

RESEARCH REPORT

A randomized study of parent- versus child-directed intervention for Dutch toddlers with DLD

Margo A. Zwitterlood-Nijenhuis¹  | Carin H. Wiefferink²  | Ellen Gerrits^{3,4} 

¹Pento Centre for Audiology Amersfoort, Department of Hearing, Speech and Language Disorders in Children, Amersfoort, the Netherlands

²Dutch Foundation for the Deaf and Hard of Hearing Child, Amsterdam, the Netherlands

³HU University of Applied Sciences Utrecht, Utrecht University, Utrecht, the Netherlands

⁴Institute for Language Sciences, Utrecht University, Utrecht, Utrecht, Netherlands

Correspondence

Margo A. Zwitterlood-Nijenhuis, Pento Centre for Audiology Amersfoort, Department of Hearing, Speech and Language Disorders in Children, Zangvogelweg 150, Amersfoort, 3815 DP, the Netherlands.
Email: m.zwitterlood@pento.nl

Funding information

SIAC, Grant/Award Number: SIAC grant dated 09-16-2014

ABSTRACT

Background: Indirect speech and language therapy, such as parent-implemented intervention, has been shown to be an effective approach for young children with speech and language disorders. However, relatively few studies have compared outcomes of parent-directed therapy with child-directed intervention, that is, individual therapy of a child delivered by a speech and language therapist (SLT). Although speech and language therapists (SLTs) regard parental engagement as imperative for successful intervention, currently they predominantly use child-directed intervention.

Aim: To evaluate the effect of parent- versus child-directed speech–language therapy embedded in usual care intervention for young children with developmental language disorder (DLD).

Methods & Procedures: In a randomized trial, forty-six 3-year-old monolingual children with DLD were assigned to parent-directed intervention or child-directed intervention groups. In addition, all children received usual care in special-language daycare centres. Outcomes included children's language development and functional communication, parents' language output, parents' perceptions and their self-efficacy. These were assessed at three time intervals, that is, at baseline, immediately after 6 months of treatment, and 1 year after baseline. The parent-directed intervention consisted of twelve 50-min sessions every 2 weeks with parent and child, consisting of parental training with immediate feedback by (SLTs). Children in the child-directed intervention group received individual speech–language therapy in weekly 30-min sessions for 6 months.

Outcomes & Results: Intervention in both groups was equally effective. All children improved significantly in receptive and expressive language measures as well as in functional communication at all intervals. All parents used significantly more language support strategies and were less concerned about their child's participation in communication. Parents in the parent-directed intervention group reported increased self-efficacy in stimulating their child's language development. In contrast, parents in the child-directed intervention group reported a decrease in self-efficacy. Though modest, these group differences were significant in both the short and long terms. Both parents and SLTs were positive about the parent-directed intervention.

Conclusions & Implications: The effects of parent- and child-directed intervention for young children with DLD are similar. The parent-directed intervention adds to treatment options for parents as well as for SLTs and creates choices for shared decision-making.

KEYWORDS

child-directed intervention, comparison, DLD, parent-directed intervention

WHAT THIS PAPER ADDS

What is already known on the subject

Language therapy for young children with DLD comprises various delivery models. Two of these are child- and parent-directed therapy by SLTs. Compared with no treatment, both delivery models are effective, but it is unclear if one of these results in better language outcomes than the other. SLTs value child-directed intervention more highly than indirect approaches where treatment is delivered by others. This study aims to compare the relative effectiveness of parent-directed intervention with child-directed intervention, both parts of multi-component usual care intervention.

What this paper adds to existing knowledge

This randomized trial indicates that a parent-directed intervention model is as effective as child-directed intervention by SLTs for children's language development and functional communication. Parents' use of language support strategies was also similar in both intervention models, in the short and long terms. Like in child-directed therapy, parent-directed intervention reduces parents' concerns. Contrary to child-directed treatment, parent-directed intervention increases parents' self-efficacy, that is, supporting their child's language development.

What are the potential or actual clinical implications of this work?

Though SLTs predominantly choose a child-directed intervention model, the study results show that they can consider parent-directed approaches too. There are no significant differences in children's language outcomes as a function of parent- or child-directed intervention. Furthermore, parents and SLTs were positive about the parent-directed intervention program and the SLTs evaluated it as valuable and feasible.

INTRODUCTION

Children with developmental language disorder (DLD) have difficulties learning the linguistic rules from their language input, which may result in unintelligibility, a small vocabulary, poor grammatical development, limited narrative skills and/or difficulties in understanding spoken language. DLD increases the risk of limited everyday communication, poor educational attainment and impoverished social relationships (e.g., Bishop et al., 2017).

Speech and language therapy for children with DLD is provided by speech and language therapists (SLTs).

The most commonly used service delivery models are direct intervention, where an SLT works individually with the children, and indirect intervention, where SLTs train parents, teachers or others to support the child using language-stimulating strategies (McKean et al., 2019).

The effectiveness of *child-directed intervention* for children with DLD, including preschool-age, has recently been reported in a systematic review (Rinaldi et al., 2021). Rinaldi et al. (2021) reported that, compared with no treatment, the child-directed intervention was effective for expressive language, specifically for phonology and vocabulary. However, the results of interventions for



receptive language, that is, phonology or syntax, as well as for general language skills were inconclusive. Rinaldi et al. found some evidence that intervention aimed at improving expressive morphosyntax was effective. Additionally, they found promising results on interventions for meta-phonological and narrative skills.

The effectiveness of *parent-directed intervention* has been evaluated in three meta-analyses (Heidlage et al., 2020; Lawler et al., 2013; Roberts & Kaiser, 2011). In general, the meta-analyses showed improvement in children's expressive vocabulary and expressive language while effects on receptive language outcomes are mixed.

Most of the current evidence comes from studies comparing either parent- or child-directed intervention with no treatment (or delayed treatment) groups. Only a few studies have compared the relative effect of parent-directed intervention versus child-directed speech-language therapy (Baxendale & Hesketh, 2003; Fey et al., 1993; Gibbard, 1994; Law et al., 1999; Lawler et al., 2013; Van Balkom et al., 2010). Such a comparison is important because SLTs tend to value child-directed intervention more than therapy delivered by others (Law, 2019). A recent survey among SLTs in Europe shows that they predominantly (70%) use child-directed intervention (McKean et al., 2019). Still, as children receive considerably more language input from their parents at home than during child-directed therapy sessions, improving parents' language support skills in therapy seems obvious. The parent-directed intervention also resonates with the increased recognition of the importance of parent participation in speech and language therapy of young children. Though SLTs consider parent engagement a key factor to therapy success (Klatte & Roulstone, 2016; Watts Pappas & McLeod, 2009), they experience difficulties in creating effective collaboration (Davies, 2019).

However, studies that investigated the relative effects of parent- and child-directed therapy report mixed results: children's language outcomes vary between no significant differences (Baxendale & Hesketh, 2003; Gibbard, 1994; Law et al., 1999; Lawler et al., 2013), equal effects of both intervention models though more consistent grammatical improvement in the child-directed intervention (Fey et al., 1993), and significant differences in favour of parent-directed intervention for children's grammatical development and conversational coherence (Van Balkom et al., 2010). However, the comparison between these studies is approximate due to different outcomes and measures. The results on measures of parent outcomes are also mixed: no significant differences (Baxendale & Hesketh, 2003) or positive effects of the parent-directed intervention, such as significantly higher parent rating of the child's behaviour, of parents' own sense of self-esteem, and of their positivity towards their child (Law et al., 1999). Only

two studies report the child as well as parent outcomes (Baxendale & Hesketh, 2003; Law et al., 1999) and only three studies monitored long-term effects (Baxendale & Hesketh, 2003; Law et al., 1999; Van Balkom et al., 2010). Most studies have some methodological weaknesses such as small samples of children (ranging from 22 to 38 in total), no randomization, and different treatment intensity between groups (Fey et al., 1993; Gibbard, 1994; Van Balkom et al., 2010; Baxendale & Hesketh, 2003; Law et al., 1999).

