks carried out as a learning activity and those included in testing. The ability to process texts inferentially is a fundamental skill that all learners must acquire. Therefore, inclusive teaching should not exclude this type of question from reading activities. Rather, it is important that reading comprehension lessons include instruction moments focusing on the development of inferential abilities and on the strategies that can help all learners, including those with special needs, to make the necessary connections between parts of the text and between the text and their background knowledge. Some adjustments may still be necessary in reading comprehension assessment tests. Again, teachers must be clear on the goal of testing and possibly avoid formats that are very demanding on higher-level processing resources and require efficient pragmatic abilities (e.g., open questions on global cohesion inferences relying

on general knowledge, local cohesion questions relying on interpretation of idioms, polysemous words or very distant coreferent, etc.). Further research should expand on these preliminary observations and investigate the most inclusive format for reading comprehension testing. Different types of questions (e.g., multiple choice questions, true-false questions, matching questions, etc.) may have different outcomes in terms of the pragmatic processing of texts. The ordering of the questions may also be a factor: does mixing types of questions make the task more difficult? Should factual questions always precede inferential questions? Can this help readers with memory issues? Should questions be ordered according to their inferential load? These are all aspects that deserve further investigation and can make a difference in the design of truly inclusive teaching and testing materials (including international standardised proficiency assessment procedures) and ensure equal opportunities for all learners in the EFL classroom.

**Bionote:** Gloria Cappelli is Associate Professor of English Language and Linguistics at the University of Pisa. Her research focuses on semantics and pragmatics, ESP and multimodal discourse, and second and foreign language acquisition in learners with and without dyslexia. She has published in national and international journals and collected volumes. She has authored and edited books on English verbs of cognitive attitude, lexical semantics, tourism communication and the impact of dyslexia on language skills. Her most recent publication is the volume *A Linguistic Approach to the Study of Dyslexia* (2022 Multilingual Matters), coedited with Dr. Sabrina Noccetti.

**Author's address:** gloria.cappelli@unipi.it

**Acknowledgements**: I would like to thank Dr. Nicoletta Simi and Francesca Todde for their help with data collection and analysis. This research was financed by the University of Pisa (Project PRA 2017-2018 no. PRA_2017_53, "Pragmatic efficiency and L1 and L2 reading comprehension in young adults with and without dyslexia", coordinated by Prof. Silvia Bruti).

# References

Ahmed Y., Francis D.J., York M., Fletcher J.M., Barnes M. and Kulesz P. 2016, *Validation of the direct and inferential mediation (DIME) model of reading comprehension in grades 7 through 12*, in "Contemporary Educational Psychology" 44, pp. 68-82.

Alptekin C. 2006, *Cultural familiarity in inferential and literal comprehension in L2 reading*, in "System" 34 [4], pp. 494-508.

Araújo S. and Faísca L. 2019, *A meta-analytic review of naming-speed deficits in developmental dyslexia*, in "Scientific Studies of Reading" 23 [5], pp. 349-368.

Araújo S., Huettig F. and Meyer A. 2020, *What underlies the deficit in rapid automatized naming (RAN) in adults with dyslexia? Evidence from eye movements*, in "Scientific Studies of Reading", pp. 1-16.

Araújo S., Reis A., Petersson K.M. and Faísca L. 2015, *Rapid automatized naming and reading performance: A meta-analysis*, in "Journal of Educational Psychology" 107 [3], pp. 868-883.

Awada G. and Plana M.G.C. 2018, *Multiple Strategies Approach and EFL Reading Comprehension of Learners with Dyslexia: Teachers' Perceptions*, in "International Journal of Instruction" 11 [3], pp. 463-476.

Barnes M.A., Dennis M. and Haefele-Kalvaitis J., 1996, *The effects of knowledge availability and knowledge accessibility on coherence and elaborative inferencing in children from six to fifteen years of age*, in "Journal of Experimental Child Psychology" 61, pp. 216-241.

Bonifacci P., Canducci E., Gravagna G. and Palladino P. 2017, *English as a foreign language in bilingual language-minority children, children with dyslexia and monolingual typical readers*, in "Dyslexia" 23 [2], pp. 181-206.

Cain K. and Oakhill J. 2006, *Profiles of children with specific reading comprehension difficulties*, in "British Journal of Educational Psychology" 76 [4], pp. 683-696.

