Efficacy of a Parent Program on Parent Communication in School-Aged Children with Developmental Language Disorders, a Pilot Study

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Abstract

Background: In children with a developmental language disorder (DLD), parent-child interaction is supposed to play an important role in children's language and socio-emotional development. Therefore, speech-language therapists provide programs to parents, mostly focused on pre-school children. However, parent programs are supposed to be effective in school-aged children as well. Because of the lack of parent programs for school-aged children with DLD in the Netherlands, at Royal Dutch Kentalis the eight-week parent program Interaction Communication Video Coaching is developed.

Aim: This study aims to evaluate the efficacy of ICVC on parent communication skills in interaction with their school-aged child with a developmental language disorder.

Method: A within participants pre-/posttest design is applied. All measurements took place during a eight-week treatment program at three assessment points. Data collection was based on videotaped parent-child interactions, performed by six parents and questionnaires completed by 11 parents.

Results: Unexpectedly, Following Ratio showed a significant decrease during therapy. Question Ratio showed a significant change post therapy; parents asked a diminishing number of questions. No significant increase was found in Language Modeling Techniques. In parent rating, a significant increase was found in total scores on questionnaires.

Conclusion: After a short intervention period, there are indications that ICVC could be efficient to change parent's questioning behaviour and to increase parent's rating of their communication skills during interaction with their school-aged child with DLD.

There's no clear explaination of the decreasing Following Ratio, which was expected to increase during therapy.

Recommendations: To look closer at the efficacy of ICVC, broader research is necessary in a multiple baseline design and with more participants. In future research, child language measures should be assessed also.

Keywords: Language Disorders/Therapy- Parent Program – School-Aged Children

Summary in Dutch

Doelmatigheid van een ouderprogramma bij kinderen met een taalontwikkelingsstoornis in de basisschoolleeftijd, een pilot studie

Samenvatting

Achtergrond: De interactie tussen ouders en hun kind met een taalontwikkelingsstoornis (TOS) is belangrijk voor de taalontwikkeling van het kind en om problemen op sociaal-emotioneel gebied te voorkomen. Daarom bieden logopedisten en zorginstellingen naast de spraak-taaltherapie ouderprogramma's aan. Voor kinderen met een TOS in de basisschoolleeftijd is er in Nederland geen ouderprogramma beschikbaar. Bij Koninklijke Kentalis is het ouderprogramma Interactie Communicatie Beeldcoaching (ICB) voor deze doelgroep ontwikkeld.

Doel en onderzoeksvraag: Het doel van huidig onderzoek is om de doeltreffendheid van ICB op oudercommunicatie te onderzoeken. De onderzoeksvraag luidt: 'Wat is het effect van ICB op de oudercommunicatie in interactie met hun kind met een TOS in de basisschoolleeftijd?'

Methode: Tijdens het behandeltraject bij het Kentalis Spraak & Taal Ambulatorium (STA) zijn op drie momenten data verzameld. Meetmomenten waren bij de start en afronding van de behandeling en vier weken post-therapie. Voor de primaire uitkomstmaten zijn van zes participanten video-opnamen van ouder-kindinteracties geanalyseerd. Voor de secundaire uitkomstmaten hebben elf participanten vragenlijsten ingevuld.

Resultaten: De 'Following Ratio' maakt een onverwachte, significante daling door. De 'Question Ratio' daalt significant. Er wordt geen significante verandering gevonden in de toepassing van taalstimuleringstechnieken door ouders. Op de oudervragenlijst wordt een significante stijging van de scores gevonden.

Conclusie: Het communicatief gedrag van ouders verandert significant tijdens het behandeltraject. Ouders lijken hun kind minder te volgen na het traject. Ouders stellen significant minder vragen. Op de vragenlijst scoren ouders significant hoger na behandeling. Op basis van de huidige studie is het niet mogelijk om harde conclusies te trekken over de doeltreffendheid van ICVC.

Aanbeveling: Voor een nauwkeuriger beeld van de effectiviteit van ICB is een grootschaliger onderzoek nodig, in een 'multiple baseline measures design' waardoor de daadwerkelijke bijdrage van ICB beter kan worden bepaald. In toekomstig onderzoek de taalvaardigheid van het kind moeten worden opgenomen in de uitkomstmaten.