To underpin choices in therapy and support the implementation of parent-directed therapy, more research comparing these two intervention models is needed. The present study investigated the effectiveness of parent- versus child-directed intervention within Dutch routine clinical practice. According to Dutch DLD guidelines (Dutch Association for Speech and Language Therapy, 2018), a diagnosis of 'presumed DLD' is limited to young children below the age of 3 years to distinguish them from late talkers, children with insufficient language exposure, and children with language delays caused by other conditions. Only children older than 3 years are diagnosed with DLD. Routine clinical practice for young children with (presumed) DLD consists of multi-component therapy in special-language daycare centres, for example, group therapy and individual speech-language therapy for children, and parent group meetings. For a period of 6 months, we changed one component, child-directed intervention, into parent-directed intervention. In addition, we wanted to use a broad range of outcome data, including measures of functional language of the children, parents' use of trained techniques and parents' perspective on the language disorder and their own capability in helping their child. We also wanted to conduct a long-term follow up in addition to baseline and immediate post-intervention measures.

Therapy outcome measures: Children's language and parents' language support strategies, parents' perceptions and their self-efficacy

Common child language outcomes in DLD intervention studies are standardized scores on language tests. Additionally, language is measured in samples of spontaneous language (e.g., Bishop et al., 2016). Parent outcome measures are, if not lacking, parent's use of language support strategies (Roberts & Kaiser, 2011). Examples of these language support strategies are expansions and recasts. Expansions are adults' imitations of a child utterance with one or more added words. In a recast, parents imitate their child's utterance with corrected word order or improved pronunciation. In Roberts and Kaiser (2011),

10 out of the 18 studies measured parent's use of language support strategies. Results indicated that, compared with no treatment, parent-directed intervention had a positive effect on parents' responsiveness and their use of language models. Heidlage et al. (2020) also found improvement in five studies measuring parents' responsiveness but not for the use of language models. Two recent studies (Kruythoff-Broekman et al., 2019; Roberts & Kaiser, 2015), not included in Heidlage et al., corroborate the results found in both meta-analyses: their results indicate that parents in the parent intervention group improved in their use of language facilitation strategies. Additionally, in Kruythoff-Broekman et al. (2019) children's gains in expressive vocabulary and syntax were associated with a decrease of parents' use of testing questions. Summarizing, the results of these studies seem promising in showing changes in parent's use of language support strategies, but not all studies measure both children's and parent's outcomes and results are inconclusive.

Miscommunication easily leads to frustration and feelings of failure for both children with DLD and their parents. Parents may experience feelings of incapability or even failure in supporting their child's language development (self-efficacy) (Selin et al., 2018). Moreover, parents may differ in the extent to which they perceive the severity of their child's language disorder and the concerns they have about the language development of their child. These perceptions may influence parental involvement in therapy, and indirectly, their child's language outcomes. SLTs can play an important role in engaging parents in their child's development by addressing their concerns and feelings of insecurity and by helping to empower them (Klatte et al., 2019). Therefore, we wanted to include parents' perceptions as an outcome in our study.

The aim of this study is to strengthen the evidence on the effectiveness of parent-directed therapy in comparison with child-directed therapy by answering the following three research questions:

- Is there a difference in children's language development between the child- and the parent-directed intervention groups?
- Is there a difference in parents' use of language support strategies, parents' perceptions and self-efficacy between the child- and parent-directed intervention groups?
- What is the long-term effect at 6 months follow-up?

The study was performed within Dutch usual care for young children with (presumed) DLD. All children attended special-language daycare centres for children

with language disorders. These centres deliver multi-component intervention, that is, group intervention for children consisting, at a minimum, of daily routines, educational play and intentional language stimulation. Intervention also consists of individual therapy by an SLT that is tailored to the needs of the children, and of parent group meetings. Treatment plans are developed by a multidisciplinary team with an SLT and, amongst others, a pedagogical assistant and a psychologist. For a period of 6 months we changed one of the components of this intervention in our parent-intervention group: individual child-directed therapy was replaced by individual parent-directed therapy (see the Methods section).

METHODS

Participants

Participants were 46 young children with DLD and their parents. The children were recruited via eight special-language daycare centres for children with DLD located in urban as well as rural regions of the Netherlands. To be admitted to the special-language daycare centres, all children go through the same standardized multidisciplinary diagnostic process at speech and hearing centres (Wiefkerink et al., 2020). This means that children with hearing loss and/or other biomedical conditions are not admitted to the special-language daycare centres.

Inclusion criteria for children were language scores 1.5 SD below average, non-verbal IQ of at least 70, no hearing loss and no other biomedical condition. Standardized tests were used to assess language development and non-verbal IQ. Language development was assessed with the Schlichting Receptive Language Test and Schlichting Expressive Language Test (Schlichting & Lutje Spelberg, 2010a, 2010b); non-verbal IQ was assessed with a Dutch non-verbal intelligence test, the SON-R (Tellegen et al., 2005). In addition to these child criteria, we used parent criteria; parents were included if they were monolingual Dutch and had no self-reported severe psychiatric disorders or drug addiction.

To achieve a power of 0.8 ($p = 0.05$) and an effect size of 0.8, the total number of participants required for each treatment group was computed using a sample size calculator (G*Power 3.1.4 software; Faul et al., 2007). This resulted in an estimated sample size of at least 19 children (i.e., 9.5 for each treatment arm).

This study was approved by the Medical Research Ethics Committee of the UMC Utrecht (reference number WAG/mb/18/039199).

Design

We conducted a randomized trial in which we compared the effect of 6 months parent-directed intervention with child-directed intervention at three intervals: pre-test (T0), immediate post-test (T1), and a follow-up test 6 months after the post-test (T2). In the parent-directed intervention group, the parents of the children received training by the SLT; in the child-directed intervention group children received individual therapy by the SLT. All children also received multicomponent and multidisciplinary usual care intervention. Outcome data were collected by SLTs and the first author M.Z. Contrary to the SLTs, M.Z. was blinded to the treatment arm children were assigned to. SLTs and parents could not be blinded to the intervention arms.

Randomization

Children were randomized by author C.W. to either the parent- or the child-directed intervention group with a computerized randomization program. We used a stratified randomization method, meaning that participants are subdivided into strata on daycare centre level. Randomization took place within daycare centres in order to control for differences in treatment between daycare centres. Participants were equally distributed over the two groups: 23 in each group, 20 boys and three girls.

Between T0 and T1, all 46 participants received treatment in the daycare centres. After T1, all but three children continued to have treatment. Most children continued to receive therapy in the special daycare centres or went to special education when they turned 4 years old (respectively 12 children in the parent-directed and 13 in the child-directed group). Others went to mainstream education and received therapy after school time in SLT practices (respectively 6 and 5 children) (Figure 1).

Child- versus parent-directed intervention

Child-directed intervention

Agent

Individual child-directed intervention by the SLT without parents is a component of usual care in the daycare centres.

Techniques

The child-directed intervention consists of treatment with goals for language tailored to children's specific communicative needs and diagnosis of DLD. SLTs choose effective intervention approaches such as Language in Interaction Therapy (Bruinsma et al., 2020), characterized by focused stimulation–modelling–recasting, vocabulary

intervention with principles from the Hanen Program (Pepper & Weitzman, 2004), or the Cycles Phonological Remediation Approach (e.g., Hodson & Paden, 1991).

Frequency

Duration of weekly child-directed treatment sessions is about 30 min face to face with the child.

