

THE RELATIONSHIP BETWEEN MENTALISATION AND RESILIENCE IN TYPICALLY DEVELOPING CHILDREN AND ADOLESCENTS AND CHILDREN AND ADOLESCENTS WITH ADHD

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Abstract

Even internationally, ADHD is the most frequently diagnosed neuropsychiatric disorder in children and adolescents, which influences quality of life. However, 20 % of those struggling with ADHD are successful in all walks of life. The focus of our test was resilience - helping successful adaptation and the mentalisation ability linked to social difficulties. The objective of the test is to identify the anomalies between groups of children and adolescents with ADHD and typically developing children and adolescents from the following perspectives: the link between the intensity of the symptoms, their mentalisation abilities and psychological resilience abilities. In the test, we examined the relationship between the variants of the following questionnaires: CD-RISK Resilience survey, (Connor and Davidson, 2003; Járai et al, 2015), (Faux Pas test (Baron-Cohen et al, 1999) the Conners Child Behaviour and Parent variation / Teachers's variation (Conners et al., 1998; Perczel-Forintos, 2018) and the SDQ questionnaire (SDQ (Strength and Difficulties Survey) Methods: non-invasive cross-section test on a 64 clinical and (32 subjects with ADHD) and non-clinical (32 typically developing subjects) sample of children (9-16 yrs). Depending on the intensity of the symptoms, we found differences between the typically developing and the ADHD group in all tests used. From the SDQ subscales, the hyperactive and the symptoms of emotional and behavioural problems and the scores of the subscales indicating pro-social behaviour correlates with the overall score measured on the CD-RISK scale in the typically developing group. While in the ADHD group, the prosocial scale indicates a relationship with the CD-RISK scale. In case of the Faux Pas test, the story comprehension dimension was significantly lower in the ADHD group. The Faux Pas test shows positive relationship regarding „correct identification”, „overall score” and „story comprehension” with the prosocial behaviour in the ADHD group. According to our results, prosocial behaviour may be present as a protective factor enhancing a higher level operation of resilience. Based on the professional literature available and our test, we suppose that the protective factor linked to resilience is a characteristic of the individual or the environment which predicts the positive outcome of a threatening situation even during the appearance of risk factors. (Masten, 2001).

Keywords: ADHD ▪ attention-deficit hyperactivity disorder ▪ deterioration of functions ▪ quality of life ▪ resilience ▪ social difficulties ▪ mentalization ▪ CD-RISK ▪ Faux Pas ▪ SDQ ▪ Conners CBRS (Conners Comprehensive Behavior Survey)

INTRODUCTION

ADHD (attention deficit hyperactivity disorder) – inattention hyperactivity disorder, the disorder of behavior, attention, thought and emotional control is the most frequently diagnosed neuropsychiatric disorder diagnosed in

childhood and adolescence. (Csiky, 2015; Somogyi, Máté and Miklósi, 2015; Kooij et al., 2019). The disorder potentially influences school performance, social adaptation and the future quality of life of the diagnosed individual. Based on the DSM-5 (Nussbaum, 2013) to make a diagnosis, 6 or more symptoms (5 symptoms above the age of 17) from at least one of the attention disorder, hyperactivity-impulsivity symptoms groups should prevail for at least 6 months in at least two real-life situations:

THE EXECUTIVE FUNCTIONS IN FOCUS

Numerous neuropsychological tests prove the deficits of ADHD children in the field of attention, executive functions and memory. Several researches emphasize the damage of the executive functions linked to the operation of the prefrontal lobe, as one of the major risk factors of ADHD (Balázs, 2017.; Kooij et al., 2019). According to the results of the latest comprehensive tests the structural deformations of the brain are more prominent in children, but can be hardly detected by adulthood (Kooij et al., 2019). The executive operation makes the difficult: self-regulation, behavior planning and organisation, goal-oriented thinking, execution of goal-directed movements, response inhibition and working memory disorder, focusing and attentional control. (Csiky, 2015; Kooij et al., 2019, Somogyi, Máté and Miklósi, 2015, Földi-Ujlaky 2014). However, these deficits are not specific: the dysfunctionality of the motivational and activation system, the increased reward-sensitivity, procrastination and due to the problems of processing aversive feedback, self-motivation, self-monitoring may become damaged. All in all they influence flexible adaptation (Csiky, 2015; Sonuga – Barke, 2002 in: Somogyi, Máté and Miklósi, 2015).