Introduction

Approximately 7% (1-3) of the children has a Developmental Language Disorder (DLD), meaning they have persisting problems with language learning. These problems cannot be explained by physical, emotional or mental deficits (2,3). Due to DLD children experience problems in academic and social participation (4,5). Children with DLD experience also socio-emotional or behavioural problems (6,7), and have a significantly higher risk in developing social or psychiatric problems in adolescence (4).

Parent-child interaction is supposed to play an important role in children's language development (8) as well as in preventing a build-up of prospective social or psychiatric problems (9). Since 50% of the children with DLD experience socio-emotional or behavioural problems (6,7), the concern of a responsive parent-child interaction is emphasized.

In a responsive parent-child interaction, parents react adequate to the child's verbal and non-verbal communication attempts. Responsiveness also includes that parents' reactions are adjusted to the language level of the child and reduce ambiguity (10,11).

However, in the interaction between parents and their children with DLD responsiveness seems to be hampered (12). Hansson (2000) found an a-symmetric communication between parents and their pre-school children with DLD. Parents dominated these conversations by asking questions (8,13). Further, there are indications that parents of children with DLD often use a directive and a less responsive interaction style than parents of typically developing children. Tannock and Girolametto (1992) suggest an 'ideosyncratic feedback cycle' in which the child's language influences parent's language and vice versa. In this cycle, the parent attempts to compensate the language problems of his child (12,14). For children with DLD, this results in diminished opportunities to develop language and conversational skills (12,15).

So, speech language therapists (SLT's) involve parents in language therapy by providing parent programs which are generally referred to as 'Parent Child Interaction Therapy' (PCIT) (16) or 'Enhanced Milieu Teaching' (EMT) (17). In a meta-analysis, Roberts & Kaiser (2011) report nine different parent approaches used by SLT's (11,18). SLT's report consensus about the following strategies they teach to parents: 'following the child', 'waiting for the child to talk', 'expanding, repetition, modelling' and 'don't ask test questions' (18).

Commonly, parent programs are based on essential communication elements like the responsivity of the parent, the quantity of language, and language modelling techniques (e.g. recasts, expansion of utterances) (18).

PCIT is mainly provided to parents of pre-school children with DLD. However, also for school-aged children, PCIT seems to be useful (8,16).

In the Netherlands, for school-aged children with DLD, there's a lack of parent programs. Therefore, at Royal Dutch Kentalis the Interaction Communication Video Coaching program

(ICVC) is developed. ICVC is based on interaction principles as described by Pepper and Weizman (2004) (19) and on Video Interaction Coaching's principles (20).
ICVC is provided to parents at the Kentalis Speech and Language Center (KSLC) during an eight-week treatment period. Similar to PCIT, ICVC uses video to make parents aware of their interaction style and the effects on their child (8,21). In ICVC, the next communication elements are explained to parents: 'following the child', 'don't ask questions' and 'adapt language modeling techniques'.
Until now, the efficacy of ICVC has not been evaluated. Since it is the first parent program for school-aged children in the Netherlands, assessing the efficacy of ICVC is important. Possibly ICVC could be adapted in other settings in the Netherlands like health care institutions or schools who provide care or education to school-aged children with DLD.

Research Questions

The aim of this pilot intervention study is to evaluate the efficacy of the ICVC parent program on parents' communication skills with their school-aged children with DLD.
The following research questions are answered:
Do parents' communication skills ('Following your Child', 'Questioning' and 'Language Modeling Techniques') change after eight weekly coaching sessions with the ICVC parent program?
The second research question is: Do parent's ratings on a ICVC questionnaire change after eight weekly coaching sessions?

Hypothesis

In primary outcome measures, it is hypothesized that there would be a significant increase in 'Following Ratio' and 'Language Modeling Techniques', and a significant decrease in 'Question Ratio'.
In secondary outcomes, a significant increase of total scores on the ICVC questionnaire is hypothesized.

Method

Design

In this intervention study a within participants pretest/posttest design is applied.Three types of parent communication skills are measured, based on parent-child interaction video tapes. To gain information about parent rating, questionnaires are completed. Measurements took place at three time points.

Setting

This study is accomplished at the KSLC. This centre provides a specialized interdisciplinary eight-week treatment to children with DLD and their parents. Children receive individual neuropsychological and speech-language treatments, watched on television screens by both parents.