Cain K., and Oakhill J. 2012, *Reading comprehension development from seven to fourteen years: Implications for assessment*, in Sabatini J., Albro E. and O'Reilly T. (eds.), *Measuring up: Advances in how we assess reading ability*, Rowman & Littlefield Education, Lanham, MD, pp. 59-76.

Cain K., Oakhill J. and Bryant P.E. 2004a, *Children's reading comprehension ability: Concurrent prediction by working memory, verbal ability, and component skills*, in "Journal of Educational Psychology" 96 [1], pp. 671-681.

Cain K., Oakhill J. and Lemmon K. 2004b, *Individual differences in the inference of word meanings from context: The influence of reading comprehension, vocabulary knowledge, and memory capacity* in "Journal of Educational Psychology" 96 [4], pp. 671-681.

Cappelli G. 2019, *Pragmatic and lexical skills of learners with dyslexia and EFL learning*, in Coppola M.M., Di Blasio F. and Francesconi S. (eds.), *Contact Zones: Cultural, Linguistic and Literary Connections in English*, Trento University Press, Trento, pp. 55-74.

Cappelli G. 2022, *The Impact of Dyslexia on Lexico-Semantic Abilities: An Overview*, in Cappelli G. and Noccetti S. (eds.), *A Linguistic Approach to the Study of Dyslexia*, Multilingual Matters, Bristol, pp. 211-239.

Cappelli G. and Noccetti S., 2016, *Teaching specialized vocabulary to dyslexic adult second-language learners: A proposal for multimodal lexical input enhancement*, in Bonsignori V. and Crawford Camiciottoli B. (eds.), *Multimodality Across*

*Communicative Settings, Discourse Domains and Genres*, Cambridge Scholars Publishing, Newcastle on Tyne, pp. 37-64.

Cappelli G. and Noccetti S. (eds.) 2022, *A Linguistic Approach to the Study of Dyslexia*, Multilingual Matters, Bristol.

Cappelli G., Noccetti S., Arcara G. and Bambini V. 2018, *Pragmatic competence and its relationship with the linguistic and cognitive profile of young adults with dyslexia*, in "Dyslexia" 24 [3], pp. 294-306.

Cappelli G., Noccetti S. Simi N., Arcara G. and Bambini V. 2022, *Dyslexia and Pragmatic Skills*, in Cappelli G. and Noccetti S. (eds.) *A Linguistic Approach to the Study of Dyslexia*, Multilingual Matters, Bristol, pp. 240-262.

Caravolas M., Lervåg A., Defior S., Seidlová Málková G. and Hulme C. 2013, *Different patterns, but equivalent predictors, of growth in reading in consistent and inconsistent orthographies*, in "Psychological Science" 24, pp. 1398-1407.

Cardillo R., Basso Garcia R., Mammarella I.C. and Cornoldi C. 2018, *Pragmatics of language and theory of mind in children with dyslexia with associated language difficulties or non-verbal learning disabilities*, in "Applied Neuropsychology: Child" 7 [3], pp. 245-256.

Cartwright K.B. 2009. *The role of cognitive flexibility in reading comprehension: Past, present, and future*, in Israel S.E. and Duffy G.G. (eds.), *Handbook of research on reading comprehension*, Routledge, New York, pp. 115-139.

Catts H.W., Hogan T.P. and Adlof S.M. 2005, *Developmental changes in reading and reading disabilities*, in Catts H.W. and Kamhi A.G. (eds.), *The connections between language and reading disabilities*, Lawrence Erlbaum. Mahwah, NJ, pp. 25-40.

Cavalli E., Casalis S., El Ahmadi A., Zira M., Poracchia-George F. and Colé P. 2016, *Vocabulary skills are well developed in university students with dyslexia: Evidence from multiple case studies*, in "Research in developmental disabilities" 51, pp. 89-102.

Cavalli E., Duncan L.G., Elbro C., El Ahmadi A. and Colé P. 2017, *Phonemic—Morphemic dissociation in university students with dyslexia: An index of reading compensation?,* in "Annals of Dyslexia" 67, pp. 63-84.

Daniel S.S., Walsh A.K., Goldston D.B., Arnold E.M., Reboussin B.A. and Wood F.B. 2006, *Suicidality, school dropout, and reading problems among adolescents*, in "Journal of learning disabilities" 39 [6], pp. 507-514.

Diamond A. 2013, *Executive functions*, in "Annual Review of Psychology" 64, pp. 135-168.