Parent-directed intervention

Agent

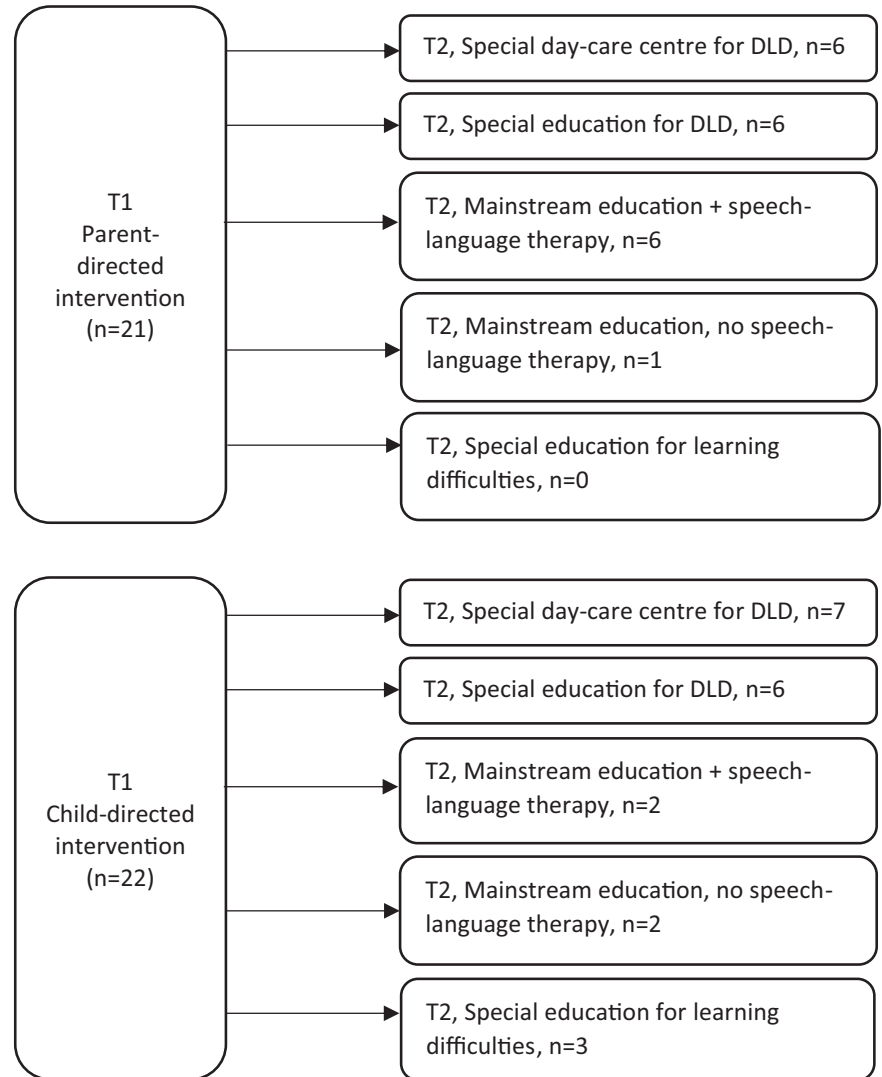
In the parent-directed intervention group, the SLT taught parents language support strategies. For each child one parent was invited to participate in parent-directed therapy. Parents were expected to exchange information about the language support strategies and their experiences. For an insignificant number of children both parents participated in therapy, meaning parents alternated therapy session participation.

Techniques

For the parent-directed intervention, we used an existing training program, ImPACT (Ingersoll & Dvortcsak, 2010, 2013), developed for young children with Autism. ImPACT fits in a family-friendly model of practice (Watts Pappas & McLeod, 2009) where SLTs support parents to be involved in intervention provision and planning while they use their expertise to guide the intervention process. Several studies have shown that ImPACT has a positive effect on communication skills of children with autism as well as on their parent's language support skills and their sense of competence, a measure of self-efficacy (Ingersoll & Wainer, 2013; Ingersoll et al., 2016; Stadnick et al., 2015). The ImPACT program aims at teaching parents' language support strategies using modelling and feedback. We adapted the program to the specific communicative and developmental needs of children with DLD by: (1) omitting sessions aimed at improving play skills, (2) adding exercises to improve phonology and (auditory) attention for children with limited intelligibility, and (3) doubling the time between two sessions, because of practical reasons, that is, a feasible frequency for parents to feel confident about their newly learned language support skills, and also to fit in parents' and SLTs' agenda's.

Language support strategies were divided into: (1) interactive language support strategies aimed at increasing parents' responsiveness, and (2) direct language support strategies aimed at teaching children new language skills by using prompts and reinforcement. An example of the first is 'Follow the child's lead' where the parent is taught to comment on materials and actions, and not ask questions. The cloze procedure in 'Teaching your child expressive language' is an example of the second. In this procedure the

FIGURE 1 Flowchart of usual care intervention between T1 (immediate post-test) and T2 (6 months post-test T2)



parent leaves off the last part of a sentence and stimulates the child to add the missing word.

The SLTs received a manual consisting of protocolled therapy activities for each language support strategy. According to this manual, the SLT chooses the language support strategies and the order in which they are practised. The order of sessions is not strictly fixed. Parents learn all different language support strategies in the program. However, if they use a certain strategy spontaneously and skilfully, the SLT only makes them aware of their behaviour. First, parents learn the interactive language support strategies. These techniques set the foundation for the techniques taught later on. Once skilled users, parents learn the direct language support strategies. Direct language support strategies are more demanding, that is, they challenge children's language output. Therefore, parents must be skilled enough to maintain children's motivation during interaction and to keep communication flowing. The parents received a manual with information on all language support strategies. Every treatment session started with a discussion of homework and parents' ques-

tions. The next 5 min of every session, the SLT modelled language support strategies with the child while parents observed. The next 20–25 min, parents practised these strategies while playing with their child. The SLT gave parents direct feedback on their use of these strategies and their influence on their child's communication. Finally, SLTs and parents discussed when and how to practice strategies in daily routines at home.

Frequency

Duration of parent-directed intervention sessions is about 50 min face to face with parents and their child once every 2 weeks.

Usual care intervention in special-language daycare centres

All participants in this study, that is, children and parents in both trial arms, received usual care multicomponent intervention with individual speech–language therapy for

the children alongside group intervention for children and parent group meetings. Treatment in specialized daycare centres is delivered by a multidisciplinary team with a psychologist, SLT and pedagogical assistants. Children visit the centres 2 or 3 days a week. The number of children in groups varies between 6 and 10. Treatment for the children consists of group activities with pedagogical assistants using language support strategies, and child-directed intervention by the SLT. Treatment targets for children are guided by typical development and children's zone of proximal development (Vygotsky, 1978). In the group intervention, mealtimes and playtime alternates with protocolled vocabulary intervention, singing and interactive book reading. Three types of activities are distinguished: (1) daily routines, such as welcoming, eating and drinking, (2) educational play and (3) intentional language stimulation in singing and picture-book reading. During these activities, children's language development is stimulated by repetition of target words and target sentence structures and principles from the Hanen Program (Pepper & Weitzman, 2004).

Parents are offered psychoeducation group meetings in which they are informed about language development, parents' role in their child's language development, management of behavioural and social-emotional developmental problems. At these meetings, parents share problems and discuss experiences with their children.

Outcome measures

Primary outcomes for children were gains in receptive language and expressive speech and language. Primary outcome measures for parents were parents' responsiveness, language models and communication rate, and secondary outcomes were their perceptions and self-efficacy.

Primary outcome measures:

- *Standardized language tests:* Children were tested with the Schlichting Receptive and Expressive Language Test (Schlichting & Lutje Spelberg, 2010a, 2010b) with subtests for sentence production and expressive vocabulary. For receptive vocabulary we used the Dutch version of the Peabody Picture Vocabulary Test (Dunn & Dunn, 2005). These tests have normed scores for children aged 2–7 years based on a representative sample of Dutch children. All tests have good construct validity. The standardized *Q*-scores have a mean of 100 (SD = 15; normal range = 86–114).
- *Spontaneous language sampling children:* We measured children's grammatical development (mean length of utterance in words—MLU) and speech sound production (percentage correct consonants—PCC) in sponta-

neous language. We recorded spontaneous language with a video of parent–child interaction. The first 5 min of these recordings were not used for analysis. An utterance was eligible when it was not unintelligible, incomplete or ambiguous. Minors (i.e., yes, no, hi, well, look, daddy), second word/utterance repetitions and utterances that reflected rote learning (e.g., nursery rhymes) were excluded. The first 100 utterances of the child and all utterances of the parent were manually transcribed and analysed. As a transcription tool, we used CHAT (CHILDES; MacWhinney, 2000). Analysis was done using CLAN (CHILDES; MacWhinney, 2000). We measured children's speech sound production in PCC (Shriberg & Kwiatkowski, 1982a, 1982b). Children's grammatical development (i.e., morphosyntactic complexity) was measured in MLU.

