# Simplifying Parental Language or Increasing Verbal Responsiveness,

# What is the Most Efficient Way to Enhance Pre-schoolers' Verbal Interactions?

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## Abstract

Literature shows that parent-implemented language interventions have positive effects on children language skills. Nevertheless, studies in this field suffer from two limitations. This pilot study compared the efficiency of two brief self-implemented interventions, each aiming to manipulate a specific parenting language variable, on a non-clinical sample of preschoolers. Sixty participants were randomly allocated to: (1) Responsive group: forty-minute intervention in order to enhance the parents' responsiveness (20 participants), (2) Structural group: forty-minute intervention in order to simplify the parental language (20 participants), (3) Control group: forty-minute program that did not deal with parental issues (20 participants). A parent/child play session was administered before and after the intervention in order to make a pre-post comparison. Results showed several modifications only after the responsive intervention, including an equilibration of parent/child turn-taking. First, results demonstrated that increasing parent's responsiveness is more efficient than simplifying parental language to enhance verbal interactions. Second, as these patterns of communication are associated with language and behavioral development, it would be a first step toward the creation of brief and cost-effective responsive interventions for prevention purposes in pre-schoolers.

Keywords: parent-implemented language intervention, verbal interactions, parent/child communication, prevention, language development, microtrial design

## 1. Introduction

Literature showed that conversations with children have specific characteristics that facilitate child language acquisition and academic achievement (Fagan & Iglesias, 2000; Schuele, 2001; Walker, Greenwood, Hart, & Carta, 1994). So, our best chance to optimize these abilities is by intervening early with evidence-based and clinically cost-effective parental interventions. There is a large body of research that analyzed the efficiency of parent-implemented language interventions on children with language disabilities (Kong & Carta, 2013) but two limitations should be noted. Firstly, the length and intensity of these programs is not suitable for prevention purposes (Lim, Tormshak, & Dishion, 2005; Metzler, Sanders, Rusby, & Crowley, 2012; Prinz & Sanders, 2007). Secondly, as several variables are manipulated together in these interventions, it is difficult to identify which parenting competences have the most effect on children communication (Roberts & Kaiser, 2011). The present study aimed to go beyond these limits by investigating the efficiency of two brief video programs that offered information and verbal strategies, for prevention purposes, to parents of typically developing preschoolers.

### 1.1 Characteristics of Parental Language Input

According to the social interactionist perspective, interactions with adults play an important part in children's language acquisition (Bruner, 1975; Yoder & Warren, 1993). Two hypotheses explain the relationship between adult verbal input and child language development (Girolametto & Weitzman, 2006). Firstly, the pragmatic/responsive hypothesis focuses on the contingency between the child's utterances and the adult's responses. A contingent verbal input is responsive to the child's plan-of-the-moment in order to reduce contextual ambiguities (see Table 1). So, this hypothesis highlights the importance of responding promptly, contingently and appropriately to the child's communication attempts.

Table 1. Pragmatic/responsive hypothesis: example

| |
|---|
| Example 1: John mother's utterances are responsive to his communication attempts. |
| John: "Oh the bird house!" Mother: "What a beautiful nest! The bird has built the nest in the tree". |
| Example 2: John's mother's utterances are not responsive to his communication attempts. John: "Oh the bird house!" Mother: "Look at this cat!" |

The supportive role of caregivers' verbal responsiveness is well documented. This aptitude includes strategies such as maternal imitations, expansions of a child's word into a phrase and recasts of utterances (see Table 6). Furthermore, it also includes the importance of balancing parent/child turn-taking in order to increase child's verbal participation. Verbal responsiveness was shown to be associated with child language development, a higher level of initiation and engagement and a greater frequency of play (Fagan & Iglesias, 2000; Kong & Carta, 2013; Landry, Smith, Swank, Assel, & Vellet, 2001). Additionally, recent studies suggested that verbal responsiveness can foster children's emotional behavior and cognitive outcomes (Landry, Smith, & Swank, 2006).

Secondly, according to the structural hypothesis, adult language input that is grammatically one step ahead of the child's level may assist language development (Girolametto, Weitzman, Wiigs, & Pearce, 1999; Tamis-LeMonda, Bornstein, & Baumwell, 2001). So, in this scenario, efficient input for children may be characterized as short, syntactically simple, redundant, and slow in tempo (see Table 2). The structural hypothesis is confirmed by negative correlations found between the complexity of mother's language and toddler's language development (Furrow, Nelson, & Benedict, 1979).

Table 2. Structural hypothesis: example

| |
|---|
| Example: Lisa's mother adapts her language to Lisa's developmental level. |
| Lisa, 1 year, is playing with a train. Mother: "Choo choo!" Lisa, 2 year, is playing with a train. Mother: "Choo choo! You're pushing the train" Lisa, 3 year, is playing with a train. Mother: "Wow you're a good train driver! You go very quickly!" |

Girolametto et al.'s results (1999) confirmed the importance of the pragmatic/responsive hypothesis. Indeed, it showed an association between maternal imitations, expansions of the child's words and language development in children with expressive vocabulary delays. However, in this study, no association was found between children's language development and the complexity of parental language, except from a slow rate of speech (Girolametto et al., 1999). Furthermore, according a recent meta-analysis, no study was able to demonstrate that interventions could decrease the level of caregivers' language or linguistic complexity (Kong & Carta, 2013). However, the precise impact of pragmatic and structural parental language features on child language development is still a matter for debate. In order to help finding an answer to that question, the present study used an original microtrial design. These designs are defined as randomized experiments testing the effects of relatively brief and focused environmental manipulations (Howe, Beach, & Brody, 2010). Such design offers the opportunity to isolate a variable and disentangle its impact from others (Mouton & Roskam, 2014). So, this study compared the efficiency of two brief programs which manipulated different parental language features. The first one aimed to increase parental verbal responsiveness and the second one aimed to simplify structural features of parental language.

