

# Developmental Language Disorder (DLD) and Autism Spectrum Disorder (ASD): similarities in pragmatic language abilities. A systematic review

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**Objective:** Pragmatics can be defined as the appropriate use of language in social interactions. Children with Autism Spectrum Disorder (ASD) and children with Developmental Language Disorder (DLD) exhibit difficulties in pragmatic language (PL), but the nature and sources of these difficulties have not been fully investigated yet. The purpose of this paper is to critically review empirical literature on the PL of children with ASD as compared to that of children with DLD.

**Materials and methods:** Thirteen studies that met established inclusion criteria were identified and reviewed.

**Results:** Children with ASD and children with DLD demonstrated several similarities in PL. However, a lot of differences were observed and mainly children with ASD faced more profound difficulties than children with DLD, while PL may be a distinct marker between the two groups.

**Conclusion:** The differences observed in the language profiles of ASD and DLD show that even if there is an overlap in some domains, the PL abilities of children of both clinical populations are likely to be controlled by different mechanisms and therefore these differences in PL may be considered as a distinguishable feature between the two populations.

**Keywords:** pragmatic language; Autism Spectrum Disorder; Developmental Language Disorder; Specific Language Impairment

## Introduction

### Pragmatic language

While it is difficult to give a clear definition about pragmatic language (PL), it is usually defined as the appropriate use of language in social interactions (Matthews *et al.* 2018, Prutting and Kittchner 1987). More specifically, PL refers to the ability to use the language in context, transcending the syntactic and the semantic abilities (Turkstra *et al.* 2017). In order to understand an utterance there are several important factors such as the cognitive skills, the use of context or the ability to manipulate and keep in memory information that allow to interpret the linguistic information (Loukusa and Moilanen 2009). As linguistic information does not accurately convey the meaning of a phrase, it is necessary to use other factors to fully understand utterance (Loukusa *et al.* 2007). Specifically, an individual is able to understand the speaker's intention utilizing the communicative context, as the same expression may express different

meanings in different social situations (Loukusa and Moilanen 2009). Therefore, intentions and communication goals are presented as pragmatic aspects that could be identified in a conversational context (Toki *et al.* 2018). Moreover, starting a conversation, maintaining and changing the subject, generating contingent and relevant responses (Matthews *et al.* 2018), topic retention and coherence, correcting conversations and adjusting language according to the social environment (Toki *et al.* 2018) are also dimensions of PL, because speakers must follow the rules that are appropriate for the social context (Parsons *et al.* 2019). PL also includes the ability to produce cohesive and coherence narratives and to understand non literal language (Matthews *et al.* 2018), facial expressions, gestures and postures (Parsons *et al.* 2019). PL is therefore associated with both verbal and non-verbal communicative behaviours (Matthews *et al.* 2018) as well as the social, emotional and communicative aspects of social language (Parsons *et al.* 2019).

Children enrich the use of language overtime and tend to shape the use of social language depending on

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the occasion. The comprehension of the messages and the intentions of the interlocutor in a particular communication context is a complicated but crucial skill. However, some children show deficiencies in communication skills and as a result their social communication is impaired. Pragmatic difficulties concern not only the inappropriate production but also the lack of comprehension of the language in a context (Bishop *et al.* 2017). Difficulties in PL are related to the expression of communicative intention, the comprehension and the management of a conversation (Troia 2011).

The way an individual manages a conversation is likely to reveal pragmatic difficulties. Specifically, during a conversation, the interlocutors frequently utilize fillers, such as *uh* and *um*. These fillers indicate to the hearer that the speaker faces difficulties while expressing the desirable thoughts. Therefore, the hearer is indirectly requested to provide a boost in the speaker's speech during the conversation (Acton 2011, Clark and Fox Tree 2002). The *uh* and *um* fillers are utilized for different purposes. Especially, the filler *uh* is used mainly for minor pauses during the discourse, whilst the filler *um* is used for major pauses (de Villiers 2011). In this regard, the fillers *uh* and *um* are considered to be a part of conversational skills and consequently, an aspect of PL, while they probably demonstrate difficulties in planning of the spontaneous speech (Gorman *et al.* 2016).

Accordingly, article choice is also related to PL, as the choice of the correct article (definitive or indefinite) during a conversation depends on the assumption of the interlocutors (Heim 1982) and therefore, it is considered as an important element of conversational skills, and consequently as an aspect of PL. Hence, choosing the wrong article during a conversation may show pragmatic difficulties (Creemers and Schaeffer 2022, Schaeffer 2018).

Narration skills are also associated with PL which is a crucial element for narrative production. Narration is a complex process. The selection of aspects of the narrative that are coded to examine PL usually involves reference to relevant or irrelevant information, coherence and management of the interlocutor's knowledge (Matthews *et al.* 2018). Poor narration skills consist a key feature of children who face pragmatic difficulties, usually, exhibiting deficits in comprehension and expression, especially when a narration requires abstraction or critical thinking (MacKay and Anderson 2013).

Finally, pronoun processing seems to be linked to PL. Pronoun reversal, that concerns the use of 'I' for an addressee and the use of 'you' for self-reference, is likely to be due to pragmatic deficits related to perspective-taking (Evans and Demuth 2012, Perovic *et al.* 2013).

### ***Pragmatic language and autism spectrum disorder***

PL of children with Autism Spectrum Disorder (ASD) differs significantly from their typically developing peers (TD) (Baixauli-Forteza *et al.* 2019), as one of the key features of ASD is impaired PL and limited social communication abilities (Filipe *et al.* 2020). The difficulties children with ASD face in the pragmatic domain have been connected to their inability to understand another person's way of thinking (Papp 2006). More specifically, they fail to communicate, despite their willingness to interact with the people around them and they are impaired in tasks that require the abilities of initiation, stereotyped language or use of context and nonverbal communication (Baixauli-Forteza *et al.* 2019). They also present a tendency for imitation, characterized as 'echolalia'. Imitation is likely to be connected to pronoun reversal that sometimes occurs in the speech of children with ASD (Evans and Demuth 2012). Moreover, children with ASD initiate communication less often than their TD peers, while the non-verbal elements of the language they use are limited (Adams *et al.* 2012). Deficiencies are also identified in conversation, as children with ASD give inappropriate answers and show reduced reciprocity while discussing. In addition, they show lower sensitivity in using contextual cues and they also exhibit deficiencies in the understanding and use of irony, metaphor and non-literal language. Moreover, they find it difficult to express their feelings and to perceive the perspective and feelings of others (Lam and Yeung 2012). In addition, they present deficiencies in narration skills especially in story organization and coherence. On the opposite the length and the complexity of children with ASD narrations are similar to those of TD children (Gillam *et al.* 2015).