Dimililer C. and Istek E. 2018, *Experiences of a dyslexic child in an English as a foreign language class*, in "Quality & Quantity" 52 [2], pp. 1391-1398.

Donato A., Muscolo M., Arias Romero M., Caprì T., Calarese T. and Olmedo Moreno E.M. 2021, *Students with dyslexia between school and university: Post-diploma choices and the reasons that determine them. An Italian study*, in "Dyslexia", pp. 1-18.

Downey D.M., Snyder L.E. and Hill B. 2000, *College students with dyslexia: Persistent linguistic deficits and foreign language learning*, in "Dyslexia" 6, pp. 101-111.

Droop M. and Verhoeven L. 2003, *Language proficiency and reading ability in first and second language learners*, in "Reading Research Quarterly" 38, pp. 78-103.

Duke N.K. 2004, *The case for informational text*, in "Educational Leadership" 61 [6], pp. 40-45.

Eason S.H., Goldberg L.F., Young K.M., Geist M.C. and Cutting L.E. 2012, *Reader–text interactions: How differential text and question types influence cognitive skills*

*needed for reading comprehension*, in "Journal of Educational Psychology" 104 [3], pp. 515-528.

Elbro C., Daugaard H.T. and Gellert A.S. 2012, *Dyslexia in a second language? A dynamic test of reading acquisition may provide a fair answer*, in "Annals of dyslexia" 62 [3], pp. 172-185.

Eloranta A.K., Närhi V.M., Eklund K.M., Ahonen T.P.S. and Aro T.I. 2019, *Resolving reading disability—Childhood predictors and adult-age outcomes*, in "Dyslexia" 25 [1], pp. 20-37.

Ferrara M., Camia M., Cecere V., Villata V., Vivenzio N., Scorza M. and Padovani R. 2020, *Language and Pragmatics Across Neurodevelopmental Disorders: An Investigation Using the Italian Version of CCC-2*, in "Journal of Autism and Developmental Disorders" 50, pp. 1295-1309.

Fidler R. and Everatt J. 2012, *Reading Comprehension in Adult Students with Dyslexia*, in Brunswick N. (ed.), *Supporting Dyslexic Adults in Higher Education and the Workplace*, Wiley-Blackwell, Chichester, pp. 91-100.

Gagliano A., Ciuffo M., Ingrassia M., Ghidoni E., Angelini D., Benedetto L. *et al.* 2015, *Silent reading fluency: Implications for the assessment of adults with developmental dyslexia*, in "Journal of Clinical and Experimental Neuropsychology" 37 [9], pp. 972-980.

Ganschow L. and Sparks R. 2001, *Learning difficulties and foreign language learning: A review of research and instruction*, in "Language Teaching" 34 [2], pp. 79-98.

Genesee F., Geva E., Dressler C. and Kamil M. 2006, *Synthesis: Cross-linguistic relationships*, in August D. and Shanahan T. (eds.), *Developing literacy in second language* learners, Lawrence Erlbaum, Mahwah, NJ, pp. 153-174.

Grabe W. 2014, *Key issues in L2 reading development*, in "Proceedings of the 4th CELC Symposium for English Language Teachers-Selected Papers", pp. 8-18.

Grabe W. and Stoller F. 2011, *Teaching and Researching Reading*, Longman Pearson, Harlow.

Gough P.B. and Tunmer W.E. 1986, *Decoding, reading, and reading disability*, in "Remedial and Special Education" 7 [1], pp. 6–10.

Griffiths C.B. 2007, *Pragmatic abilities in adults with and without dyslexia: A pilot study*, in "Dyslexia" 13, pp. 276-296.

Hamouda A.M.S. and Tarlochan F. 2015, *Engaging engineering students in active learning and critical thinking through class debates*, in "Procedia – Social and Behavioral Sciences" 191, pp. 990–995.

Helland T. and Morken F. 2016, *Neurocognitive development and predictors of L1 and L2 literacy skills in dyslexia: a longitudinal study of children 5–11 years old*, in "Dyslexia" 22, pp. 3-26.

Horiba Y. 1996, *Comprehension processes in L2 reading: language competence, textual coherence and inferences*, in "Studies in Second Language Acquisition" 18, pp. 403-432.

Horiba Y. 2000, *Reader control in reading: effects of language competence, text type, and task*, in "Discourse Processes" 29, pp. 223-267.

In'nami Y., Hijikata Y. and Koizumi R. 2021, *Working Memory Capacity and L2 Reading: A Meta-Analysis*, in *Studies in Second Language Acquisition*, pp. 1-26.