- *Spontaneous language sampling parents:* Following Baxendale and Hesketh's (2003) procedure, we measured parents' responsiveness and their language model. We counted parents' total number of utterances and their utterances in interaction with their child, and we labelled the latter as Questions, Recasts or Comments, that is, their use of language support strategies. Questions were utterances preceding child utterances which are a request for information; Recasts, that is, imitations of (part of) the child utterance in the same or (slightly) different word order; Comments, that is, all other utterances preceding child utterances. We also measured parents' MLU to assess parents' language model. Finally, we measured parents' communication rate, that is, their number of utterances compared with their children's.

Secondary outcome measures

Questionnaire parent perceptions: Parents answered three questions addressing (1) their perception of the severity of their child's functional communication problems (Severity), (2) their concerns about the language development of their child (Concerns) and (3) the extent to which they feel capable (Self-efficacy) in supporting the language development of their child. Parents answered these questions on a 10 cm visual analogue scale (VAS) scale ranging from respectively not serious/no concerns/not capable to very serious/extreme concerns/completely capable.

Measurement procedure

All children were assessed at baseline (T0), immediately after treatment (T1), and at 6 months follow-up (T2).

Language testing: Data at T0 and T1 were collected by the children's own SLTs in the special daycare centres.

At T2, data were also collected by SLTs outside the centre because two-thirds of the participants had reached the age of 4 and therefore had left the special daycare centres and had entered school. Over 90% continued to have speech–language treatment either in their new school, or in a SLT practice. The few children who no longer received language therapy travelled to the daycare centre one extra time for a T2 test session. At every measurement, some children were incapable of completing the whole language test (see the Results section). Causes were lack of concentration, insufficient understanding of tasks, or unwillingness to cooperate.

Spontaneous language sampling: Trained interns, Dutch students in the fourth year of their bachelor's study in speech–language therapy, recorded videos with parents and children in the SLT playroom in the special daycare centre (T0 and T1). They followed a video protocol that ensured a language sample with sufficient child utterances that represented the child's language and speech capacities. At T2, videos were recorded at the child's home where parents were instructed to play with their child. The intern asked parents' and SLTs' opinion about the representability of the language sample for the child's daily communication skills. If not representative, an additional 10 min recording was made with a maximum total duration of 30 min. For some children with limited vocabulary or very quiet children, samples included fewer than 100 utterances. However, if representative for their language skills we included these samples. For some children we could not obtain a reliable sample of spontaneous language. Causes were limited language, a small amount of communication attempts or unintelligibility.

Transcription and analysis of language samples was performed by four research assistants, who were blinded to the intervention groups. They were trained in the use of CHAT and CLAN (CHILDES; MacWhinney, 2000). Author M.Z. checked six 100-utterance transcriptions resulting in 75–80% agreement between the research assistants and M.Z.

Questionnaires: Parents completed the questionnaire at T0, T1 and T2.

Treatment quality procedure parent-directed intervention

Treatment was delivered by seven SLTs with a four-year bachelor's degree in speech–language therapy and were qualified to work with preschool-age children with DLD in the daycare centres. All but one SLT (6 years' experience) had been working for 15 years or more with children with DLD. Treatment quality for the parent-directed intervention program was monitored by first author M.Z. (SLT, MSc Clinical Language, Speech and Hearing Sciences, experi-

TABLE 1 Descriptives, participants' gender and diagnosis of DLD in the parent- versus child-directed intervention group

	Parent-directed intervention	Child-directed intervention
Gender: Girls/boys	3/20	3/20
Expressive DLD	11	10
Receptive + expressive DLD	12	13

ence with DLD over 30 years and trained in delivering the IMPACT program) who trained SLTs in the treatment protocol. The training was supported with video examples of all language support strategies. During the intervention period, four meetings were organized with the seven SLTs to ensure consistent treatment delivery and to support SLTs in their feedback and coaching skills. All SLTs attended the meetings where they presented case stories. Experiences and difficulties in specific sessions were discussed. In between meetings, author M.Z. contacted the SLTs regularly to monitor if they worked according to protocol, to answer questions, to discuss the parent-directed intervention program and specific sessions of the children.

Statistical methods

We used IBM SPSS Statistics 22 for analysis of Group and Time differences. We used a mixed design with time within subjects (main effect) and group between subjects (interaction effect) with analysis of variance (ANOVA) for repeated measures. The effect size of the treatment conditions on the outcome measures over time was investigated using partial η^2 .

RESULTS

From September 2015 to February 2017, we included 46 children (Table 1 and Figure 2).

Of the 46 participants, four in the parent-directed and three in child-directed intervention withdrew from the study; the reasons for withdrawal were not registered. The data for these children were included in the statistical analysis (intention to treat). By doing so, the effect of the intervention in the general population is reflected because clients do drop out from care in daily practice (Curran et al, 2015). Shortly after inclusion, two of the children in the parent-directed intervention group were referred to other healthcare institutions because of the need for additional therapy for general developmental problems. These two children were excluded from the analysis.

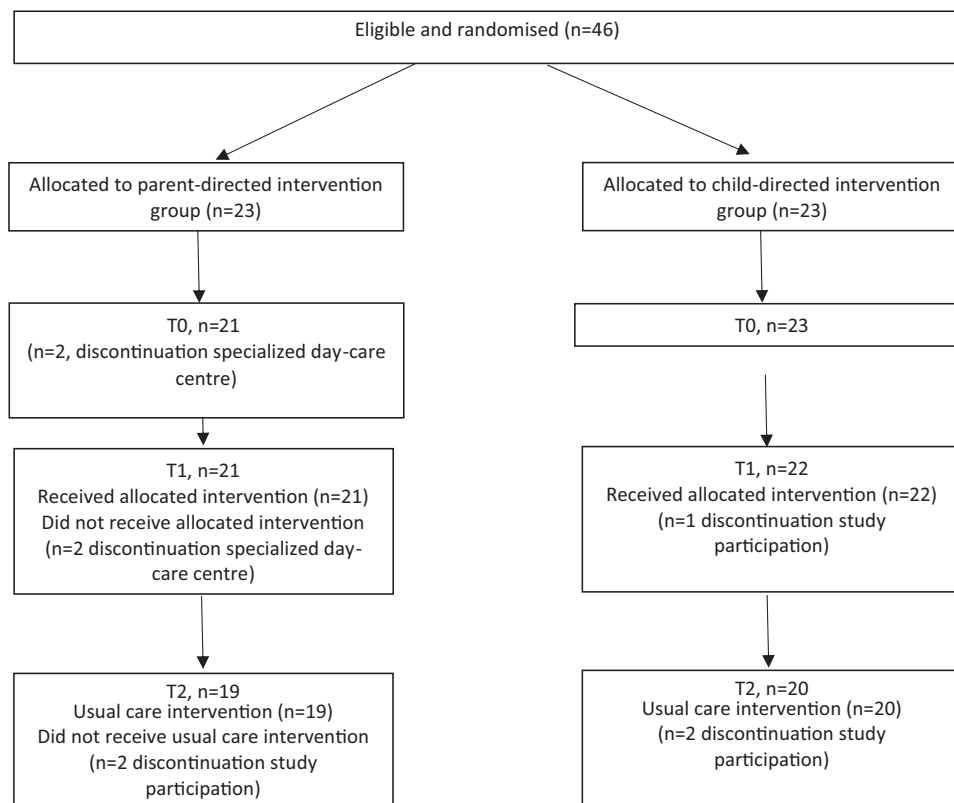


FIGURE 2 Flowchart randomization

At baseline, there were no significant differences between groups for any of the outcome measures including parents' education level. Most children (72%) had an expressive language disorder; 18% had mixed receptive and expressive language disorder. At T1, all but one child in the parent-directed intervention group completed 12 therapy sessions. The parents of this child received 11 therapy sessions.

There were missing data of primary outcomes at every measurement caused by a variety of reasons. Therefore, the number of participants varies per outcome variable with a maximum of eight missing (Receptive vocabulary, intervention group at T2). Missing data were equally spread over both groups. The pattern of missing data was examined by using the Little MCAR test, which indicated that data were missing completely at random. Single imputation was used to impute the missing Q -scores on the language pre- and post-tests. The results of analyses on the imputed dataset were the same as with the not-imputed dataset. We present the not-imputed data.