There are various factors that are related to the PL and may affect the performance of children with ASD in tasks that require pragmatic skills (Baixauli-Forteza *et al.* 2019). The chronological age and the abilities in syntax, in vocabulary and in Theory of Mind have an impact on the pragmatic abilities. PL abilities are increased significantly with age and with the development of the aforementioned abilities, however, children with ASD do not seem to develop the pragmatic abilities at the same rate as the typically developing children (Whyte and Nelson 2015). Interestingly, an increase of the difficulties of children with ASD is observed when mind-reading tasks are required (Loukusa *et al.* 2018). In conclusion, it is likely that their pragmatic deficits arise from the core cognitive dysfunctions (Lam and Yeung 2012) and that their structural difficulties can affect their communication (Baixauli-Forteza *et al.* 2019).

The impact of pragmatic deficits is evident throughout the social life of people with ASD (Tobin *et al.*

2014, Weiss and Harris 2001). Importantly, communication deficits in children with ASD are difficult to improve, as rehabilitating them remains one of the biggest challenges for professionals (Jones and Schwartz 2009, Weiss and Harris 2001).

### **Pragmatic language and developmental language disorder**

Developmental Language Disorder (DLD) is a neurodevelopmental language disorder, which includes a broad range of difficulties. The term Specific Language Impairment (SLI) was initially used to describe the individuals whose language development was not typical. The term SLI was replaced by the term DLD (Bishop *et al.* 2016), as the term DLD that was proposed defines the language impairment that cannot be justified by other factors and does not correlate with biological or neurological causes (Bishop *et al.* 2017).

Traditionally, PL is considered to be a strong aspect of DLD compared to the other domains of language, however, this does not mean that there is not a delay in PL development compared to that of TD children. Thus, deficits in social cognitive understanding, lower ratings of PL competence, and difficulty in the analysis of linguistic context in pragmatic tasks are observed (Davies *et al.* 2016).

In particular, children with DLD face difficulties in initiating speech, whilst undergoing a passive role and they have limited social interaction and poor conversational skills (Osman *et al.* 2011). Moreover, they exhibit deficits in finding the key points of a conversation, in describing an event and producing oral narratives (Andreou and LEMONI 2020, Osman *et al.* 2011). Regarding narrative skills children with DLD produce poorer and more confused narrations than their TD peers, while the development of narrative skills on their part is slower than that of TD children (Andreou and LEMONI 2020). In addition, children with DLD are impaired in utilizing verbal context, due to their practice to rely on their world knowledge to generate an answer, without considering contextual information (Ryder and Leinonen 2014).

The difficulties children with DLD face in quantifiers affect their pragmatic competence, as the expressions of quantity are frequently used in daily communication (Katsos *et al.* 2011). Thus, the performance of children with DLD on the use of quantifiers has been investigated by several researchers (Arosio *et al.* 2017, Katsos *et al.* 2011), who documented a delay on their part as compared to their TD peers. Their competence in the use of quantifiers appeared to be at the same level as that of younger TD children and they, also, showed difficulty in understanding pragmatically under-informative sentences (Arosio *et al.* 2017).

### **Language development: autism spectrum disorder and developmental language disorder**

It has been documented that children with ASD and children with DLD demonstrate a lot of similarities in language development, as well as in their PL profile (Leyfer *et al.* 2008, Ramírez-Santana *et al.* 2019). These similarities in children of both populations were so many, that researchers considered the perspective that the two disorders are related and an overlap may lurk (Bishop 2010, Kjelgaard and Tager-Flusberg 2001, Tager-Flusberg and Joseph 2003). The relation between the two disorders has not yet determined, as recent research reveal common linguistic features between ASD and DLD, highlighting that it is likely that the linguistic similarities between the two populations shared etiology (Bishop and Norbury 2002, Kjelgaard and Tager-Flusberg 2001, Lindgren *et al.* 2009). Hodge *et al.* (2010) found that children with ASD and children with DLD present abnormalities in the circuits concerning motor control, language processing, cognition, attention and working memory. Studies in ASD children with or without language impairments in comparison to DLD children seem to support the assumption of a common phenotype between the two disorders (McGregor *et al.* 2012, Tuller *et al.* 2017). Furthermore, a numerous subgroup of ASD exhibits language impairments similar to these of DLD children (Georgiou and Spanoudis 2021, Loucas *et al.* 2008). These impairments refer to phonology, vocabulary, semantics and morphosyntax (Kjelgaard and Tager-Flusberg 2001, Ramírez-Santana *et al.* 2019), as well as PL (Osman *et al.* 2011, Simmons *et al.* 2014).

Regarding PL, common weaknesses observed in both groups, when compared to typically developing children, include difficulties in initiating speech (Baixauli-Fortea *et al.* 2019), conversational speech and discourse management (Simmons *et al.* 2014), inadequate narrative skills (Andreou and LEMONI 2020, Lam and Yeung 2012), a common habit of changing topic, and difficulties in expression and understanding other people's feelings (Lam and Yeung 2012, Osman *et al.* 2011), finding contextual cues, and in the use of context (Loukusa *et al.* 2018, Ryder and Leinonen 2014).

However, qualitative differences between the two populations in language development in terms of structural language abilities and in PL are also observed (Williams *et al.* 2008) while children with ASD face more profound pragmatic difficulties as compared to children with DLD (Malkin *et al.* 2018). Moreover, children with ASD have better performance in structural language than in pragmatic language tasks, in contrast to children with DLD, who are more impaired in structural language than in PL (Malkin *et al.* 2018).

