

INTERVENTIONS FOR CHILDREN WITH DEVELOPMENTAL LANGUAGE DISORDER THAT TARGET ORAL PRAGMATIC LANGUAGE: A SYSTEMATIC REVIEW AND NARRATIVE SYNTHESIS OF THE HOWS AND WHYS IN SINGLE-CASE DESIGN STUDIES

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Abstract: *This study presents a review of interventions targeting the oral pragmatic language abilities of children with developmental language disorder (DLD), as well as an overview of the ingredients and teaching techniques used to provide changes, determine the setting and dosage, test the efficacy of the intervention, and measure the quality of the studies. The review adheres to regulations outlined in the PRISMA guidelines for systematic reviews. Seven electronic databases were searched using appropriate search terms. Only single-case studies (AB, ABA, interrupted time series, alternating treatment, multiple baseline designs, and non-experimental case designs) were included. All included papers were published between 2006 and 2020. The age range of participants was 3 to 18 years and included participants who were either formally diagnosed with DLD or met the criteria for language disorder. Studies where oral pragmatic language was measured as an outcome variable were included and appraised using Risk of Bias Assessment tool for Non-randomised Studies (RoBANS). Eleven studies were included in the final analysis: these studies reported on interventions in the domain of pragmatic language for children with DLD aged 3 to 9 years. Seven of the interventions targeted conversational skills, while the remaining four targeted narrative skills. All studies used prompting or modelling techniques to enhance pragmatic abilities selected for change such as initiation, response, turn-taking, topic management, adaption to listener knowledge, and the ability to build sequences. Several of the children in the studies improved their pragmatic skills after undergoing the intervention, however individual differences were noted. All interventions were carried out in the children's schools and varied in terms of duration. The quality of the studies included was medium. Due to the diversity observed among the studies regarding oral pragmatic outcome measures that were used to evaluate changes, as well as the ingredients and teaching techniques used, it was difficult to draw precise conclusions about recommendations for practitioners based on the included studies. Although several interventions reported moderate changes in conversational and narrative skills, as well as good social validity, the findings are considered weak because of the lack of ecological validity.*

Keywords: *pragmatic language intervention, developmental language disorder, single-case experimental design, prompts, conversation, narrative*

INTRODUCTION

Based on the CATALISE consensus, the term Developmental Language Disorder (DLD) is used to refer to children with language disorder that are not associated with biological causes (i.e., deafness, intellectual difficulties, brain injury), stressing that the language problems are expected to

persist into middle childhood and beyond (Bishop et al., 2017). The prevalence of DLD is estimated to be 7-14% (Law et al., 2017), and it is characterised by risk factors for developing psychological and mental health problems such as anxiety and emotional and social difficulties (Fujiki et al., 2002).

It is commonly known that children with DLD have difficulties regarding grammar, lexicon, or reading, however less emphasis has been placed on the difficulties they face in pragmatic language. According to The International Classification of Diseases -11 (ICD-11) (WHO, 2022), children who have primarily difficulties with pragmatics are grouped under the qualifier 6A01.22: impairment of mainly pragmatic language, which includes “persistent and substantial difficulties in the understanding and use of language in social contexts, for example, making references, understanding verbal humour, and resolving ambiguous meanings” (Gerralda, 2016, p. 25). The Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5) differs from ICD-11 in that it includes a unique disorder called Social (Pragmatic) Communication Disorder under the code 315.39 (F80.89). Social (Pragmatic) Communication Disorder is used to identify children with persistent difficulties in the social use of verbal and nonverbal communication, resulting in functional limitations and this disorder is associated with an early developmental onset. The symptoms of this disorder may not be attributable either to any other medical or neurological condition, including autism, or to low structural language (American Psychiatric Association, 2013). There are several overlaps between the ICD-11 and DSM-5, particularly in the verbal domain, with the main difference being that the ICD-11 applies a qualifier under DLD to identify this group of children, whereas the DSM-5 relies on a separate category corresponding to the disorder.

Approaches to identifying and differentiating pragmatic disorders have been informed by diverse research disciplines, for example, philosophy, linguistics, and psychology (Turkstra et al. 2017). However, there is no consensus on how to define pragmatic language. Broad definitions have delimited pragmatics to either *effective use of language* (Ninio & Snow, 1996), or the study of how interlocutors bridge the gap between communicative signals, which is usually in the form of linguistic utterances and fully-fledged meanings based on contextual factors (Sperber & Wilson, 1986/1995).

Clinicians working with children with DLD in the UK, for instance, have been encouraged to view pragmatics as a broad set of communication behaviours combining social, cognitive, and linguistic abilities (Adams et al., 2005). The authors went on to stress that social communication development consists of an integrity and synergy of the following developmental factors: a) social interaction (attachment and empathy), b) social cognition (shared and mutual knowledge, e.g., theory of mind and emotional understanding), c) language (formal language specific syntactic, phonological, and semantic processing), and finally d) language pragmatics (formal pragmatic devices, some of which may be specific to one language or culture), including all aspects of the pragmatics of spoken communication, except those that are associated with paralinguistic devices or nonverbal communication (Adams et al., 2005, p. 229). Similarly, from the field of clinical pragmatics, researchers argue for the importance of accounting for the complexity of pragmatic abilities in individuals as they learn to do things in the world with words. Furthermore, they mentioned that the focus should be on the language in use, without including semiotics (i.e., nonverbal communication, gestures, paralinguistics) (Turkstra et al., 2017, p. 1874). In the present review, consistent with the above-mentioned developmental factors addressed as language pragmatics, we focused on a broad view of oral language and delimited pragmatic language use to include the factors defined by Adams et al. (2005), while addressing the recommendations based on the new approach of clinical pragmatics (Turkstra et al., 2017).

Studies that have investigated aspects related to pragmatic difficulties in children with DLD continuously confirm that children with DLD have difficulties mastering verbal and interpersonal aspects of conversational skills such as topic selection, topic introduction, topic maintenance, turn-taking initiation, turn-taking response, revision, pause time-overlap, and cohesion (Adams & Bishop, 1989; Andreou & Lemoni, 2020; Andrés-Roqueta & Katsos, 2020; Prutting and Kirchner, 1987). Furthermore, personal narratives rely

on interpersonal aspects of pragmatic skills and make up more than half of children's conversations (Westerveld et al., 2022). Currently, there are very few tools that can be used to identify and provide interventions for pragmatic language disorder in children with DLD.

In summary, there is little clarity on the type of interventions and support that should be offered to children growing up with pragmatic language disorder. Consistent with the work of the COST Action IS1406 network aiming to improve the understanding of intervention and service delivery for children with DLD, the present study conducted a systematic literature review to explore language interventions for children with a focus on pragmatic aspects of oral language.

Systematic reviews of interventions for pragmatic language

Intervention tools in the field of speech, language, and communication therapy are often multifaceted and heterogenous, raising the need for concise summaries of the best available evidence. Systematic reviews play a critical role in evidence-based practice (Schlosser, 2007) and are described as *"a scientific tool which can be used to summarise, appraise and communicate the results and implications of otherwise unmanageable quantities of research"* (Centre for Reviews and Dissemination, 2001 in Pickstone et al., 2009, p. 68). Thus, systematic reviews are widely considered one of the best sources of research evidence for practitioners, commissioners, and policymakers who are involved in developing practices and planning services (Pickstone et al., 2009).

For children growing up with DLD, evaluating and implementing effective interventions is an important focus. In existing systematic reviews of interventions for children with language disorders, the domains of phonology, morpho-syntax, and semantic-lexical are frequently studied, whereas the domain of pragmatics is rarely addressed. This is presumably related to the nature of pragmatics being more complex and less straightforward to isolate and identify compared to the other domains of language. A systematic review

was conducted by an ad hoc committee convened by the American Speech-Language-Hearing Association with the aim to identify evidence-based treatments for school-aged children with DLD in the area of language use in social interactions (Gerber et al., 2012). The authors identified studies published between 1975 to 2008 that included all types of study designs and investigated the effect of 11 independent treatment approaches (e.g., behavioural support, narrative treatments). The committee concluded that although several treatments were feasible, the results were very difficult to summarise due to the pioneering aspects of the studies included. These findings reflect the infancy of research on pragmatics, the variability in treatment goals and procedures, as well as the methodological weaknesses of the included studies. The authors recommended that, given the large heterogeneity in children with DLD regarding difficulties in children with difficulties in language use in social interaction, single-case designs can provide a viable alternative for evaluating pragmatic interventions.

Rinaldi et al. (2021) recently published a large systematic review of the efficacy of interventions for children with DLD up to 8 years of age. Although the authors stated that they did not include studies that focused on improvements in pragmatic skills, they included two studies on interventions on narrative skills (one Spanish study and one study with mixed mono- and bilingual children). These studies showed improvements in the organisation of causal and temporal relationships and inferential comprehension of narratives. Jensen de López et al. (2022) published a systematic review focusing exclusively on interventions supporting language pragmatics in children with DLD. The study included large group studies based on randomised controlled trials, pre- and post-test/control groups, and cohort designs. The review included 11 studies and concluded that there was a large variation between the studies regarding intensity, duration, and efficacy. Furthermore, the authors concluded that interventions often included parent-child interaction, suggesting that interventions may be effective when carried out indirectly under the

continuous supervision of a specialist. Many of the included studies focused on narrative skills, often in the context of shared book reading.

In the present study, we explored monolingual children with DLD aged 3 to 18 years and focused solely on oral pragmatic language. We addressed a broader range of pragmatic abilities compared to Rinaldi et al. (2021). Furthermore, we included studies that were published between 2005 and 2020 in order to include more recent research and increase the scope of the findings of Gerber et al. (2012), which included studies published between 1975 and 2008. We focused exclusively on single-case studies, meaning the sample sizes were substantially smaller compared to other reviews, and we provided more detailed analyses of the content of the interventions compared to large-scale group reviews.

