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Parent supportive dialogue and preschool children performance in executive function tasks

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**Contact with more
experienced social
partner promotes
the development
of child's higher
cognitive
functioning**

(Vigotskij, 1962,1978)

Introduction

Current events of the science

Researches of executive function of preschool children (EF) has **scientific**
priority (*Willoughby et al , 2010*)

- Lack of information about mechanisms, that supports development of VF.
- Research must turn to development of parent – child relationship (*Bernier et al., 2010*).
- Family conditons could be an essential contex in VF development (*Rhoades et al , 2011*)

- risk of development of schizophrenia (*Bhojraj et al.,2010*)
- emotional regulation (*Hughes & Graham, 2002*)
- attention deficit and hyperactivity syndroms (*Wählstedt et al., 2008*)
- autism and sindrom of Asperger, tic disorder, depression and other disorders (*Powell &Voller, 2004*)
- impressibility (*Karpinski&Scullin, 2009*)
- maths and computing skills (*Clark et al, 2010*)
- Self regulation and academical achievements in further life (*Catroppa &Anderson, 2005*), et al

EF research in twins shows that heredity accounts for 43-79%, joint environment for 0-12% and **individual environment for 22-54%**

(*Goldsmith, Buss, & Lemery, 1997; Lemery-Chalfant, Doelger, & Goldsmith, 2008*).

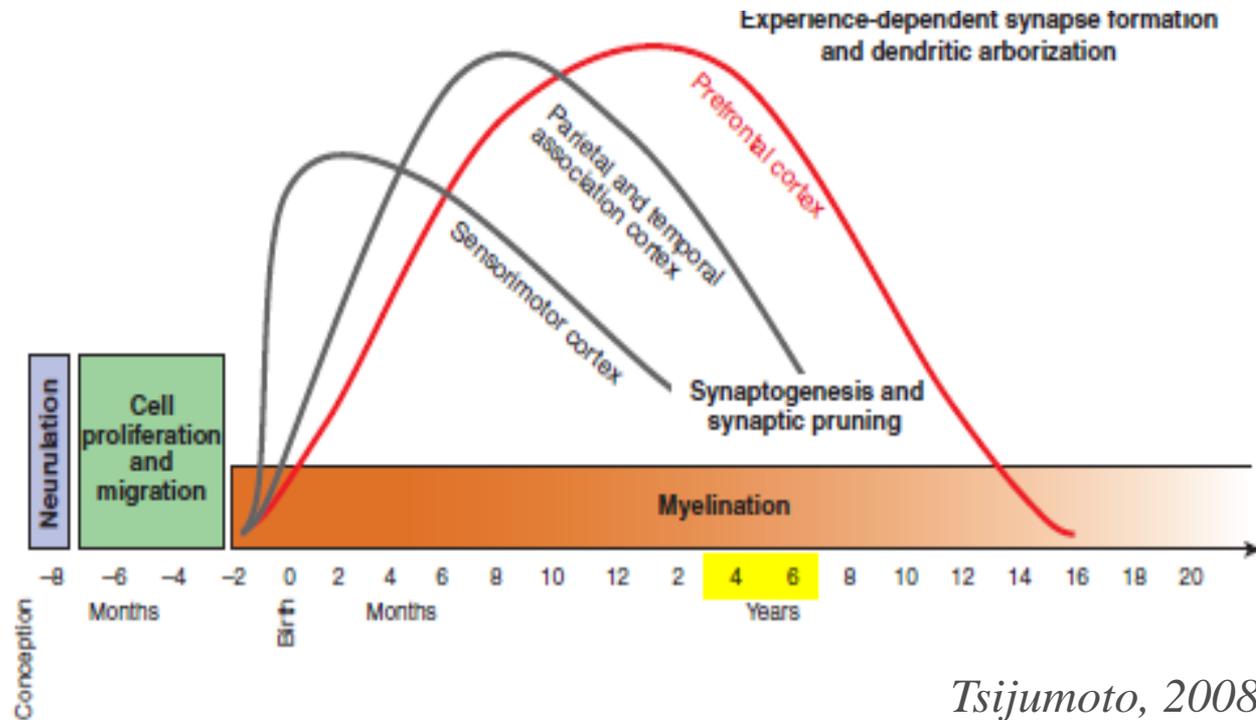
EF can be considered an umbrella term for higher processes (*inhibition, working memory, shifting*) and related to the activity in prefrontal cortex which promotes goal-oriented behaviour and adaptive responses in new, complex or unclear situations

(Hughes, Graham & Grayson, 2004).