Children's language outcomes

Results of measurements at T0, T1, and T2 for children are shown in Table 2.

There were no group differences in any of children's outcome measures. Language scores in both groups improved equally. There were no interaction effects between intervention group and language gains. However, there was a main effect for Time for receptive language and receptive vocabulary (respectively $F(2, 30) = 5, 27, p = 0.011$; $F(2, 22) = 5, 34, p = 0.013$), for sentence production and expressive vocabulary (respectively $F(2, 26) = 8, 76, p < 0.001$; $F(2, 28) = 18, 71, p < 0.001$), MLU ($F(2, 24) = 41, 59, p < 0.001$) and PCC ($F(2, 24) = 24, 71, p < 0.001$). Post-hoc tests showed that receptive language and receptive vocabulary improved between T0 and T1 (effect sizes $\eta_p^2 = 0.248$ and 0.309 , respectively) and stabilized between T1 and T2. Post-hoc tests showed that children's language production scores improved significantly at T1 as well as at T2. The effect sizes for expressive vocabulary at T1 and T2 were $\eta_p^2 = 0.465$ and 0.298 , respectively. The effect sizes for sentence production at T1 and T2 were $\eta_p^2 = 0.306$ and 0.155 , respectively. The mean group PCC's and MLU's improved significantly and post-hoc tests showed significant improvement at T1 as well as at T2. The effect sizes for MLU in T0–T1 and T1–T2 were $\eta_p^2 = 0.630$ and 0.371 , respectively. The effect sizes for PCC at T1 and T2 were $\eta_p^2 = 0.372$ and 0.345 , respectively.

TABLE 2 Comparison of mean (SD) age and language scores of children receiving parent- versus child-directed intervention at three time intervals (pre-test T0, immediate post-test T1, and 6 months post-test T2)

	Parent-directed intervention			Child-directed intervention		
	T0	T1	T2	T0	T1	T2
Mean (SD) age (months)	40 (3.7)	46 (0.9)	52 (1.0)	39 (3.7)	46 (0.9)	52 (1.0)
Range, min–max	33–46	40–52	45–58	32–44	39–52	44–57
<i>Language tests standardized quotient scores (SD), number of participants^a</i>						
Receptive language	87 (13), <i>n</i> = 22	93 (12), <i>n</i> = 20	92 (12), <i>n</i> = 15	88 (11), <i>n</i> = 22	90 (8), <i>n</i> = 21	91 (9), <i>n</i> = 18
Receptive vocabulary	90 (15), <i>n</i> = 20	100 (15), <i>n</i> = 18	100 (13), <i>n</i> = 11	92 (9), <i>n</i> = 19	96 (9), <i>n</i> = 17	96 (13), <i>n</i> = 14
Expressive vocabulary	77 (17), <i>n</i> = 21	90 (18), <i>n</i> = 19	95 (19), <i>n</i> = 14	74 (16), <i>n</i> = 20	86 (17), <i>n</i> = 19	96 (16), <i>n</i> = 17
Sentence production	75 (9), <i>n</i> = 21	81 (8), <i>n</i> = 17	82 (9), <i>n</i> = 13	73 (10), <i>n</i> = 18	75 (9), <i>n</i> = 17	80 (8), <i>n</i> = 16
<i>Spontaneous language</i>						
Number of participants	19	17	13	22	19	14
Mean length of utterance in words, MLU (SD)	1.7 (0.45)	2.5 (0.55)	2.8 (0.60)	1.5 (0.38)	2.1 (0.75)	2.6 (0.64)
Percentage consonants correct, PCC (SD)	65 (9)	74 (9)	81 (11)	61 (11)	69 (11)	75 (12)

Note: ^aMean language test scores in quotients (SD), scores between -1 SD and $+1$ SD are considered within the average range, that is, quotient between 86 and 114.

TABLE 3 Comparison of parents' mean (SD) mean length of utterance (MLU), number of utterances and language support strategies in the parent- versus child-directed intervention group at three time intervals (pre-test T0, immediate post-test T1, and 6 months post-test T2)

	Parent-directed intervention			Child-directed intervention		
	T0	T1	T2	T0	T1	T2
Number of participants	19	17	13	22	19	14
Mean length of utterance in words, MLU (SD)	3.8 (0.5)	3.9 (0.7)	4.0 (0.4)	3.8 (0.4)	4.0 (0.4)	4.1 (0.4)
Total number of parent utterances ^a (SD)	298 (69)	190 (40)	154 (45)	316 (150)	229 (104)	173 (72)
Number of parent utterances preceded by child utterances (SD)	261 (66)	167 (39)	130 (44)	280 (138)	201 (88)	178 (110)
<i>Number of language support strategies (%)</i>						
Comments (SD) ^a	166 (56%)	108 (57%)	91 (57%)	186 (58%)	129 (56%)	105 (61%)
Questions (SD) ^a	109 (36%)	60 (31%)	44 (30%)	113 (36%)	79 (35%)	54 (30%)
Recasts (SD)	22 (8%)	22 (12%)	19 (13%)	17 (6%)	21 (9%)	15 (9%)

Note: ^aMain effect of time for all participants, T0 and T1 comparison significant and/or T1 and T2 comparison significant at $p < 0.05$. No significant differences between groups.

Parent's language outcomes

There were no group differences in parent's language outcomes at any measurement. Measures of parent's spontaneous language are shown in Table 3 and Figures 4 and 5. There was a main effect for Time for number of utterances ($F(2, 24) = 13.92, p < 0.001$), comments and questions (respectively $F(2, 24) = 13.7, p < 0.001$ and $F(2, 24) = 31.8, p < 0.001$). Post-hoc tests showed that parents reduced their number of utterances, comments and questions significantly at T1 as well as at T2 with effect sizes respectively $\eta_p^2 = 0.561$ and $\eta_p^2 = 0.408$ (utterances), $\eta_p^2 = 0.533$ and $\eta_p^2 = 0.202$ (comments) and $\eta_p^2 = 0.454$ and $\eta_p^2 = 0.488$ (ques-

tions). There was also a main effect for Time for percentage of recasts ($F(2, 24) = 5.95, p < 0.008$). Parents in both groups significantly increased the percentage of recasts. Post-hoc tests showed a significant increase at T1 but not at T2 with effect size $\eta_p^2 = 0.275$ for T1.

In other words, all parents changed the amount of language output over time (number of utterances, comments) and improved their language support strategies, that is, reduced their number of questions and increased their percentage of recasts. However, the balance between comments, questions and recasts in percentages of parent's total language output, remains more or less the same over

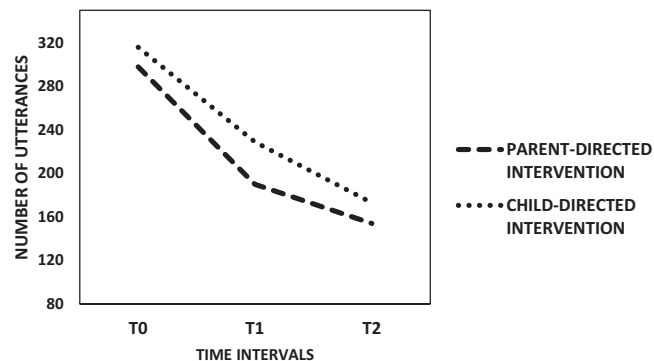


FIGURE 3 Parents' number of utterances in the parent- versus child-directed intervention group at three time intervals (pre-test T0, immediate post-test T1, and 6 months post-test T2)

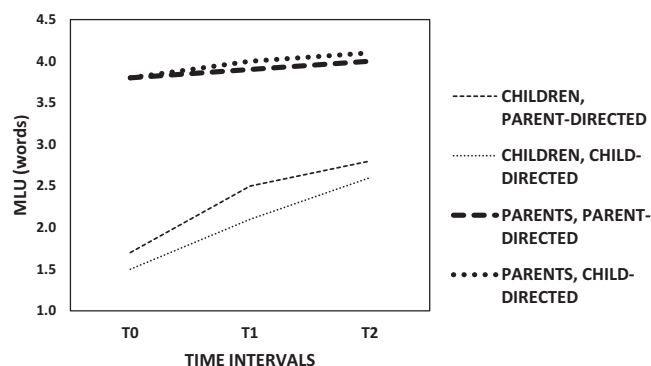


FIGURE 4 Mean length of utterance in words (MLU) of parents and children (thin dots-en-dashes) in the parent- versus child-directed intervention group at three time intervals (pre-test T0, immediate post-test T1, and 6 months post-test T2).

time, that is, 57.5% comments, 33% questions and 9.5% recasts on average.