Jang E.E. 2009, *Demystifying a Q-matrix for making diagnostic inferences about L2 reading skills*, in "Language Assessment Quarterly" 6 [3], pp. 210-238.

Jeon E.H. and Yamashita J. 2014, *L2 reading comprehension and its correlates: A meta-analysis*, in "Language learning" 64 [1], pp. 160-212.

Johnson-Laird P.N. 1983, *Mental models: Towards a cognitive science of language, inference, and consciousness*, Harvard University Press, Cambridge, MA.

Keenan J.M., Betjemann R.S. and Olson R.K. 2008, *Reading comprehension tests vary in the skills they assess: Differential dependence on decoding and oral comprehension*, in "Scientific Studies of Reading" 12, pp. 281-300.

Kendeou P., Van Den Broek P., Helder A. and Karlsson J. 2014, *A cognitive view of reading comprehension: Implications for reading difficulties*, in "Learning disabilities research & practice" 29 [1], pp. 10-16.

Khataee E. and Davoudi M. 2018, *The Role of Cultural Schemata in Inferential Reading Comprehension: An Investigation in the Iranian EFL Context*, in "Asian Journal of Teaching and Learning in Higher Education (AJTLHE)" 10 [2], pp. 11-27.

Kim Y.S. 2012, *The relations among L1 (Spanish) literacy skills, L2 (English) language, L2 text reading fluency, and L2 reading comprehension for Spanish-speaking ELL first grade students*, in "Learning and Individual Differences" 22 [6], pp. 690-700.

Kintsch W. 1998, *Comprehension: A paradigm for cognition*, Cambridge University Press, New York.

Kintsch W. 2012, *Psychological models of reading comprehension and their implications for assessment*, in Sabatini J., Albro E. and O'Reilly T. (eds.), *Measuring up: Advances in how to assess reading abilities*, Rowman & Littlefield Education, Lanham, MD, pp. 21-38.

Koda K. 2005, *Insights into second language reading*, Cambridge University Press, New York.

Kormos J. 2020, *Specific learning difficulties in second language learning and teaching*, in "Language Teaching" 53 [2], pp. 129-143.

Landerl K., Wimmer H. and Frith U. 1997, *The impact of orthographic consistency on dyslexia: A German-English comparison*, in "Cognition" 63, pp. 315-334.

Li P. and Clariana R.B. 2019, *Reading comprehension in L1 and L2: An integrative approach*, in "Journal of Neurolinguistics" 50, pp. 94-105.

Livingston E.M., Siegel L.S. and Ribary U. 2018, *Developmental dyslexia: emotional impact and consequences*, in "Australian Journal of Learning Difficulties" 23 [2], pp. 107-135.

Łockiewicz M. and Jaskuulskaa M. 2016, *Difficulties of Polish students with dyslexia in reading and spelling in English as L2*, in "Learning and Individual Differences" 51, pp. 256-264.

Lonergan A., Doyle C., Cassidy C., MacSweeney Mahon S., Roche R.A., Boran L. and Bramham J. 2019, A meta-analysis of executive functioning in dyslexia with *consideration of the impact of comorbid ADHD*, in "Journal of Cognitive Psychology" 31 [7], pp. 725-749.

Meisinger E.B., Breazeale A.M. and Davis L.H. 2021, *Word-and Text-Level Reading Difficulties in Students with Dyslexia*, in "Learning Disability Quarterly", pp. 1-12.

Miller-Guron L. and Lundberg I. 2000, *Dyslexia and second language reading: A second bite at the apple*, in "Reading and Writing: An Interdisciplinary Journal" 12, pp. 41-61.

Miller-Shaul S. 2005, *The characteristics of young and adult dyslexics readers on reading and reading related cognitive tasks as compared to normal readers*, in "Dyslexia" 11, pp. 132-151.

Moll K., Ramus F., Bartling J., Bruder J., Kunze S., Neuhoff N. *et al.* 2014, *Cognitive mechanisms underlying reading and spelling development in five European orthographies*, in "Learning and instruction" 29, pp. 65-77.

Morken F., Helland T., Hugdahl K. and Specht K. 2017, *Reading in dyslexia across literacy development: A longitudinal study of effective connectivity*, in "Neuroimage" 144, pp. 92-100.

Nijakowska J. 2020, *Dyslexia in the context of second language learning and teaching*, in "Pragmalingüística" 2, pp. 257-271.