For clinical pragmatics and for practitioners working with children with pragmatic disorders, knowledge based only on randomised controlled trials (RCTs) may be difficult to transfer to practice as clinical populations and practices do not match the subjects and interventions highlighted in RCTs (Pickstone et al., 2009). Due to the complexity and heterogenous nature of pragmatic impairments in children with DLD, in-depth analysis of single-case studies may provide a better understanding of teaching techniques, strategies, and concrete behaviours in interventions that are effective for improving the oral pragmatic language skills of children, as well as providing valuable resources for the clinical setting.

Advantages of single-case studies

Single-case designs (SCDs) assess the changes in different measures based on data collected from one or a few individuals over a period of time and on many occasions. SCDs permit the evaluation of interventions under conditions that are similar to those used in educational settings or in the clinic, such as repeated applications of a procedure over time, while focusing on the process of change (Horner et al., 2005). Single-case studies have provided useful information, specifically in the field of special education (Horner et

al., 2005, p. 3) and in clinical practice such as that of speech-language pathologists (SLPs) (Brobeck & Lubinsky, 2003). It has the advantage of unpacking knowledge that remains obscured in RCTs and group studies in terms of group means, effect sizes, and variance within the group. While the positive results from a RCT intervention study may lead to the acceptance of a one-size-fits-all approach to specific interventions, the underlying goal of SCDs are to determine “*which intervention is effective for this case (or these cases)?*” (Kratohwill et al., 2010, p. 4). SCDs are intentionally adaptive, therefore, the independent variable can be manipulated while continuing to assess the dependent variable if a participant is not responding to an intervention (Horner et al., 2005). By asking if the intervention is more effective than the current baseline or the “business-as-usual” condition, SCDs are particularly appropriate when one wishes to understand the responses of one or more children to an intervention under specific conditions (Horner & Spaulding, 2010), as well as to evaluate individual differences among participants. Therefore, the benefits of systematically reviewing interventions reported in SCD studies should not be underestimated, since they provide important insights into the specific aspects leading to changes in a participant’s behaviour, and these findings are important for practitioners who provide support services and for schoolteachers who support the learning environments of children with challenges. Given the large heterogeneity of children with DLD, we should not expect to identify a one-size-fits-all intervention that is effective for all children. Finally, SCDs are less expensive to carry out than RCTs and their results can serve as recommendations for the development of revised or new interventions, as well as for testing the efficacy of an intervention in a larger group in the future.

Aim of the study: the *hows* and *whys* of interventions supporting pragmatic language

Our general research question addressed the *how* and *why* of the included SCD interventions. Although these aspects are not mutually exclusive, we attempted to separate them in the anal-

ysis to provide a more in-depth overview of each aspect. To capture the question of *how*, we analysed the included interventions regarding the ingredients or teaching techniques, in other words, the observable actions taken by the clinician with the aim to change the performance of the child in the targeted function (i.e., language pragmatics) (Hart et al., 2014, Denman et al., 2021). Treatment ingredients can include environmental modifications, implementation of specific strategies, and different types of guidance. These may include instructional methods such as how to teach or re-teach skills and knowledge (Sohlberg & Turkstra, 2011 in Turkstra et al., 2016) by using elaborate instructions to help the child learn new information or by providing opportunities for frequent practise.

Our analysis was inspired by the taxonomy for terms describing language interventions for school-aged children developed in collaboration with Australian practitioners (Denman et al., 2021). Following this taxonomy, teaching techniques can be delineated into three types of techniques: prompting, linguistic, and regulatory (Ukrainetz, 2006, in Denman et al., 2021). We also analysed how the intervention was delivered to the child (e.g., direct, indirect, specialised intervention), as well as the setting, dosage, and unit of allocation. This aligns with what is described as the intervention form and purpose in the taxonomy.

In addition, we analysed the *why* question related to the specific purposes of the ingredients and actions offered in the interventions and how these were contextualised. Finally, we analysed the specific outcome measurements that the studies used to evaluate the effect of the intervention. Outcome measures were restricted to the modality and domain of oral pragmatic language and communication and were required to be reported in a way that allowed evaluation of the efficacy of the intervention.

In summary, the objective of our systematic review was to investigate what has been done so far to improve oral pragmatic language in children with DLD. The specific research questions (RQs) were 1) *What are the findings of SCD studies of in-*

terventions that have been carried out to improve oral pragmatic language in children with DLD?; 2) What was the effect of these interventions?; 3) What were the outcome measures used to measure change?; 4) What are the Hows and Whys of the interventions?; and 5) What is the level of reliability (quality) of the studies included?

METHODS

Search strategy and selection criteria

The present study is part of a series of systematic reviews of interventions for children with DLD across different language domains, which is being carried out within the Cost Action IS1406 network. In the first step, a systematic search was conducted to identify empirical peer reviewed articles in any language involving oral language interventions for children diagnosed with DLD. Since the adoption of the DLD terminology and criteria is relatively recent (Bishop et al., 2017), children diagnosed based on previously used terminology, such as specific language impairment (SLI) or language impairment (LI), were also included. The language impairments of the children participating in the studies included in our review were delimited based on the Prospero protocol (ID = CRD42017067239, Jensen de López et al., 2017): this protocol provides specifications regarding how DLD is a neurodevelopmental condition that occurs when a child's oral language skills are determined to be significantly below expectations based on both professional judgements and parental or other reports.

Seven electronic databases were searched, including the Web of Science (Medline, SSCI), MEDLINE (PubMed), ERIC, PsycINFO, Cochrane Library, Scopus, and LLBA. The initial search was limited to peer reviewed studies published between (and inclusive of) January 2006 and December 2015. Three updated searches were then completed: the first to include studies published between January 2016 and October 2017, the second between November 2017 and May 2019, and the third between June 2019 and May 2020. In the next step, studies were screened for their relevance to specific language domains us-

ing the following search strings: *pragmatic* OR social (communication OR skill OR interaction) OR conversation* OR speech OR narrative* OR figurative language (idiom OR metaphor OR simile OR proverb) OR non-literal OR inferen** (for *inferencing or inferential*).

Inclusion/exclusion criteria

All included papers met the following criteria:

- Single-case experimental or non-experimental designs
- Peer reviewed publication published between January 2006 and May 2020
- Participants had a mean age ≥ 3 years and ≤ 18 years
- Participants identified as having a) developmental language disorder or an equivalent term such as primary language impairment, specific language impairment, or developmental language impairment, and/ or b) difficulties on at least one oral language assessment (vocabulary, morpho-syntax, or discourse) falling at least 1 SD below the mean. Studies where language impairment appeared secondary to those conditions identified by the CATALISE criteria as precluding a DLD diagnosis (e.g., autism spectrum disorder, learning disability) were not included. Only studies of monolingual children were included.
- Studies examined an oral language intervention that measured outcomes in the domain of oral pragmatic language.

Selection of papers and reliability of search procedures

Consistent with the aims of the large multi-domain Cost Action systematic review, the selection of studies was carried out in four stages.

Stage 1: Aiming to identify studies evaluating interventions for children with DLD across all language domains (vocabulary, phonology, morpho-syntax, and pragmatics), papers were screened for inclusion/exclusion using titles and abstracts based on the criteria of date of publication, target group, and evaluation of an intervention. This was carried out using a specialist software that supports systematic reviews (Evidence for Policy and Practice (EPPI) – Reviewer 4). Twenty percent of the papers were double screened by two independent reviewers. Reliability calculation was undertaken at each stage with an overall agreement rate of 96% (see Frizelle et al. 2021 for details of stage 1). Disagreements at all stages were resolved through discussion. Based on the title and abstract, all papers involving intervention studies identified as including some aspect of oral pragmatic language were allocated to the systematic review domain, which formed the basis for stage 2.

Stage 2: Two independent researchers (KJL & JKK) screened all papers allocated to the domain of pragmatics based on their title and abstract and proceeded to identify papers that focused specifically on the domain of oral pragmatics, monolingual children, and DLD. Due to the expansion of the search period, this process was carried out twice and yielded 1031 papers.

Stage 3: The inclusion based on full text screening was completed after consulting the inclusion/exclusion criteria.

Stage 4: All three researchers (KJL, JKK, and EBS) performed full text screening of the papers identified in Stage 3. The final analysis included only single-case design studies involving monolingual children with DLD and focusing specifically on pragmatic outcomes (n = 11).