At baseline, parent's communication rate, that is, their number of utterances compared with their children's, was three times higher (Table 3 and Figure 3). Over time, their communication rate changed from 3:1 (parents:children) to 2:1 at T1 to 1.6:1 at T2. While there was significant improvement of children's MLU, the MLU of their parents did not change (children's MLU in Figure 4, parent's MLU in Table 3 and Figure 4).

Parents' perceptions and self-efficacy

Table 4 shows scores of parental perceptions concerning their child's language disorder at T0, T1, and T2.

Main effects were found for parental perception on Severity ($F(2, 24) = 15.36, p < 0.001; \eta_p^2 = 0.406$ for T0–T1 and 0.152 for T1–T2) and Concerns ($F(2, 24) = 13.59, p < 0.001; \eta_p^2 = 0.470$ for T0–T1). Parental perception on the

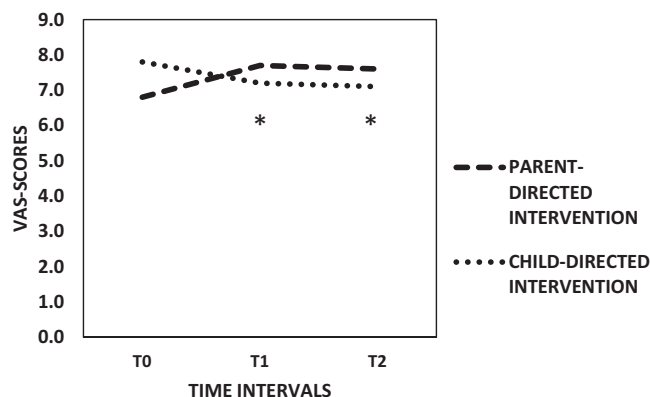


FIGURE 5 Mean VAS scores for parents' self-efficacy in the parent- versus child-directed intervention group at three time intervals (pre-test T0, immediate post-test T1, and 6 months post-test T2). Note: *Significant group difference ($p < 0.05$)

severity of their child's reduced functional communication and their concerns about their child's language difficulties decreased significantly. There were no interaction effects, meaning that both outcomes decreased equally in both groups.

We did find an interaction effect for self-efficacy ($F(2, 26) = 4.94; p = 0.016; \eta_p^2 = 0.254$), meaning that parents in the parent-directed intervention perceived an increase in their capability to support their child's language development at T1, whereas parents in the child-directed intervention felt less capable. At T2, parents' self-efficacy did not change compared with T1 (Table 3 and Figure 5).

DISCUSSION

In this study we compared the effectiveness of parent-directed therapy with child-directed intervention for young children with DLD receiving usual care intervention in special-language daycare centres in the Netherlands. Children's language improved equally in both intervention conditions immediately post-intervention and at follow-up. In both intervention conditions parents' language support behaviour and their perceptions changed equally. The only difference we found was in parents' self-efficacy that improved in the parent-directed intervention group, but decreased in the child-directed intervention group. Though small, this group difference was also found at follow-up.

The similar gains in children's language outcomes in our two intervention conditions are in accordance with the findings of Fey et al. (1993), Gibbard (1994), Law et al. (1999), Baxendale and Hesketh (2003) and Lawler et al. (2013) and partly match Van Balkom et al. (2010). The equal progress in speech sound production corroborates

TABLE 4 Comparison of parents' mean (SD) perceptions and self-efficacy in the parent- versus child-directed intervention group at three time intervals (pre-test T0, immediate post-test T1, and 6 months post-test T2)

	Parent-directed intervention			Child-directed intervention		
	T0	T1	T2	T0	T1	T2
Number of responses	<i>N</i> = 20	<i>N</i> = 18	<i>N</i> = 14	<i>N</i> = 22	<i>N</i> = 20	<i>N</i> = 15
Missing	<i>N</i> = 3	<i>N</i> = 2	<i>N</i> = 1	<i>N</i> = 0	<i>N</i> = 1	<i>N</i> = 3
<i>Parents' perceptions and self-efficacy</i>						
Parents' perception of their children's level of functional communication (SD) ^a	3.0 (2.1)	4.3 ^b (2.4)	5.1 ^b (2.6)	3.0 (1.6)	5.5 ^b (3.1)	6.4 ^b (2.7)
Concerns parents (SD) ^a	6.5 (2.6)	4.8 ^b (3.0)	4.5 ^b (2.8)	6.0 (2.7)	3.7 ^b (2.6)	2.9 ^b (2.4)
Self-efficacy parents(SD) ^a	6.8 (1.4)	7.7 ^c (1.3)	7.6 ^c (1.2)	7.8 (2.0)	7.2 ^c (1.8)	7.1 ^c (1.4)

Note: ^aVAS scale: 10 cm scale, higher values associated with an increasing degree of parents' perception of their children's level of functional communication, parents' concerns and parents' self-efficacy.

^bSignificant difference T0-T1 and T1-T2 ($p < 0.05$).

^cSignificant difference between groups ($p < 0.05$).

with two studies on parent-directed intervention for children with DLD and concomitant speech sound disorders (Barnett et al., 1988; Eiserman et al., 1990).

In the parent- and child-directed intervention groups in Van Balkom et al. (2010), children in both conditions improved equally in their MLU and language comprehension. However, the parent-based intervention group showed significantly larger improvement of children's proportion of grammatically correct utterances and of their conversational coherence. Both outcome measures were not included in our study. Though Van Balkom et al. did not define grammatical correctness in their study, this measure seems not suited to the language level of typical 3-year-old children (Crystal, 1979).

Concerning parents' language support strategies, our results match those of Baxendale and Hesketh (2003) and partly agree with Law et al. (1999) who also found no group differences when comparing parent-directed intervention with child-directed therapy. In addition, similar to our results, Law et al. showed no group differences at follow-up. Surprisingly, in our study parents changed their use of language support strategies equally in both groups post-intervention and at follow-up. Not only the parents in the parent-directed intervention being coached and receiving feedback on their language support behaviour improved their responsivity, language models and communication rate but also the untrained parents in the other group. Several possibilities may explain the equal growth. First, in group meetings all parents received psychoeducation and information about language development and stimulation. Thus, even without training, parents in the child-directed intervention group may have changed their communicative behaviour in interaction with their child.

Another explanation is that we may have chosen language support outcomes that are too general or not sen-

sitive enough to change. The language support strategies taught in the ImPACT intervention program are grouped into five fidelity dimensions, that is, makes play interactive, models and expands language, provides opportunities for initiations, helps increase the complexity of initiations and paces the interaction. The results of Stadnick et al. (2015) show a strong positive trend for improvement of these dimensions after training. Maybe these dimensions might be fine grained enough to reveal group differences in our study. Another study that measured more specific strategies than we did, is Roberts and Kaiser (2015). Their results also showed significant improvement of parents' use of these newly learned behaviours. However, for our study we selected the more common outcomes in the meta-analyses to enable comparison with other studies. In addition, these measurements are also less time-consuming.

Finally, parents' changed interaction behaviour in both groups might be the consequence of positive changes in their child's language skills, functional communication and communication rate. Therefore, possibly parents did not have to keep the conversation flowing or to ask questions. Simultaneously, contingent responding may have become easier for parents.

