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A report on the development and clinical application of Lexipontix, a new therapy programme for school age CWS

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Abstract

The development of 'Lexipontix', a structured therapy programme for children who stutter (CWS) 8 to 12 years, is presented. 'Lexipontix' is based on principles and clinical practices of Cognitive Behavioural Therapy, Parent-Child Interaction Therapy, Solution Focused Brief Therapy, Fluency Shaping and Stuttering Modification Therapy. Therapy aims at 'Communication Restructuring' and is based on a metaphor and a theme. It develops as a rolegame between a 'Superhero' (the child), an 'Alliance' (the family) and a naughty mouse called 'Lexipontix'. Two case examples are presented. Formal and informal assessment results are discussed in relation to the structure and the content of the programme.

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1. Introduction

'Lexipontix' is a structured therapy programme for school age Children Who Stutter (CWS). It is based on theoretical principles and clinical practices of Cognitive Behavioral Therapy (CBT) (Beck, 1967a; 1967b; Beck, 1995), Parent-Child Interaction Therapy (PCIT) (Eyberg et al, 1999; Kelman & Nicholas, 2008), Solution Focused

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Brief Therapy (SFBT) (Berg, 1999; De Shazer, 1988; De Shazer et al, 2007), Fluency Shaping (Ingham & Andrews, 1973) and Block Modification (Van Riper, 1971; 1973).

The therapy programme aims to address the overall stuttering experience of the child (WHO, 2001; Yaruss, 2010). Parents and child are engaged in therapy as equal partners (Anderson & Gehart, 2007; Biggart, Cook & Fry, 2006). Therapy is built on a theme, it is fun, it makes sense and it is about exploring and understanding the stuttering experience, finding alternative ways of management and producing meaningful changes (Botterill, 2011; Fry & Cook, 2004; Fry & Farrants, 2003).

School age children are familiar and often empathize with fictional characters. The protagonists in '*Lexipontix*' are the child in the role of a '*Superhero*', who tries to defend her '*Factory of Mind*' (Fig. 1.), and a naughty mouse called '*Lexipontix*' which tries to '*Intrude/Invade*' the '*Factory of Mind*' and '*Sabotage*' the '*Factory Machines*' (see Appendix C for a glossary of terms). The child is empowered with '*Allies*' and '*Tools*' and is involved in '*Missions*' and '*Experiments*' in order to deal with the activity of '*Lexipontix*'. There are four interrelated '*Factory Components*' that work synergistically in communication, before, during and after a communicative event: The '*Machine of Thoughts*', the '*Lab of Emotions*', the '*Body Sensors*' and the '*Machine of Actions and Words*'. These '*Components*' correspond to the key elements of the CBT cycle: Thoughts, Emotions, Somatic reactions, and Behaviours (Beck, 1967a). The '*Factory*' is regulated by the '*Control Centre*' which is the central control panel of the '*Factory of Mind*'. It continuously receives and sends information, keeping all '*Factory Components*' in equilibrium.

'*Lexipontix*' is a well known visitor representing both internal as well as external threats. The former corresponds to the organic and personal (affective, cognitive & behavioral) factors of stuttering, the latter to environmental and communicative variables. Against '*Lexipontix*' is a '*Superhero*', the CWS. Stuttering occurs when '*Lexipontix*' attempts to intrude into the '*Factory of Mind*' (anticipation of a stuttering event), '*Sabotages*' any of the '*Factory Machines*' (the experience of a stuttering event), or '*Invades*' the '*Control Centre*' of the '*Factory*'. Invasion, as a result of a successful sabotage, triggers a vicious cycle leading to avoidance or to a moment of stuttering.

As therapy progresses the child is empowered to self-discover his own super-role in therapy, his '*Super-Powers*' potentials and skills, which he uses to dominate '*Lexipontix*'. Like most '*Superheroes*' the child has a supporting network of friends or co-workers. This is the therapeutic '*Alliance*' which the child gradually builds and broadens. Parents, as part of the '*Alliance*', are allocated their own cognitive, emotional and behavioral therapy aims. They are empowered to achieve a shared understanding of their child's difficulty (cognitive level), to empathize with the child by recognizing his thoughts and emotions (emotional level) and to act as fluency and communication facilitators (behavioral level).

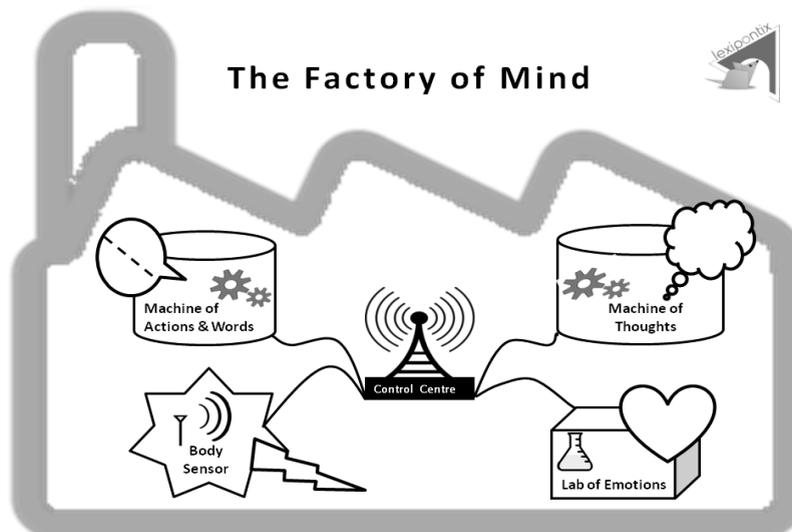


Fig. 1. The '*Factory of Mind*'

In 'Lexipontix' terminology, therapy aims to empower the child to gain, retain, maintain or regain control over the 'Control Center' of the 'Factory'. In this way 'Lexipontix' is kept under control and his invasions have no significant impact on the functioning of the 'Factory of Mind' (Fourlas & Marousos, 2014). The child gradually experiences a rationalized and harmonious relationship with his stuttering and stuttering is not a worrying threat any more. This aim is compatible to the nature of stuttering and the CBT orientation of the programme.