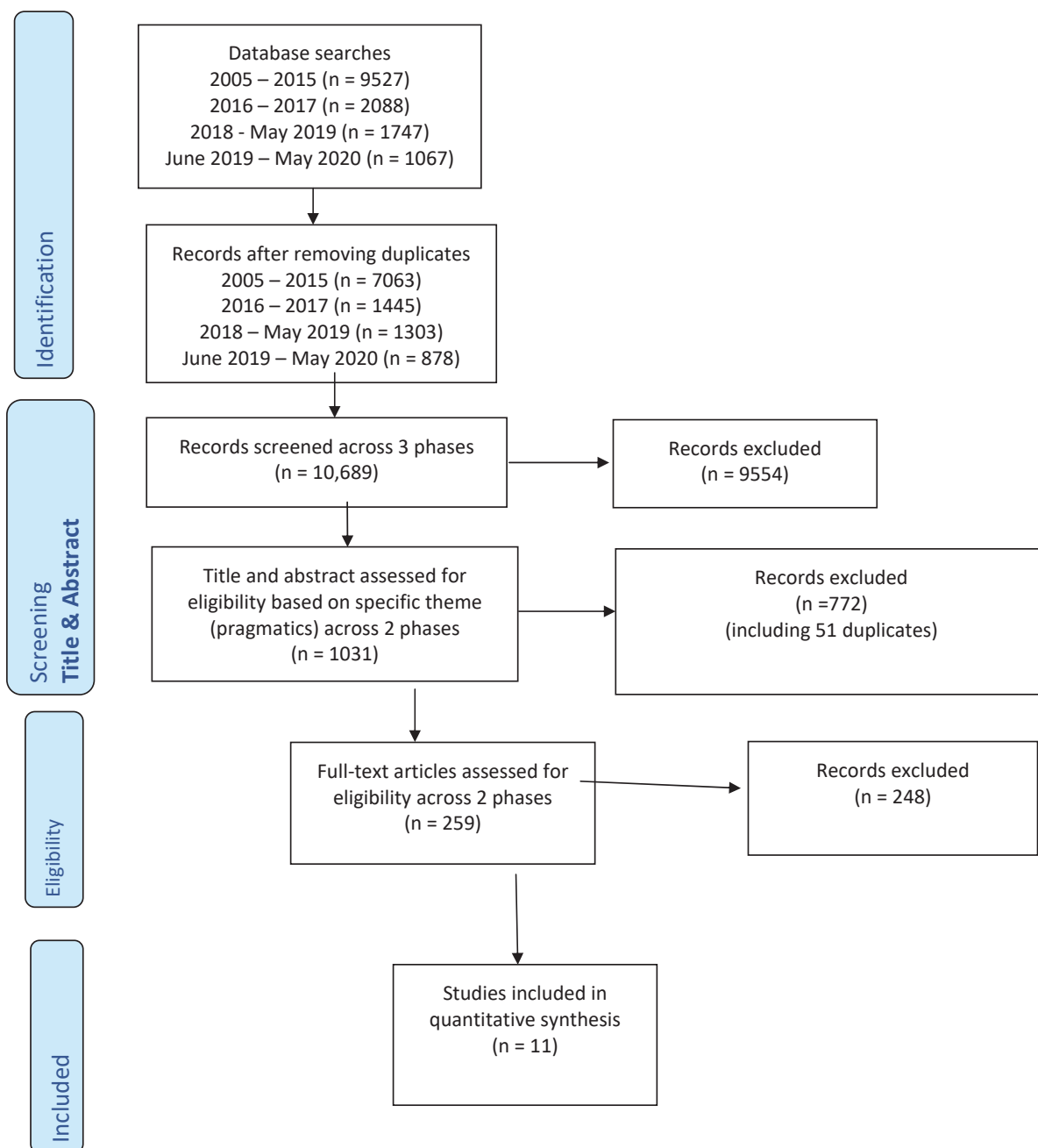


Figure 1. PRISMA flowchart depicting literature search strategy

Data extraction

The following data were extracted from the included papers and tabulated in an Excel spreadsheet, or coded in EPPI by KJL, JKK, and EBS (agreements were reached through discussion): study design (ABA, AB, interrupted time series, alternating treatments, multiple baseline and

non-experimental single-case participant variables (number, age, language); intervention details (ingredients, model and service of delivery, setting, unit of allocation, dosage (i.e.,) frequency, length of session, and duration), pragmatic outcome measurements, and efficacy.

While effect size estimates are available for most designs involving group comparisons, there are no agreed-upon methods or standards for effect size estimation in SCDs (Kratochwill et al., 2010). According to Kratochwill et al. (2010), single-case researchers have traditionally relied on visual analysis of the data to determine possible evidence of a relationship between the independent variable and the outcome variable, as well as the strength and magnitude of such a relationship. An effect is documented when the data pattern in one phase of the intervention differs more than would be expected from the data pattern observed or extrapolated from the previous or baseline phase (Horner et al., 2005).

Percentage of Nonoverlapping data (PND) was used to analyse the effect of SCD interventions, when relevant to the respective design. PND is calculated by counting the number of data points in the intervention that are higher than the highest data points in the baseline phase, which is then divided by the total number of data points and multiplied by 100 (Scruggs & Mastropieri, 2013). For example, 16 nonoverlapping data points divided by 20 data points in total is 0.75, which is multiplied by 100 to give 75%. PND scores of 90% or greater are considered very effective, 70-90% are considered effective, 50-70% are considered questionable, and less than 50% are considered ineffective. These effects can be attributed strictly to change.

Data synthesis

A narrative synthesis was conducted in two stages. To respond to our first three research questions (RQ1, RQ2, and RQ3), we first provided descriptive summaries of the general components of the studies, as well as detailed descriptions of the outcome measures used to evaluate changes in oral pragmatic language, delivery, setting, and dosage of the interventions. In the second stage, we focused on responses to RQ4 and RQ5. In this synthesis, we analysed and summarised in detail the ingredients and teaching techniques (*Hows and Whys*) applied in the respective interventions, as well as the quality of the studies included.

The quality of each of the included papers was appraised using the Risk of Bias Assessment tool for Non-randomised Studies (RoBANS; Kim et al., 2013). The RoBANS is a domain-based evaluation tool compatible with the Cochrane risk of bias tool and can be used when evaluating the risk of bias in non-randomised studies (Kim et al., 2013). The tool aims to evaluate selection bias (inadequate selection of participants), performance bias (measurement of exposure), detection bias (blinding of outcome assessments), attrition bias (incomplete outcome data), and reporting bias (selective outcome reporting). Additionally, the studies were evaluated to check whether they had carried out fidelity measures to ensure that the specific intervention was carried out according to plan. Fidelity was rated as yes or no. The papers were appraised independently by KJL and JKK and an agreement was reached through discussion.

RESULTS

RQ1: Descriptive summary of the studies included

A total of eleven studies examined oral pragmatic language as an outcome variable and were included in the final analysis. Four studies by Stanton-Chapman and colleagues (Stanton-Chapman et al., 2006, 2008, 2011, 2012) used the same intervention, thereby inflating the total number of interventions being explored in the review. The language spoken by the children was English in all, but one study, which included Spanish-speaking children (Axpe et al., 2012).

The total number of children represented in the studies included was 58, varying in sample size from 1 to 10. The age of the children ranged from 3 to 9;9 years. Approximately half of the studies ($n = 5$) represented preschool children, aged 3 to 5 years, thus, aligning with the window of opportunity for acquiring language (see Dickinson et al., 2006). The remaining studies represented primary school children, aged 6-9 years. The outcome measures capturing pragmatic language varied across the studies (see Table 1).

Table 1. Aspects of the studies included: design, participants, delivery, setting, tier, dosage, outcome measures, and effectiveness of the intervention

| First Author (Year of publication) | Type of study | Population (n, age, language, gender) | Delivery, Setting, Tier, Dosage | Outcome measures | Effectiveness of intervention |
|------------------------------------|--|--|--|--|---|
| 1. Adams (2007) | Single-case study (ABA reversal design) | Six, 5;11-9;9-year-old, British, boys | SLP, direct, specialist primary school, one-to-one, 3 x week/8 weeks | ALICC ¹ , which captures elicited conversations with the child and researcher. Three indices were coded: 1) Discourse participation (taking the floor), 2) Conversational dominance (requesting or providing information), and 3) Loquacity – a measure of child initiative/talkativity). ACE ² Inferential comprehension subtest and Narrative propositions subtest | Pragmatic language components Progress in conversation skills: discourse participation (child taking the floor and dominating) decreased for all five children, conversational dominance (repeatedly requesting information or providing unsolicited information) decreased for two children and increased for one child, while loquacity (too talkative) increased in one child and decreased in one. The results of the intervention thereby suggest some changes that represent positive changes (discourse participation and conversational dominance). Anticipated changes in inference and narrative propositions were not found |
| 2. Adams (2015) | Case study (enhanced AB design with a 6-month follow-up) | One, 8;4-year-old, British, boy | SLP & assistants, direct, specialist elementary school, one-to-one, 12 weeks | TOPICC ³ : Responsiveness and turn taking, Discourse style, Response problems and Appreciation of listener knowledge | Parents and teachers reported improvements in social communication (listening, turn-taking, asking for clarification) and peer relations, in creating sequenced stories, and recounting recent events |
| 3. Axpe (2012) | Quasi-experimental case study | Six (+2 control children), 4-year-old (at the onset of the intervention programme), spanish children, gender unclear | SLP & teachers, direct, specialist, preschool, Large group (e.g., whole case (stage 1), small group (stage 2), and one-to-one (stage 3 - individualised programme) Stage 1: 3 x week; 45 min/12 weeks Stage 2: 3 x week; 30 min/12 weeks Stage 3: 3 x week; 30 min/16 weeks | Retelling of the tale 'Good Night, Gorilla'. Coding followed the discourse dimensions suggested by Bliss et al (1998) ⁴ ; expression of the main topic, event sequence, cohesion, and referential pronouns | All children in the experimental group acquired more elaborated and complex narrative structures, featuring a greater amount of formal linguistic elements that contributed to their production's coherence and cohesion. The contrast between the pre- and post-test evaluations of the experimental group subjects' narrative development showed a statistically significant difference (T = 0, p < 0.05 based on the Wilcoxon test) |

¹ Analysis of Language Impaired Children's Conversation

² Assessment of Comprehension and Expression (6–11)