It is worth mentioning that crucial findings to strengthen the assumption of a common ground between the two disorders arise from studies concerning adolescents. More specifically, the study of Conti-Ramsden *et al.* (2006) found that a significant percentage of adolescents who had a diagnosis of DLD met the criteria in order to get a diagnosis of Autism. Leyfer *et al.* (2008) draw to similar conclusions, investigating whether and in which extent specific clinical characteristics of ASD are observed in DLD. The results showed that a percentage of 41% of DLD children met autism or autism spectrum boundaries for social or communication domains.

Moreover, DLD is likely to co-occur with other disorders, however ASD is not considered as a co-occurring disorder, but as a differentiating factor (Bishop *et al.* 2017). ASD may co-occur with structural language impairment or intellectual disability.

Therefore, based on the above, the aim of this study is to review existing literature on the PL of children with ASD and children with DLD. A review of research findings on the pragmatic abilities and deficits of both disorders is likely to clarify the communication difficulties children of both groups face (Bavin *et al.* 2016). Moreover, the comparison of the performance on pragmatic tasks of children with ASD and children with DLD may contribute to the accurate description of their PL profile and to further understand their learning mechanism and the specific deficits related to pragmatism inherent in each group (Geurts and Embrechts 2008, Haebig *et al.* 2017).

Accordingly, the following research questions were emerged:

- (a) Are there similarities between children with ASD and children with DLD regarding PL that could lead to an overlap between the two disorders?
- (b) Are there differences between the two disorders regarding PL? and
- (c) Can PL be considered as a distinct marker between ASD and DLD?

## Materials and methods

### Selection criteria

For the present review, studies that met established criteria were included. More specifically, we included:

- (1) studies that were published in English in peer-reviewed journals,
- (2) studies that included individuals who had either a diagnosis of ASD or DLD, aged 3; 6 to 15 years or their parents.
- (3) studies that compared PL or aspects of PL between ASD and DLD,
- (4) studies in which the measures or the procedure of evaluation was clearly outlined,
- (5) studies that were published within the last twenty years.

Studies that were excluded:

- (1) their purpose focused solely on the development of a new measure for measuring and evaluating pragmatic abilities,
- (2) doctoral dissertations and theses.

The diagnoses of ASD in included studies obtained individuals with Pervasive Developmental Disorder, Autistic Disorder, Asperger Syndrome/High Function Autism, Pervasive Developmental Disorder – non otherwise Specified and were based on (a) Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV), (b) Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5) following the American Psychiatric Association (2000), (c) ICD-10 criteria. The diagnosis of DLD occurred by standardized tests by speech therapists, child's healthcare professionals and speech-language pathologists. The cognitive ability of the participants in the studies was 70 or above.

Given that the Pragmatic Language Impairment (PLI) and the Social (pragmatic) Communication Disorder (SPCD) are different diagnoses based on the rubric of DSM-5 (Bishop *et al.* 2017, Swineford *et al.* 2014, Topal *et al.* 2018), this paper does not include these populations, as they go beyond the aim of this review.

### Search procedure

Prisma guidelines were followed for this systematic review. A total of 5 databases were searched by the lead author: ERIC, NCBI/PubMed, PsycNet, Researchgate, Google Scholar and SemanticScholar. Initially, studies published during the last decade were searched, as we would like to focus on the recent literature. Due to the limited number of surveys found, surveys from the last twenty years were searched and studies from 2002 onwards were eventually included, as most research papers on this subject have been published in the last twenty years. In all databases, the following terms were inserted into the Keyword field: 'pragmatics', 'pragmatic skills', 'pragmatic language', 'pragmatic abilities' combined with the terms 'ASD and DLD', 'ASD and SLI', 'Autism and DLD', 'Autism and SLI', 'Autistic Disorder and DLD', 'Autistic Disorder and SLI', 'Asperger/HFA and DLD', 'Asperger/HFA and SLI'. The last search in all the databases was conducted on January, 2022. All studies that mentioned keywords in the title or in the list of keywords were studied by the lead author. The duplicate records were removed and 3.105 were screened. Their abstracts were screened by all the authors and finally 18 studies seemed appropriate for further investigation. Five of the studies were not included as (a) they focused solely on the development of a measure for measuring and evaluating PL or (b) the participants

**Table 1. Studies excluded from the review.**

Title	Author	Year	Journal	Reason of exclusion
Using a parental checklist to identify diagnostic groups in children with communication impairment: a validation of the Children's Communication Checklist—2	Norbury <i>et al.</i>	2004	International Journal of Language & Communication Disorders	The aim of the study focused on the development of a measure.
Pragmatic abilities in children with neurodevelopmental disorders: development of Pragmatic Abilities Questionnaire based on the Rasch rating scale model.	Jafari <i>et al.</i>	2019	Psychology research and behavior management,	The aim of the study focused on the development of a measure.
Language and pragmatics across neurodevelopmental disorders: An investigation using the Italian version of CCC-2.	Ferrara <i>et al.</i>	2020	Journal of Autism and Developmental Disorders	There is not DLD group among participants.
Comparing Early Pragmatics in Typically Developing Children and Children with Neurodevelopmental Disorders	Wong <i>et al.</i>	2022	Journal of Autism and Developmental Disorders	There is not DLD group among participants.
Capacity of the CCC-2 to Discriminate ASD from Other Neurodevelopmental Disorders	de la Torre Carril <i>et al.</i>	2021	Children (Basel, Switzerland)	The aim of the study focused on the development of a measure.

DLD = Developmental Language Disorder.

had not been diagnosed with DLD, but with Language Impairment (Table 1). As a result only 13 studies were finally included.

In addition to the studies that investigated the general PL, some studies that examined specific aspects of PL, in which, according to the literature, both groups face deficits, such as narration and conversational skills are included in this review.

The term general PL concerns the basic features of pragmatics, which are assessed by measures for global pragmatic function (Matthews *et al.* 2018), while specific aspects of PL are considered as some skills that affect the PL abilities and are solely examined by the researchers, such as the use of fillers, the narrative skills, the use of quantifiers and the article choice. We decided to include these studies in order to generate an accurate profile of PL abilities for the two populations, and therefore their similarities and differences to be recognizable. The above aspects of PL are not included in the search terms as we have included studies that consider them only in the light of PL. That is, we did not include studies that merely examined these skills but we included studies that through these aspects examined pragmatic skills and therefore the keywords or title should have included the term pragmatics.