1.1. Structure & content of the programme

The programme develops in two phases. Phase A (see Fig. 2) lasts for 12 weeks. Then progress is assessed and additional therapy may be recommended in phase B according to individual needs. For children in no need of further therapy, follow up sessions are scheduled in 1, 3, 6 and 12 months (Fig. 2). Phase A consists of a 'Core Structure' and several optional 'Modules'. 'Modules' are distinct entities of inter-related clinical tools and practices adjacent to the 'Core Structure'. In phase B additional modules are implemented sharing common to phase A therapy principles and clinical practices. This adaptable 'Modular Structure' provides the programme with the necessary flexibility to meet individual needs.

For children with low motivation and parents with unrealistic outcome expectations or low engagement readiness, a preliminary phase may precede the programme. This preceding phase is called 'Pre-Alliance Phase' (PAP) and incorporates 'Pre-Alliance Motivation' phase for children (PAM) and 'Pre-Alliance Negotiation' phase (PAN) for parents. PAM aims to help children to commit themselves to therapy by expressing their own best hopes, identifying and challenging established safety behaviours, and considering prospects of alternative solutions. PAN aims to maximize parental engagement. By receiving information and identifying their unique strengths, such as being experts on their own child, they are encouraged to realize their key role as "modulators" (Packman, 2012; Packman & Attanasio, 2004).

1.2. Administration: 'Core Structure' and optional 'Modules'

Figure 2 presents an outline of the 'Core Structure' & 'Modules' of the programme which will be discussed below:

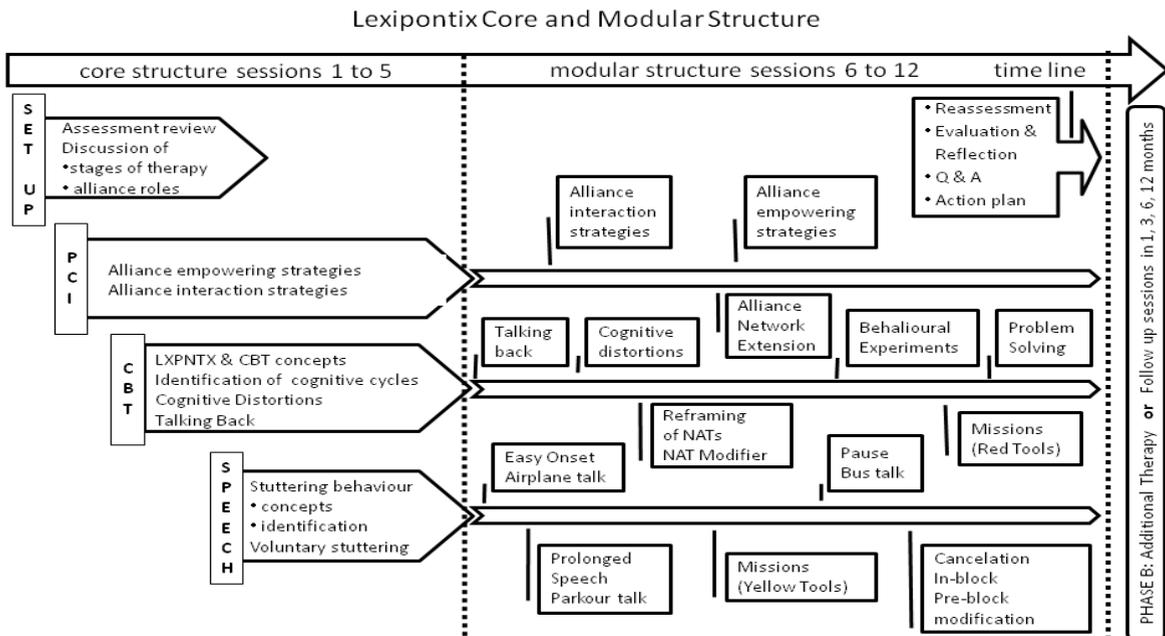


Fig. 2. 'Core & Modular Structure' in 'Lexipontix'

1.2.1. The Parent-Child Interaction Therapy component of 'Lexipontix'

The Parent-Child Interaction Therapy (PCIT) component (Eyberg, 2005; Eyberg et al, 1999; Kelman & Nicholas, 2008; Querido, Bearss, & Eyberg, 2002; Zisser & Eyberg, 2010) is introduced from day one in the form of '*Alliance Interaction Strategies*' and '*Alliance Empowering Strategies*'. Special time is introduced to (a) help the child and the family make use of their own potential (Millard, Nicholas & Cook, 2008), (b) help the therapist get additional information on individual strengths, and family dynamics and family communication at an early stage in the programme, (c) prepare the ground for family board games, (d) strengthen the '*Alliance*' relationships, and (e) build a safe and desensitized environment for practicing '*Yellow Tools*' and '*Red Tools*' (i.e. '*Tools*' for speech and '*Tools*' for thoughts and emotions, respectively). The child progressively recruits more members in the '*Alliance*', expanding the '*Alliance Network*'. The '*Core*' and '*Modular*' PCIT component of the programme is presented in Table 1.:

Table 1. '*Core*' and '*Modular*' PCIT component

	<i>'Alliance Interaction Strategies'</i> (list not exhaustive)	<i>'Alliance Empowering Strategies'</i> (list not exhaustive)	<i>'Alliance Network Expansion'</i>
<i>'Core Structure'</i>	<ul style="list-style-type: none"> child takes the lead in play child regulates/leads the alliance 	<ul style="list-style-type: none"> special time praise desensitization / openness about stuttering 	
<i>'Modular Structure'</i>	<ul style="list-style-type: none"> communication rate modification linguistic modifications 	<ul style="list-style-type: none"> desensitization / openness about stuttering turn taking 	<ul style="list-style-type: none"> advertising recruiting Allies assertiveness

1.2.2. The CBT component of 'Lexipontix' – '*Red Tools*'

CBT is a form of psychotherapy which was originally developed by Aaron Beck (Beck, 1967) and it is increasingly used with young children who do not stutter (Monga, Young & Owens, 2009; Stewart, Christner & Freeman, 2007) as well as with CWS (Cook & Botterill, 2009; Scott, 2010). CBT has helped us understand the links between a person's thoughts, feelings, physical reactions, and behaviour. Similarly, by applying the CBT model in stuttering therapy, CWS are helped to realize cognitive ("they will think I am stupid if I stutter"), emotional (anxiety, fear), physical (sweaty palms, raised heart rate) and behavioural reactions (increased stuttering or avoidance behaviours) associated with the moment of stuttering.