Although, most children diagnosed with ADHD struggle with different levels of emotional, behavioral, social and school performance difficulties, the tests show that almost 20% of children with ADHD adapts well and despite the appearance of the symptoms ADHD, it doesn't result in functional deterioration in the field of social, emotional and school performance. Another 20% performs poorly, while 60% performs moderately in these fields (Regalla et al, 2015). *Inter alia*, this phenomenon provides the basis for the tests researching the links between ADHD and resilience. (Dvorsky & Langberg, 2016; Mackenzie, 2017; Regalla et al., 2015; Schei et al., 2018; Shi et al., 2018)

ADHD AND SOCIAL DIFFICULTIES

In ADHD, one area influencing the quality of life – often accompanied with functional deterioration – effects social relationships because children with

ADHD very often struggle with problems in their peer-relationships and often suffer from peer-rejection or experience social isolation in everyday life. (de Boo and Prins, 2007).

Regarding people with ADHD, several researches serve with persuading evidence in the field of social cognition. The inattention symptoms of ADHD show a relationship to the deficits of emotional recognition; it seems that in case of both children and adults with ADHD negative feelings are the biggest obstacle in recognizing emotions (Perroud et al., 2017). According to the researchers of this field, the attentional difficulties play a role in the deviations of empathy skills; the difficulty of sustaining attention may create problems during interaction to understand the feeling of others and showing compassion to other people's perspective (Braaten és Rosen, 2000; Marton et al., 2009; Perroud et al., 2017).

Deschamps et al (2014) examined empathic ability and prosocial behavior linked to empathy (e.g. offering help, sharing, comforting others) in children (6-7 yrs) with disruptive behaviour disorder and ADHD. In children with ADHD also showing symptoms of disruptive behavior, prosocial behavior linked to empathy was less common.

According to the professional literature available, it may be supposed that deficiency in empathy and social cognition disorder, which were diagnosed in people with ADHD, apart from the attentional disorders, may originate from the damage of the executive functions and the deficits of mentalisation ability –. (Maoz et al., 2017; Perroud et al., 2017; Pineda-Alhucem et al., 2018).

MENTALISATION

According to Fónagy and Target (1998), reflective function is the ability of a person to react not only to another person's superficial behavior but also to our own ideas of the other person's thoughts, feelings, desires and plans depending on the mental states. Reflective function is a multi-dimensional concept, which partly overlaps with narrowly-defined social cognitive phenomena like empathy or theory of mind. However, in an interpersonal context, the notion of reflective function text aims at seizing the complexity of the emotional and cognitive features of how we think about ourselves and others. (Perroud et al., 2017) Basically, Fónagy and Target (1998) calls this reflective function as mentalisation ability, which makes us possible to „read” other people's thoughts, the understanding of mental states, which aids the understanding of other people's behavior, thus enhancing adaptive behavior in interpersonal situations. Mentalisation ability plays a huge role when cooperating with or empathizing with others; to influence or deceive others, to understand the body language and to predict the behaviour of other's (Gál, 2015; Herold, 2004). The concept can be described as a social-cognitive ability; it is the basis of emotional control,

impulse control and self-monitoring. It is an extremely important ability of social adaptation: early social stimulus and interaction play an important role in its evolution and development (Fónagy és Target, 1998; Gál, 2015). According to Fónagy and Target (1998) the learning of mentalisation is part of the intersubjective process between the newborn baby and his/her carer. During this process, the child begins to interpret his/her own actions and that of others by interpreting desires and emotional states. In their view, one potential mediator of the development of mentalisation ability is peer-interaction. Peer interaction increases the chance of having to imagine, simulate what the child would think, feel or see if he/she were in the other child's shoes.