While watching their child during a speech-language treatment, a communication coach provides the ICVC principles to parents. Main goals are to create awareness about parents' communication, to inform parents about interaction principles and to increase responsiveness in the parent-child interaction. ICVC elements are pointed out in Figure 1. ICVC principles are explained by means of the communication between their child and the therapist in the treatment session watched on a television screen. Every week, at the end of this treatment session, one of the parents practices specific interactional elements with his child during activities like playing or cooking. This 'parent-child interaction session' is videotaped. Afterwards, the videotape is watched and discussed by the parents, the communication coach and the SLT.

Parents perform alternately in the 'parent-child interaction session' to get aware of their interaction style and communication skills. So at the end of the eight-week treatment, four videotaped parent-child interaction sessions of each parent are made.

Participants

In- and exclusion criteria

In order to be eligible to participate in this study, parents meet the following criteria:

- The participants are Dutch native speakers or proficient Dutch speakers.
- The participants' child meets the inclusion criteria for the KSLC.
  Children are referred to the KSLC when they meet the following criteria: Score on an intelligence test above 70; scores on standardized language tests below -1.5 SD in at least two language domains even after at least six months of treatment by an SLT. About the child, parents, school or the SLT question about the most suitable treatment for the child. Often, they report a stagnation in the educational development of the child.

Exclusion criteria

Parents who meet any of the following criteria are excluded from participation in this study: Unable to communicate in Dutch, deaf or blind.

Subjects

During the research period, nine children and their parents (totally 18) were referred to the KSLC. From these parents, seven didn't meet the entry criteria, so 11 parents of six children were included in the study. The parent group existed of five couples, one parent participated as a single. Children were all boys with a mean age of 7;2 years (range 5;1-9;2 years).

To collect data for primary outcomes, parent-child videos taken in the first and last treatment week, and four weeks after treatment, are used. This implies that one parent per child could be included, since every treatment week one parent per child is videorecorded.

So from 11 parents, six parents entered the study to gain data for primary outcome measures. These parents are described as 'Parents (*a)*'.

To collect data for secondary outcomes, parents *(a)* and their partners *(b)* were asked to complete parent questionnaires. Totally 11 parents *(a+b)* completed questionnaires at three measurement points.

Variables

First primary outcome measure is 'Following Ratio' (FR), related to the ICVC element 'Following your Child'. Comparable to the Baxendale study (22) and to the Allen study (8), FR is computed by counting the total number of the child's verbal initiatives divided by the total number of parents' verbal initiatives. A score close to 1 is a desirable score, then if the number of verbal initiatives is equal for child and parent, this indicates a balanced interaction.

Second primary outcome measure is 'Question Ratio' (QR), related to the ICVC element 'Act and Mention'. QR is computed by counting the number of asked questions by a parent and divide this number to the total number of parent's utterances. A low score indicates more responsive language behaviour.

Third primary outcome measure is 'Language Modeling Techniques' (LMT). Related to the ICVC element 'Confirm your Child's initiative', the language modeling techniques 'repetition' and 'recast' are explained to parents. Related to the ICVC element 'Add Language', parents are explained how to expand their child's utterances.

By counting the number of repetitions, recasts and expansions and divide them to the total number of parents' utterances, the ratio of language modeling techniques parents use in the interaction with their child is obtained. A score close to 1 indicates responsive and language modeling behaviour.

Parent rating is computed as a secondary study parameter. Parents scored a parent rating list, counting six items related to the ICVC program. The questionnaire is listed in Appendix A.

Data collection

Assessments took place at the start of the treatment program (T1), in the eighth (i.e. the last) treatment session (T2), and four weeks after the last treatment session (T3). Table 1 shows a measurement timetable.

Data for primary outcome measures are collected by videotaped 'parent-child interactions'. Recording was made in the therapy room. All parents received the same instruction, given by the communication coach who is informed about the study but not actively involved.

To standardize the interaction context, all parents accomplished a kind of construction activity. At T1 and T2 they played with play dough, at T3 they played with LEGO® bricks. The choice to create something was made since it's supposed that a context of acting encourages a more responsive interaction than book reading (23).

Data for the secondary outcome measure were collected by questionnaires. Parents scored a parent rating list (Appendix A) at T1, T2 and T3. The rating list counts six items scored on a continuous 100mm line.