## Results

In the first place, 18 studies were selected that would probably be included in the review. They were then evaluated by the lead author to determine whether they met the inclusion criteria. Finally, 13 studies met the criteria and were included in the review. Those studies were divided into two categories: (a) The first category

includes six studies examining general PL abilities and (b) the second category includes seven studies investigating specific aspects of PL (Table 2).

### **General pragmatic language abilities in ASD as compared with DLD**

In this section the results of six studies (Demouy *et al.* 2011, Georgiou and Spanoudis 2021, Geurts and Embrechts 2008, Hage *et al.* 2022, Loucas *et al.* 2008, Whitehouse *et al.* 2008) examining general PL on the part of ASD children compared to those of DLD children are presented. A direct comparison between the two clinical groups is presented in Table 3.

A lot of similarities were observed in the language profile between ASD and DLD. According to the study of Loucas *et al.* (2008) both ASD and DLD children face deficits in PL. More specifically, they studied the PL of the children of both groups, using the CCC-2 (Bishop 2003). Children with ASD were separated into two groups; (a) a group of children with ASD and language impairment (ASD-LI); and (b) a group of children with ASD without language impairment. The results showed that the performance of DLD group and ASD-LI group did not reach significance regarding the stereotyped language parameters. Similar results were, also, found by Geurts and Embrechts (2008), who observed similarities between ASD and DLD groups in their performance on speech output, syntax, coherence, and semantics and on the scale of stereotyped language. In addition, Whitehouse *et al.* (2008) attempted to describe accurately the language profiles of ASD and DLD children. More, specifically, in their study participated 34 children with DLD and 34 children with ASD,

**Table 2. Studies included in the review.**

Author	Year	Participants			Measures of pragmatics	Results
		Age	Number and population			
Norbury and Bishop	2003	6–10	17 DLD,* 12 ASD, <sup>†</sup> 18 TD <sup>‡</sup>		'Frog, Where are you?' CCC	Notable overlap Similarities on cohesion ASD and DLD groups used ambiguities more often than TD ASD weaker in referencing than DLD All groups added fanciful information
Loucas <i>et al.</i>	2008	9–14	25 DLD, 72 ASD		CCC-2	Similarities are not strong enough to lead to an overlap. ASD-LI and DLD had similarities on inappropriate initiation and stereotyped language. A subgroup of ASD exhibited more similarities with DLD.
Whitehouse <i>et al.</i>	2008	6–15	34 DLD, 34 ASD		CCC-2	ASD and DLD had similarities on speech, syntax and semantics, but significant differences in inappropriate initiation, use of context, nonverbal communication, social relationship and interests. ASD with structural difficulties and DLD similarities on coherence and stereotyped language. ASD without structural difficulties performed weaker in the same tasks than DLD. A subgroup of ASD exhibited more similarities with DLD.
Geurts and Embrechts	2008	4–7	28 DLD, 28 ASD, 28 TD		CCC-2	Similarities are not strong enough to lead to an overlap. ASD and DLD had a delay in their first word or/and sentence utterance. ASD and DLD had similarities on speech output, syntax, coherence, semantics and on stereotyped language. ASD had more deficits in the use of context, in inappropriate initiation, nonverbal communication, social relationship and interests than DLD.
Manolitsi and Botting	2011	4–13	13 DLD, 13 ASD		TOP-L	ASD and DLD exhibited similarities on combined micro-level narrative tasks and on using of references, but differences on macro-level abilities. ASD exhibited a strong relationship between the scores obtained for micro-narrative tasks and pragmatic language.
Demouy <i>et al.</i>	2011	6–13	13 DLD, 12 ASD, 70 TD		Sentence completion	ASD made more pragmatic errors than DLD. The language abilities of ASD and DLD depend on different mechanisms.
Creemers and Schaeffer	2015	4–14	27 DLD, 27 ASD, 27 TD		Elicited Production Task (Article Choice)	ASD and DLD had similarities on PL. DLD exhibited difficulties in grammar. ASD and DLD are not parts of the same continuum.
Gorman <i>et al.</i>	2016	4–8	17 DLD, 50 ASD, 43 TD		Retrospective assessment from a stratified random sample of experimental tasks and cognitive, language and neuropsychological tasks	ASD and DLD had similarities in the use of filler uh, but differences in the use of filler um.
Schaeffer	2018	4–14				

*(Continued)*

Author	Year	Participants		Measures of pragmatics	Results
		Age	Number and population		
			27 DLD, 27 ASD, 27 TD	Elicited Production Task (Article Choice)	ASD and DLD had similarities in the use of definitive and indefinite article. DLD performed worse in grammar tasks. There is not an overlap between the ASD and DLD.
Andrés-Roqueta and Katsos	2020	4–10	20 DLD, 20 ASD, 40 TD	Cavegirl task Strange Stories	ASD and DLD children faced severe difficulties in the linguistics-pragmatics, but to a different extent. ASD had more difficulties in relevance of the answer, informativeness and veracity. ASD performed worse than DLD in social-pragmatics. ASD presented more profound difficulties in PL than DLD. Language is controlled by different mechanisms.
Moreno-Pérez <i>et al.</i>	2020	6–18	15 ASDHL <sup>§</sup> 13 ASDLL <sup>¶</sup> 15 DLD	Material in accordance with the Thompson and Choy (2009) paradigm Material in accordance with the Love <i>et al.</i> (2009) paradigm	No statistically significant differences were found between the three groups. The comprehension of clitic and reflexive pronouns cannot be considered as a distinguishing marker between ASD and DLD
Hage <i>et al.</i>	2021	3;6–6;11	10 DLD 10 ASD 20 TD	Assessment of Pragmatic Language and Social Communication – APLSC	ASD group exhibited more severe deficits than DLD group.
Georgiou and Spanoudis	2021	6–12	28 DLD 40 ASD 35 TD	CCC-2	ASD group exhibited more severe deficits than DLD group. ASD exhibited deficits in social-pragmatics. A subgroup of ASD exhibited more similarities with DLD.

\*DLD = Developmental Language Disorder.

†ASD = Autism Spectrum Disorder.

‡TD = Typically Developing.

§ASDHL = Autism Spectrum Disorder with high language proficiency.