*1.2 Parent-implemented Language Interventions*

As there is a relationship between parental verbal interactions and child language development, many naturalistic interventions promote caregivers' communication to improve children's language and communicative development. For example, widely known programs are the Hanen Early Language Parent Program (Girolametto, Greenberg, & Manolson, 1986), the Play and Learning Strategies program (PALS, Wheeden & Fewell, 1995), the Enhanced Milieu Teaching (Hemmeter & Kaiser, 1994) and the Responsivity Education/Prelinguistic Milieu Teaching (Yoder & Warren, 2002). In these programs, caregivers learn to apply strategies during their daily routine with the child in order to react sensitively and contingently to the child's behavior at a level appropriate to his development (Kaiser & Hancock, 2003). Parents who decide to enroll in these programs usually attend a series of group or individual sessions and receive individual video-feedback. For example, in the Hanen program, parents attend eight group sessions and receive three individual video-feedback sessions.

Empirical evidence for the effectiveness of these parent-implemented language interventions on children with language or developmental disabilities has been provided by controlled studies (Kaiser & Hancock, 2003). Changes in parent behavior included an increase in verbal responsiveness and a higher frequency of verbal responsive strategies like open-ended questions and expansions of child's words or utterances. Furthermore, after these interventions, children with language or developmental disabilities showed improvement in communication, took more turns in conversations, made more initiations, increases their vocabulary diversity and positive affects with their parent (Kong & Carta, 2013; Roberts & Kaiser, 2011). Dyadic modifications have also been found by Girolametto et al. (1988), who observed more balanced turn-taking after the intervention. So, children increased their conversational participation whereas parents decreased theirs.

However, the format of these programs is not suitable for prevention purposes. Indeed, a number of serious obstacles prevent the widespread dissemination of parent-implemented language interventions. First, they are long and expensive and are only available to a limited number of parents (Baxendale & Hesketh, 2003; Gibbard, Coglan, & MacDonald, 2004). Second, despite the fact that parents enrolled reported high levels of satisfaction (Girolametto, 1988; Kaiser & Hemmeter, 1996; Pennington & Noble, 2010), programs about parenting have been sometimes associated with punitive measures. So, enrollment can be stigmatizing (Prinz & Sanders, 2007). Third, the intensity of the program could make it difficult to attend for parents who have family and work obligations (Pennington & Noble, 2010). Barriers such as transportation, arranging child care and scheduling around therapists' availability prevent many parents from completing an intervention. Finally, some parents could be anxious and uncomfortable about the group nature of the training, the use of role play and the video-recording for coaching (Pennington & Noble, 2010). For these reasons, parent-implemented language interventions are reaching only a tiny proportion of parents and children in the population (Metzler et al., 2012). In the light of the above barriers, crucial challenge is to facilitate their delivery.

Low intensity self-administrated parenting programs can provide a solution for prevention purposes by permitting a broad dissemination in an efficient and cost-effective manner. Several studies have demonstrated that self-administered programs are effective in teaching parenting skills (Baggett et al., 2009; Gordon, 2000; Lim et al., 2005; Meadan & Daczewitz, 2015). In a recent study, Baggett et al. (2009) have shown that an internet-based adaptation of the Play And Learning Strategies program (Wheeden & Fewell, 1995) led to an increase of child social engagement and engagement with the environment in low-income families. In addition, Metzler et al. (2012), in the context of the Triple P Positive Parenting Program, asked parents of 3- to 6-year-old children how they would prefer to receive parenting information. The highest preference ratings were given for self-administrated approaches (TV programs, online programs, written materials). These authors therefore concluded that a mismatch exists between what parents are looking for and what is available.

*1.3 Current Study*

In order to go beyond these limits, the present pilot study investigated the efficiency of two self-administrated programs, for prevention purposes, to parents of typically developing preschoolers. Parent/child dyads were recruited from the French-speaking part of the Belgium. Each intervention focused on manipulating a unique feature of parental communication with a design that can be considered as a microtrial. So, the aim was to provide limited and precise information on the malleability of parental communication features and the impact of these modifications in child communication. One intervention's purpose was to emphasize the parent's responsiveness to the child's plan-of-the moment (pragmatic/responsive hypothesis) whereas the other intervention's purpose was to simplify parental language (structural hypothesis). The effects of these two interventions were compared with a control group in which parents followed a video program that did not deal with parental issues.