The results of research carried out in the last decades may conclude that in social interactions, children with a higher level mentalisation ability are more successful than children with a lower level mentalisation ability. However, the findings are contradictory: according to the tests, the occurrences can be shown very poorly or moderately and the cause and effect relationships lack clarity (Gál, 2015). The results of tests on school bullying show that certain children use their well-performing theory of mind ability for antisocial intentions. Obviously, this cannot be evaluated as successful peer interaction. (Slaughter and Repacholi, 2003; Sutton, 2003 in: Gál, 2015).

Among the tests, a longitudinal study of Banerjee and Watling (2005) can be emphasized. It measured the theory of mind ability of children by the Faux Pas test detecting social blunders. The results of the test was related to the sociometric position of the child in a sample of 308. The results demonstrate that the children who received more negative sociometric nominations from their peers, reached lower results on the Faux Pas test, too. Researchers found that the presence of strong negative social relationships predict the occurring difficulties in the Faux Pas situation much more than the lack of highly positive relationships. The relationships appeared more strongly in the older age-group (8-9yrs), while this could not be detected in the age group (5-6 yrs) as they are not expected to understand Faux Pas. The work of the authors carried out in 2011 shows the 24-month follow-on test of the children: the performance of the Faux Pas test was compared with the degree of peer rejection measured in the sociometry. The average of the Faux Pas performance showed a steady increase in proportion to age. Peer-rejection at the age of 7 successfully predicts the lower level Faux Pas understanding at the age of 8. The same correlation was identified in peer-rejection at the age of 9 and the Faux Pas comprehension at the age of 10. Furthermore, the higher level Faux Pas comprehension measured at the age of 9 corresponded with peer acceptance at the age of 10. The lower level Faux Pas comprehension at the age of 10 successfully predicted the peer-rejection at the age of 11 in the sociometry test. The results clearly indicate that peer rejection hinders the successful learning of Faux Pas comprehension in an age when it should show a typically increasing tendency. (Banerjee, et al., 2011).

MENTALISATION AND ADHD

According to professional publications, presumably, hyperactivity can be linked to lower level mentalisation processes, which could influence social adaptation, among others (Földi and others., 2016). Tests related to mentalisation showed the damage of mentalisation abilities and its links to social relationships in people with autism spectrum disorder (Banerjee et al., 2005). Further research show mentalisation deficits in case of Williams syndrome, bipolar affective disorder, antisocial and borderline personality disorder, certain type of dementia cases and also in ADHD (Herold, 2004).

According to Fónagy and Target (1998) biology-based disorders like hyperactivity, attention problems, low impulse control, most probably hinder the child to create a mentalisation reflective model in a conflict-related social interaction. The authors believe that this could be the reason that aggressive behaviour problems are often accompanied by hyperactivity and attention difficulties.

Perroud and his associates (2017) examined mentalisation abilities in adults diagnosed with attention-deficit hyperactivity disorder, comparing them with *without disease* and borderline personality disorder control groups. In their test, the Reflective Function Questionnaire (RFQ) was used. N = 101 subjects with ADHD (41 women, 60 men) took part in the research. The results show that their score in the mentalisation questionnaire are in-between the *without disease* and borderline personality disorder control groups. The scores showed negative correlation with the severeness of the ADHD symptoms and within the ADHD group the test people demonstrating impulsivity and anger-management difficulties scored significantly lower on the test. Finally, the conclusion had been reached that based on the mental state and insecurity of the other individual when it comes to understanding another individual, the ADHD group can be significantly separated from the other two control groups. Researchers have concluded that the results suggest that the test individuals with ADHD do not think about their own or other's mental state often when trying to understand them.

Pineda-Alhucema et al (2018) processed the results of the researches in a systematic comprehensive study which examined the connections of the executive functions and theory of mind abilities of children with ADHD in the light of social function deterioration. Only 2 out of 8 tests didn't show any significant relationships. In case of ADHD, from the group of executive functions, the theory of mind/mentalisation abilities showed relationship with the inhibitive functions, working memory and cognitive flexibility. According to the authors, the adequate operation of the inhibitory functions is indispensable for the control of cognitive and emotional processes which play a role in producing an adequate response in situations that involve planning, decision-making, solving

a problem, self-control and emotional control. In several studies, attention also showed relationship with theory of mind operation. However, on the whole, despite the obvious connection between executive functions and the theory of mind operation, the reviewed tests showed poor or moderate connections in people with ADHD examining them in the context of social difficulties.