In the '*Core Structure*' of the programme the CBT component involves:

- identification of feelings and attitudes
- identification of Negative Automatic Thoughts (NATs) (Beck, 1967a; 1967b)
- initial processing of NATs by means of "Talking Back" (Cook & Botterill, 2009).
- identification and challenging of cognitive distortions (Beck, 1995)

Games and therapy activities have been developed to serve these aims. Certain clinical tools and practices have been incorporated such as Socratic questions (Padesky, 1993), '*Anxiety Meter*', similar to Worry Dial (Scott, 2010), rating scales, identification and challenging of NATs, exploring for alternatives, behavioural experiments (Menziez et al, 2008; Menziez, Onslow, Packman & O'Brian, 2009; Stallard, 2005), progressive exposure (Beck, 1995) and so on.

Certain CBT clinical practices have been developed as autonomous clinical tools and modules (Cook & Botterill, 2009; Scott, 2010, Stallard, 2005). These are:

- problem solving
- behavioral experiments
- "Talking Back"
- reframing of NATs by means of modification

1.2.3. The Speech control component of 'Lexipontix' – 'Yellow Tools'

In 'Lexipontix' we adopt a stand point that focuses on functional speech control (Furlas,2011). Speech techniques (see below) are used to serve certain communicative demands and to enhance functional communication. Speech techniques are used in purpose and to produce meaningful results. Contrastive production, that is talking using the technique and the 'anti-technique', is practiced to enhance understanding. Children are guided to self-discover which technique serves best the communicative demands of a specific communicative event. Yet, they learn how to make use of the techniques in 'Missions' and behavioural experiments in order to challenge cognitions and to control emotional reactions. 'Missions' are collaboratively designed actions for practicing 'Red' and 'Yellow Tools' in real-life communicative events. Both fluency shaping (Ingham & Andrews, 1973) and stuttering modification techniques (Van Riper, 1971; 1973) are included in the programme. Different speech techniques constitute separate modules.

The following modules have been incorporated:

- 'ParkourTalk' - Prolonged speech
- 'Airplane Talk' - Easy onset
- 'Bus Talk' – Pause
- 'Rebound Talk' – Cancellations
- 'Instant Parkour Talk' - Pull outs
- 'Cassandra Talk'- Pre-block modification

Labels for the techniques are not fixed. Children are encouraged to negotiate and set up their own jargon.

2. Method

Certain steps were followed for the development of the programme:

- review of literature and related clinical practices.
- review and consultation on the CBT components by an external CBT trained psychologist.
- peer review
- clinical trial
- feedback on the clinical application of therapy components by external therapists
- revisions

During the clinical trial phase data were collected and recorded by means of (a) detailed therapy notes, (b) written reflection, (c) consumer feedback recording, (d) pre and post therapy formal assessments, (e) pre and post therapy informal assessments and interviews, (f) evaluation questionnaires. Following a trial period, modifications were made to the initial version of the programme in terms of content, structure and material used. The development process as well as modifications made in the initial version are extensively discussed in Furlas and Marousos (2014) and presented in www.lexipontix.gr. Two case studies of the clinical application of Lexipontix will be discussed next. The application of the programme in those two cases was part of the final stage in the process of development of the programme.

2.1. Participants and Data Collection

Five families were involved in clinical trials. Pre-, in- and post- therapy data were collected by means of informal and formal procedures. Informal questionnaires, parent and child interviews, subjective scales and an assessment protocol on "body functions", which includes stuttering measurements, were used. Detailed therapy notes, extensive written reflection, and parental/child feedback were used to evaluate the programme in terms of content, structure and timing. Informal and formal assessments were used to record treatment outcomes in descriptive and objective terms respectively. These include structured parent and child interviews, the Communication Attitude Test (CAT-R) (Brutten & Dunham, 1989), the Overall Assessment of the Speaker's Experience of Stuttering – School Age (OASES-S) (Yaruss & Quesal, 2010) and the Palin Parent Rating Scales (Palin PRS) (Millard, 2002; 2013).

Of all the five participants in clinical trials only the two children attended at the most recent version of the programme will be discussed, Peter (age: 9;07) and Maria (age:10;11). The decision of presenting only two clinical

cases was made aiming to discuss the clinical examples in detail rather than evaluating the clinical effectiveness of the programme. Furthermore the presentation of two clinical examples allows discussion on the differential activation of 'Modules'.

2.2. Review of 'Formulation Charts'

Yaruss & Quesal (2004) used the International Classification of Functioning, Disability, and Health framework (ICF; WHO, 2001), to describe the stuttering experience from different perspectives. Based on Yaruss & Quesal (2004), 'Lexipontix Formulation Chart' (Fig. 3) schematically presents the interrelated components of the stuttering experience in a holistic perspective. By bringing together important predisposing, precipitating and perpetuating variables, 'Lexipontix Formulation Chart' provides the therapist with a dynamic assessment framework, which is constantly being updated during the therapy process. The 'Formulation Chart' is used to deliver "Formulation" (Stallard, 2005) by following the illustrative schematic presentation of assessment data. Yet, it guides the therapist in planning, selecting and delivering the relevant 'Modules' of the programme, in an appropriate way at the right point towards the collaborative agreed goals for therapy (Kuyken & Beck, 2004). Color coding is used to most assessment instruments to help with mapping data from the assessment instruments onto the 'Formulation chart'.

By functionally relating elements of the intervention programme, to the 'Formulation Chart', the path to the appropriate 'Modules' becomes readily apparent. For example a high CAT-R score or comments and narrations indicative of negative attitudes, which are recorded in the assessment interviews, highlight the need for CBT 'Modules'. High counts in stuttering behaviours – that is involvement of "body functions"- point towards engagement of more speech techniques 'Modules'. Heightened involvement of environmental factors, related to parental behaviours point to an increased need for implementation of PCIT 'Modules'. On-going assessment information can be incorporated in this process of forming a guiding 'Formulation Chart'. A further step may be, to set criteria for selecting 'Modules' according to the data recorded in the 'Formulation Chart' but, for the time being, the selection of 'Modules' is a clinical decision. Data recorded in the 'Formulation Charts' for the children under discussion (Maria & Peter) are presented in Appendices A and B.