This research extended the literature by two questions: (1) Is it possible to modify parent/preschoolers verbal interactions with a forty-minute self-administrated parental intervention? (2) What kind of intervention is the most efficient: an intervention that aims to increase parental verbal responsiveness or an intervention that aims to simplify parental language? We predicted a better efficiency of the responsive intervention for two reasons. First, the crucial role of parental responsiveness on child language was demonstrated (Landry et al., 2006). Second, the impact of a parent language simplification on child language development was not confirmed by the literature (Girolametto et al., 1999).

## 2. Method

*2.1 Participants*

This study is part of the H2M (Hard-T(w)o-Manage Children) research program conducted at the Psychological Sciences Research Institute of the University of Louvain-la-Neuve (Belgium) (Houssa, Nader-Grosbois, & Jacobs, 2013; Mouton & Roskam, 2014). Sixty 4- to 5-year-old self-selected convenient sample of non-clinical preschoolers (24 girls and 26 boys) and one of their parents (49 mothers and 11 fathers) participated in the study. The sample was selected to be representative of the population and not considered to be at risk for language disabilities. The children were enrolled

in schools in the French-speaking part of Belgium. Flyers had been put in children's school bags in order to inform parents about this research. The flyer's message was: "Would you like to learn more about your child and help the scientific research?" Furthermore, the flyer included the address of the project's web site and provided a link to the online registration. Parents were asked to email a completed form stating their child's name, gender, age, native language and grade before the meeting. Additionally, the parent's gender, number of children and level of education were recorded. In most families, the children's parents lived together (n=55). The majority of fathers and mothers had a college degree (n=56). All parents were the biological parents of their children, except for one. All children lived at home with their parent. The mean age of the children was 57.6 months (SD=6.95). Selection criteria for the study were (a) chronological age between 48 and 70 months, (b) attendance at a school, (c) French as first language used at home, (d) no diagnosed developmental disorder, (e) no medical disorder, and (f) no hearing impairment reported. This study had received ethics approval from the Psychological Sciences Research Institute (Université catholique de Louvain) ethics committee dated February 2012.

### 2.2 Procedure

This study used a microtrial design, a kind of procedure with two main characteristics: a randomized experimental method, such as those employed to study etiologic processes in a laboratory, and a brief manipulation focusing on changing a specific variable (Howe et al., 2010). The parent was invited to the laboratory for a ninety-minute session with his/her child. At the beginning of the session, an introduction period (five minutes) was needed to explain the background of the study and to sign the consent form. So, the dyad was randomly allocated to one of the three groups: pragmatic/responsive intervention (R-group), structural intervention (S-group) or the control group. Participants were unaware of the experimental goals and condition assignment.

#### 2.2.1 Pretest

During the ten-minute baseline session, parents were instructed to play with their child on a carpet in a laboratory playroom with the aid of a variety of age-appropriate toys (cars, playmobils sets, dolls, blocks, trucks, and felt-tip pens). Parents were asked to play as they would at home with any of the toys they wished. The session was video-recorded and the first author of the study watched the dyad through a room-length one-way mirror.

#### 2.2.2 Language Assessment

Subsequently, the first author of the study assessed the child's language in another room while the parent followed the intervention. Child's speech, receptive and expressive language skills were evaluated using three subtests of the standardized language battery Evaluation du Langage Oral (ELO) (Khomsi, 2001). This is an individually administered test for use with children from 3 to 10 years of age. Articulation/phonology was measured with a word repetition subtest (32 items). Omissions, substitutions, distortions and additions of phonemes or syllables were considered incorrect. In addition, receptive vocabulary was evaluated with a word designation subtest (20 items). In this task, the child had to find, among four pictures, the one that matched the word the interviewer read. Finally, grammatical development was measured with an utterance repetition subtest (15 items). The child had to repeat the sentence produced by the examiner without omitting or modifying any word.

#### 2.2.3 Intervention

While child language was evaluated in another office by a speech therapist (the first author of the study), the parent stayed in the pretest room alone in order to follow a forty-minute self-administered intervention in French on a computer. Before leaving with the child, the first author of the study explained to the parent how to turn on the program. The content of the structural intervention and pragmatic interventions is explained on Tables 3 and 4. The strategies used have been adapted from widely known parent-based language programs such as the Hanen Early Language Parent Program (Girolametto et al., 1986), the Play And Learning Strategies program (Wheeden & Fewell, 1995) and the Responsivity Education/Prelinguistic Milieu Teaching (Yoder & Warren, 2002). Parents only had to view and follow a session on a computer. Programs included a series of videotaped segments which showed parents who had previously attended a parent-implemented language intervention. In addition, we used clips from various commercially made videotapes (Martin, Ménard, & Marin, 1992a, 1992b). We included educational materials which contained interesting images, audio clips and entertaining illustrations such as comic strips (see Table 3 and 4). At the end, a summary of key concepts was presented. Finally, in the control group, parents followed a forty-minute video on a computer but there was no manipulation of parental language. The intervention consisted of the following steps: (1) information on opposition in childhood, (2) information on children's cognition, (3) information on children's sleep.