Noccetti S. 2022, *Visual and Auditory Stimuli for Teaching EFL Vocabulary to Learners with Dyslexia*, in Cappelli G. and Noccetti S. (eds.), *A Linguistic Approach to the Study of Dyslexia*, Multilingual Matters, Bristol, pp. 265-285.

Noccetti S. and Cappelli G. 2018, *Blended learning and memory-training techniques for specialised vocabulary learning in adult EFL learners with dyslexia*, in Garzelli B. and Ghia E. (eds.), *Le lingue dei centri linguistici nelle sfide europee e internazionali: formazione e mercato del lavoro*, ETS, Pisa, pp. 181-198.

Oakhill J. and Cain K. 2012, *The precursors of reading ability in young readers: Evidence from a four-year longitudinal study*, in "Scientific Studies of Reading" 16 [2], pp. 91-121.

Oakhill J., Cain K. and Bryant P.E. 2003, *The dissociation of word reading and text comprehension: Evidence from component skills*, in "Language and cognitive processes" 18 [4], pp. 443-468.

Oakhill J., Cain K., and Elbro C. 2015, *Understanding and teaching reading comprehension: A handbook*, Routledge.

Oren R. and Breznitz Z. 2004, *Reading processes in L1 and L2 among dyslexic as compared to regular bilingual readers: behavioral and electrophysiological evidence*, in "Journal of Neurolinguistics" 18, pp. 127-151

Perfetti C. 1985, *Reading ability*, Oxford University Press, New York.

Perfetti C. and Adolf S. 2012, *Reading comprehension: A conceptual framework from word meaning to text meaning*, in Sabatini J., Albro E. and O'Reilly T. (eds.), *Measuring up: Advances in how we assess reading ability*, Rowman & Littlefield Education, Lanham, MD, pp. 3-20.

Perfetti C. and Hart L. 2002, *The lexical quality hypothesis*, in "Precursors of functional literacy" 11, pp. 67-86.

Perfetti C. and Stafura J. 2014, *Word knowledge in a theory of reading comprehension*, in "Scientific studies of Reading" 18 [1], pp. 22-37.

Prehn K., Taud B., Reifegerste J., Clashen H. and Flöel A. 2018, *Neural correlates of grammatical inflection in older native and second-language speakers*, in "Bilingualism: Language and Cognition" 21 [1], pp. 1-12.

Prior A., Goldina A., Shany M., Geva E. and Katzir T. 2014, *Lexical inference in L2: Predictive roles of vocabulary knowledge and reading skill beyond reading comprehension*, in "Reading and Writing" 27 [8], pp. 1467-1484.

Read J. 1998, *Validating a test to measure depth of vocabulary knowledge*, in Kunnan A. J. (ed.), *Validation in language assessment*, Lawrence Erlbaum Associates, Mahwah, NJ, pp. 41-60.

Reis A., Araújo S., Morais I.S. and Faísca L. 2020, *Reading and reading-related skills in adults with dyslexia from different orthographic systems: a review and meta-analysis*, in "Annals of dyslexia" 70 [3], pp. 339-368.

Ramus F. and Szenkovits G. 2008, *What phonological deficit?* in "The Quarterly Journal of Experimental Psychology" 61, pp. 129-141.

Ramus F., Rosen S., Dakin S.C., Day B.L., Castellote J.M., White S. and Frith U. 2003, *Theories of developmental dyslexia: insights from a multiple case study of dyslexic adults*, in "Brain" 126 [4], pp. 841-865.

Raudszus H., Segers E. and Verhoeven L. 2018, *Lexical quality and executive control predict children's first and second language reading comprehension*, in "Reading and Writing: An Interdisciplinary Journal" 31 [2], pp. 405-424.

Samiei F. and Ebadi S. 2021, *Exploring EFL learners' inferential reading comprehension skills through a flipped classroom*, in "Research and Practice in Technology Enhanced Learning" 16 [1], pp. 1-18.

Sand L.A. and Bolger D.J. 2019, *The neurobiological strands of developmental dyslexia: What we know and what we don't know*, in Kilpatrick D., Joshi R.M. and Wagner R.K. (eds.), *Reading development and difficulties*, Springer, Cham, pp. 233-270.

Santulli F. and Scagnelli M. 2017, *The improvement of silent reading strategies through Super Reading*, in "The Journal of Inclusive Practice in Further and Higher Education" 9 [1], pp. 88-100.