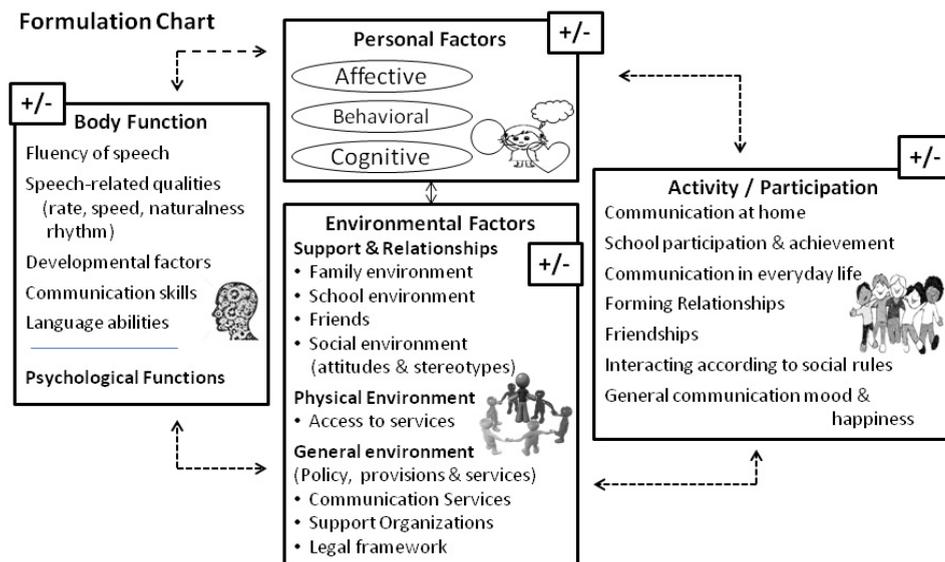


Fig. 3. 'Lexipontix' 'Formulation Chart' based on Yaruss & Quesal (2004)

According to the information recorded in Maria's and Peter's 'Formulation Chart', stuttering was considered "mild" in terms of percentage of Stuttered Syllables (%SS), subjective severity rating scales and concomitant behaviours. Based on the OASES-S and informal interviews, their stuttering was considered "moderate" in terms of

the overall disability. Overt stuttering characteristics mainly involved repetitions for Peter and blocks for Maria. Both children were shy and introvert. Maria exhibited perfectionistic traits and presented with good introspection ability. Peter tended to rationalize his answers and demonstrated aggressive behaviour at times. Both children were experiencing difficulties in socialization. Maria reported moments of isolation and Peter reported conflicts with his classmates. Maria had high achievement at school and increased difficulty with reading aloud in class. Peter presented with limited participation in the classroom. Both children had developed negative personal reactions to their stuttering at a cognitive, affective and behavioural level. These were more prevailing and established in Maria's case. Both children were living in supportive family environments (parents brought them in for therapy, they were supporting their child's decision to participate in extracurricular activities, they accompanied them in school and social events). Parental concern was high for both, and there were frequent prompts for fluent speech. Maria had an open attitude to stuttering. Unlike Peter, she frequently discussed stuttering with her mother. Peter's family was experiencing problems with behaviour management. His parents were rather concerned and proactive in "protecting" him from failure and disappointment and they were ready to suggest ways for him to manage his problems. In Maria's family, expectations for Maria were high. Both children were occasionally teased by other children at school.

2.3. Treatment

'Lexipontix' aims at 'Communication Restructuring'. 'Communication restructuring' is defined as the therapeutic process that leads a person to (a) reconstrue his communicative role (b) alter the definition of communicative success and failure and (c) respond in a functional and meaningful way to the demands of a communicative event (Fourlas & Marousos, 2014).

In order to reach the above aim, the programme was differentiated and individualized for each child with the appropriate 'Modules' having been selected to cover individual needs. The modular implementation of the programme was an ongoing, session by session, process and it was following the updates of the 'Formulation Chart'.

The PCIT component of the 'Core Structure' helped in setting up the 'Alliance'. Concepts, jargon and the theme of the programme were introduced at this stage, which lasts for the first 5 sessions. Games were used for the identification of feelings and attitudes as well as for the exploration of cognitive cycles. An open and desensitized attitude was initiated by voluntary stuttering board games. In the 'Core Structure' children were also helped to identify and challenge cognitive distortions and NATs by making use of the "Talking Back" tool.

The 'Core Structure' was followed by a period of 7 ninety-minutes sessions, in which selected 'Modules' were applied. For Peter, the Problem Solving 'Module' was selected to target low levels of independence and parental over-protectiveness. A board game, especially designed to reinforce autonomy and internal locus of control, was used. In this game participants are introduced to daily problems such as teasing and are asked to contribute with alternative solutions. The player who offers the greater number of solutions wins.

The behavioural experiments as well as the 'Negative Automatic Thought-Modifier' ('NAT-M') 'Modules' were selected for Maria to challenge her well established negative attitudes towards communication. 'NAT-M' is one of the 'Red Tools' for reframing dysfunctional or unhelpful thoughts in a practical and enjoyable way. Maria's age and her good introspection ability were the necessary prerequisites for the effective application of the 'NAT-M' module.

In Peter's case only one speech 'Module' ('Yellow Tool') was introduced to manage his mild overt characteristics (syllable repetitions). On the contrary Maria needed more speech 'Modules' to deal with her well established silent blocks.

It was deemed that both children would benefit from an objective and desensitized attitude towards stuttering. Thus, the 'Alliance Network Expansion Module' was implemented for both. Yet, Peter, being more hesitant socially, needed to invest more time in that module. Similarly, the 'Missions Module' was equally applied.

3. Outcomes

A descriptive account of therapy outcomes that were recorded through parental reflections, therapy formal test results and assessment interviews, is presented shortly. Therapy outcomes were related not only to speech measures

but also to other domains such emotional wellbeing, social interaction, independence, participation and inclusion, and academic achievement (Hayhow, 2014).