Table 3. Content of the structural intervention

| Subject | Content | Video used |
|---|---|---|
| Introduction to the aims of parent-implemented interventions | The importance of parent/child interactions for language learning<br>The main purposes of parent-implemented language interventions<br>The program's purpose: presentation of strategies aiming to enhance children language development | Two parents, who had attended a parent-implemented language intervention point out the usefulness of this treatment<br>In two parent/child interaction sessions, parents use structural intervention's target strategies. A brief written presentation of these techniques is included. |
| Observing the child's language in order to adapt parental language | Child vocabulary and utterances' changes: illustration<br>Definition of the "motherese": the simplified type of speech, with exaggerated intonation and rhythm, used by adults when speaking to children<br>Observing the child's language level (strengths and weaknesses) and adjusting the language input | Two parents point out the importance of observing the child's language level<br>In a free-play session, a mother reports observing her child language development<br>In an interaction in a bathroom, a mother reports being aware of her child speech difficulties |
| Decreasing the length of utterances to one step ahead of the child's utterances | The use of a language too complex can induce children incomprehension and frustration<br>Shortening utterances and using less complex grammatical structures | In four activities (setting the table, playing, bathing and a craft activity), mothers speak to their child by adjusting their language input, using simple but complete utterances and grammatical structures |
| Simplifying vocabulary | Using simple words while maintaining the overall meaning of the message | In an activity of shared book reading, a father points out the importance of adjusting language input |
| Slowing down the rate of speech | Speaking slowly, making long pauses between words | A mother points out the importance and the difficulty of speaking slowly to facilitate the child's language comprehension |
| Emphasizing intonation on important words | Making a pause before a new or an important word<br>Varying the tone of voice<br>Using a great deal of word repetitions | In two situations (bathing, playing), a father and a speech therapist speak with a child by emphasizing the key words |
| A conclusion on the importance of playing with the child | Importance of playing and using books in an interactive manner to facilitate language development | In two activities (free play sessions, shared book reading), two mothers and a father use the structural intervention target strategies with their child |

Table 4. Content of the pragmatic/responsive intervention

| Subject | Content | Video used |
|---|---|---|
| Introduction to the aims of parent-implemented interventions | The importance of parent/child interactions for language learning<br>The main purposes of parent-implemented language interventions<br>The program's purpose: presentation of strategies aiming to enhance children language development | Two parents, who had attended a parent-implemented language intervention, point out the usefulness of this treatment<br>In two parent/child interaction sessions, parents use responsive intervention's target strategies. A brief written presentation of these techniques is included. |
| Following the child's focus of interest | Observing the child's interests<br>Giving the child time to initiate<br>Listening to the child<br>Enjoying interactions with the child | In an activity of shared book reading, a father observes his child's interests<br>A father points out the importance and difficulty of following the child's lead<br>Two parents point out the importance of enjoying interactions with the child |
| Balancing turn-taking | Give the child time to take his turn in a conversation<br>Looking into child's eyes while awaiting a response<br>Responding sensitively and contingently to the child | A father points out the importance of giving the child time to respond to questions and requests |
| Maintaining face-to-face interactions | Maintaining face-to-face interactions to look directly into child's eyes | A father points out the importance of maintaining face-to-face interactions |
| Imitating and interpreting the child's message | Imitating the child's actions and sounds and interpreting his message by putting into words what we think he means | In a free play session, a speech therapist interprets child's messages |
| Commenting | Commenting on the child's focus and activity | A child is cleaning a bike while his mother is commenting his actions |
| Do not ask too many questions | Asking questions to encourage conversation | In a shared book reading activity, a father asks open-ended questions to his child |
| A conclusion on the importance of playing with the child | Importance of playing and using books in an interactive manner to facilitate language development | In two activities (free play sessions, shared book reading), two mothers and a father use the responsive intervention target strategies with their child |

2.2.4 Posttest

Following the intervention, parent and child went back to the first laboratory room and a play session identical to the one administered at the beginning of the study occurred in order to make a pre-post comparison. At the end of the session, the dyads received small material rewards (toys, purchase vouchers, discount coupons) and a written summary of the two interventions. Furthermore, a report on the language test performed with the child was sent to the parent two weeks after the testing session.

*2.3 Measures*

In order to measure the respective efficiency of the two interventions, parent/child verbal interactions and parent use of verbal responsive strategies were evaluated in the free play session.

2.3.1 Parents' and Children's Verbal Interactions

All language samples collected during the free play sessions were manually transcribed with CHILDES (MacWhinney, 2000) by the first author (see Table 5). An utterance was defined as a unit of speech indicated by intonation and/or pauses. Multiple utterances per turn are possible. A turn was defined as one or more communicative acts emitted by one participant that was not separated by a communicative act of the other partner (Girolametto, 1988).

Several language measures were generated automatically by the CHILDES computerized profiling system. The expected effect of the structural intervention would be a decrease of parent language complexity. We chose to analyze parent utterances complexity with parent Mean Length of Utterances (MLU) (in words). The MLU is an index of the structural complexity of utterances (Brown, 1973). It was calculated by computing the number of words spoken and dividing that by the number of utterances.

Second, the expected effect of the pragmatic/responsive intervention would be an increase of parental verbal responsiveness. To verify this, on one hand, we chose to analyze the parent and child conversational participation because verbal responsiveness includes balancing parent/child turn-taking in order to increase the child verbal participation. So, the turn-taking measures were:

(1) Parent and child's Mean Length of Turns (MLT) (in utterances) calculated as: number of utterances/number of turns for child and parent.