¶ASDLL = Autism Spectrum Disorder with low language proficiency.

while ASD children were separated into two groups; (a) the first group included children with Autism with structural language difficulties and (b) the second group included children with Autism without structural language difficulties. The results showed that difference in performance between both ASD and DLD groups did not reach significance in speech, syntax and semantics. Interestingly, children with Autism with structural difficulties exhibited similar performance in coherence and stereotyped language with children with DLD, while children with Autism without structural difficulties performed weaker in the same tasks than DLD group. These findings are in line with the study of Hage *et al.* (2022), who also compared pragmatic skills of children with ASD and DLD using the questionnaire of the ‘Assessment of Pragmatic Language and Social Communication’. The questionnaire was answered by 40 parents and 29 teachers of children and the results showed that both clinical groups are impaired in pragmatic skills, but ASD group exhibited more severe deficits than DLD group. Accordingly, Georgiou and

Spanoudis (2021) examined the language profile of ASD, DLD and TD children using the CCC-2 (Bishop 2003) separated into two subscales: the General Communication Composite (GCC) and the Social-Interaction Deviance Composite (SIDC) and a task regarding formulated sentences. The results showed that ASD and DLD groups faced impairments in PL and more specifically DLD children exhibited impairments in GCC, while ASD children faced deficits in both subscales of CCC-2.

Nevertheless, a lot of differences were observed between ASD and DLD children. Specifically, in the study of Geurts and Embrechts (2008) ASD children showed statistically significant more deficits in the use of context than the other two groups, while DLD children demonstrated statistically significant differences compared to TD children. In addition, ASD group had difficulties in inappropriate initiation, nonverbal communication, social relationship and interests compared to both DLD and TD groups, while children with DLD did not present any differences compared to the TD

group. In addition, Whitehouse *et al.* (2008) found statistically significant differences in inappropriate initiation, use of context, nonverbal communication, social relationship and interests between the two clinical groups. In contrast, in the study of Loucas *et al.* (2008) the performance in inappropriate initiation was similar between ASD and DLD group, however DLD group performed higher than both ASD groups, however, the performance of children with DLD was below average. Moreover, Demouy *et al.* (2011) investigating the language profile of DLD, ASD and TD children revealed statistically significant differences in the PL between the two clinical groups. The performance of DLD group in the pragmatic task did not differ from that of TD group, while a lot of pragmatic errors were observed in children with ASD. The researchers finally claimed that despite some similarities observed in other language domains between the children of both clinical groups, their language abilities depend on different mechanisms. In contrast to the researches described above, this study did not find any similarities in the PL abilities between ASD and DLD children.

**Specific aspects of pragmatic language abilities in autism spectrum disorder and developmental language disorder**

In this section, the results of seven studies investigating PL through specific aspects of PL abilities in children with ASD compared to those of children with DLD are presented. A direct comparison between the two clinical groups regarding the specific aspects of PL is presented

**Table 3. Results of the comparison in general performance on pragmatic language according to the studies included in the review.**

Similarities ASD = DLD	Differences ASD < DLD*
Speech output	Use of context
Syntax	Inappropriate initiation
Coherence	Social relation
Semantics	Interests
Stereotypical language	Nonverbal communication

\*ASD < DLD: children with ASD showed weaker performance than children with DLD.

in Table 4. Narration (Manolitsi and Botting 2011, Norbury and Bishop 2003), article choice (Creemers and Schaeffer 2022, Schaeffer 2018), the use of fillers (Gorman *et al.* 2016), the Quantifiers (Andrés-Roqueta and Katsos 2020) and pronoun processing (Moreno-Pérez *et al.* 2020) were measured.

The above studies revealed a lot of similarities between ASD and DLD children. In terms of narrative, in the study of Manolitsi and Botting (2011) the narrative skills were separated into macro-skills and micro-skills, while the PL of children of both groups were evaluated using the Test of Pragmatic Language (TOPL) (Phelps-Terasaki and Phelps-Gunn 1992). The results showed that children with ASD and children with DLD exhibited similarities on combined micro-level narrative tasks. Importantly, deficits in using of references were observed in children of both groups. Accordingly, Norbury and Bishop (2003), examining narrative skills in children with ASD and children with DLD, found a notable overlap of the type of errors made by the participants of both groups in their research. They found that all the participants exhibited the habit of adding fanciful information in the narration. Moreover, they noticed similarities in the performance on tasks regarding cohesion and narrative skills between the two clinical groups.

Cohesion in the above study was measured through the article the participants chose during the narration. The article choice was also measured by Creemers and Schaeffer (2022) and Schaeffer (2018) in order to assess PL. More specifically, Creemers and Schaeffer (2022) investigated the linguistic profiles of 27 children with DLD as compared to 27 children with ASD, while 27 TD children also participated. For the purpose of examining whether grammar is a discrete unit than pragmatics in language, the participants were assessed on a Quantity Judgment Task and an Elicited Production Task, through which the choice for a definite or indefinite article was examined. The results showed that there are similarities in the PL between children of both clinical groups, as they had a high

**Table 4. Results of the comparison on performance on specific aspects of pragmatics according to the studies included in the review.**

	Similarities ASD = DLD	Differences ASD < DLD	ASD > DLD*
Narration skills	Micro-level narration Coherence Use of inference Cohesion Rarely use of ambiguities Add fanciful information	Macro-level narration Macro story content Referencing	Micro-vocabulary
Article choice	Indefinite condition Definite condition More substitutions		Grammar
Quantifiers	Linguistic-pragmatic domain	Social-pragmatic domain	
Fillers	Uh rate	Higher um-uh ratio	
Pronoun processing	Reflexive pronouns Clitic pronouns		

ASD > DLD: children with DLD showed weaker performance than children with ASD.



performance in the task on the indefinite conditions and differences in their performance failed to reach significance. Statistically significant differences between the two clinical groups and the TD group were found in the task of the definite condition, in which the performance of the two clinical groups was weaker than that of the TD group. However, in the same task no statistically significant differences were found in the performance between DLD group and ASD group. In addition, both clinical groups exhibited more substitutions in the definite condition than in the indefinite condition. Subsequently, Schaeffer (2018) attempted to examine if the profiles of ASD and DLD children overlap, while a TD group was recruited. The participants were evaluated in terms of mass-count distinction for grammar and of Article Choice. The researcher found that both clinical groups had lower performance than the TD group in the aspects of PL measured and claimed that there is a similarity between the PL profiles of the two clinical groups. No statistically significant differences on the production of the definitive article were observed between the two clinical groups, while they used the definitive article significantly less often than the TD group. Regarding the indefinite article, the three groups did not show statistically significant differences, while children of all three groups chose more often the indefinite article than the definite article.