³ Targeted Observation of Pragmatics in Children's Conversation

⁴ Narrative Assessment Profile: Discourse Analysis for School Age Children

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|-------------------|---|--|--|---|--|---|
| 4. Boyer (2014) | Alter-nating treatment case-study design (Cooper, Heron & Heward, 2007) (dyads) | Two ⁵ , 4;4-8;5-year-old, unclear, Canadian girls | SPL, direct, specialist, preschool, small groups, 3 x week/15 min./12 weeks | Each videotaped recording of three alternative treatment sessions was coded for social interaction sequences | Both participants demonstrated more sustained interaction related to conversation skills in the live animal condition (12% and 27% increase in the last week of the intervention compared to week 1) | Teachers reported progress in verbal initiations, increase in continuing inter-actions, and more frequent responses to questions, as well as questions asked |
| 5. Brown (2014) | Multiple baseline design | Two ⁶ , 4;9-4;11-year-old, American, 1 girl and 1 boy | SLP & Communication Sciences and Disorders graduate students, direct, specialist, small groups, 2-3 x week/15-20 min./unspecified | TNR ⁷ focusing on 5-macro structure story grammar components in retelling; Character, Take off, Feelings, Action and Landing (consequence) | The intervention proved very effective for one child and questionable for the other one. PND calculated as part of this review study: 94% and 56%. Both children maintained improved skills 2 weeks after the intervention ended | Not reported, but regarding social validity, outcomes measured were discussed with the teacher |
| 6. Martin (2015) | Multiple baseline across participants | Three, 6;4-7;2-year-old British children, 1 girl and 2 boys | SLT, direct, specialist, primary school, small groups, 1 x week/20min./4 weeks | Measures from a dynamic assessment procedure ⁸ for supporting narrative abilities | One child showed a positive response to mediation regarding story narratives when she learned to use locative phrases appropriately and developed an appropriate use of dialogue. Another child revealed greater understanding of time in the story as the mediator let him become more agentive. The results of the performance of the third child indicated increasing awareness about the story narrative genre | Not reported |
| 7. Spencer (2010) | Multiple baseline across participants | Three ⁹ , 4;3-5;1-year-old British girls | SLP & first author, direct, specialist, Head Start classrooms, small groups, daily/12 min. (range of 7-17 min. per session/duration unspecified) | The INC ¹⁰ (modified) used for the coding of both retold and personal generated narratives. Total score based on five key elements: Character (and the name of the main character), Problem, Inner response, Action, and Consequence | Results indicated that narrative intervention led to improvements in the preschoolers' retell narratives, with PND ranging from 53% to 100% i.e., from questionable to very effective. The evidence supporting its effect on personal generations is less convincing | Not reported, but regarding social validity, about 71% of the time, the teachers identified participants' intervention retell narrative as better than their baseline narrative. Teachers also rated the intervention as important, appropriate, adaptable to larger groups, and interesting to use |

⁵ Three girls were in the study, but only the two girls who met our criteria for DLD were included in the analysis

⁶ Three children were in the study, but only two girls qualified to our criteria for DLD and were included in the analysis

⁷ Test of Narrative Retell School-Age: Kindergarten Stories

⁸ Dynamic assessment and intervention: Improving children's narrative abilities

⁹ Five children were in the study, but only three girls met our criteria regarding monolingual development and were included in the analysis

¹⁰ Index of Narrative Complexity

| | | | | | | |
|--------------------------------------|---|--|--|--|---|---|
| 8. Stan- ton-Chap- man (2006) | Alter- nating treatments design with the inde- pendent variables adminis- tered con- currently across dyads | Four, 4;0-4;11-year- old, unclear but likely Ameri- can, 2 girls and and 2 boys | Early childhood special educator, direct, specialist, Head Start centre, small groups (dyads), 5 x week/25min./duration unspec- ified | The five targeted social prag- matic strategies: 1) talk to your friend, 2) listen, then respond, 3) use your friends name, 4) take your turn and give your friend a turn, and 5) look at your friend when talking, assessed with the PLBC ¹¹ | Results of the study indicated no dif- ferential effects between the prompt- ing and no prompting conditions of the intervention package | Not reported |
| 9. Stan- ton-Chap- man (2008) | Multiple baseline design across two dyads and replicated across two additional dyads | Eight, 3;4-4;9-year- old, unclear but likely Ameri- can, 3 girls and 5 boys | Early childhood special educator, direct, specialist elementary school, small groups (dyads), 2 x week/25min./duration unspec- ified | The four targeted social prag- matic strategies: 1) talk to your friend, 2) listen, then respond, 3) use your friends name, and 4) take your turn and give your friend a turn, assessed with the PLB ¹¹ | Results indicated an increase in peer-directed requests (social initia- tion) and verbal requests for 6 of the 8 participants post-intervention | Social validity was evaluated by five Masters level early childhood special education students blind to the research questions |
| 10. Stan- ton-Chap- man (2011) | Multiple baseline design across two dyads replicated across three additional dyads | Ten, 4;8-5;7-year- old, unclear but likely Ameri- can, 1 girl and 9 boys | Early childhood special educator, direct, specialist elementary school for pre-schoolers, small groups (dyads) 4-5 x week/25min./duration unspec- ified | Initiations of play and/or con- versation with a peer, appro- priate responses to peer initia- tions and turn-taking skills assessed with the PLBC ¹¹ | The intervention proved very effective for five children (PND = 94%, 94%, 100%, 100%, and 100%), effective for three children (PND = 72%, 83%, and 83%), and questionable for two chil- dren (PND = 61% and 67%) in increas- ing the rate of initiations with an im- mediate peer response from baseline to intervention. With respect to improving turn-taking skills, the social communi- cation intervention was very effective for one child (PND = 94%), effective for three children (PND = 72%, 78%, and 83%), questionably effective for two children (PND = 61% and 61%), and ineffective for four children (PND = 17%, 22%, 39%, and 44%) | Regarding social validity, teachers found the intervention procedures to be socially acceptable and rated the behavioural changes as being socially important |
| 11. Stan- ton-Chap- man (2012) | Multiple baseline across parti- cipants (4 dyads) | Eight, 3;8-4;5-year- old, unclear but likely American, 3 girls and 5 boys | Early childhood special educator, direct, specialist elementary school for preschoolers, small groups (dyads), 4-5 x week/25min./duration unspec- ified | Peer-directed initiations followed by an immediate response assessed with the PLBC ¹¹ | All eight participants showed increas- es of initiations with an immediate peer response (PND = 100% for all participants) | Regarding social validity, teachers found the intervention procedures to be socially acceptable and rated the behavioural changes as being socially positive |

¹¹ The Peer Language and Behavior Code

The interventions were most often delivered by SLPs and to a lesser extent by specialists in childhood special education. Direct delivery, where the specialist SLP bears the full responsibility for the training rather than delegating it to assistants or parents, seems to be the preferred model of delivery. Regarding tier of support, the interventions were carried out in small groups or dyads, while two studies also involved one-to-one delivery, for example, only the child and the SLP. Axpe et al. (2012) followed a 3-tier intervention, starting with the entire classroom, followed by small groups, and finally, individualised support. The frequency for the delivery ranged from once a week to five times a week. The duration for the full intervention ranged from 4 to 16 weeks, with the majority lasting 10-12 weeks. However, six studies (including the Stanton-Chapman studies) did not report the overall duration (total number of hours spent or provide information to calculate this) of the intervention. All, but two studies, reported the length of each session, and the range was from 15 to 50 min. Regarding the setting and context of the included interventions, they were all carried out at the children's school in a separate classroom (except for stage one in the Axpe et al. 2012 intervention). The outcome variables used to measure the efficacy of the individual interventions revealed a large degree of variation regarding the conceptualisation, operationalisation, and assessment of oral pragmatic language (see Table 1). Thus, as expected, the specific aspects of pragmatic language selected for each of the studies included reflect the broad and multifaceted nature of pragmatic language.

RQ2: Efficacy of the interventions

To respond to our second RQ regarding the effect of the interventions, we attempted to compile the results from the included studies. However, as expected, we identified different methods used for data analyses, as well as different ways of reporting findings across the included studies. Two studies (see Table 1) provided qualitative reports based on the participants increased (or decreased) performance on the respective targeted pragmatic language measures (Adams et al., 2015; Mar-

tin, 2015), while others reported percentage increases (Boyer & Mundschenk, 2014), or mean pre- and post-therapy scores (Adams & Llyod, 2007). Axpe et al. (2012) reported non-parametric statistics (Wilcoxon signed-rank test) to compare repeated measurements between the intervention and control group, as well as visual inspections (total narrative scores). Spencer & Slocum (2010), Stanton-Chapman & Snell (2011), and Stanton-Chapman et al. (2012) reported effect sizes using the percentage of PND method. Brown et al. (2014) did not report the PND, but the relevant information required to calculate the PND was available. In this case, PND was calculated by the authors from the data presented in the study. Visual analyses of graphs were also one of the means of analysis conducted to interpretate the results, which is consistent with the methodology of SCDs. All studies, except Stanton-Chapman et al. (2006), reported improvements after and/or during the intervention, as well as individual differences.

To provide an overview of the pragmatic language skills that were captured as outcome measures in the studies included, we stratified these skills into conversational and narrative skills (see Table 1). Three studies investigating interventions targeting conversational skills reported mild (Boyer & Mundschenk, 2014) to moderate (Adams et al., 2015; Stanton-Chapman et al., 2008) improvements in the measures selected for change. Stanton-Chapman and Snell (2011) reported that the interventions were effective for eight of the ten participants, while Stanton-Chapman et al. (2012) proved that they were very effective for all eight participants. In contrast, Stanton-Chapman et al. (2006) did not observe any improvements: this lack of effect may be due to inconsistent prompts and lower frequencies in the intervention, but also due to methodological differences (see Stanton-Chapman et al. 2006, p. 201). The measures of change in the children's conversational skills in Adams and Llyod (2007) showed mixed results, with all children benefiting from the intervention and adapting to more adequate discourse behaviour regarding floor time, while for dominance in discourse (too much

requesting of information or too much unsolicited information) and loquacity (too talkative), some children improved while others showed increased non-adequate abilities after the intervention. Interestingly, one child, who was at the threshold for a pragmatic language impairment as assessed by the Child's Communication Checklist, showed an improvement in discourse participation after the intervention. However, this specific child also showed increased conversational dominance after the intervention, which is a negative developmental path. Adams et al. (2015) found the increase in communication skills to be evident at home as well as in the classroom. Boyer and Mundschenk (2014) reported on certain generalisations for continuing interactions and verbal initiations in the classroom. Similarly, Stanton-Chapman and Snell (2011) found that all participants demonstrated increased peer play following the intervention, whereas Stanton-Chapman et al. (2008) and Stanton-Chapman et al. (2012) offering the same intervention were unable to conduct generalisation sessions in the classroom. The remaining six studies did not address the issue of generalisation.