(2) The ratio of child's MLT to parent's MLT was calculated as: child MLT/parent MLT. A score of 1 indicated that the child and parent's MLTs are equal. A score lower than 1 indicated a talkative parent relative to the child.

Table 5. Extract from the transcript of a play session

| Hannah: 1 turn, 2 utterances. Hannah's mother: 2 turns, 3 utterances. |
| :---: |
| MOT:      I can put a dress on her. |
| CHI:      Yes. |
| CHI:      She will be prettier. |
| MOT:      It's pretty too, isn't it? |
| MOT:      I like this dress. |

2.3.2 Parents' Verbal Responsive Strategies

On the other hand, to evaluate the efficiency of the pragmatic/responsive intervention, parental verbal responsive strategies were coded by a research assistant in the free play sessions. 15,642 utterances were analyzed. The coder utilized both the tape and the written transcriptions of the utterances to code parent repeats, recasts, wh-questions, responsive labelling, requests for clarification, and verbal praises (see Table 6). The proportion of each strategy was calculated as a percentage of total parent utterances. 25% percent of the transcripts randomly selected were recoded independently by the first author, with an intercoder reliability of .85 for repeats, .79 for recasts, .94 for wh-questions, 80. for responsive labelling, .71 for request for clarification and .86 for verbal praises calculated with the weighed Kappa coefficient.

Table 6. Parents' verbal responsive strategies

| Responsive strategy | Definition | Example |
|---|---|---|
| Repeats | Parent responds to the child's utterance by repeating any part of what the child had said. | CHILD: There are so dolls. MOTHER: There are so dolls. |
| Recasts | Parent replies to child's utterance by maintaining the basic meaning and basic references to events in the child's utterance. The reply occurs immediately and includes syntactic and/or phonological changes. | CHILD: /a sair/. MOTHER: A chair. |
| Wh-questions | Parent asks an open-ended question. | MOTHER: Where will you the change baby's nappy? CHILD: On the changing table. |
| Responsive labelling | Parent's utterance fulfils a teaching function as determined by the presence of a noun in the final position. The parent and child must be jointly attending to the object when parent uses the label. | MOTHER: That's a fire truck. MOTHER: Yes, a fire truck. |
| Requests for clarification | Occurs when the adult says "What ?", "Hmm ?", "Huh ?", "What did you say ?" in response to the child's utterance because the adult did not hear or could not understand all or part of what the child said. | CHILD: Some bread. FATHER: What? CHILD: Bread. |
| Verbal praises | Parent gives a positive evaluation of a specific behavior or activity of the child | MOTHER: What's this? CHILD: The bathroom. MOTHER: Very good! |

*2.4 Predictions*

Firstly, we hypothesized that the pragmatic/responsive intervention would increase parental verbal responsiveness: (a) modify the dyad's conversational capacities by increasing child's Mean Length of Turn-taking (MLT), decrease parent's length of turn-taking and balance the dyad's turn-taking ratio (Pile, Girolametto, Johnson, Chen, & Cleave, 2010), (b) increase the number of parent's verbal responsive strategies (repeats, recasts, wh-questions, responsive labelling, requests for clarification and verbal praises). Secondly, we hypothesized that the self-administered parent structural intervention would decrease the parent Mean Length of Utterances (MLU) but would not modify children communication outcomes.

## 3. Results

Sixty parent/child dyads were enrolled in the study: twenty in each group. All statistical analyses were conducted using SPSS version 19. Prior to address the research questions, preliminary analyses were made using repeated multivariate analysis of variance (MANOVA) in order to verify the comparability of groups. Then, to test the intervention effects, comparisons were made between the three groups of dyads whose intervention types differed (the S-group, the R-group and the control group) on the dependant variables (1. measures of language complexity: parent MLU, 2. conversational participation: child and parent MLT, MLT ratio, 3. verbal responsive strategies: percentage of repeats, recasts, wh-questions, responsive labelling, requests for clarification, and verbal praises). As assessments were made before and after intervention, 3 (S-group, R-group, control group) x 2 (pretest, posttest) multivariate repeated measure factors analysis MANOVAs were administrated. This analysis is a commonly used statistical approach to repeated measure design. Then, pre-post comparisons were realized with paired *t*-test. The one-tailed probability level was set to 0.05.

*3.1 Comparability of Groups*

To determine whether the random assignment to groups was successful or not, we tested between-group differences on pretreatment variables with a one-way ANOVA (see Table 7). There was no significant difference between the characteristics of parents and children in the three groups for any of the following independent variables: rate of girls/boys, child chronological age, rate of mothers/fathers, language scores. Furthermore, there was no significant difference between groups for all dependent variables recorded in the first play session. As we recruited a non-clinical sample, the results showed that very few children had weak language performances. Indeed, only 8 % of children in the study had a performance ≤1.5 Z-score bellow the mean on at least one language measure. Especially, 5 % had a performance ≤1.5 Z-score bellow the mean on the measure of articulation/phonology (word repetition subtest), 0 % on the measure of vocabulary (word designation) and 3 % on the measure of grammar (utterance repetition).