In addition, Moreno-Pérez *et al.* (2020) failed to find differences between ASD and DLD children. In their study, children with ASD and children with DLD were compared regarding their comprehension of reflexive pronouns and clitic constructions. Two experiments were conducted. In the first experiment, participants listened to a three-sentence story, while at the end they had to answer to a question. In the second experiment, 30 sentences including or reflexive pronouns were presented, while two pictures were depicted in a screen. Participants clitic had to choose the picture that represented the sentence they listened. Results indicated that ASD and DLD groups exhibited similar interpretation in reflexive and clitic pronouns. Similarities between DLD and ASD children were also found in the study of Gorman *et al.* (2016), who investigating the use of fillers *uh* and *um* in the language of 50 children with ASD and 17 children with DLD. In their research the participants were evaluated through six sessions, while their answers were collected and the fillers were measured in retrospect. According to their results, no statistically significant differences were observed in the use of the filler *uh* between the groups.

Moreover, Andrés-Roqueta and Katsos (2020) found a lot of similarities in pragmatic competence between ASD and DLD using linguistic-pragmatic tasks and social-pragmatic tasks. More specifically, their results showed that both ASD and DLD children faced severe difficulties in the linguist-pragmatic domain, however

their performance in the task was similar. In contrast, in the social-pragmatic task, children with ASD performed worse than children with DLD.

Crucial differences were, also, observed between ASD and DLD. In the research of Manolitsi and Botting (2011), described above, the results demonstrated that DLD group performed better than ASD group on the TOPL (Phelps-Terasaki and Phelps-Gunn 1992), while statistically significant differences on macro-level abilities were observed between the two clinical groups. Moreover, the relation between the performance of the participants within each group separately in the pragmatic tasks and in narrative tasks was investigated. It seems that there is a strong relationship between the scores obtained for micro-narrative tasks and those for PL in children with ASD, in contrast to children with DLD, who did not demonstrate such associations. Norbury and Bishop (2003) support the assumption of an overlap, however, they found that ASD group was weaker in referencing, and especially in producing ambiguous nouns and pronouns than DLD group.

Moreover, Creemers and Schaeffer (2022) and Schaeffer (2018) failed to find similarities leading to an overlap. Creemers and Schaeffer (2022) found that children with DLD presented difficulties in grammar, while children with ASD did not and concluded that the deficits of ASD and DLD are not part of the same continuum. Schaeffer (2018) concluded to similar conclusions as regarding grammar the differences between children with ASD and children with DLD were statistically significant. Children with DLD performed significantly worse than TD children in grammar tasks, whilst the performance of children with ASD in the same tasks were similar to that of their TD peers. Additionally, in the research of Gorman *et al.* (2016) statistically significant differences between ASD and DLD were found in the use of *um*, while a disproportion between the uses of *uh* and *um* was also observed. The filler *um* was not utilized by children with ASD as often as it was used by children with DLD.

## Discussion

Both children with ASD and children with DLD face difficulties in PL, nevertheless, the pragmatic deficits of children with ASD are statistically significant more acute than those of children with DLD, whilst simultaneously the differences the two clinical population demonstrate in PL may be considered as a distinguishable feature, as their pragmatic abilities even if are due to an overlap, are likely to be controlled by different mechanisms.

### *General pragmatic language abilities in ASD and DLD*

The first group of studies included six studies examining general PL of children with ASD as compared to that of children with DLD.

More specifically, regarding the first research question, the two clinical groups exhibited several similarities in their general PL abilities. It was observed that the first word and/or sentence of children of both clinical groups was uttered in a delay as compared to the first word and/or sentence of their TD peers (Geurts and Embrechts 2008). In addition, similarities were noticed in conversational skills while speech output, syntax, and stereotyped language were domains in which both groups of ASD and DLD children faced difficulties (Geurts and Embrechts 2008, Loucas et al. 2008, Whitehouse et al. 2008). These findings are in line with other studies that identified impairments in conversational skills in DLD (Osman et al. 2011) and in ASD (Lam and Yeung 2012, Simmons et al. 2014).

Moreover, both groups of children with ASD and DLD presented difficulties in utilizing the contextual information in a conversation (Geurts and Embrechts 2008). These findings are also observed in the study of Loukusa et al. (2018) and in the study of Baixauli-Fortea et al. (2019) who examined pragmatic abilities in ASD, while simultaneously in the study of Ryder and Leinonen (2014) who found that children with ASD do not use contextual information in order to draw conclusions. However, ASD children faced statistically significant more severe difficulties than DLD children in this domain. In general, children with ASD were found to present more profound difficulties in PL than children with DLD (Georgiou and Spanoudis 2021, Geurts and Embrechts 2008, Hage et al. 2022, Whitehouse et al. 2008). Children with ASD presented deficits in nonverbal communication, social relationship and interests, while children with DLD did not face difficulties in those domains (Geurts and Embrechts 2008, Whitehouse et al. 2008). These findings are in line with several studies that found impaired nonverbal communication in ASD (Baixauli-Fortea et al. 2019, Lam and Yeung 2012), but they are on the contrary to the study of Osman et al. (2011) who found deficits in several parameters of nonverbal communication of DLD. More specifically, in their study the researchers found that DLD group exhibited deficits in greetings and in maintaining attention on a task (Osman et al. 2010).