At the end of 12 weeks parents focused on communication rather than speech per se and improved their communication skills. Peter's mother reported: "I came to realize the importance of having some exclusive, special time with my child. This facilitated our communication." Maria's mother reported: "I longed such a relaxed communication with my daughter." Parents increased their knowledge for their child's stuttering and its management. Peter's mother reported "I liked it. It was humorous, fun and entertaining." "I learnt a lot about stuttering and now I do not care that much whether he stutters or not. I just do not notice." Maria's mother reports: "I now understand better my child's difficulty." Teachers recognized significant changes in children's communication. Maria's teachers noticed changes in Maria's confidence, willingness to participate and speech. Peter's teachers conveyed to his parents that he was happier, more sociable and willing to participate in class. Both children improved significantly in their speech fluency and confidence. Maria mentioned: "I now have my Yellow and Red Tools to use. I can always say what I want to say and I have noticed a significant change in my speech." Peter's father admitted: "His fluency has significantly improved and now I am much more relaxed. At the beginning, I didn't believe that the programme could help us. I was rather skeptical."

In Peter's case there were changes at cognitive, emotional and behavioural level. Relationships were improved and strengthened. His mother reported "To collaborate, to praise and reinforce... all those things I had forgotten to use; I think that the programme helped us all see some things quite differently; My husband now hugs and kisses the kids. He treats children better and has stopped scolding and shouting at them." Peter became more talkative. His mother reported: "My child was introvert and closed to himself but now he is talking all the time." Peter generally became more outgoing and courageous. He even asked his mother to participate in the school parade next year. This was a life dream for Peter, yet laying outside his comfort zone. Mother reported: "Peter has become more relaxed and assertive. He doesn't avoid other people." Peter became happier and more sociable. Having difficulty in acknowledging change in himself, he attributed it to his environment. He reports: "my classmates have changed. All of them! They are friendly. I like feeling accepted by my friends."

Similar changes were noticed in Maria's case. Parents reported improvements in fluency and in psychological well-being. Mother reported: "She talks and feels much better now. She doesn't cry at nights thinking of reading out loud at school." Maria herself reported: "My unhappiness has gone. I now have my tools and I know how to control Lexipontix!" Maria undertook a more optimistic perspective in envisaging future. At the initial interview she had said: "I think stuttering will worsen and I won't be able to speak at all," but after treatment she mentioned: "I think that using my Yellow and Red Tools I will overcome my difficulty."

The aforementioned encouraging outcomes are confirmed by the formal tests and Severity Ratings (SR) (see Table 2).

Table 2. Therapy outcomes for Peter & Maria; Formal Assessments & SR

Assessments	Peter		Maria	
	Pre-therapy	Post-therapy	Pre-therapy	Post-therapy
CAT-R	16	6	22	6
OASES-S	2.82 (Moderate)	1.45 (Mild)	2.7 (Moderate)	1.97 (Mild/Mod.)
% SS	3.3	2	3	1
SR	4	2	4	2

A considerable attitudinal change for both children was reflected in CAT-R scores (Brutten & Dunham, 1989). A similar substantial drop was evident in the overall impact rating and the impact ratings of different sections in OASES-S (Yaruss & Quesal, 2006; 2008; Yaruss, Coleman & Quesal, 2010) (Table 2). PPRS (Millard, 2002; 2013) along with written reports submitted by parents indicated the positive effects of the programme in the family (Tables 3 and 4). Maria's PPRS demonstrate small changes on her parent's ratings. Maria was the most recent case and

based on our experience parents may need time to accommodate and acknowledge change; thus, it might have been premature for outcomes to be fully appreciated by them.

Table 3. Palin Parent Rating Scales Results for Peter (M = Mother; F = Father)

Ratings	Pre-therapy	Post-therapy	3 months follow up
Impact on the child	M: 2.52 (very high)	M: 5.97 (low)	M: 5.59 (moderate)
	F: 2.52 (very high)	F: 4.95 (moderate)	F: 5.74 (low)
Severity of stammering & parental concern	M: 2.90 (moderate)	M: 4.77 (low)	M: 5.97 (very low)
	F: 2.90 (moderate)	F: 4.18 (moderate)	F: 6.09 (very low)
Parent's knowledge & confidence in managing the stammering	M: 5.22 (moderate)	M: 5.56 (moderate)	M: 6.14 (high)
	F: 5.22 (moderate)	F: 5.48 (moderate)	F: 6.72 (very high)

Table 4. Palin Parent Rating Scales Results for Maria (M = Mother; F= Father)

Ratings	Pre-therapy	Post-therapy
Impact on the child	M: 2.33 (very high)	M: 2.65 (very high)
	F: 2.64 (very high)	F: 3.33 (high)
Severity of stammering & parental concern	M: 2.43 (high)	M: 3.47 (moderate)
	F: 4.06 (moderate)	F: 3.83 (moderate)
Parent's knowledge & confidence in managing the stammering	M: 6.39 (high)	M: 5.97 (high)
	F: 4.64 (moderate)	F: 5.55 (moderate)

4. Discussion

It is a common experience among clinicians who work with school age children who stutter to feel devalued, frustrated and depowered by the lack of progress as well as relapse (Hancock & Craig, 1998). In many cases children are able to speak fluently in therapy but unable to generalize (Webster, 1979). They may be oversensitive to listener's evaluation and may make unhelpful thoughts about communication despite their improvement in fluency. Focus on fluency makes speech techniques part of the problem rather than part of the solution. Parents report being unable to help and many times they are trapped to unhelpful roles such as urging for the use of speech techniques, and challenge therapy and the clinician skills. *'Lexipontix'* introduced an alternative approach to stuttering therapy, merging well known and evidenced based theories and clinical practices into a coherent whole that makes sense. It makes sense for the child, the parents and the clinician. However, training is necessary for those clinicians who wish to implement the programme. Yet, *'Lexipontix'* is still a "newborn" and data presented here are a preliminary report on its development and initial outcomes.

During the development phase a number of issues emerged and action was taken at an early stage. Among others, issues related to the structure of the programme, the *'Red Tool'* called *'Negative Automatic Thought – Modifier'* (*'NAT-M'*) and the need of linking assessment findings to the selection of *'Modules'* were addressed as follows.