Table 7. Dyads characteristics by intervention group at the start of the study

|  | Structural group N | | Responsive group N | | Control group N | | $\chi^2$ |
|---|---|---|---|---|---|---|---|
| Number of children | 20 | | 20 | | 20 | | |
| Number of mothers | 16 | | 17 | | 16 | | 1.29 |
| Number of female children | 13 | | 10 | | 11 | | 1.78 |
|  | M | SD | M | SD | M | SD | F |
| Mean age of children (in months) | 59.3 | 7.92 | 55.3 | 6.51 | 58.3 | 5.96 | 1.84 |
| Word repetition level (32 items) | 0.26 | 0.77 | 0.18 | 0.75 | 0.21 | 1.03 | .04 |
| Word designation level (20 items) | 0.4 | 0.68 | 0.57 | 0.95 | 0.51 | 0.61 | .25 |
| Utterance repetition level (15 items) | 0.69 | 0.58 | 0.64 | 0.68 | 0.51 | 0.67 | .41 |

*Note:* Word repetition, word comprehension and utterance production level = Evaluation du Langage Oral (ELO): 1= 1 SD above grade level, 0=grade level, -1= below grade level.

### 3.2 Parent Linguistic Complexity: Mean Length of Utterances (MLU)

Firstly, we hypothesized a decrease of the parent utterances complexity in S-group. However, results demonstrated that the parent MLU remained stable between pretest and posttest in the three groups. A repeated measures MANOVA with the pre-posttest score as a within-group factor and groups (S-group, R-group and the control group) as a between-participants factor revealed no effect (see Table 8). So, results did not confirm this prediction.

### 3.3 Conversational Participation: Mean Length of Turns (MLT)

Secondly, we hypothesized an equilibration of the parent/child turn-taking after the responsive intervention. As expected, parents' MLT decreased over time for the R-group but increased or remained stable for the other groups. In addition, children's MLT and the child/parent MLT ratio increased over the time for R-group whereas it decreased for the two other groups. It indicated that the parents' MLT was more closely matched to the children's MLT after the responsive intervention. Repeated measures MANOVA were conducted and significant pre-post x group interactions were found for the three variables (parent MLT, child MLT and MLT ratio). The *t* test pre-post comparison was significant for dyads in R-group who increased their MLT ratio (*p* = .002) whereas dyads in the control group decreased their own MLT ratio between the pretest and the posttest (*p* = .02) (see Table 8). So, results confirmed the hypothesis by showing an equilibration of turn-taking after the pragmatic/responsive intervention.

Effect sizes for all dependant variables were computed by calculating the value of Cohen's d by using the means and standard deviations of the two periods (pretest and posttest for R-group). The effect sizes were all in or near the medium range: child MLT (*d* = .45), parent MLT (*d* = .59) and MLT ratio (*d* = .61).

Table 8. MLT and MLU variables: Mean and S.D. over time and treatment

|  | Control group | | | | | Responsive group | | | | | Structural group | | | | | F (Treatment x Time) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Pretest | | Posttest | | | Pretest | | Posttest | | | Pretest | | Posttest | | | |
| Variables | M | SD | M | SD | t(19) | M | SD | M | SD | t(19) | M | SD | M | SD | t(19) | |
| Parent MLU | 5.3 | 1 | 5.46 | .7 | -1.20 | 5.54 | .8 | 5.48 | .8 | .54 | 5.41 | .7 | 5.53 | .8 | -1 | .94 |
| Parent MLT | 1.51 | .2 | 1.7 | .4 | -2.2* | 1.67 | .3 | 1.51 | .2 | 2.51* | 1.59 | .3 | 1.54 | .2 | 1.43 | 7.74** |
| Child MLT | 1.49 | .3 | 1.42 | .2 | 1.36 | 1.32 | .2 | 1.41 | .2 | -2.5* | 1.42 | .2 | 1.35 | .2 | 1.46 | 3.87* |
| Ratio MLT child/ parent | 1.01 | .3 | 0.88 | .3 | 2.06* | .82 | .2 | .96 | .3 | -3.6* | .92 | .3 | .89 | .2 | .97 | 10.07** |

*Note:* MLU = Mean Length of Utterances; MLT= Mean Length of Turns. *p ≤ .05, ** p ≤ .01

### 3.4 Parents' Verbal Responsive Strategies

Finally, we predicted that parents would demonstrate a higher percentage of verbal responsive strategies (repeats, recasts, wh-questions, responsive labelling, requests for clarification and verbal praises) after the pragmatic/responsive intervention. A MANOVA was conducted on these percentages. A significant pre-post x group interaction was found only for percentage of recasts. Contrary to what it is expected, the pre-post comparison was significant in parents on S-group who increased their percentage of recasts (*p* = .02) after the intervention (see Table 9).