Regarding narrative abilities, the findings were more mixed and it was difficult to arrive at an overall conclusion. This was partly due to the individual differences identified across the studies. These findings are consistent with the results of Jensen de López et al. (2022), where efficacy also seemed to be related to the type of outcome variables used to measure the effectiveness of the intervention. Axpe et al. (2012) reported substantial differences between pre- and post-intervention narrative structure (topic, cohesion, referential pronouns) for all six children participating in the experimental group, as well as statistically significant changes in pre- and post-measures of group performances. In contrast, no differences were observed in the performance of the two control children. Similarly, the ability to build narrative structure (story grammar) improved for one of the two children assessed in the Brown et al. (2014) study. After calculating the PND, the authors showed that the intervention proved very effective for one child (94% of nonoverlapping data), yet only questionable (56%) for the other

child. The learning process of the two children differed, with the high performing child showing an immediate increase within the first three interventions, followed by an increase in the two-week follow-up measure. The low performing child, on the other hand, showed a very low immediate increase effect and showed a large variation in performance across the individual sessions and did not show any additional increase on the follow-up measure. The PND reported in the Spencer and Slocum (2010) study ranged from 53-100%, indicating that the narrative intervention was effective for improving retelling skills for three out of five children, while the effect remained questionable for two children. The authors explained these individual differences by demonstrating that the child with the PND score of 100% needed little instruction on the main grammar elements to retell the story and suggested that she posed sufficient language skills, but lacked knowledge of story structure. The two children with low PND scores (53% and 58%), on the other hand, showed ascending patterns following the intervention and they were 2 and 5 months younger than the child that showed improvement, and in addition they were often absent and appeared shy (Spencer & Slocum, 2010). Surprisingly, all three children performed relatively similar on the norm-referenced narrative retell Renfrew Bus Story in the selection phase prior to the baseline measure. This might bring into question the authors explanation that lack of improvement is uniquely related to low maturation. The reported findings from the study based on the dynamic assessment by Martin (2015) and the subsequent response to mediation indicated that one child gained awareness of the narrative genre, while another revealed a greater understanding of time in the story. Yet another child developed a more appropriate use of locatives, as well as dialogue.

RQ3: Specific outcome measures used to measure change

As mentioned, despite the heterogeneity of skills that were targeted in the included interventions, the language skills that were measured as outcomes can be divided into conversational and

narrative skills (see Table 2a). The specific domains of pragmatic language that were measured were related to expressive language, but also to a combination of expressive and receptive language, which is consistent with the natural setting of everyday discourse and conversation. The aspects that were evaluated in the studies measuring conversation skills included initiation, response, turn-taking, topic management, and adaption to the social context, as well as the listener’s knowledge. In the studies measuring narrative abilities as outcome variables, it was mainly aspects of narrative macrostructure that were evaluated. Some studies

also included questions that assessed the child’s use of dialogue, as well as understanding of inner states, feelings, and/or internal responses of the protagonists in the stories. With respect to narrative skills, some studies also measured changes in the child’s ability to draw inferences. Most of the skills measured as outcomes tapped into formal aspects of pragmatics and language-dependent behaviours that are necessary to follow a conversation or unfold a narrative. The studies varied regarding whether they focused on aspects of conversation-supporting or narrative-supporting outcome measures.

Table 2a. *Elements evaluated in outcome measures of oral pragmatic language skills: conversation and narrative skills*

| Study | Conversation skills | | | | Narrative skills | | |
|----------------------|---------------------|----------|-------------|------------------|--|---|----------------------|
| | Initiation | Response | Turn-taking | Topic management | Adapting to listener knowledge/context | Use of story grammar components/sequences | Inferential ability* |
| Adams 2007 | x** | | x*** | x | x**** | x | |
| Adams 2015 | | x | x | | x | | |
| Axpe 2012 | | | | | | x | x |
| Boyer 2014 | x | x | | | | | |
| Brown 2014 | | | | | | x | x |
| Martin 2015 | | | | | | x | x |
| Spencer 2010 | | | | | | x | x |
| Stanton-Chapman 2006 | x | | x | x | | | |
| Stanton-Chapman 2008 | x | | x | x | | | |
| Stanton-Chapman 2011 | x | x | x | | | | |
| Stanton-Chapman 2012 | x | x | | | | | |

* focusing on either inner states and feelings of the characters, the quality of inferences, use of dialogue, or internal responses and dialogue

** ‘child loquacity’ - a measure of child initiative assessed by the proportion of child utterances that were unsolicited by the adult’s contributions

*** ‘discourse participation’ - ratio of child utterances to assessor utterances

**** ‘conversational dominance’ - repeatedly requesting information, or providing unsolicited information

RQ4: Hows and Whys of the interventions

Teaching techniques in the interventions

The teaching techniques or ingredients in the included studies covered a wide range of observable actions aimed at improving the child’s verbal and nonverbal performance (Denman et al., 2021). In all studies, except for Axpe et al. (2012), prompting was used during the intervention phases. Prompting is a method of support in which

the child is offered some form of direct assistance (prompt or cue), which is intended to elicit an immediate response or action (Denman et al., 2021). In terms of the mode of communication, prompting can be verbal (e.g., highlighting a lexical item in an utterance), visual (e.g., showing a picture to support language production), gestural (e.g., a pointing gesture), or physical, i.e., tactile (e.g., tapping while performing certain language activities). Several studies also used linguistic

techniques (e.g., modelling), which are not intended to elicit an immediate response, but are used repeatedly to demonstrate a target response or a specific linguistic structure (Baker, 2012 in Denman et al., 2021).

In the studies included, the number of different types of prompts and modelling varied from

one (Adams & Lloyd, 2007; Adams et al., 2015) to several (Boyer & Mundschenk, 2014; Stanton-Chapman et al., 2006; Stanton-Chapman et al., 2008; Stanton-Chapman & Snell, 2011; Stanton-Chapman et al 2012; Brown et al., 2014; 2013; Martin, 2015; Spencer & Slocum, 2010) (see Table 2b and 2c).

Table 2b. *Teaching techniques that support conversation skills*

| Study | Prompting* | Modelling | Role play | Scaffolding | Script training/play | Facilitated play | Other |
|----------------------|------------|-----------|-----------|-------------|----------------------|------------------|---|
| Adams 2007 | x | x | x | | | | Self-monitoring/promoting coping strategies |
| Adams 2015 | x | | | x | x | | Comprehension-monitoring |
| Axpe 2012 | | | | | x** | | Focused simulation |
| Boyer 2014 | x | | | | | | AAT*** |
| Stanton-Chapman 2006 | x | x**** | x | | x | x | |
| Stanton-Chapman 2008 | x | x | x | | x | x | |
| Stanton-Chapman 2011 | x | x | x | | x | x | |
| Stanton-Chapman 2012 | x | x | x | | x | x | |

*Involves modelling, mands, and visual cueing by the use of pictures or pointing gestures

**Although the study does not assess conversation, they used verbalisation of scripts for balanced turn-taking and conducting daily routines (e.g., greeting classmates by saying: “*Good Morning*”)

***Animal-Assisted Therapy

****Involves models for verbalisation during role play (e.g., a grocery worker saying: “*Can I help you?*”)

Table 2c. *Teaching techniques that support narrative skills*

| Study | Prompting* | Script training | Scaffolding | Dialogic reading | Modelling | Feedback | Expansions | Other |
|--------------|------------|-----------------|-------------|------------------|-----------|----------|------------|--------------------------------|
| Axpe 2012 | | x** | | x | | | | Focused simulation, repetition |
| Brown 2014 | x | | | | | x*** | x | Self-monitoring |
| Martin 2015 | x | | | | | | | |
| Spencer 2010 | x | | | | x**** | | | |

*Involves modelling (e.g.,) modelled responses, repetition, visual cueing by the use of pictures or pointing gestures, rephrasing, semantic and phonemic cues, closing procedures, as well as direct and indirect questions

**Both regarding *event structures* and *literature-based scripts*

***Intrinsic reinforcement

**** During the introduction, the instructor modelled the targeted story by displaying pictures corresponding to the story and placed grammar story icons in the corresponding pictures

When several types of prompts or modelling were used in an intervention, the principle of least-to-most prompting was followed. For example, Boyer and Mundschenk (2014) examined conversation skills within the framework of Animal-Assisted Therapy (AAT) by using different prompts: first, the therapist gave the children a verbal prompt (e.g., “The two of you can decide

what Abby (cat) should wear today and get her dressed “ p. 32), then if necessary the therapist combined a visual prompt with a verbal prompt (e.g., pointing to a specific piece of clothing item for the cat with the aforementioned verbal instruction), and finally, they used a verbal prompt, i.e., verbalized a specific request (e.g. “I want Abby (cat) to wear shoes.” p. 32). In addition, this study

used a step-by-step prompt removal procedure to reduce the children's dependence on the therapist's prompts during interactions, first by removing the verbal prompt and then the visual prompt. In other included interventions, prompts were combined with some other ingredient. For example, Adams and Lloyd (2007) included role-play, where the child was invited to take on a particular role (e.g., a doctor visiting a boy) and the therapist would then give a series of verbal prompts in the form of questions (e.g., "Why do you think the doctor is visiting the boy?", "Have you ever felt that way?", "Tell me a little bit about that").