EF in childhood

A long post-natal development is an opportunity for environmental input to impact the development of frontal brain systems and related executive functions

(Kolb et al. 1998; Noble, et al.,2005 as mentioned in Berniere et al.,2012).



Tsujimoto, 2008

“Verbal thinking is internalization of speech, reflection is an internalized fight” (Vigotskij, 1934/1987).

EF development is affected by social and emotional context

(Qu & Zelazo, 2007)

- Highest cognitive functions (*eg, flexible thinking, driven towards the goal*) are based of dialogue experience in common activities (*Vigotskij, 1934/1987*).
- Skill to adjust thinking and behaviour results from participation in interaction with adults (*Vigotskij, 1934/1987/ 2002*)
- By offering preferable stimuli, mother promotes the development of the child’s brain and self regulation functions during early childhood (*Schore, 1994*)
- Child-directed speech could be the beginning of development of elements of control (*Oh & Lewis, 2008*).

Croscultural researches

Korean children had higher results in inhibition and switching tasks, working memory similar to the control group (children from England) ($N=110$, $M=47.2$ months, $SD = 6.5$; Oh & Lewis, 2008).

Korean children had higher results in EF tasks ($N=216$, $M =48.28$ months, $SD = 6.78$, Sabbagh et al., 2006) than children in the US

Explanation

Differences in social interactions. Lingual differences may affect cognitive development of the child (Gopnik, Choi, & Baumberger, 1996).

Differences, how parents name the initiatives of children. In conversations, held towards the children in Korea, verbs are used often than in other countries (Choi & Gopnik, 1995, as mentioned Oh & Lewis, 2008).

Main accent is directed towards the action and it's controlling (Kim, McGregor, & Thompson, 2000, as mentioned Oh & Lewis, 2008).

Verbal information strengthens the meaning of self-control, and teaches children about actions and relationships in a natural way (Oh & Lewis, 2008).

Introduction

Parental supportive dialogue

Waiting

Children can inhibit initial, automatic response, if the time between the stimuli and answer is given (*Simpson et al., 2011*).

Confirmation

Possible active participating and encouraging, that entirely raises child's motivation to act (*Pino-Pasternak & Whitebread, 2010*) and lessens stress reactions (*Smeeckens, Riksen-Walraven & Van Bakel, 2007*).

Labeling

- Parent, by labeling child's actions, supports functional system, that combines speech with action (*Luria, 1979*)
- Development of child's self-regulation starts with practical action, which is done by the request of the adult. In next stage, child starts to use its expressive speech, that internalizes during the time, by becoming its inner speech, that has functions of behavioral regulation (*Luria, 1979*).
- Use of verbal labels increases the chance, that the child will consider events, that further could be used in conduction of behaviour (*Marcovitch & Zelazo, 2009*).

AARTS, 1976



- ▣ The adult labels child's **actions**: for example, "*You took the red block*"
- ▣ The adult labels child's **emotions**: for example, "*You are happy*"
- ▣ The adult labels **their own actions**, emotions: "*I will bring the blocks; I am happy*"

VIGOTSKIJ, 1934;1983;1984;2002



Self-directed speech

“The child’s self-directed utterances that accompanies their practical actions, reflects or registers the results or turning-points of their practical effort and **generally assumes the function of planning and directing the next action**” (Vigotskij, 2002, 47.lpp).