Table 9. Verbal responsive strategies: Mean and S.D. over time and treatment

| Variables | Control group | | | | | Responsive group | | | | | Structural group | | | | | F (Treatment x Time) |
| | Pretest | | Posttest | | | Pretest | | Posttest | | | Pretest | | Posttest | | | |
| | M | SD | M | SD | t | M | SD | M | SD | t | M | SD | M | SD | t | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % repeats | 4.8 | 2.8 | 5.3 | 3.6 | -.56 | 4.1 | 2.3 | 3.8 | 2.5 | .48 | 3.3 | 2.4 | 4.1 | 2.9 | -1.35 | .62 |
| % recasts | .93 | 1.2 | .52 | .7 | 1.39 | .5 | .7 | .22 | .5 | 1.59 | .3 | .4 | .9 | .9 | -2.46* | 3.19* |
| % wh. Questions | 10.1 | 4.6 | 10 | 5.9 | .11 | 9.3 | 4.2 | 11.6 | 7.4 | -1.5 | 10.2 | 4.3 | 10.8 | 5.6 | -.43 | .81 |
| % labelling | 2.6 | 1.5 | 2.7 | 2.4 | -1.2 | 2.3 | 3 | 1.8 | 1.7 | 1.05 | 2.7 | 2.6 | 1.7 | 2.1 | 2.02 | .85 |
| % requests for clarification | .4 | .9 | .4 | .7 | .21 | .3 | .6 | .36 | .7 | -.25 | .3 | .5 | .3 | .8 | -.29 | .08 |
| % verbal praises | .4 | .8 | .2 | .6 | 1.24 | .5 | .7 | .23 | .5 | 1.59 | .5 | .8 | .5 | .7 | -.06 | .7 |

*Note:* *p ≤ .05, ** p ≤ .01

## 4. Discussion

### 4.1 Training Effects

This pilot study aimed to test and compare the efficiency of two brief video parent-implemented language interventions for prevention purposes. Despite some limitations, this research extends the literature in several ways. Firstly, we focus on changing a unique parental communication feature in each intervention with a microtrial design. Generally, intervention studies don't follow such controlled methodology and focus on changing a variety of parental communication factors (Howe et al., 2010; Roberts & Kaiser, 2011). In this case, it is difficult to determine which specific characteristics of the parental training result in changes in child language development. Secondly, to the best of our knowledge, this research is the first to assess the efficiency of a one-session self-administered parent language intervention for prevention purposes. Finally, the study's methodology is particularly interesting for this type of research. Indeed, we carried out the entire session in a laboratory with a great degree of control over environmental variables.

Results gave a partial affirmative answer to the first research question: "Is it possible to modify parent/child communication with a forty-minute self-administrated parental intervention?" The purpose of the pragmatic/responsive intervention was to increase parent verbal responsiveness. We expected that this intervention would equilibrate parent/child Mean Length of Turn-taking ratio (MLT) and increase the number of parents' verbal responsive strategies (repeats, recasts, wh-questions, responsive labelling, requests for clarification, verbal praises). Although no increase of parental verbal responsive strategies was observed, an immediate enhancement of conversational capacities appeared after this intervention. Indeed, the turn-taking ratio became significantly more equilibrated after the increase of children's MLT and the decrease of parents' MLT. These significant effects showed that, after the pragmatic/responsive intervention, conversations became more equilibrated. It had been expected as a result of the intervention program's emphasis on waiting and balancing the taking of turns.

Nonetheless, no modification in the number of parental verbal responsive strategies (repeats, recasts, wh-questions, requests for clarification, responsive labeling, and verbal praises) was observed after the pragmatic/responsive intervention. This result is unexpected because an increase in the number of verbal responsive strategies is the greatest effect found after a parent-implemented language interventions (Roberts & Kaiser, 2011). Several explanations seem possible. First, it is possible that a forty-minute parent self-administered language intervention is adequate to modify the parent/child turn-taking ratio but not long enough to increase the number of verbal responsive strategies. Second, it is possible that there is a ceiling effect. Indeed, parents of language impaired children were generally less responsive to their children's utterances than parents of typically developing preschoolers (Carson, Carson, Klee, & Jackman-Brown, 2007). Contrary to other studies, the participants of the present research were a non-clinical sample of preschoolers. We can hypothesize that the parents produced already an important number of responsive strategies and were satisfied with their current parenting strategies (Lim et al., 2005).

Finally, the microtrial design allows us to answer the second research question: "What kind of intervention is the most efficient: an intervention that aims to increase parental verbal responsiveness or an intervention that aims to simplify parental language?" Indeed, no modification of parental language complexity and child communication appeared after the structural intervention. This result is in line with the literature in this area which shows that no study was able to demonstrate that interventions could decrease the level of caregivers' linguistic complexity (Kong & Carta, 2013). In

addition, Girolametto et al. (1999) found no relation between parental language complexity and child language development. In our study, as in the Girolametto's study (1999), children performed well in language comprehension. So, the lack of effects on parent's MLU can also be explained by the fact that the parents already spoke at a level that the children could understand. In addition, an increase in the number of recasts was observed after the structural intervention although it was expected to be a result of the pragmatic/responsive intervention. As this intervention explained the relationship between parental language and child language development, we can hypothesize that parents of this group had understood the importance of correcting child's utterance constructions.