In an earlier research (Földi et al, 2016) we examined the connection between the executive functions and mentalisation abilities of children with ADHD. The preliminary idea of the test was that the more severe the symptoms connected to hyperactivity (attention deficit, impulsivity) are and the more the child's environment can detect these symptoms, the more deficit will appear in the mentalisation processes of the child. N= 31 children (12-17yrs) diagnosed with hyperactivity and similar number and age-group of typically developing children as a control group took part in the test. After comparing the averages of the two groups, we received significant results in the averages of the subscales of the SDQ test examining peer-relations. The comparison of the story comprehension averages reached in the Faux Pas test showed a tendency level difference. The control group was less apt to commit the so-called social blunder.

Obioha et al (2017) also examined the mentalisation ability of children and adolescents with ADHD in and around New York with the Baron-Cohen modified Faux Pas test. Children with ADHD scored significantly lower in the Faux Pas test. In terms of age group, 7-8 year old children performed significantly lower in the Faux Pas test.

MENTALISATION AND RESILIENCE

Despite the fact, that it is apparent from the above mentioned that the concepts of mentalisation and resilience overlap in certain areas, professional literature contains very little information about the potential relationship between the operation of the theory of mind and resilience. Fónagy et al (1994) describe in their study that extreme jeopardizing experiences can be inhibitory to the operation of the reflective functions. Therefore the person may become vulnerable in all interactions which require the judgement of his/her own mental state or that of the other person. People with high-order mentalisation abilities are supposedly more resilient to stressful conditions (Fónagy and Bateman, 2016). However, looking through the professional literature, I couldn't detect any empirical evidence regarding the relationship between mentalisation and resilience.

THE OBJECTIVE OF THE TEST

The research is the work of the Developmental Psychology Research Group (Resilience Development – Positive Research Group) of the Institute of Psychology, Károli Gáspár Reformed University. The research does not involve treatment, has an ETT TUKEB permission, (Permission number: 19024-2/2019/EKU).

The objective of the test is to examine the factors playing a role in the peer relations of children and adolescents with ADHD compared to the control group and based on this to put a spotlight on the possibilities supporting adaptive environmental adaptation.

SAMPLE

The experiment involved children (9-16 yrs) with ADHD and the control group consisting of typically developing, *without disease* children and adolescents of a similar age group. Both in the treatment group and the control group, the experiments were carried out with the approval of the Head of Institutes and the written approval of the parents. Data collection was carried out face-to-face.

The members of the ADHD group were specifically chosen based on the (psychology) documentation of their school, selected by the diagnosis specifically with the professional help of the Institution. The formation of the control group adjusted to the headcount of the ADHD group was done by excluding any psychiatric diagnosis. 83 test persons, 41 diagnosed with ADHD and 42 typically developing children and adolescents participated in the test, which resulted as follows after data cleaning (partially missing data):

Group with ADHD n=32 children (8 girls, 27 boys, mean age:12,8 years)

Typically developing control group: n=32 children (14 girls, 21 boys, mean age:12,91)

HYPOTHESES

1. Children and adolescents diagnosed with ADHD scored lower in the total score in the CD-RISK (resilience) test than the control group. (Dvorsky & Langberg, 2016; Mackenzie, 2017; Regalla et al., 2015; Shi et al., 2018).
2. Based on the severity of the externalisation symptoms of ADHD, we supposed significant difference in the Opposition, Cognitive subscales of the Conners Child Behavior Survey, which influence the social situations and interactions effecting the formation of peer relations. (Braaten and Rosen, 2000; Marton et al., 2009; Perroud et al., 2017).