Santulli F. and Scagnelli M. 2022, *Reading as Multi-Layer Activity: Training Strategies at Text Level*, in Cappelli, G. and Noccetti, S. (eds.), *A Linguistic Approach to the Study of Dyslexia*, Bristol, Multilingual Matters, pp. 286-304.

Scagnelli M., Ciuffo M., Baradello A. and Santulli F. 2018, *Super Reading: ulteriori prove di efficacia rilevate con i test di valutazione per l'adulto*, in "Dislessia" 15 [1], pp. 35-51.

Schneider E. and Crombie M. 2012, *Dyslexia and foreign language learning*, David Fulton Publishers, Abingdon.

Simi N. 2021, *Developmental Dyslexia and Anaphora Resolution in English L1/L2: The Effect of Referent Abstractness*, Cambridge Scholars Publishing, Newcastle upon Tyne.

Simon C.S. 2000, *Dyslexia and learning a foreign language: A personal experience*, in "Annals of Dyslexia" 50 [1], pp. 155-187.

Soroli E., Szenkovits G. and Ramus F. 2010, *Exploring dyslexics' phonological deficit III: Foreign speech perception and production*, in "Dyslexia" 16, pp. 318-340.

Smith-Spark J.H. and Fisk J.E. 2007, *Working memory functioning in developmental dyslexia*, in "Memory" 15, pp. 34-56.

Smith-Spark J.H., Fisk J.E., Fawcett A.J. and Nicolson R.I. 2003, *Central executive impairments in adult dyslexics: Evidence from visuospatial working memory performance*, in "European Journal of Cognitive Psychology" 15, pp. 567-587.

Smith-Spark J.H., Henry L.A., Messer D.J., Edvardsdottir E. and Zięcik A.P. 2016, *Executive functions in adults with developmental dyslexia*, in "Research in Developmental Disabilities" 53-54, pp. 323-341.

Snowling M.J., Hulme C. and Nation K. 2020a, Defining and understanding dyslexia: *past, present and future*, in "Oxford Review of Education" 46 [4], pp. 501-513.

Snowling M.J., Hayiou-Thomas M.E., Nash H.M. and Hulme C. 2020b, *Dyslexia and Developmental Language Disorder: comorbid disorders with distinct effects on reading comprehension*, in "Journal of Child Psychology and Psychiatry" 61 [6], pp. 672-680.

Sparks R.L. 2013, *Individual Differences in Learning a Foreign (Second) Language: A Cognitive Approach*, in Martin D. (ed.), *Researching dyslexia in multilingual settings*, Multilingual Matters, Bristol, pp. 36-54.

Sparks R.L. and Ganschow L. 1993, *The impact of native language learning problems on foreign language learning: Case study illustrations of the linguistic coding deficit hypothesis*, in "The Modern Language Journal" 77 [1], pp. 58-74.

Sparks R.L., Patton J., Ganschow L., Humbach N. and Javorsky J. 2006, *Native language predictors of foreign language proficiency and foreign language aptitude*, in "Annals of Dyslexia" 56 [1], pp. 129-160.

Stanovich K.E. 1986, *Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy*, in "Reading Research Quarterly" 21 [4], pp. 360-407.

Stanovich K.E. 2000, *Progress in understanding reading: Scientific foundations and new frontiers*, Guilford Press, New York.

Suárez-Coalla P., Martínez-García C. and Carnota A. 2020, *Reading in English as a Foreign Language by Spanish Children with Dyslexia*, in "Frontiers in psychology" 11, p. 19.

Swanson H.L. and Hsieh C.-J. 2009, *Reading disabilities in adults: A selective meta-analysis of the literature*, in "Review of Educational Research" 79 [4], pp. 1362-1390.

van den Bosch L.J., Segers E. and Verhoeven L. 2020, *First and second language vocabulary affect early second language reading comprehension development*, in "Journal of Research in Reading" 43 [3], pp. 290-308.

Verhoeven L. and van Leeuwe J. 2012, *The simple view of second language reading throughout the primary grades*, in "Reading and Writing" 25, pp. 1805-1818.

Wagner R., Muse A. and Tannenbaum K. 2007, *Promising avenues for better understanding implications of vocabulary development for reading comprehension*, in Wagner R., Muse A. and Tannenbaum K. (eds.), *Vocabulary acquisition: Implications for reading comprehension*, Guilford Press, New York, pp. 276-291.