Video analysis

Parent-child interactions took 8 minutes. First and last minutes were not included in the analysis. Parent's and child's utterances were transcribed manually. Relevant communication elements were counted and entered in an Excel document. In order to carry out an objective and reproducible video analysis, the Dutch 'STAP-Analyse' (24) is used to analyse parents' as well as children's utterances. This instrument provides guidelines to distinguish verbal initiatives from (elliptic) answers. Further, the videos were analysed in terms of the following communication elements of parent communication:

- Verbal initiatives, described as a verbal start of one or more turns, which are no answers or reactions to former turns.
- Answers/reactions to the child, described as a direct answer or reaction to the child's communication.
- Questions, described as questions to the child.
- Repetitions of the child's utterances, described as repetitions of (a part of) the child's utterance.
- Expansions of the child's utterances, described as a (partly) repetition of the child's utterance, expanded with words or constituents.
- Recasts, described as a corrected repetition of an incorrect utterance.

Data-analysis

Data-analysis is accomplished using the IBM Statistical Package for Social Sciences 22 (SPSS) (25).

To compute the results on primary outcomes, values of all primary outcomes were compared between participants at T1, T2 and T3. Because the lack of conditions for normality, the non-parametric Friedman's ANOVA for repeated measures is used.

Totally sixteen videotapes were analysed by the researcher, who is a SLT at the KSLC. To compute inter-rater reliability, a linguistic student analysed two videotapes. Agreement is found to be high (Cronbachs alpha $\alpha = 0{,}964$; $p = 0{,}000$). Statistics are shown in Appendix B.

To compute the secondary outcome measure, totals of scores on the continuous 100mm scale were summed per parent at every measurement point. The differences in these total scores on the parent rating scale are analysed with the non-parametric Friedman's ANOVA.

Procedures

When referred to the KLSC, parents who met the inclusion criteria where asked to join the study. First, the researcher spoke with parents and handed written information. Afterwards, the researcher made phone calls with all parents to discuss participating the study. All parents gave written consent to join the study.

Ethical Issues

This study is conducted according to the principles of the Declaration of Helsinki and in accordance with the Medical Research Involving Human Subjects Act. The study proposal is judged by the METC (Medical Ethical Committee). Personal data are handled according the Dutch Personal Data Protection Act (In Dutch: Wet Bescherming Persoonsgegevens).

Results

Participants

Not all participants completed te study. Parents (*a+b)* of child 2 dropped out at T3 due to familiar circumstances. Coincidently, at T2 the same parent's (*a*) videotape couldn't be analysed due to technical problems. Participants characteristics (parents *a*) are shown in Table 2.

Primary Outcome Measures

Graphs of ratio's on primary outcome measures 'Following Ratio' (FR), 'Question Ratio' (QR) and 'Language Modeling Techniques' (LMT) are shown in Figure 3. Table 3 reports scores and means for every primary outcome measure.

In FR, Friedman's ANOVA for repeated measures shows no significant difference between measurement points (p = 0.165 F_r = 3,600). Although no significant results were found, further investigation seemed reasonable because of the small sample size (26). Wilcoxon Signed Ranks Test shows a significant change is found between T1 and T2 (Z= -2,023, p = 0.043). No significant changes are found between T1 versus T3 and T2 versus T3.
In QR, Friedman's ANOVA shows no significant difference between measurement points (p 0.091 F_r 4,800). Wilcoxon Signed Rank Test shows a significant decrease of question ratio between T1 and T3 (Z= -2.023, p = 0.043).
In LMT, no significant differences between measurement points are found (p = 0.549, F_r =1,200). Wilcoxon Signed Rank test shows no significant changes between two measurement moments either.

Secondary Outcome Measures (Parent Rating)
Friedman's ANOVA computes significant differences in sums of scores on questionnaires between measurement points for all participants (*a* and *b*) (N=9 p 0.050 F_r 6,000). Post-hoc testing with Wilcoxon Signed Rank test shows a significant difference between T1 and T2 (Z = -2,179, p = 0,029). Total scores on questionnaires are listed in Table 4.
When computed for participants *a*, no significant differences are found (p = 0.247, F_r = 2,800). For participants *b*, no significant differences are found (p 0.174 F_r 3,500). Post-hoc testing with Wilcoxon Signed Rank test shows a significant difference between T1 and T2 for parents *a* (Z-0,647 p 0,050) but not for parents *b.*