*4.2 Clinical Implications*

The results of the study, though modest, have several implications. First, the positive effect of the pragmatic/responsive parent intervention may be a first step toward the creation and the evaluation of a preventive approach. This short program created an increase of the child verbal participation with a medium effect size. Literature showed that it correlates both with language development and fewer behavioral problems (Fagan & Iglesias, 2000; Girolametto et al., 2002; Roberts & Kaiser, 2011; Tommerdahl & Semingson, 2013). So, if replicated in large study, with a sample of children at-risk for language development, these findings would be considerably important because this kind of interventions could be available in settings that serve parents on a routine basis (the waiting room of a pediatricians, schools, day care). Furthermore, watching this kind of video program would be useful prior to initiating parent-implemented intervention as this might assist parents in identifying goals for the treatment (Lim et al., 2005).

Second, this pilot research tends to show the importance of self-administered parent language interventions. Advances in multimedia technology allow the development of individualized computer interventions. These new programs avoid some disadvantages of parent-implemented group interventions. First, little therapist participation is required; however telephone consultations or online monitoring of participants' activities remain possibilities. Second, as no therapist is present, these interventions destigmatize parental programs and avoid anxiety about their group nature (Gordon, 2000). Third, the length of the programs is flexible and can be adapted for parents who have different needs (Tannock & Girolametto, 1992). Fourthly, both parents could attend this kind of programs whereas, for practical reasons, only a small proportion of fathers participate in group programs. Finally, as they are administered at home, they eliminate practical barriers (transportation, child care, etc.). For these reasons, researches have demonstrated that completion rates were much higher than for group programs (Baggett et al., 2009; Calam, Sanders, Miller, Sadhnani, & Carmont, 2008).

Third, the present study innovatively used a randomized controlled microtrial design and demonstrated that it can bring a real added-value in the field of parenting interventions. Indeed, as several variables are usually manipulated together in parent-implemented interventions, it is difficult to identify which parenting competencies have the most effect on children communication. The present study attempted to disentangle the impact of two parenting variables (parental responsiveness and parent language complexity). Manipulations of this kind are useful for two reasons. Firstly, since microtrials incorporate experimental designs with random assignment, they can rule out potential confounds that correlational studies can miss. Therefore, it provides a way to clarify relationships between parenting variables. Second, it provides a way to compare the effects of different intervention components as an initial test of malleability prior to incorporating them as targets in full-scale programs (Howe et al., 2010). So, we suggest that it is a promising method for enhancing the efficiency of parent-implemented interventions.

*4.3 Limitations and Futures Perspectives*

It should be kept in mind that this study is a pilot which suffers of several limitations. First, the sample size is small (only twenty dyads per group) though adequate for a microtrial procedure (Howe et al., 2010; Mouton & Roskam, 2014). Second, because of time limitations, we have no clear indications of the long-term outcomes of the interventions for these dyads. Third, participants in the study were a non-clinical convenience sample. They were middle-class and represented a highly motivated group. Furthermore, they were not considered to be at risk in terms of children's language, in particular when looking at family characteristics (high parent educational level). That can explain the fact that some results did not appear because of ceiling effect. With other parents, similar results may not be obtained. Forth, although the pretest-posttest design is ideal for experimental manipulations, the proximity in time of the two free play session may have create test-retest effect bias. This could explain why the child conversational participation decreased on posttest for the control group. The responsive intervention had probably balanced this effect by increasing the child verbal participation. Fifth, the limited number of participants in each condition restrained the statistical analyses that could be computed to compare the intervention effect on mothers or fathers. The analysis of the influence of mothers versus fathers is complex and interesting as studies demonstrated gender differences in verbal interactions with children. For example, fathers take less turn-takings than mothers, respond less to child utterances, are less adept at understanding the child, ask fewer request for clarification and adapt less their vocabulary to the child level (Fagan & Iglesias, 2000). Future studies should include more participants in order to compare the intervention effect on mothers

and fathers. And finally, additional measures would have been useful. For example, the number of parent utterances that were responsive to the child previous utterances would have been an additional interesting measure of parent's responsiveness. In addition, an indicator of the complexity of parent's vocabulary could have been used. Lastly, it would have been interesting to evaluate children's emotional behaviors as some studies demonstrated an effect of parent-implemented language interventions on this competence (Brassart & Schelstraete, 2015; Kong & Carta, 2013).

So, this pilot study needs further investigations. Firstly, a replication with parents of children at-risk for language problems is needed. Indeed, research showed that parents of language impaired children were generally less responsive to their children's initiatives than parents of typically developing preschoolers. So, several questions can be posed: What the efficiency of a structural intervention on children with language issues? Does a responsive intervention leads to increase the number of parent verbal responsive strategies? Secondly, it will be useful to replicate the results with younger children (2- or 3-year-old) since the parent responsiveness plays a more important role at early developmental periods (Landry et al., 2006). Thirdly, as this study was performed in Belgium it will be useful to replicate the experiment on other countries. Nevertheless, we have no reason to believe that this had any special significance for the results of this study.

To conclude, despite some limitations, the results of the study show that a one-session self-implemented responsive intervention created some modifications in parent/typically developing preschooler verbal interactions. This program led parents to become less conversationally demanding and created an increase of child conversational participation. The present research demonstrates that brief parenting interventions show promise in working with families. It is clear that, to be more efficient, a range of delivery format (group program, individual, self-administrated programs) and several level of intensity of intervention should be available in order to respond to the different needs of families (Lim et al., 2005).

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