“So... I take the blue pencil”

Introduction

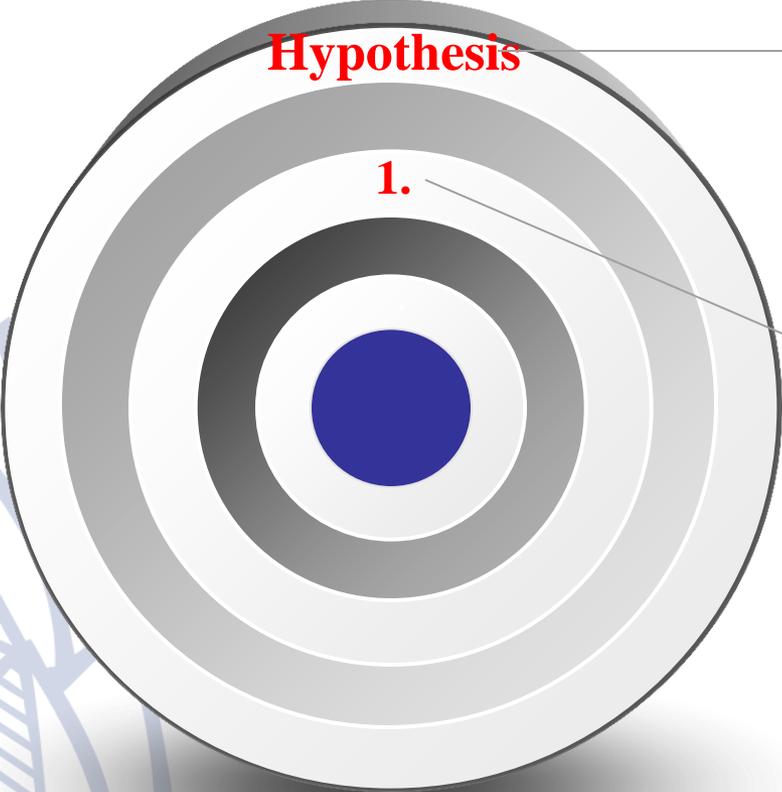
Current researches

- ❑ Children, which mothers gave **verbal support** at the age of 3, had more developed EF function at the age of 6 (*longitudinal research, children aged 3-6, N=360; Landry, Miller-Loncar, Smith & Swank, 2002*).
- ❑ **Maternal sensitivity, maternal mind-mindedness, autonomy support** was rated, when children were 12-15 months old (N=80). EF was rated in children, in age 18-26 months. All three dimensions were connected with executive functions (*Bernier, Carlson & Whipple, 2010*).
- ❑ **Autonomy support** predict EF in all ages, despite general cognitive skills and mother's education (*Bernier, et al, 2010*).

Explanation

- Verbal instructions of adult gives a model, how to express difficult coherence, and how to think in a context of difficulties (*Miller-Loncar, Smith & Swank, 2002*)
- Mother, which can interpret her child's signals and respectively (gently) react on them, or understands child's mind-mindedness during interactions, is able to provide child with autonomy supportive environment and sense of self-efficacy (*Bernier, 2010*)

Hypothesis and questions



Hypothesis

1.

Hypothesis

There are statistically significant positive correlations between executive functions of child and elements of supportive dialogue, observed in behavior of mother.

Questions of research

Which of the development supportive elements, observed in behavior of mother, predict executive function of the child the best, by controlling verbal skills of the child?

40 monolingual children born at term without medical problems ($M = 4.25$; $SD = 0.30$)
50% female

40 employed mothers with higher education aged 26 to 42 ($M = 35.50$; $SD = 3.81$).

All respondents lived in cities.

All children's verbal abilities were at normal level.

Excluding criteria:

- Prematurely born children, children with low birth weight (approximately – 1158,3g) Sun, Mohay & O'Callaghan, 2009)
- Children with development delay, disorders or head traumas (Andersona, et al., 2010).
- Children with low verbal skills level ((Fuhs & Day, 2010)
- Children from bilingual families (Bialystok & Viswanathan, 2009)
- Children from social risk families and families with low income level *et al.*, 2007)
- Children from countryside (Brock et al., 2009)
- Children, with left hand dominant (research in selection of development of adults Beratis et al ., 2009)
- Children, whose mothers were smoking or using alcohol during pregnancy (Morales, et al., 2009).