The initial rigid, step-by-step structure of the phase A of the programme was easy to administer and easy to research but provided little room for being tailored to individual needs. At an early stage of development it was modified into a basic *'Core Structure'* lasting for five sessions followed by a flexible *'Modular Structure'* lasting for

seven sessions. The *'Core Structure'* was preserved for setting up the *'Alliance'*, introducing and implementing the PCIT component, introducing the concepts, the jargon and the back-story of the programme, exploration of cognitive cycles, identification and challenging of NATs. The *'Core Structure'* is the foundation for the implementation of the subsequent *'Modular Structure'*. Both children presented above participated in the current version of the programme. The current version proved flexible enough to cover their individual needs. No further modifications in the structure and timing seemed to be necessary thereof.

Other issues to be addressed at a very early stage of the programme development concerned the *'Negative Automatic Thought-Modifier'*, the CBT *'Tool'* for the reframing of NATs. This deals with changing dysfunctional or unhelpful thoughts. Although the *'Tool'* is introduced through board-games that are fun, younger children generally met significant difficulty in the conceptualization of this process probably due to developmental issues (Cook & Botterill, 2009). To simplify the process the initial five-step sequence of the *'NAT-M'* was modified into a simpler three step procedure consisting of (a) identification of the automatic thought (b) search for alternative explanations and (c) modification (Furlas & Marousos, 2014). In addition *'NAT-M'* was removed from the *'Core Structure'* and was placed as optional module to the *'Modular Structure'*. Criteria were set for the introduction of this *'Module'* namely (a) children to be able to think about thinking (metacognitive skills), (b) children to comfortably talk about their NATs without getting stressed (c) children to have enough preliminary practice in exploring thoughts, differentiating them from feelings, and eliciting NATs and (d) children to demonstrate ability in responding to their NATs by talking back to them. This simplified version of the *'NAT-M Tool'* was introduced to Maria who fulfilled the aforementioned criteria set. It was introduced at the 7th session. By that time Maria was able to identify her own NATs, evaluate and challenge thoughts by making use of the "Talking Back" *'Module'* introduced earlier in the programme. *'NAT-M'* equipped her with a quick, three step procedure of generating alternative meaningful and empowering ways of thinking. By actively focusing herself on positive and more realistic appraisals of everyday communicative situations, such as buying a snack from the school canteen or reading aloud in class, she could better tolerate moments of anxiety related to her stutter.

For some children psychological stress was acknowledged stemming from the process of NAT identification. At certain instances this issue seemed to be magnified by the presence of parents, as was the case with Peter, who appeared to rationalize his answers, trying to comply with his parents' thoughts and expectations. The attempt to provide a safe therapeutic environment and facilitate a more open attitude involved emphasis on (a) building the child's confidence (b) letting the child lead the *'Alliance'* (c) helping parents to act as listeners (d) acknowledging to each member of the *'Alliance'* the role of the expert on his own NATs. Further decisions involved reassuring the child that there are no right or wrong answers nor a single or expected answer, acknowledging the child as the possessor of the real answer, acknowledge parental expertise in areas other than the child's core beliefs and the arrangement of sitting position during therapy as a means of differentiating the participation of each member of the *'Alliance'*.

The need for linking assessment findings to the selection of *'Modules'* was also addressed early enough leading to the introduction of the *'Lexipontix Formulation Chart'* and its use as a dynamic compass in the ongoing therapy process. The use of the *'Formulation Chart'* in the selection of *'Modules'* for Peter and Maria supported the rationale behind *'Module'* selection, justified decisions and reduced clinicians' anxiety.

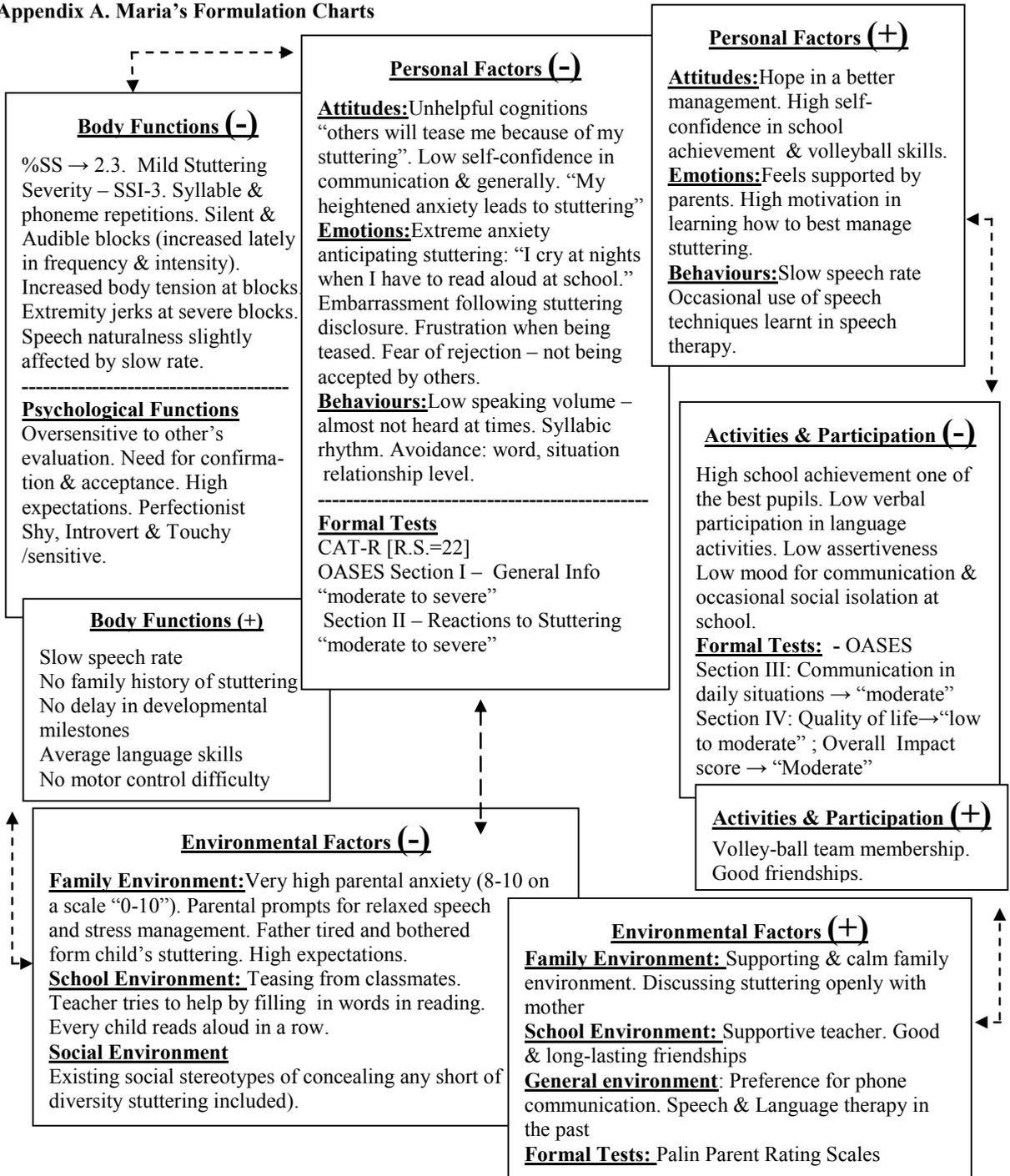
Results presented in Tables 2, 3 and 4 are indicative of a tendency of improvement in formal assessment scores, at the end of the programme. However, data collection regarding outcomes is still at an early stage. The presented preliminary results, in both formal and informal assessments, as well as the enthusiasm of both children and parents who participated in this final stage of the development of the programme are indications of promising outcomes.