Furthermore, concerning the use of inappropriate initiation, contradictive results were obtained by the study of Loucas et al. (2008) and the studies of Geurts and Embrechts (2008) and Whitehouse et al. (2008). More specifically, Loucas et al. (2008) found that the performance of ASD group in tasks measuring inappropriate initiation was similar to that of DLD group. These findings agree with several studies, such as the study of Osman et al. (2010) who found that DLD group had a passive role in conversation and therefore did not exhibit initiating speech. Accordingly, Baixauli-Fortea et al. (2019) found also inappropriate initiation in ASD population. On the contrary, Geurts and Embrechts

(2008) and Whitehouse et al. (2008) found that children with ASD presented a high proportion of inappropriate initiations, while children with DLD did not. This difference is probably due to the variability of pragmatic deficits inherent in each group, since not all children with DLD face the same difficulties in PL (Manolitsi and Botting 2011), while correspondingly, there are subgroups of ASD that present different impairments in PL (Loucas et al. 2008, Whitehouse et al. 2008). As a result, differences observed in the studies included concerning the PL between children with DLD and ASD can be attributed to this variability.

As regard the possibility of an overlapping, despite the fact that some of the aforementioned studies found similarities in PL between the two clinical populations they are not strong enough to lead to the claim that the PL profiles of the two disorders overlap (Geurts and Embrechts 2008, Loucas et al. 2008). Furthermore, a subgroup of ASD exhibit more similarities with DLD in language tasks than other children with ASD (Georgiou and Spanoudis 2021, Loucas et al. 2008, Whitehouse et al. 2008). This finding are supported by previous research concerning a significant number of individuals with ASD who has common linguistic profile with DLD (Kjelgaard and Tager-Flusberg 2001, Tager-Flusberg and Joseph 2003) highlighting the apparent need for further investigation taking into consideration this subgroup.

Finally, regarding the third research question, one study (Demouy et al. 2011) failed to find any similarities in the PL abilities between DLD and ASD, while Hage et al. (2022) found that the pragmatic difficulties of children with ASD are more severe than those of children with DLD. DLD children do not demonstrate social pragmatics deficits (Georgiou and Spanoudis 2021, Geurts and Embrechts 2008, Whitehouse et al. 2008) and therefore these differences may reveal that PL could be a distinct marker between the two populations. This is consistent with the study of Norbury et al. (2004) who attempted to validate the utility of CCC-2 (Bishop 2003) and found that the CCC-2 could provide an incentive for some children to undergo further diagnostic evaluation.

### ***Specific aspects of pragmatic language abilities in autism spectrum disorder and developmental language disorder***

The second group of studies included six studies regarding specific aspects of PL abilities. Regarding the first research question there are some similarities, but also severe differences were observed. More specifically, two of the studies examined the narrative abilities of children with ASD and children with DLD (Manolitsi and Botting 2011, Norbury and Bishop 2003) and they revealed similar performance in micro-level narration, in cohesion, and in the use of inferences

between the children of both groups. These conclusions agree with studies that found deficits in narrative skills of children with DLD (Andreou and LEMONI 2020, Osman *et al.* 2010) and children with ASD (Lam and Yeung 2012). Regarding deficits in cohesion, this finding agrees with the study of Liles *et al.* (1995) who concluded that the performance in cohesion could be a distinguishing marker between children with and without language disorders. One study investigated the pronoun processing of ASD and DLD children, revealing similarities on the comprehension of clitic and reflexive pronouns (Moreno-Pérez *et al.* 2020), strengthening the possibility of the overlap, as Bishop suggests (2010). However, this finding was not expected as previous studies found that children with ASD usually produce pronoun reversal (Evans and Demuth 2012, Perovic *et al.* 2013), while children with DLD do not (Lindgren *et al.* 2009). The lack of differences between the two populations regarding the pronoun processing is likely to be due to the tasks used, which examined the comprehension of pronouns, but not the production of pronouns on a discourse.

Moreover, one study examined the specific aspects of quantifiers, informativeness, relevance of the answer and veracity (Andrés-Roqueta and Katsos 2020). Children of both clinical groups exhibited deficits in the aforementioned abilities but children with ASD faced more severe difficulties than children with DLD in terms of relevance of the answer, informativeness and veracity. Hence, the difficulties that children of each group face in social pragmatic abilities are similar, but to a different extent. Moreover, the performance in social pragmatics is likely to be predicted by structural language and the Theory of Mind. Baixauli-Fortea *et al.* (2019) had also documented the aforementioned factors are significant predictors for PL. Furthermore, regarding linguistic-pragmatics, ToM is not a significant predictor, but structural language is. This finding is in line with other studies who draw on similar conclusions regarding the role of ToM and structural language and linguistic-pragmatics on both ASD and DLD (Chevallier *et al.* 2010, Davies *et al.* 2016).

Responding to the first research question, the similarities on the performance of children of both groups may lead to the conclusion that there is a significant overlap in the linguistic profile of ASD and DLD populations (Norbury and Bishop 2003). This is in line with previous studies who support the assumption of similar language profile of both populations (Kjelgaard and Tager-Flusberg 2001). However, despite the overlap between ASD and DLD, different mechanisms may account for the communication difficulties of the two populations (Andrés-Roqueta and Katsos 2020, Manolitsi and Botting 2011). Several studies suggest potential underlying mechanisms that are likely to

control their language abilities (Luyster *et al.* 2011), but further research is needed to more closely investigate it.

In contrast, two of the studies examining the ability to choose the correct article among ASD and DLD groups (Creemers and Schaeffer 2022, Schaeffer 2018) concluded that there is not an overlap between the PL profile of children with ASD and children with DLD and that their deficits are not part of the same continuum (Creemers and Schaeffer 2022, Schaeffer 2018). The researchers of these studies revealed that both populations often used the wrong article, showing a preference in using indefinite articles. In addition, the researchers found that grammar does not depend on PL and vice versa for children of both clinical groups. This difference in grammar competence demonstrates that there is not an interdependence between grammar and PL, as in ASD deficits in PL are observed independently from grammar, while in DLD deficiencies in grammar are noticed independently from PL. Consequently, the researchers claimed that there is not a resemblance in their PL (Creemers and Schaeffer 2022, Schaeffer 2018). However, their conclusion is in odds to Bishop (2010) who supports the existence of an overlapping between ASD and DLD populations.