Discussion
This study aims to evaluate the efficacy of the ICVC parent program on parent communication skills with their school-aged child with DLD, during the 'care as usual' treatment program at the KSLC. The evaluation is achieved by analysis at three measurement points at the beginning and end of the 8-week treatment, and after a 4-week consolidation period without intervention.
Main findings from this study are significant changes in the primary outcome measures 'Following Ratio' and 'Question Ratio', and a significant change in parent rating as a secondary outcome measure.
First, instead of an hypothesized increase, FR shows a significant decrease between T1 and T2. Between T2 and T3, a trend to increase is seen, but this is not significant and does not even reach levels measured at T1. This finding is deviant from the results of the Allen study (8) where child/parent ratio increased significantly after a 4-week intervention and a 6-week

consolidation period. Baxendale (22) found no significant changes in parents' turntaking either, where Falkus (16) did find an improved parent/child ratio in a study with pre-school children during a 10-week intervention. Measurements in the Allen study (8) counted also non-verbal behaviour, where in the current study only verbal initiatives were taken into account. Possibly this explains the different findings. However, in literature, overall findings in parents' following behaviour vary, letting questions about influencing following behaviour unanswered.

Second, QR shows a significant change between T1 and T3. So it seems that parents are able to diminish the number of questions they ask their children, also during a retention period without intervention. Probably, for parents questioning is a concrete skill which is more easy to adapt. In the Klatte (18) study, SLT's report asking test questions as a theme of their parent programs. Questioning was not found as a variable in other studies, but based on current study, it could be a recommendable variable to take into account in assessing parent-child interaction.

Third, no change was found in the use of language modeling techniques by parents. Possibly the 8-week period is too short to learn specific language techniques which fits the child's language level. In her systematic review, Blackwell (15) reports a few studies in which parents showed a significant improvement in adapting language techniques, for example Conti-Ramsden (27) and Paul & Elwood (28). These studies were appraised of medium quality, and studied preschool children, whose language level probably makes it easier to adapt language techniques compared to school-aged children.

Finally, the results of parents ratings are significantly positive. These findings are not fully consistent with the results on primary outcome measures, since they don't reflect the decreasing FR and the lack of changes in LMT. So it is recommended to reconsider and adapt the ICVC questionnaire.

This study knows several strengths and limitations. Strength of this study is the fact that it represents care as usual at KSLC. Since there's no need to large modifications or high costs to accomplish, this will facilitate prospective research.

Further, this is the first study to parent programs for school-aged children with DLD in the Nehterlands. It could be the start of further development of parent involvement in care and education for school-aged children with DLD.

The first limitation is the fact that this study was conducted by one person. Further, the small number of participants limits the external validity of this study. Third, the study has a selection bias; children referred to the KSLC are children with persisting language problems. This could have influenced the adaption of ICVC.

Coincidently, all included parents have a medium or high educational level. The lack of low educated parents could have biased the results.

For a robust study design, the inclusion of a no treatment control group would have been desirable. But, withholding children and parents from therapy can be regarded as unethically, so no controls were included in this study.
To gather more knowledge of the efficacy of ICVC on parent-child interaction in school-aged children with DLD, it is necessary to carry out a larger study. In this study, children of the other Kentalis Speech Language Centers in the Netherlands could be included. To clarify the development of parent-child communication, a multiple baseline design is recommended. In a larger study, also child outcome measures could be assessed.
Finally, it would be worthwhile to cooperate with British health care institutions who provide PCIT, to gain a strong base for the evidence of parent programs in school-aged children with DLD.

Conclusion

In parent-child interaction, ICVC could be efficient in influencing parents' communication with their school-aged child with DLD. However, further research is necessary. Based on the current study, it is not possible to draw strong conclusions.