'Lexipontix' is the first structured intervention programme produced by fluency clinicians in the Greek language. It is still at an experimental phase. It is well-supported theoretically and it is clinically relevant. It is fun and addresses the needs of the whole family. It is brief and goal-directed, comprehensive but also flexible, easily tailored to meet individual needs. It is supported by a smart assessment process that indicates the appropriate *'Modules'* for each child and includes all the necessary material, forms and games. Emerging evidence from those who have participated in the programme is in favor of the above comments.

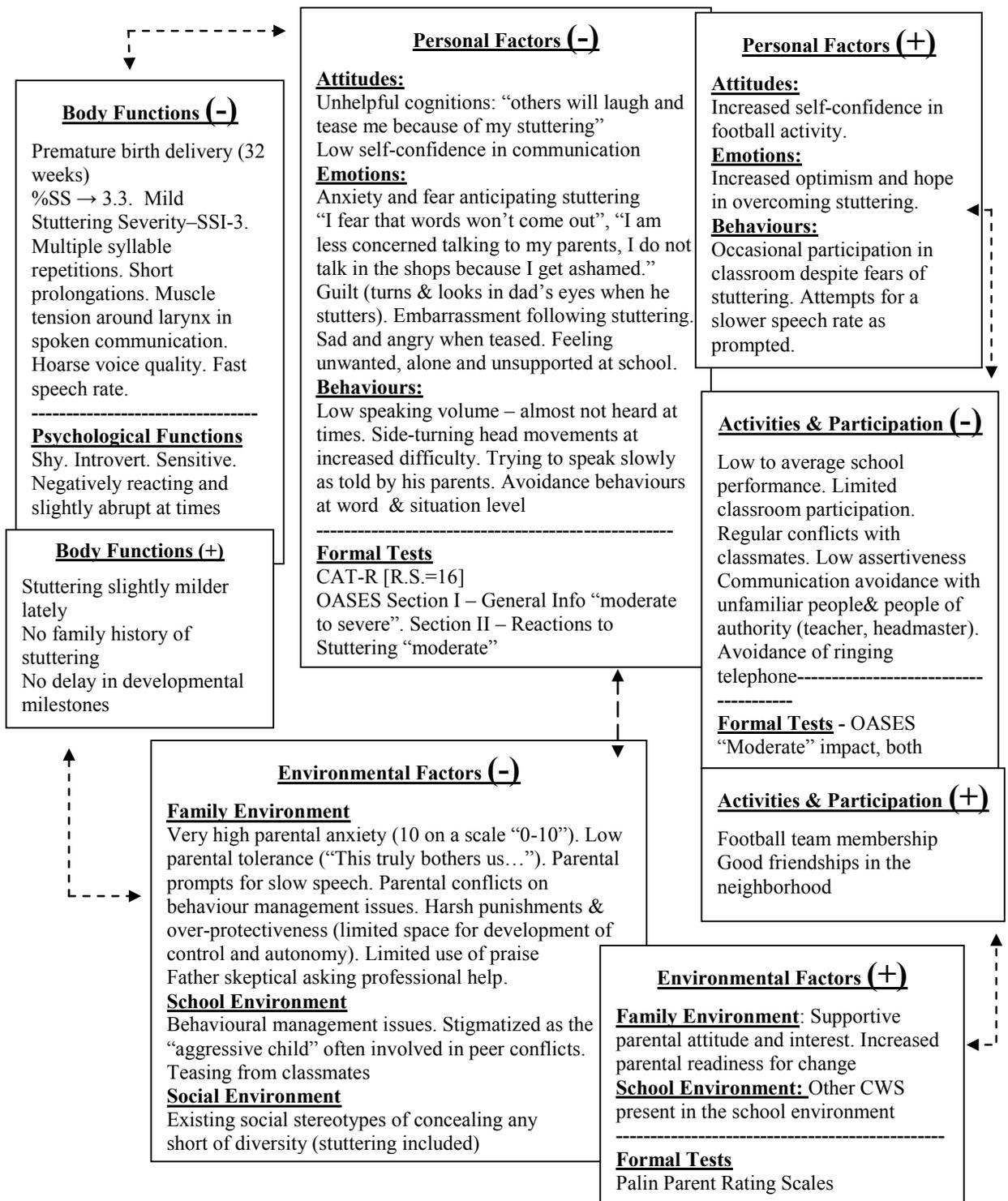
Acknowledgements

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Appendix A. Maria’s Formulation Charts



Appendix B. Peter's Formulation Charts



Appendix C. Glossary

'Airplane Talk': The fluency shaping speech technique of easy onset.

'Ally': Member of the *'Alliance'*.

'Alliance': A gradually extended team of significant others, who support child's efforts in the programme.

'Alliance Empowering Strategies': Strategies aiming at the strengthening of parent-child communication and interpersonal relationship. They are introduced during the PCIT component of the *'Core Structure'* and may also be continued as an optional module during the *'Modular Structure'* of the programme.