Prompting was often combined with linguistic techniques. Unlike prompting, which requires an immediate response or action from the child, linguistic techniques do not. Their purpose is to demonstrate language structure to facilitate language processing (Denman et al., 2021). Adams et al. (2015) used an intervention that was based on a combination of prompting and linguistic techniques. For example, children were exposed to an activity aimed at understanding and expressing their feelings in a series of situations using four emotion cards. The child was visually prompted to immediately point to corresponding pictures of the emotions that the therapists had previously described, or verbally prompted to repeat the emotion immediately after the therapist. This linguistic technique was used in situations where the therapist talked to the child about an emotion, or where the therapist repeated a set of different emotions using examples from the material to help the child understand feelings, without the child having to react verbally or non-verbally (Adams et al., 2015).

Since the pragmatic skills realised in different social situations require the speaker to take

on different roles, it is not surprising that scripts and role play were often used in the interventions. These techniques were exclusively present in studies promoting conversation skills. For example, Adams et al. (2015) reported that, scripts were implemented by the therapist in order to promote conversation: first, the child was given a picture that represented a specific social context and then they were asked to describe what a person in that social context would say, i.e., using language specific to that context. The therapist would then continue to guide the child through the process using other support methods. Axpe et al. (2012) described how the therapist provided scripts representing well-known everyday activities, such as going to the hairdresser, traveling by plane, getting ready for school, visiting the doctor/veterinarian and so on, with each script focusing on the use of language specific to that particular activity. In four studies conducted by Stanton-Chapman et al. (2006; 2008; 2011; 2012), role play was implemented in such a way that during each therapy session, the therapist: 1) provided the necessary materials for play, 2) introduced and explained the complementary roles that the children were supposed to play (e.g., doctor and patient, hairdresser and customer, veterinarian and dog owner), 3) read a story to the children underlying the role play that included topic-specific language models, 4) made a decision along with the children regarding who would take on which role, as well as explaining each role again, while showing corresponding pictures from the story, and finally 5) used other supportive methods such as encouragement and modelling during the role play. As described in Table 3, prompting procedures were used for a range of different purposes.

Table 3. Prompting and modelling procedures used in the included interventions

| First author | Description of the least-to-most hierarchy | Timing and reasons for prompting the children | Examples of contexts using prompting |
|----------------|---|--|---|
| Adams (2007) | None - Both verbal and visual prompts | To keep the conversation going – during conversation assessment During the Formulation Sentence Task | <i>‘Why do you think the doctor is visiting the boy?’; ‘Have you ever been poorly like that?’; ‘Tell me about it’</i> (accompanied by a set of photographs e.g., a doctor’s visit or a car breaking down) Here the child was asked to make up a sentence using a keyword and given a picture prompt. |
| Adams (2015) | None - Both verbal and visual (picture cues) prompts | During conversation when there was not enough details being provided to keep the conversation going | None/more modelling, scaffolding, and repeating, instead of prompting per se |
| Axpe (2012) | None | During stage 1 and stage 2 i.e., in the classroom sessions and the subsequent sessions carried out in small groups | Script training, instead of prompting per se. Although no specific examples are mentioned explicitly, it is stated that the simulation of scripts (sequence of actions around a character) follows Pavez, Coloma and Maggiolo’s plan to stimulate narrative development (Plan de Estimulación del Desarrollo Narrativo, EDEN, 2008) |
| Boyer (2014) | From verbal prompts to visual prompts, in the form of gestures or manual signs, and finally to a verbal model. - 3 stages - Involves modelling and gestures - Both verbal and visual prompts | During conversation to facilitate interaction | Verbal: <i>‘‘The two of you can decide what Abby should wear today and get her dressed’’</i> Visual: includes the previous verbal prompt plus the clinician pointing to a specific clothing item for the cat. Verbal model: a verbalisation to initiate interactions such as <i>‘‘I want Abby to wear shoes’’</i> |
| Brown (2014) | a) Repeating the definition of the story grammar component (<i>‘‘the ‘‘who’’ of the story’’</i>), b) providing picture cues by pointing to the corresponding page in the book (the character), c) offering a choice between two responses, and d) modelling the correct response (<i>‘‘it’s the dinosaur’’</i>). - 4 stages - Involves repetition, cueing (using pictures or gestures), and modelling of the correct response - Both verbal and visual prompts | In response to an incomplete/inaccurate response regarding the targeted story grammar component | No examples of prompts in response to incomplete/inaccurate responses, but <i>the procedure before the story</i> included a verbal definition of the targeted story grammar component e.g., the <i>character</i> and a corresponding picture icon was verbally introduced and put on a whiteboard. The child was asked <i>‘‘What does ‘character’ mean’’</i> and their correct answer was repeated or restated. Wrong answers were corrected with a model of the definition. |
| Martin (2015) | Not regarding prompting, but a <i>hierarchy of mediational prompts</i> - Both verbal and visual prompts | During the two 20-minute mediated interventions | In the dynamic assessment and the second mediation session, the mediator drew on three mediational prompts that were used in the classroom for learning locatives: 1) saying the word ‘where’, while 2) gesturing a specific sign and 3) showing a visual symbol (a red card representing the question word ‘where’) 1) <i>‘‘The character’s name is John. Now you say, ‘John.’’’</i> 2) <i>‘‘He fell and hurt his knee. Now he feels —’’</i> , 3) <i>‘‘What was John’s problem?’’</i> 4) <i>‘‘What happens next?’’</i> |
| Spencer (2010) | From most to least intrusiveness: 1) modelled responses with a request to imitate, 2) closing procedures, 3) direct questions about parts of the story, and 4) indirect questions - Involves modelling, closing procedures - Verbal prompts only - Prompting <i>only used for the main grammar components</i> i.e., character, problem, internal response, action, and consequence – the others (from INC) are mentioned as <i>supplemental</i> | Following a sequence of instructor-modelling i.e., during the following group retelling, the individual retelling, as well as the individual generation of their own story (step 2-5) – all when needed and appropriate to make sure that the children successfully mentioned each of the five main story grammar elements. The prompting hierarchy was used as a rough guide for on-the-spot decisions about what level of prompting was appropriate | |

| | | | |
|------------------------|--|---|---|
| Stanton-Chapman (2006) | <p>Model and mandates</p> <p>If the child did not comply after the first prompt, the interventionist either repeated the exact prompt or gave a specific model if the first prompt presented was a mand and then waited 5 seconds for compliance. If the child did not comply after two prompts, the interventionist provided a verbal follow through by repeating the prompted utterance to the peer (e.g., "Sam says, 'help me please'") or by doing the action for the child.</p> <ul style="list-style-type: none"> - Involves modelling, repetition - Verbal prompts only | <p>During the play session to engage the children in the thematic play activity and to interact using the social pragmatic strategies</p> <p>Used when the children were in proximity with one another and when they were not talking</p> <p>The interventionist could prompt as many as three social pragmatic strategies in a single prompt. For example, if the interventionist prompted a child to look at his friend and say, "Tom, I need the scissors", then the interventionist prompted for (a) eye contact, (b) name use, and (c) to initiate talk in one prompt</p> | <p>Model: "say: 'can you help me please'"</p> <p>Mand: "ask your friend to show you how?"</p> <p>As each new social pragmatic strategy was introduced, it was prompted in the play session along with the previously introduced social pragmatic strategies (e.g., when name use was introduced, name use, listen and respond, and initiation were prompted in the play session)</p> <p>The interventionist could prompt as many as three social pragmatic strategies in a single prompt. For example, if the interventionist prompted a child to look at his friend and say, "Tom, I need the scissors", then the interventionist prompted for (a) eye contact, (b) name use, and (c) to initiate talk in one prompt</p> |
| Stanton-Chapman (2008) | <p>Three types of prompts were used: models, mandates, and indirect instructions.</p> <ul style="list-style-type: none"> - Involves modelling - Verbal prompts only | <p>Model: "Say: 'It is my turn to be the doctor'" – provides the child with a specific utterance to use with peers</p> <p>Mand: "Ask Iman for help"- an explicit instruction to verbalise to peers, but the target children were not given specific utterances to say. Then the target child was expected to generate the specific statement to peers and thereby, might be expected to say: "Iman, I need help"</p> <p>Indirect instructions: "I think Owen has some nails you can use"- suggestions to target children that they should interact with peers without specifically indicating that a verbal response is required</p> | <p>Model: "Say: 'It is my turn to be the doctor'" – provides the child with a specific utterance to use with peers</p> <p>Mand: "Ask Iman for help"- an explicit instruction to verbalise to peers, but the target children were not given specific utterances to say. Then the target child was expected to generate the specific statement to peers and thereby, might be expected to say: "Iman, I need help"</p> <p>Indirect instructions: "I think Owen has some nails you can use"- suggestions to target children that they should interact with peers without specifically indicating that a verbal response is required</p> |
| Stanton-Chapman (2011) | <p>The interventionist used a system of least prompts, which 1) employed an opportunity to respond without prompting, 2) followed as needed using simple verbal prompts, and finally 3) as needed by verbal plus gestural prompts. A protocol for prompting was developed and it included a hierarchy for determining when prompts should occur, what type of prompt should be used, and the structure of the prompting episodes. The goal was to deliver prompts at a rate and in a manner that did not disrupt the children's ongoing social interaction or play</p> <ul style="list-style-type: none"> - Involves repetition, gestures - Both verbal and visual prompts | <p>During the play sessions (a) to engage in the thematic play activity, (b) to use target vocabulary words, and (c) to interact using social communication strategies</p> <p>Additional prompting was provided when children were in proximity to one another, but were not talking</p> | <p>1) None</p> <p>2) A simple verbal prompt: "Sit by Timmy" or "Say: 'Keith, I need the hammer'"</p> <p>And then, if the child did not comply within 5 seconds (and after the prompt was repeated) the verbal prompt was completed with gestures:</p> <p>3) "Sit by Timmy" and pointed to a location closer to the peer or "Say: Keith, I need the hammer" and then pointed to the hammer.</p> <p>If the child still did not comply, the interventionist said the words or performed the action</p> |
| Stanton-Chapman (2012) | <p>A system of least prompts that 1) employed an opportunity to respond without prompting, 2) followed as needed by simple verbal prompts, and finally 3) followed as needed by verbal plus gestural prompts</p> <ul style="list-style-type: none"> - Involves gestures - Both verbal and visual prompts | <p>During play sessions. Additional prompting was provided when the children were in proximity to one another, but were not talking</p> <p>Prompts for the social communication strategies included prompts to sit next to a peer, to initiate an interaction, to listen to a peer and then respond, to take a turn, and to use a peer's name to obtain his or her attention. If children were not adjacent to one another, they were first prompted to sit next to one another. Prompts were given following several specific rules. If a child did not engage in one of these behaviours after approximately a minute of play, the interventionist provided a simple verbal prompt, and then (if not complied) repeated the prompt with gestures (pointing) – see Stanton-Chapman 2011.</p> <p>The prompts were delivered at a rate of about one prompt per minute at times when no social interactions were occurring between the children</p> | <p>Prompts for the social communication strategies included prompts to sit next to a peer, to initiate an interaction, to listen to a peer and then respond, to take a turn, and to use a peer's name to obtain his or her attention. If children were not adjacent to one another, they were first prompted to sit next to one another. Prompts were given following several specific rules. If a child did not engage in one of these behaviours after approximately a minute of play, the interventionist provided a simple verbal prompt, and then (if not complied) repeated the prompt with gestures (pointing) – see Stanton-Chapman 2011.</p> <p>The prompts were delivered at a rate of about one prompt per minute at times when no social interactions were occurring between the children</p> |