Over time, parents in both groups experienced a decrease in their concerns and perceived an increase in their children's functional communication. However, for parents' self-efficacy we do see group differences. In the parent-directed intervention group self-efficacy increased whereas it remained relatively stable in the child-directed intervention. The increase in the parent-directed group is a change of 10% on a 10 cm VAS scale. Law et al. (2015) and Davies (2014) offer a plausible explanation for the lower self-efficacy of parents of children with DLD. Parents in the child-directed intervention condition might show an insuf-



ficient conception of their role in therapy. Both studies found that SLTs perceive parents of children with DLD as unsure and passive regarding their role in stimulating their child's language development. Parents reported they feel uncertain in their role and responsibility in therapy, and in how to practice with their child at home. Parent-directed intervention can change parents' role from an advocacy role into an increasingly involved role as implementer and adaptor of the intervention (Davies, 2014).

Strengths and limitations of the study

First, our study contributes to effectiveness studies in other languages than English (Rinaldi et al., 2021). After all, results of the studies with the English language are not transferable to other languages because of the implicit differences between languages, specifically in phonology, syntax and morphology. Second, the improvement of children's sentence production level, MLU and PCC in our study strengthens the benefits of parent-directed intervention for these language levels. Other strengths of our study are the large sample size, outcomes of children's language as well as parents' behaviour and perceptions, and the long-term follow up. Finally, our trial was embedded in a multi-component usual care therapy in which we changed one element: a group of children receiving child-directed therapy was assigned to the experimental parent-directed therapy condition. We think this is a strength as well as a limitation of our study. A strength, because we followed usual care as much as possible, which will facilitate transfer of the findings to everyday speech-language therapy. We wanted to avoid the gap between research and clinical practice often experienced by SLTs trying to implement results from well controlled trials with strict selection criteria for children and treatment protocols (Bruinsma et al., 2020). It is also a limitation because we were not able to control all aspects in the intervention, such as the lack of blinding and reliability for children's language test measurement, and rigorous control of treatment fidelity. We did train SLTs delivering the intervention and organized four meetings aimed at consistent treatment delivery, but we have not monitored treatment fidelity with video observations of the actual treatment sessions nor used logbooks. Additionally, without a no treatment group we do not know if the improvement of the children was caused by maturation or by (a component of) the intervention. The fact that children's standardized test scores improved suggests that their growth was more than expected based on maturation. Exempting children of therapy is regarded unethical by Dutch ethical review boards and therefore not allowed; let alone that it is very doubtful if parents would have agreed their children to participate in a trial arm without speech-language therapy. Moreover, the improve-

ment in language development between T1 and T2, cannot be attributed to the parent-directed therapy nor the child-directed therapy or group therapy or the combination of all components. Indeed, it is the result of the whole and diverse care in that span of time. Results of our study are not generalizable to all children with DLD, that is, not to children with parents with a low SES, multilingual children or children with a multicultural background. A final limitation of this study is the difference in spontaneous language sampling at T0/T1 versus T2. Contrary to T0/T1, at T2 children were being videoed at home. This might have resulted in more relaxed and therefore probably more talkative children. However, at T2 children in both groups were videoed at home. Therefore, none of the children was favoured over others and no group was favoured over the other.

Future research and clinical implications

Considering the equal improvement in parents' language in both groups, future research should be done to evaluate effects of children's language skill improvement on parents' language support strategies and parents' language input. Also, more research is needed to unravel the contribution of group therapy for children and parents to individual speech-language therapy, for example, by comparing usual care in special-language daycare centres with language therapy in Dutch speech-language therapy practices. After all, communication goals for children's group therapy are much broader than the tailor-made goals in individual language therapy, that is, aimed at improving the motivation to communicate and to interact with other children.

Currently, SLTs tend to value child-directed therapy more than parent-directed intervention, but this study shows that parent-directed intervention as part of a multi-component intervention was equally effective as child-directed therapy. Furthermore, the program enhanced parents' motivation to engage in intervention. It also seemed to contribute to parents' feelings of competence and to their belief that they can effectively manage their child's language disorder, that is, parental self-efficacy. Therefore, the ImPACT-DLD program adds to treatment options for parents as well as for SLTs and creates choices for shared decision-making. Results of our study correspond with contemporary views of working with parents in a family-friendly model (Watts Pappas & McLeod, 2009). This result will benefit clinical practice, because language profiles of DLD including speech sound disorders are quite common, 50–75% (Shriberg & Kwiatkowski, 1994). More evidence might be especially important since half of the SLTs participating in our study were somewhat reluctant to address articulation goals via parents. They were

convinced that child-directed intervention using specific programs for improving phonological delays was imperative, for example, the Cycles Phonological Remediation Approach (e.g., Hodson & Paden, 1991).

CONCLUSIONS

Engaging parents in a multi-component intervention for young children with DLD is feasible and results in equal short- and long-term outcomes for children's language development and parents' language support skills, perceptions and concerns compared with child-directed intervention by SLTs. Furthermore, parents were positive about the parent-directed intervention and the SLTs evaluated the program as valuable and feasible. Therefore, the ImPACT-DLD program adds to treatment options for parents as well as for SLTs and creates choices for shared decision-making. This parent-directed intervention matches contemporary views on the collaboration between parents and SLTs.

ACKNOWLEDGMENTS

We thank the SLTs for their valuable contribution to the project, and the coordinators for recruiting participants. We also thank the parents and children who participated in the study.

CONFLICT OF INTEREST STATEMENT

The authors declared no conflicts of interest with respect to the research, authorship and/or publication of this article.


DATA AVAILABILITY STATEMENT


Data are available from the authors upon request.

PATIENT CONSENT STATEMENT

Parents provided written consent to participate in the study.

ORCID

Margo A. Zwitserlood-Nijenhuis  <https://orcid.org/0000-0002-8526-3525>

Carin H. Wiefferink  <https://orcid.org/0000-0002-8951-6702>

Ellen Gerrits  <https://orcid.org/0000-0002-4403-0792>

REFERENCES

- Barnett, W.S., Escobar, C.M. & Ravsten, M.T. (1988) Parent and clinic early intervention for children with language handicaps: a cost-effectiveness analysis. *Journal of Early Intervention*, 12, 290–298.
- Baxendale, J. & Hesketh, A. (2003) Comparison of the effectiveness of the Hanen Parent Programme and traditional clinic therapy. *International Journal of Language & Communication Disorders*, 38, 397–415.
- Bishop, D.V.M., Snowling, M.J., Thompson, P.A. & Greenhalgh, T. & The CATALISE Consortium. (2016) CATALISE: a multinational and multidisciplinary Delphi consensus study. Identifying language impairments in children. *PLoS ONE*, 11, e0158753.
- Bishop, D.V.M., Snowling, M.J., Thompson, P.A. & Greenhalgh, T. & the CATALISE consortium. (2017) CATALISE: a multinational and multidisciplinary Delphi consensus study identifying language impairments in children. *PLoS ONE*, 11(7), 1–26
- Bruinsma, G., Wijnen, F. & Gerrits, E. (2020) Focused stimulation intervention in 4- and 5-year-old children with developmental language disorder: exploring implementation in clinical practice. *Language, Speech and Hearing Services in Schools*, 51, 247–269.
- Crystal, D. (1979) *Working with LARSP*. London, Edward Arnold Publishers.
- Curran, A., Flynn, C., Antonijevic-Elliott, S. & Lyons, R. (2015) Non-attendance and utilization of a speech and language therapy service: a retrospective pilot study of school-aged referrals. *International Journal of Language & Communication Disorders*, 50(5), 665–675
- Davies, K. (2014) Parents' and speech and language therapists' roles in intervention for pre-school children with speech and language needs. Doctoral thesis (PhD), Manchester Metropolitan University. Available from: <http://e-space.mmu.ac.uk/347077/>
- Davies, K.E., Marshall, J., Brown, L.J. & Goldbart, J. (2019) SLTs' conceptions about their own and parents' roles during intervention with preschool children. *International Journal of Language & Communication Disorders*, 54(4), 596–605.
- Dutch Association for Speech and Language Therapy. (2018) *Evidence-based guideline speech and language therapy for children with DLD*. Woerden: NVLF.
- Eiserman, W.D., McCoun, M. & Escobar, C.M. (1990) A cost-effectiveness analysis of two alternative program models for serving speech-disordered preschoolers. *Journal of Early Intervention*, 14, 297–317.
- Faul, F., Erdfelder, E., Lang, A.-G. & Buchner, A. (2007) G*Power 3: a flexible statistical power analysis program for the social, behavioural, and biomedical sciences. *Behaviour Research Methods*, 39, 175–191.
- Fey, M., Cleave, P., Long, S. & Hughes, D. (1993) Two approaches to the facilitation of grammar in children with language impairment. *Journal of Speech and Hearing Research*, 36, 141–157.
- Gibbard, D. (1994) Parental-based intervention with pre-school language delayed children. *European Journal of Disorders of Communication*, 29, 131–150.
- Heidlage, J.K., Cunningham, J.E., Kaiser, A.P., Trivette, C.M., Barton, E.E., Frey, J.R., et al. (2020) The effects of parent-implemented language interventions on child linguistic outcomes: a meta-analysis. *Early Childhood Research Quarterly*, 50, 6–23.
- Hodson, B. & Paden, E. (1991) *A phonological approach to targeting intelligible speech*, 2nd edition. Austin, TX: PRO-ED.
- Ingersoll, B. & Dvortcsak, A. (2010) *Teaching social communication: a practitioner's guide to parent training for children with autism*. New York: Guilford Press.
- Ingersoll, B. & Wainer, A. (2013) Initial efficacy of Project ImPACT: a parent-mediated social communication intervention for young children with ASD. *Journal of Autism and Developmental Disorders*, 43, 2943–2952.