'Alliance Interaction Strategies': Strategies based on parental communicative style that reduce pressure on child's fluency. They are introduced during the PCIT component of the *'Core Structure'* and may also be continued as an optional module during the *'Modular Structure'* of the programme.

'Alliance Network Expansion': An optional module, which involves (a) advertising stuttering to selected familiar communicators and (b) giving roles to significant others that facilitate the child's therapy goals.

'Anti-technique': Speech behaviour that involves contrastive muscular and/or articulatory activity to the activity induced by a fluency shaping technique.

'Anxiety Meter': A 10 point scale that is used as a "Tool" to estimate the intensity of anxiety. It is located in the *'Lab of Emotions'*.

'Body Sensors': A component of the *'Factory of Mind'* corresponding to the "Somatic Reactions" of the CBT model.

'Bus Talk': The fluency shaping speech technique of pause.

'Cassandra Talk': The technique of pre-block modification. (Van Riper, 1971; 1973).

'Communication Restructuring': The therapeutic process that leads a person (a) to reconstrue his communicative role (b) to alter the definition of communicative success and failure and (c) to respond in a functional and meaningful way to the demands of a communicative event.

'Control Centre': The central control panel of the *'Factory Machines'* in the *'Factory of Mind'*. It continuously receives and sends information, keeping all factory components in equilibrium.

'Core Structure': The initial, basic step by step period of the programme with duration of 5 sessions

'Factory of Mind': A metaphorical representation of the CBT model (Beck, 1967a) comprising cognitive, emotional, somatic and behavioural (verbal and non-verbal) aspects of communication.

'Experiments': Behavioural experiments used in CBT intervention programmes.

'Factory Components': Different components in the *'Factory of Mind'* including the machine of thoughts for the processing and development of cognitions, the lab of emotions for the processing and evaluation of feelings, body sensors for the conscious perception of somatic reactions and the *'Machine of Actions and Words'* for the processing and development of verbal and non-verbal behaviours related to stuttering.

'Factory Machines': The *'Machine of Thoughts'* for the processing and development of cognitions and the *'Machine of Actions and Words'* for the processing and development of verbal and non-verbal behaviours related to stuttering.

'Instant Parkour Talk': The technique of in-block modification (pull outs) according to Van Riper (1971; 1973).

'Invasion / Intrusion to the Factory of Mind': This occurs when *'Lexipontix'* is attacking the *'Machine of Thoughts'* or the *'Machine of Actions and Words'*. Invasion/Intrusion leads to stuttering related behaviours (eg. a stuttering event or avoidance). *'Invasion'* is the outcome of a successful sabotage.

'Lab of Emotions': A laboratory used for the development and evaluation of feelings related to the moment of stuttering. The *'Lab of Emotions'* is equipped with the *'Anxiety Meter'* for the estimation of the intensity of the anxiety.

'Lexipontix': The name *'Lexipontix'* is a combination of the Greek words *lexis* (word) and *pontix* (mouse). It means the mouse of the words or the lexicon. *'Lexipontix'* is a naughty mouse inherent in humans. It interferes with the functioning of the two *'Factory Machines'* in the *'Factory of Mind'*. It personifies a range of different roles between the most difficult opponent to a friendly pet.

'Lexipontix Formulation Chart': A schematic representation of the interrelated components of the stuttering experience in a holistic perspective. It is based on Yaruss & Quesal (2004) model of stuttering experience.

'Machine of Actions and Words': The *'Factory Machine'* responsible for human verbal and non-verbal behaviours.

'Machine of Thoughts': The *'Factory Machine'* responsible for human thoughts & cognitions.

'Missions': Collaboratively designed actions for practicing *'Red Tools'* and *'Yellow Tools'* in real-life communicative events.

'Modules': Distinct entities of inter-related clinical tools and practices adjacent to the *'Core Structure'*.

'NAT – M': Its full name is *'Negative Automatic Thought – Modifier'* and involves a three-step procedure for transforming negative automatic thoughts into alternative and meaningful neutral or positive thoughts. It is one of the *'Red Tools'* of the programme aiming at the modification of unhelpful anxiety-provoking automatic cognitions.

'Parkour Talk': The fluency shaping speech technique of prolonged speech.

'Pre-Alliance Motivation' phase or *'PAM'*: A phase preceding the implementation of the programme. It aims to motivate the child who stutters to commit himself to therapy by identifying and challenging established safety behaviours and by considering prospects of alternative solutions.

'Pre-Alliance Negotiation' phase or *'PAN'*: A phase preceding the implementation of the programme. Its aim is to maximize parental engagement by helping parents to identify their unique strengths such as being experts on their own child and their key role as “modulators” (Packman & Attanasio, 2004; Packman, 2012).

'Pre-Alliance Phase' or *'PAP'*: A phase preceding the implementation of the programme involving the *'Pre-Alliance Motivation'* phase and/or the *'Pre-Alliance Negotiation'* phase.

'Rebound Talk': The technique of post-block modification (cancellation) according to Van Riper (1971; 1973).

'Red Tools': CBT *'Tools'* that help the *'Superhero'* with the management of feelings and cognitions. *'Red tools'* aim at both cognitive restructuring and speech control.

'Sabotage of the Factory Machines': The outcome of *'Lexipontix's'* interference in the one or both the *'Factory Machines'*. In an effective sabotage *'Lexipontix'* takes the control of the *'Control Centre'* instantly or for a longer period. As a result of a sabotage the child enters into an unhelpful vicious cycle of thought, emotions, somatic reactions and behaviours.

'Superhero': The CWS in the leading role in the alliance.

'Super-Powers': Those skills acquired during the development of the programme that empower the *'Superhero'* and the *'Alliance'* to reach the ultimate goal of *'Communication Restructuring'*.

'Therapeutic Alliance': The *'Alliance'* formed (initially by parents and therapist) and gradually extended to significant others in order to support the child to control *'Lexipontix'*.

'Tools': Clinical practices and techniques that are used to achieve therapy aims. According to the theme, the *'Superhero'* uses *'Tools'* to acquire *'Super-Powers'*.

'Yellow Tools': Speech *'Tools'* for the management of speech behaviours. The use of *'Yellow Tools'* aims at both cognitive restructuring and speech control.

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