Figures and Tables

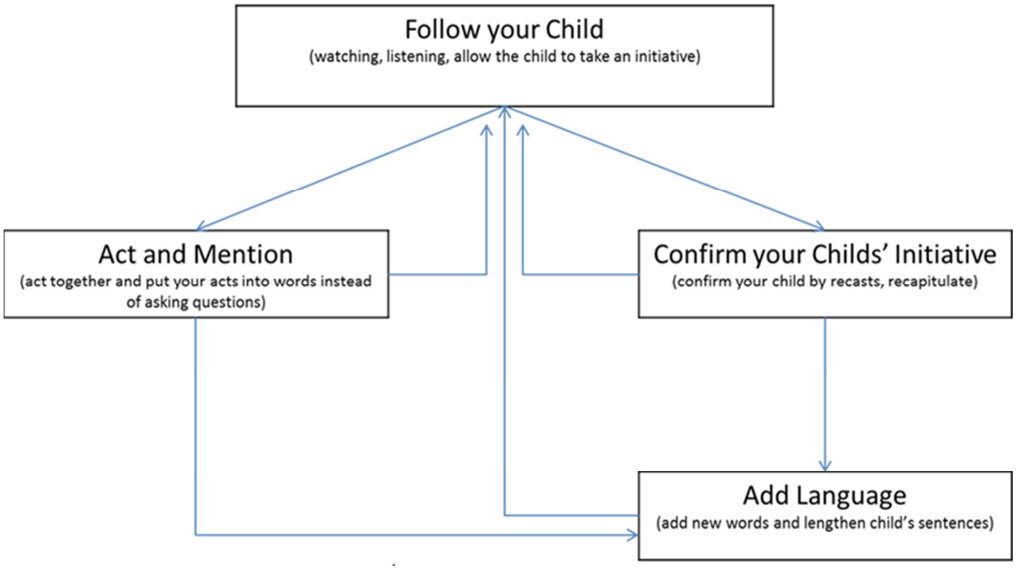

Figure 1. ICVC Communication Model

Table 1

Measurement Points during Treatment

Week (measurement point)	**1 (T1)**	**2-7**	**8 (T2)**	**9-11**	**12 (T3)**
ICVC information	*a+b*	*a+b*	*a+b*		
Video analysis	*a*	*b/a alternately*	*a*		*a*
Questionnaire	*a+b*		*a+b*		*a+b*

Parents (a) are parents whose videotapes are used for data-analysis at T1, T2, T3. Parents (b) are spouses of parents (a).

Table 2

Participant Characteristics

Child ID	Age C[1,2]	Sexe[3] C	Intelligence Level	Main language problem	SLT treatment history	Sexe P[6]	Educational level parents group *(a)*
1	5;1	M	89[4]	Phonology	Private practice, once a week, 3 years	M	High
2	5;7	M	103[4]	Phonology	Private practice, once a week, 3 years	F	High
3	5;9	M	100[4]	Phonology	Private practice, once a week, 2,6 years	F	High
4	9;0	M	93[4]	Semantics, Word finding	At school for children with DLD, 3 years	F	Unknown
5	8;3	M	125[4]	Word finding	Private practice, once a week, 3 years	F	High
6	9;2	M	87[5]	Semantics, Narratives	Private practice; once a week, 3,6 years	M	High

[1]C=Child; [2] = age in years;months at the start of investigation, February 1st 2017; [3]M= male; [4] Measured with SON-R 2 ½ - 7, is a non-verbal intelligence test, [5] Measured with WISC-III, general intelligence test; [6] P=Parent group (a).

Table 3

Primary Outcome Measures

	Following Ratio (FR)			**Question Ratio (QR) (inversed scores)**			**Language Modeling Techniques (LMT)**		
Parent *(a)*	**T1**	**T2**	**T3**	**T1**	**T2**	**T3**	**T1**	**T2**	**T3**
1	0.369	0.264	0.825	0.515	0.494	0.544	0.092	0.118	0.085
2	0.567			0.716			0.085		
3	0.957	0.851	0.657	0.685	0.574	0.700	0.206	0.087	0.176
4	0.493	0.273	0.500	0.739	0.691	0.786	0.173	0.000	0.093
5	0.600	0.500	0.596	0.543	0.786	0.945	0.039	0.093	0.104
6	0.851	0.539	0.450	0.574	0.787	0.633	0.087	0.076	0.032
Mean (SD)	0.654 (0.245)	0.485 (0.240)	0.606 (0.146)	0.611 (0.962)	0.666 (0.130)	0.721 (0.153)	0.119 (0.682)	0.075 (0.445)	0.098 (0.052)