Finally, the study of Gorman *et al.* (2016) generate a response to the third research question. The differences in the use of the filler *uh* between the two clinical populations were not statistically significant, in contrast to the use of the filler *um*, which presented statistically significant differences between the two clinical groups, as DLD group used the filler *um* significantly more often than ASD group. Hence, in response to the third research question, the measurement of fillers could be used as a quantified feature of PL, whilst, in particular the measurement of the filler *um* could be a feature which distinguishes the two disorders. Moreover, as the use of fillers is associated with the conversational skills, the findings of Gorman *et al.* (2016) are consistent with studies who found that DLD children (Osman *et al.* 2010) and ASD children (Lam and Yeung 2012, Simmons *et al.* 2014) face impairments during a discussion. In contrast, in the study of Moreno-Pérez *et al.* (2020) no significant differences were found and therefore, reflexive and clitic pronoun processing cannot be considered as a distinguishing marker between ASD and DLD populations.

To sum up, the findings concerning the specific aspects of PL examined in the studies included in this review are likely to be useful 'tools' for understanding the PL of ASD and DLD children and for distinguishing them, as they provide useful information regarding their pragmatic profile. The aforementioned studies revealed some similarities in PL of children of both clinical groups, however, these similarities may not lead to an overlap (Creemers and Schaeffer 2022,

Schaeffer 2018), while the mechanisms the two populations use differ. Moreover, the study of Andrés-Roqueta and Katsos (2020), revealed that children with ASD exhibit significantly more acute pragmatic difficulties than children with DLD. Therefore, there are a lot of significant differences in their language profiles, which show that even if there is an overlap in some domains, as Norbury and Bishop (2003) claimed, the PL abilities of children of both clinical populations are likely to be controlled by different mechanisms (Andrés-Roqueta and Katsos 2020, Manolitsi and Botting 2011).

### General discussion

The critical and comparative examination of the aforementioned studies revealed that children with ASD and children with DLD share some common features in both PL and social behavior. However, direct comparison of children of both groups on tasks regarding PL showed that children with ASD exhibit more profound pragmatic difficulties as compared to children with DLD (Geurts and Embrechts 2008, Manolitsi and Botting 2011).

In addition, it seems that structural language abilities affect pragmatic development in children with ASD and children with DLD (Andrés-Roqueta and Katsos 2020, Baixauli-Fortea 2019, Davies et al. 2016). However, their pragmatic difficulties are on varying degrees and are likely to arise from different reasons, as difficulties in other language domains and their impact in PL vary (Andrés-Roqueta and Katsos 2020). The differences between the two clinical groups are likely results of the differences in non-verbal cognition or in other developmental delays, which each population faces (Arosio et al. 2017, Lam and Yeung 2012, Whyte and Nelson 2015). Research has shown that pragmatic abilities in ASD develop at a lower rate compared to TD children (Whyte and Nelson 2015), while pragmatic errors decrease as TD children get older, but ASD children continue to make the same errors (Simmons et al. 2014). Accordingly, pragmatic abilities in DLD increase with age (Arosio et al. 2017). Their differences, may, also be justified by deficits in cognitive functions (Lam and Yeung 2012) or by language-specific mechanisms that cause delays in language milestones (Luyster et al. 2011), but this notion needs further examination. One more explanation about the more acute difficulties children with ASD face in comparison to children with DLD regards the overly focus on the low-level perceptual components of speech children with ASD exhibit (Mayer et al. 2016), a fact that is likely to be a hindrance to higher-level language processing, such as PL. Moreover, the heterogeneity of language problems children with DLD and children with ASD face may account for their variability in the pragmatic domain (Loukusa et al. 2018).

This review is restricted by several limits. Initially, the heterogeneity that children of the two populations demonstrate regarding their pragmatic features may cause ambiguities in their linguistic profile, while their pragmatic abilities and deficits vary. Moreover, the studies included in this review were conducted in populations with a different first language (English, French, Greek, Spanish and Dutch) and therefore the different structure of each language is likely to have an impact on the results of each research. Accordingly, different culture of participants in each study may have an impact in their performance on pragmatic tasks.

Moreover, PL is a broad area that can be examined measuring different factors, while the measures of PL vary regarding focus, quality and coverage (Matthews 2018). Hence, the different measures used in the studies included to examine the pragmatic abilities (questionnaire for participants' parents versus tests directly addressing the participants) may be the cause for the emergence of different patterns (Geurts and Embrechts 2008). For example, some of the studies utilized the Children's Communication Checklist (Bishop 1998) and Children's Communication Checklist-2 (Bishop 2003), two measures that were completed by parents and are focused on parents' observation regarding the pragmatic competence of their children, in contrast to other studies that used measures which evaluate directly the performance on pragmatic tasks of the participants.

Finally, regarding the studies included, only one author had screened the studies that mentioned keywords in the title or in the list of keywords, a fact that is likely to be considered as a limitation of this review. However, all the authors participated in the study of the articles based on their abstract and on the full text.

However, the wide range of ages of the participants (children and adolescents aged 3; 6 to 15 years) in the studies included can be considered a strength of this review, because pragmatic abilities increase significantly with age for both children with ASD (Whyte and Nelson 2015) and children with DLD (Arosio et al. 2017). Thus, the evaluation and comparison of PL abilities of individuals at a wide age range can give useful and precise information on the similarities and differences in the PL between the two clinical populations.

Further research in the PL of ASD as compared to that of DLD is needed to clarify the PL profile of children of both groups and the aspects of PL they have in common, while investigating separately the subgroup of ASD that face language difficulties. It would be useful if subsequent research focuses on the specific language difficulties children of each group face, while simultaneously highlighting the dimensions of similarity or overlap, in order to extract the accurate factors that cause difficulties in the PL of ASD children and DLD children.

An accurate pragmatic profile of children with ASD and children with DLD will allow researchers and educators to focus on their strengths and weaknesses (Khowaja and Salim 2019). Several methods and practices of interventions adapted to the needs of these populations can be developed and will contribute to the improvement of the pragmatic development of the children of both groups in a targeted and specific way, helping them to deal more effectively with the difficulties they encounter.

Finally, it would be interesting if further research was conducted in order to examine whether PL could be considered as a differentiating factor between the two populations, so that it could be measured for the diagnosis of both disorders combined with other measurements. Moreover, future research should focus on the language difficulties of the subgroup in ASD that exhibits linguistic similarities with DLD to clarify the possibility of overlap.

### Disclosure statement

No potential conflict of interest was reported by the authors.

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