In interventions targeting conversational skills, prompting was used either to keep the conversation going and to facilitate interaction, or to engage the children in the play activity during play sessions and to interact using targeted social pragmatic strategies. These prompts were often verbal and ranged from models explicitly providing the child with a specific utterance (e.g., “Say: ‘It is my turn to be the doctor’ (Stanton-Chapman et al., 2008, p. 649-650)) to mands providing the child with an explicit instruction to verbalise without providing any specific utterance (e.g., “Ask Iman for help” (Stanton-Chapman et al., 2008, p. 650)), and finally, to indirect instructions (e.g., “I think Owen has some nails you can use” (Stanton-Chapman et al., 2008, p. 650)). Prompting for promoting social interaction, often among peers, was sometimes accompanied by gestures, for example, pointing at a toy or an object that was part of the activity.

Teaching techniques to promote narrative abilities were often verbal, including defining the meaning of a story grammar component, modelling the correct response, or using closing procedures to promote the child’s ability to include story grammar components (setting, problem, internal response, action, and consequence) in building the narrative sequence. Spencer and Slocum (2010) described how verbal prompts can be combined with other ingredients, such as imitation, to provide a model (e.g., “The character’s name is John. Now you say, ‘John’” (p. 190)), to aid in closing procedures (e.g., “He fell and hurt his knee. Now he feels...” (p. 190)), to direct questions about central aspects of the story (e.g., “What was John’s problem” (p. 190)), and finally to ask indirect and open questions such as “What happens next?”. Some studies targeting narrative skills have also used visual prompts in combination with other ingredients.

Narrative training and book reading

In supporting narrative skills, regulatory techniques were also integrated into the interventions. These techniques do not aim to elicit a response, but to facilitate the learning process (Denman et al., 2021). To achieve the goal, regulatory tech-

niques include a wide range of structured activities such as explicit (verbal or visual) instructions on tasks to be completed, linking new content to prior knowledge, explaining (visually or verbally) goals/expectations, feedback, and rewards (Denman et al., 2021). The ingredients used in interventions targeting narrative abilities in Axpe et al. (2012) were organised into three stages with different settings: first in the setting of a formal preschool classroom, followed by interventions conducted in small groups, and finally, a one-to-one intervention with an SLP. In the first two stages, the intervention included conversations about daily routines (the weather, greeting each other in the morning) and held aspects of turn-taking, posing questions, as well as talking about past and future events. These stages also included working with scripts (visiting a doctor, going to the hairdresser, and so on), simulation of scripts, and reading story tales with an episode in narration. The third stage included promoting the child’s ability to write the narratives while providing verbal and visual support (e.g., on how to plan the individual episodes of the narrative (“let’s make up an end to Tito’s problem”)), followed by recording and listening to the narratives, reading, and retelling books with a clear narrative structure, and engaging in conversations about favourite activities. Spencer and Slocum (2010) highlighted how the ingredients of the intervention were structured around story retelling and personal narration. The stories created for the retelling task contained five story grammar elements (character, problem, internal response, action, and consequence) and were accompanied by pictures. The children also recounted personalised narratives influenced by the topic of the model story in the retelling task when prompted with the following sentence “Has something like that ever happened to you?”. Visual support for the story grammar elements was provided by icons representing the elements. The intervention consisted of a total of six steps: 1) listening to the model story; 2) group retelling with pictures and icons (retelling one element of story in collaboration with the three other children in the group); 3) individual retelling with pictures and icons, 4) individual retelling with icons; 5) in-

dividual generation of personal story with icons; and finally 6) individual generation of personal story without icons. Vocal prompting was provided during steps 2-6 (see Table 3). Similarly, the ingredients in the intervention described in Brown et al. (2014) consisted of training story grammar elements in small groups of children. The story grammar elements were character (who?), initiating event (what gets the story going?), feelings (internal response/emotion), action (what does the character do?), and landing/consequence (result of the action). The first step in the intervention was to teach the child to define the story grammar elements with the support of a visual icon. The children then listened to a story and were told to raise their hand when a particular story grammar element was mentioned. If the child provided an incorrect response, then the interventionist provided a model of the correct response. After the story was told, the interventionist asked the children to explain the story grammar elements (e.g., “Who was the character in the story?”). Hierarchy prompting was used to support the child. Finally, the child was asked to retell the story with the support of icons and pictures. The retell was recorded and the child was then asked to identify the

story grammar elements while listening back to the recorded retell. The intervention in the Martin (2015) study was based on a dynamic assessment following a protocol that included three main aspects of narratives: story components (setting, character, temporal order, casual relationships), story ideas and language, and episode elements and structure (initiating event, attempt to achieve goal, consequence, internal response, plan, and reaction to consequence/ending). The intervention provided means to mediate the effort taken by the child to listen, while the level of modifiability was evaluated using the procedure of dynamic assessment. Consistent with the taxonomy for teaching techniques presented by Denman et al. (2021), most of the included interventions applied several integrated techniques that used a combination of regulatory techniques, as well as verbal and visual prompting.

RQ5: Quality appraisal of the studies included

Using RoBANS, the risk of bias was measured for all included studies and the ratings were assigned as high, low, or unclear (Fig. 2).

| First author | Selection bias/inadequate selection of participants | Performance bias | Detection bias | Attrition bias | Reporting bias | Fidelity |
|------------------------|---|------------------|----------------|----------------|----------------|----------|
| Adams (2007) | + | + | + | + | + | No |
| Adams (2015) | + | + | + | + | + | Yes |
| Axpe (2012) | ? | + | ? | - | + | No |
| Boyer (2014) | + | + | + | + | + | No |
| Brown (2014) | + | + | + | + | + | Yes |
| Martin (2015) | + | ? | + | + | + | No |
| Spencer (2010) | + | + | + | + | - | Yes |
| Stanton-Chapman (2006) | + | + | + | + | + | Yes |
| Stanton-Chapman (2008) | + | + | ? | + | + | Yes |
| Stanton-Chapman (2011) | + | + | + | + | + | Yes |
| Stanton-Chapman (2012) | + | + | + | + | + | Yes |

⊕ = Low risk of bias, ⊖ = High risk of bias, ? = unclear risk of bias

Figure 2. Critical appraisal of the quality of the studies included

Overall, the studies included were rated as having a low risk of bias on the domains that were evaluated. Since Axpe et al. (2012) did not clearly describe how the children were selected for participation, this lack of blinding may have affected the results. In four of the 11 included studies, the researchers did not report whether they had carried out measures of fidelity, therefore, it is unclear whether the protocol for the intervention was followed precisely.

DISCUSSION

The present systematic review investigated interventions that measure improvements in oral pragmatic language in children with DLD. A synthesis of the findings of the 11 included studies revealed a great deal of variation regarding outcome measures: this is consistent with the expectations associated with exploring a field that is as broadly defined as pragmatics. All the included studies explored interventions targeting at least one aspect of pragmatic language, although several of the studies also targeted other language aspects. In our review, we included all outcome measures of oral pragmatic language. During the process of screening papers, we applied a broad inclusive approach and included papers where any aspect of oral pragmatic language within a specific context was examined. This resulted in outcome measures mainly related to conversation and narrative abilities.

Regarding the quality of studies (RQ5) addressing pragmatic language intervention for children with DLD, it appears that the quality of the studies in our review was higher than what was reported for in previous studies, for example, Gerber et al. (2012) and Jensen de López et al. (2022). Several of the studies included, despite being pull-out deliveries, showed good levels of social validity as reported by teachers and parents. Consistent with previous reviews, our study identified improvements related to narrative skills. Furthermore, we identified improvements in discourse skills, similar to Gerber et al. (2012).

Variables applied to measure change

Regarding our RQ3: *What were the outcome measures used to measure change?* we observed

that the specific oral pragmatic language elements captured in the outcome variables differed across interventions. Some interventions measured changes in conversation skills, while others measured changes in narrative skills. For interventions measuring the initiation of conversation skills, the main elements measured were response, turn-taking, and topic management, whereas for interventions measuring narrative skills, the dominant measures were macro-structure story grammar elements (characters, setting, cohesion).