During the video observation a free play situation is filmed in which a child and mother are playing with blocks. The mother's behaviour is coded in line with the Marte Meo criteria.

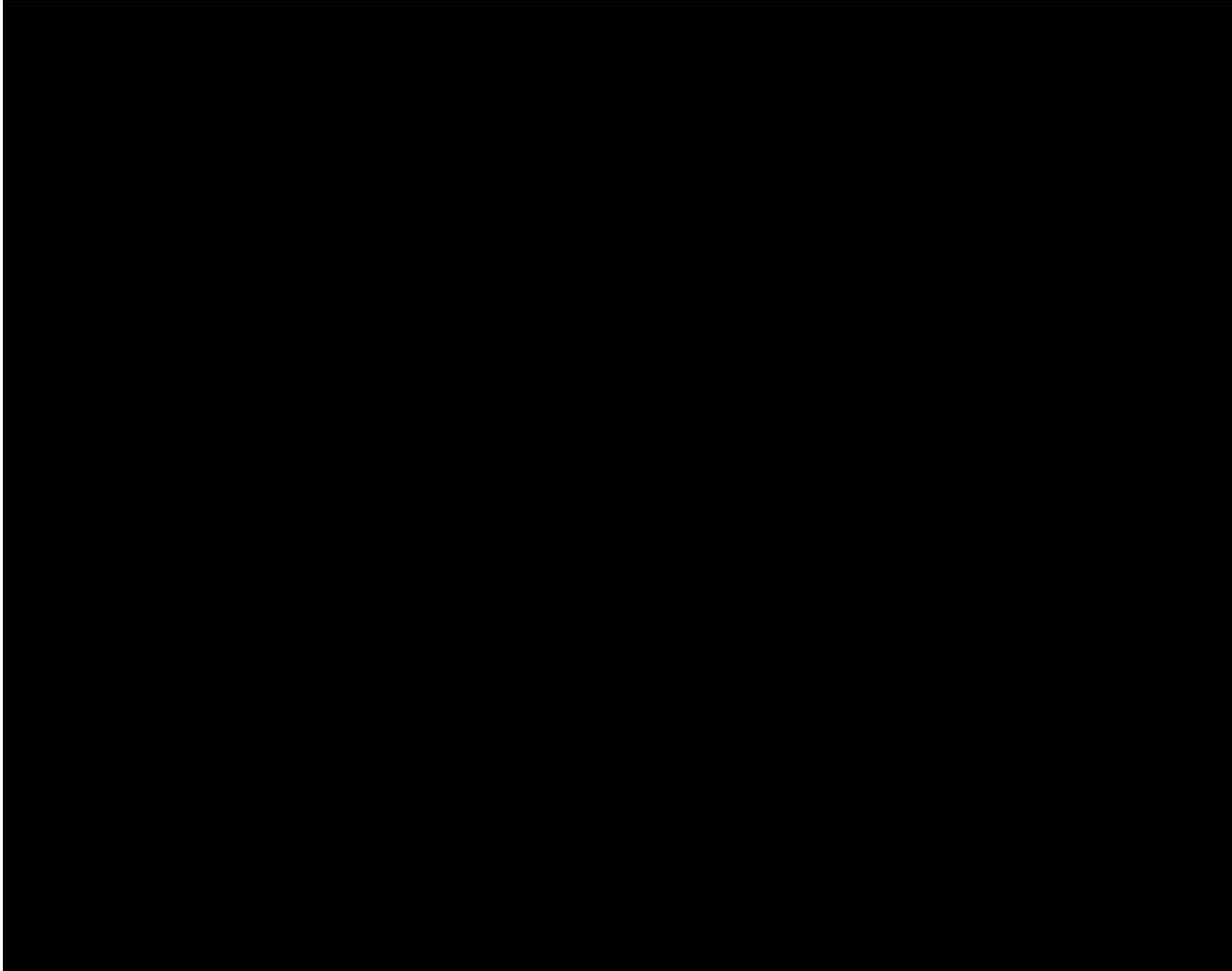
The obtained video material was coded by two professionals according to the Marte Meo therapy criteria.