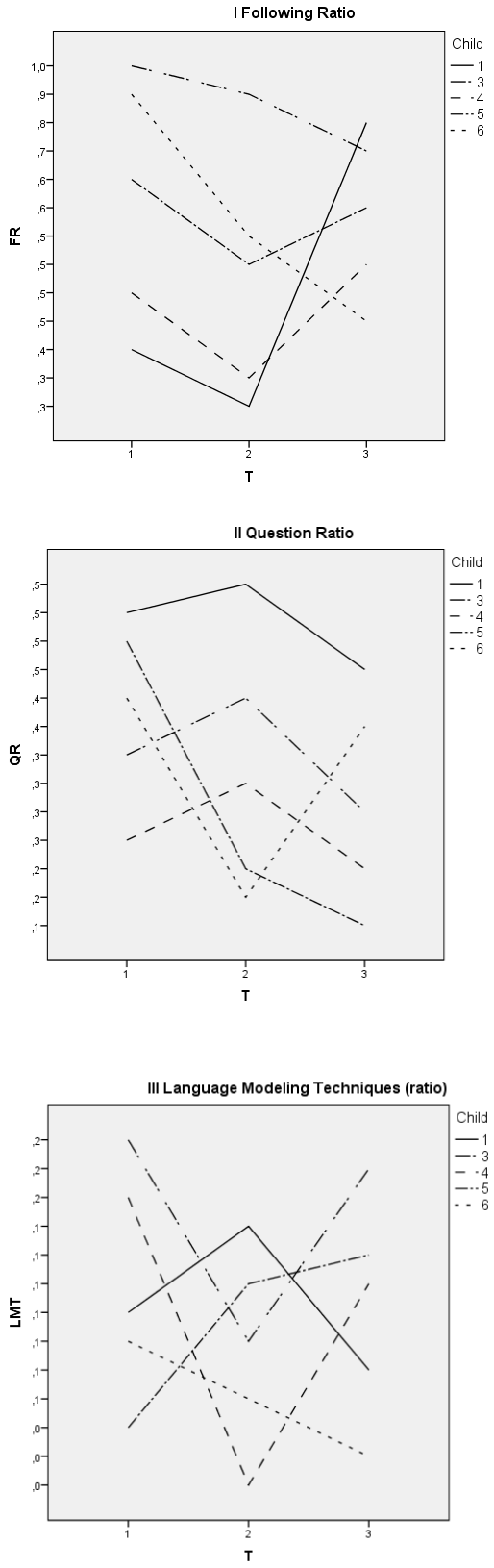

Figure 3. Primary Outcome Measures (I) Following Ratio, (II) Question Ratio and (III) Language Modelling Techniques at three assessment points (T) per parent (a).

Table 4
Secondary Outcome Measures

Parent *a* (child)	**T1**	**T2**	**T3**
1 (1)	374	407	420
2 (2)	331	378	
3 (3)	368	512	472
4 (4)	395	384	290
5 (5)	300	335	389
6 (6)	350	361	386
Parent *b* (child)			
7 (1)	331	444	461
8 (2)	349	308	
9 (3)	315	389	373
10 (5)	355	358	320
11 (6)	314	412	442
Mean (N=11)	343.82	389.92	394.78
(SD)	(28.764)	(55.107)	(61.613)
Range	300-395	308-512	290-472

Totals on ICVC Questionnaire. Maximum total score is 600.

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Appendix A

Interaction Communication Video Coaching - Parent Rating Scale

Oudervragenlijst
Op de plaats die u het best vindt passen bij uw antwoord zet u een verticaal streepje.

1. Binnen een activiteit laat ik mijn kind leiding nemen

NOOIT ---------- VAAK

2. Ik stel vragen om het gesprek gaande te houden.

NOOIT ---------- VAAK

3. Ik benoem wat ik mijn kind zie doen.

NOOIT ---------- VAAK

4. Ik bevestig mijn kind door zinnen van mijn kind in de correcte vorm te herhalen.

NOOIT ---------- VAAK

5. Ik gebruik inhoudswoorden in plaats van woorden als ‘deze’, ‘die’, ‘daar’.

NOOIT ---------- VAAK

6. Ik reageer op zinnen van mijn kind door deze uit te breiden.

NOOIT ---------- VAAK

Appendix B

Inter-rater reliability

Case Processing Summary

		N	%
Cases	Valid	6	100,0
	Excluded[a]	0	,0
	Total	6	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
,982	2

Intraclass Correlation Coefficient

	Intraclass Correlation[b]	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	,964[a]	,770	,995	54,890	5	5	,000
Average Measures	,982	,870	,997	54,890	5	5	,000

Two-way random effects model where both people effects and measures effects are random.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type C intraclass correlation coefficients using a consistency definition. The between-measure variance is excluded from the denominator variance.