- Ingersoll, B. & Dvortcsak, A. (2013) *Trainen van sociaal-communicatieve vaardigheden bij kinderen met een autismespectrumstoornis*. Leuven, Belgium: Uitgeverij ACCO.
- Ingersoll, B., Wainer, A.L., Berger, N.I., Pickard, K.E. & Bonter, N. (2016) Comparison of a self-directed and therapist-assisted telehealth parent-mediated intervention for children with ASD: a pilot RCT. *Journal of Autism Developmental Disorders*, 46(7), 2275–2284.
- Klatte, I.S. & Roulstone, S., (2016) The practical side of working with parent–child interaction therapy with preschool children with language impairments. *Child Language Teaching and Therapy*, 32, 345–359
- Klatte, I.S., Harding, S. & Roulstone, S. (2019) Speech and language therapists' views on parents' engagement in Parent–Child Interaction Therapy (PCIT). *International Journal of Language & Communication Disorders*, 54(4), 553–564.
- Kruijthoff-Broekman, A., Wiefferink, C., Rieffe, C. & Uilenburg, N. (2019) Parent-implemented early language intervention programme for late talkers: parental communicative behaviour change and child language outcomes at 3 and 4 years of age. *International Journal of Language and Communication Disorders*, 54, 451–464.
- Law, J., Kot, A. & Barnett, G. (1999) *A comparison of two methods of providing intervention to three year old children with expressive/receptive language impairment*. London, England: City University London.
- Law, J., Roulstone, S. & Lindsay, G. (2015) Integrating external evidence of intervention effectiveness with both practice and the parent perspective: development of 'What Works' for speech, language, and communication needs. *Developmental Medicine & Child Neurology*, 57(3), 1469–8749.
- Law, J. (2019) Evidence-based practice and its application to developmental language disorders. In: Law, J., McKean, C., Murphy, C.A. & Thordardottir, E. (Eds.) *Managing children with developmental language disorders. Theory and practice across Europe and beyond*. London and New York: Routledge, pp. 84–109.
- Lawler, K., Taylor, N.F. & Shields, N. (2013) Outcomes after caregiver-provided speech and language or other allied health therapy: a systematic review. *Archives of Physical Medicine and Rehabilitation*, 94, 1139–1160.
- MacWhinney, B. (2000) *The CHILDES project: tools for analyzing talk*, 3rd edition, Mahwah, NJ: Lawrence Erlbaum Associates.
- McKean, C., Gerrits, E., Tulip, J. & Tolonen, A.K. (2019) Service delivery for children with language disorders across Europe and beyond. In: Law, J., McKean, C., Murphy, C.A. & Thordardottir, E. (Eds.) *Managing children with developmental language disorders. Theory and practice across Europe and beyond*. London and New York: Routledge, pp. 84–109.
- Pepper, J. & Weitzman, E. (2004) *It takes two to talk®: a practical guide for parents of children with language delays*, 2nd edition, Toronto: The Hanen Centre.
- Rinaldi, S., Caselli, M.C., Cofelice, V., D'Amico, S., De Cagno, A.G., Della Corte, G., et al. (2021) Efficacy of the treatment of developmental language disorder: a systematic review. *Brain Sciences*, 11(3), 407.
- Roberts, M.Y. & Kaiser, A.P. (2011) The effectiveness of parent-implemented language interventions: a meta-analysis. *American Journal of Speech–Language Pathology/American Speech–Language–Hearing Association*, 20(3), 180–99.
- Roberts, M.Y. & Kaiser, A.P. (2015) Early intervention for toddlers with language delays: a randomized controlled trial. *Pediatrics*, 135, 686–693.
- Schlichting, J.E.P.T. & Lutje Spelberg, H.C. (2010a) *Schlichting test voor taalbegrip*. Houten: Bohn Stafleu van Loghum.
- Schlichting, J.E.P.T. & Lutje Spelberg, H.C. (2010b) *Schlichting test voor taalproductie—II*. Houten: Bohn Stafleu van Loghum.
- Dunn, L.M. & Dunn, L.M. (2005) *Peabody picture vocabulary test, Dutch version by Schlichting*. Amsterdam: Pearson Assessment and Information.
- Selin, J., Hill, M.S. & Schmitt, M.B. (2018) Caregivers' perceptions of their child's language disorder: alignment between caregivers and speech–language pathologists. *Seminars in Speech and Language*, 39, 427–442
- Shriberg, L.D. & Kwiatkowski, J. (1982a) Phonological disorders II: a conceptual framework for management. *Journal of Speech and Hearing Disorders*, 47, 242–256.
- Shriberg, L.D. & Kwiatkowski, J. (1982b) Phonological disorders III: a procedure for assessing severity of involvement. *Journal of Speech and Hearing Disorders*, 47, 256–270.
- Shriberg, L.D. & Kwiatkowski, J. (1994) Developmental phonological disorders I: a clinical profile. *Journal of Speech and Hearing Research*, 37, 1100–1126.
- Stadnick, N.A., Stahmer, A. & Brookman-Frazee, L. (2015) Preliminary effectiveness of project IMPACT: a parent-mediated intervention for children with autism spectrum disorder delivered in a community program. *Journal of Autism and Developmental Disorders*, 45, 2092–2104
- Tellegen, P., Winkel, M., Wijnberg-Williams, B. & Laros, J. (2005) *Snijders–Oomen niet-verbale intelligentietest SON-R 2,5–7: Verantwoording en handleiding*. Amsterdam: Hogrefe.
- Van Balkom, H., Verhoeven, L., Van Weerdenburg, M. & Stoep, J. (2010) Effects of parent-based video home training in children with developmental language delay. *Child Language Teaching and Therapy*, 26, 221–237
- Vygotsky, L. (1978) Interaction between learning and development. In: Gauvain, M. & Cole, M. (Eds.) *Readings on the development of children*, 2nd edition, New York, NY: Scientific, pp. 34–40.
- Watts Pappas, N. & McLeod, S. (2009) *Working with families in speech–language pathology*. Oxfordshire, United Kingdom, Plural Publishing
- Wiefferink, K., van Beugen, C., Wegener Sleeswijk, B. & Gerrits, E. (2020) Children with language delay referred to Dutch speech and hearing centres: caseload characteristics. *International Journal of Language & Communication Disorders*, 55, 573–582. doi:10.1111/1460-6984.12540

How to cite this article: Zwitserlood-Nijenhuis, M.A., Wiefferink, C.H. & Gerrits, E. (2023) A randomized study of parent- versus child-directed intervention for Dutch toddlers with DLD. *International Journal of Language & Communication Disorders*, 58, 1768–1782. <https://doi.org/10.1111/1460-6984.12901>