After the filming the child performed **executive functioning** tasks

Marte Meo elements	Examples
<p>Confirmation</p>	<p>Verbal or non-verbal confirmation of child's initiative. Examples : <i>Verbal:</i> 'yes', 'good', 'good boy/girl', 'you did it', <i>sound s:</i> 'mhm', 'aha'. <i>Non-verbal :</i> a nod, a smile</p>
<p>Labelling</p> <p>3 levels :</p> <ol style="list-style-type: none"> 1.Labelling the focus of attention 2.Social situation- Simultaneous labelling own and the social partner initiatives 3.The labelling of the child's initiatives, emotions, plans. Pronoun 'you' is used 	<ol style="list-style-type: none"> 1)"house', 'blue', it is a dog' etc. 2)We are building a house' etc. 3)You are now building a house.' 'You are happy "
<p>Waiting</p> <p>The mother lets child to manage a task, she is not trying to interrupt and change the situation if it is not necessary, but instead of that she is focused on the child.</p> <p>The time, when the mother is not focused on the child is not counted.</p>	



Example



The Dimensional change card sort (DCCS, Zelazo,2006)

Day/Night task (the Day/Night task; Gerstadt, Hong &Diamond, 1994);

Tapping task (Diamond &Taylor, 1996; Hala et al., 2003; Luria, 1966, cited in Nilsen & Graham,2009);

Count and Label (Gordon & Olson, 1998, cited in Carlson, 2005);

Backward digit span (The Subtest 7 of Woodcock-Johnson's cognitive ability test).

The factor analysis included the test results of 5 correlated executive functions. KMO measure was 0.73, Bartlet test was statistically significant: $\chi^2 (6) = 30,47$ ($p < 0,001$), The included variables formed one factor that accounted for 55.48% of variation. Kronbach's alpha is 0.72.

Verbal abilities

The Subtest 1 of Woodcock-Johnson's cognitive ability test is used according to the procedure

1.table. Correlations between child executive function, verbal abilities and Marte Meo elements in 4 years old child (N = 40)

Variables	Executive function	Verbal abilities
Mother label child(M_Ch)		
2.M_Ch focus of attention	0,26	0,11
3.M_Ch social situation	0,53**	0,37*
4.M_Ch initiatives	0,46**	0,30
5.M_Ch amount	0,57**	0,35*
Marte Meo elements		
Confirmation	0,55**	0,42**
Waiting	0,48**	0,25

2.table. Hierarchical regression analysis of child executive function as dependent variables (N=40)

	<i>Independent variables</i>	<i>B</i>	<i>SE B</i>	β	R^2	<i>Adjusted R^2</i>	ΔR^2	<i>F change</i>
1.step					<u>0,27</u>	0,25		13,92** (0,001)
	Verbal abilities	0,12	0,03	0,52**				
2.step					<u>0,44</u>	0,41	0,17	11,43** (0,002)
	Verbal abilities	0,08	0,03	0,36*				
	Mother label child (amount)	0,17	0,05	0,44**				

Child had higher index of executive function, **if:**

- the mother employed **naming** *(of initiatives, social situations)*
- **confirmed**
- **expected** child's reactions

No statistically relevant correlation was found between the frequency of mother naming the focus of child's attention (for example, by saying "That is a car") and index of executive function.

Four-year-olds performance on executive functions tasks are predicted by the verbal abilities (27%) of the child and mother's ability to name the child* (17%)

The model accounts for **44%** of EF variation.

**Mother's commentary on the child's initiatives during free play situation (e.g., "You are now putting the blue cube up there").*

Mother phrases are similar to child's self-directed speech, which performs the functions of EF (*Vigotskij, 1934/1983*).

By naming mother **teaches how to think** about the action in progress and offers specific names for specific behaviour.

In the framework of the zone of proximal development, mother comment is an example of child's self-directed speech dialogue, which becomes internalized in the course of time and forms inner speech.

- Longitudinal study
- Large sample
- Include other age groups
- Children with developmental disorders.



Thank you for attention

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