*How*s and *Why*s of interventions supporting or and measuring pragmatic oral language

Consistent with Jensen de López et al. (2022), we were unable to identify specific techniques or ingredients that tapped directly into supporting the child's social cognition, an umbrella term referring to cognitive processes involved in social interaction, for example, emotion recognition, perspective-taking, and theory of mind (see Turkstra et al., 2017 for an overview). This result is related to our RQ4 where we investigated the *How*s and *Why*s of the interventions. Previous studies including a meta-analysis (Nilsson & Jensen de López, 2016) have revealed that children with DLD can be delayed in different aspects of their social cognition. Therefore, the development of future interventions to support pragmatic language should consider integrating techniques to support elements of social cognition, as well as pragmatic language.

Based on the studies included in the present review, we identified that all teaching techniques or ingredients were unfolded in contextualised ways that rested on meaningful and natural interactions between the child and therapist. We also identified several similarities in techniques and ingredients across interventions that target both conversation and narratives. All included interventions incorporated prompting as a core aspect of the activity used to assist the child in producing appropriate requests or correct verbal responses. Regarding mode of communication, all types of prompts and modelling were included (e.g., verbal, visual, gestural, tactile, physical), indicating

that therapists often used a multisensory approach to promote pragmatic skills. In many cases, least-to-most prompting procedures were used reflecting a hierarchical prompting system in which the level of prompting is based on how intrusive the level of instruction is. These prompting strategies resemble techniques that directly relate to the concept of zone of proximal development proposed by Vygotsky (1978), as well as to the principles of dynamic assessment, where a systematic method of prompting provides increasingly instructive facilitation of the desired response (Hasson & Joffe, 2007). The application of graduated prompting during intervention offers opportunities for cooperation between the child and the intervener, thus facilitating the child to experience success in a mediated learning situation (Camilleri & Botting, 2013). Similar to dynamic assessment, SCDs, offer important insights regarding information concerning the responsiveness and motivation of the child during the intervention. This information is important for parents, teachers, and practitioners. The use of prompts must be modified to be most beneficial to the individual child depending on the nature and extent of the child's language difficulties (Bain & Olswang, 1995). Practitioners therefore need to be fully aware of the child's language abilities, as well as the language demands of the task. Otherwise, as Law and Camilleri (2007) pointed out, there is a potential risk that the child may not demonstrate enhancements through an instructional interaction or intervention, simply because of inappropriate learning opportunities (the mediation), rather than a lack of learning potential.

Ecological validity and generalisability of the efficacy of the interventions

When measuring the effectiveness of an intervention, several aspects must be considered, such as the setting, the type of assessment used to measure the effect, the feasibility of integrating the ingredients and whether the effect is generalisable to other settings (e.g. the child's every-day activities). These questions are related to RQ2 in the present study. Although most of the interventions included in our review took place in the children's school,

they were mainly carried out via a 'pull out' service model. This model has been criticised for isolating the target child, as well as making it difficult to generalise the results to natural settings (Paul-Brown & Caperton, 2001 in Stanton-Chapman et al., 2008).

Furthermore, the type of assessment tool applied influences how the effectiveness is appraised. To et al. (2015) suggested that functional assessment tools such as parent or teacher questionnaires should be used as a supplement to standardised assessments, since they may capture possible changes in language use in naturalistic contexts. It seems crucial to identify these changes when it comes to interventions targeting contextually based skills such as pragmatic language. The degree to which an intervention shows good social validity can have a significant impact on the long-term effect of the intervention because the child's significant others play an important role in generalising the effects in everyday contexts.

In our review, only five of the papers included investigated whether the findings generalised to settings other than that of the intervention (Adams et al., 2015; Boyer & Mundschenk 2014; Stanton-Chapman et al., 2008; Stanton-Chapman & Snell, 2011 and Stanton-Chapman et al., 2012). Lastly, most of the outcome measures used in studies on narrative skills relied on the retelling of a narrative with visual support, which only holds minimal resemblance to real-life language use. As mentioned earlier, personal narratives were not considered as an ingredient or an outcome measure in any of the interventions. These narratives should be given further consideration in future studies.

Our target group was children with DLD and therefore, we expected to find studies that included children that were diagnosed with some kind of pragmatic language impairment or disorder. However, this was not the case, perhaps due to the lack of standardised tools to assess pragmatic language disorder, but also due to the high complexity in operationalising oral pragmatic language. The inclusion criteria in the present study did not mention that the children participating in the study must be diagnosed with a social communication disorder based on the recent diagnostic criteria in DSM-5 or the typical characteristics of such impairments.

Despite this, we expected that some of the studies would have screened the children for pragmatic disorders according to (for example) DSM-5.

Strengths and limitations of the study

The effectiveness of interventions for children with DLD that target oral pragmatic language have rarely been evaluated (but see Jensen de López et al., 2022). So far, pragmatic impairment has mainly been investigated in relation to children with autism. In addition, SCDs are less frequently observed in systematic reviews, although they provide important data that are relevant for practitioners and can potentially describe individual differences better than reviews of large-scale group research. Systematic reviews are often restricted to evaluating effects with respect to the child without considering the importance of social validity, especially given that social validity contributes to the approval of the intervention by those offering services to the specific population. Some of the interventions included in the present review investigated changes related to variations in the language environment of the child and the classroom demands. For this reason, in addition to reporting on the effectiveness of the interventions with respect to the child, we also reported on the effectiveness of the intervention as perceived by the child's significant others.

While statistical differences reflect the variation across the population, the advantages of SCDs are that they offer a comparison of behaviour *within* an individual (or other unit) across different conditions, provide suggestions on identifying how much intervention is necessary, as well as highlight motivational factors that affect the results.

The evaluation of the dosage of the interventions in the present review is limited, since the total duration of the intervention in hours was unclear for six of the 11 included papers, while the period of the interventions for the rest of the papers ranged from 1-4 months¹². The effect of

these studies must be interpreted after considering the relatively low treatment intensity. Except for one study, all the included studies were carried out with English-speaking children, which limits the generalisation of our results to other languages and cultures.

SUMMARY AND RECOMMENDATIONS FOR THE FUTURE

The present study investigated the limited research available on SCD interventions targeting pragmatic language and illustrated the need for further research to inform clinical practice, special education, and teachers. Due to the broad nature of developmental pragmatics and the multifaceted profile by which pragmatic impairments are characterised, assessments may be complex and must therefore include a functional analysis to accurately reflect the contextuality in which any act of language use is embedded. On the positive side, several of the studies included provided interventions that were unfolded within contextualised language use, including peer interactions and play settings, which mirror the natural social setting for a young child's language development.

The results of the present systematic review, which included data from single-case designs on eight different interventions (from 11 different studies) for children with DLD that measured oral pragmatic language as an outcome variable, showed that, despite the great diversity across the interventions, there seems to be considerable agreement in applying prompting as the main ingredient used when aiming to improve conversation and narrative skills. Various prompting techniques were used including cueing, modelling, repetition, closing procedures, and so on, both alone and in combination with verbal cues (model, mands, and indirect instructions) and visual cues (pictures, icons, and gestures). Most of the interventions reviewed applied a least-to-most strategy, which aligns with a constructivist or social-interactionist theory that explains children's language acquisition. Regarding the effectiveness of the interventions, several of the interventions resulted in improvements in the children's prag-

¹² Axpe et al. (2012) described an intervention that consisted of three stages and was conducted over a duration of three and four months.

matic language abilities, and these interventions merit further testing in larger groups. To further improve the social validity of oral pragmatic language interventions, standardised reports by parents or teachers regarding their observations of positive changes should be an integrated tool for examining the generalisation of changes provided by the intervention.

Although some included papers suggest moderate changes in conversational and narrative skills, the evidence provided is weakened by the lack of ecological validity (in an intervention setting and outcome assessment), as well as the low to moderate quality of the studies.

The results from our systematic review contribute to understanding the mechanisms underlying interventions that provide changes in children's oral pragmatic language. For example, the use of visual prompts and icons in combination with verbal prompts to cue the child on how to provide a relevant response. The use of scripts and role play accompanied by discourse, prompting, and scaffolding to guide the child on how to respond and act in concrete verbal interactions were also reported as activities promoting pragmatic language development. Joint book reading, the use of mands, as well as the use of indirect and direct instructions in the context of narratives were activities that showed good feasibility.

Despite having gained substantial knowledge of the *Hows* and *Whys* in SCDs promoting pragmatic language development, it remains unclear which recommendations should be given to practitioners working with children with DLD and pragmatic language disorder. Furthermore, consistent with the conclusions drawn in the Gerber et al. (2012) review, there continues to be a lack

of agreement on how to operationalise pragmatic language, as well as insufficient knowledge of whether any gains observed are generalisable to settings outside the intervention. The need for further research focusing on how to promote the development of pragmatic skills in school-aged children with DLD remains significant, especially in order to inform clinical practice, teachers, and parents.

Future research and intervention studies targeting narrative skills should mirror the everyday use of narratives (e.g., personal narratives (see Westerveld et al. 2022)). Personal narratives require abilities within the broader umbrella of oral pragmatic language (e.g., theory of mind, referentiality, cohesion). However, none of the intervention studies conducted so far have included personal narratives as outcome measures in interventions for children with DLD.

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Figures and tables

Figure 1. PRISMA flowchart depicting literature search strategy

Figure 2. Critical appraisal of the quality of studies included

Table 1. Aspects of the studies included: design, participants, delivery, setting, tier, dosage, outcome measures, and effectiveness of the intervention

Table 2a. Elements evaluated in outcome measures of oral pragmatic language skills: conversation and narrative skills

Table 2b. Teaching techniques that support conversation skills

Table 2c. Teaching techniques that support narrative skills

Table 3. Prompting and modelling procedures used in the included interventions