3. We suppose that there is a correlation between the data of the subscales of the SDQ Peer-relation Problem and the Prosocial Scale appearing in social relations and the degree of resilience. (Dvorsky & Langberg, 2016).
4. People with ADHD demonstrate significantly lower performance compared with typically developing people in the Faux Pas test indicating mentalisation, primarily in the comprehension of social situations (story comprehension). (Földi et al., 2016; Perroud et al., 2017; Pineda-Alhucema et al., 2018; Obioha et al., 2017)
5. We suppose that there is a correlation between the data of social relations appearing in the subscales of the SDQ Peer relation Problems and Prosocial scales and the level of story comprehension measured in the Faux Pas test measuring mentalisation. (Banerjee and Watling, 2005; Banerjee, et al, 2011).

TEST INSTRUMENTS

- **Conners Child Behavior Survey** teacher and parent version, (Conners et al., 1998; Perczel-Forintos, 2018)

The teacher and parent versions of the survey have been used by professionals for decades. They consists of items describing behavioural traits (externalisational symptoms).

With the help of the survey, the parent and the teacher of the child indicates the behavioural features on a four-level scale (Benyák, 2007). Using the teacher's version is extremely important in the clinical practice in order to derive measurable information according to the ADHD diagnostic criterion to show that the symptoms appear in the school, as well.

The survey has Oppositional, Cognitive, Hyperactive subscales and an ADHD index which does not qualify as a subscale (Conners et al., 1998).

- **SDQ** (Strengths and Difficulties Survey–Abilities and Difficulties Questionnaire) – paper and pencil version. The short Abilities and Difficulties Questionnaire can be filled in by parents, children, teachers alike to examine and diagnose behavioural problems and mental disorders in childhood. In many countries of the world, the survey is used as part of the clinical examination, a measure for treatment effect and as a research tool. The survey was created by Goodman (1997). The parent and teacher version can be applied from the age of 4 and from the age of 11 it can be filled in on your own. The SDQ differs from other similar measuring tools in the following way: it presents an overview on the child's behavior and potential difficulties by composing the majority of the other items in a positive way and by measuring the children's strengths, abilities and prosocial behaviour in the subscales. The items are marked on a 3-level scale (Turi et al., 2014). The survey includes an Overall Problems Scale,

and Emotional Symptoms, Behavior problems, Hypeactivity, Peer-relations and Prosocial subscales. (Turi et al., 2014).

- **CD-RISK 10-item Resilience Survey** is originally a 25-item measuring tool developed by Connor and Davidson to measure emotional resilience. The results of the authors raised numerous methodological issues which gave reason for further testing. In the later tests, the authors worked with a 10-item set of questions, which show more stable psychometrical characteristics according to the results (Járai et al, 2015; Kövesdi, 2018). The Hungarian CD–RISK used the 25-item version of the original English survey to choose the 10 item included in the test. According to the results, the new survey has adequate psychometric characteristics, high validity and reliability; therefore it is a suitable and reliable tool for measuring reliability. The test participants must indicate their answers on a 1-5 scale (0 – not true at all, 1 – rarely true, 2 – moderately true, 3 – often true, 4 – almost always true) (Járai et al, 2015).
- **Faux Pas (Baron-Cohen et al., 1999)** The Faux Pas test is a theory of mind measuring tool based on testing the phenomenon of false beliefs. There is a child and an adult version (Baron-Cohen et al., 1999) available. The test is capable of examining the explicit, verbalised theory of mind operation/mentalisation in a population of school children; it measures the understanding of both the cognitive and the affective mental states. (Gál, 2015). The objective of the test is the correct recognition of the „the Faux Pas” a 'slip of the tongue' in a social situation listening to short stories. Besides, the stories containing the 5 social blunders, the test also contains 5 control stories, where the task is the rejection of the „Faux Pas” as they do not include any social blunders. When understanding the social blunder, the participant must recognize that there is a (cognitive) difference between the knowledge of the characters and that the blunder was followed by a negative emotion (affective). In case of typical development, the recognition of the Faux Pas evolves around the age of 9-11 (Stone, Baron-Cohen and Knight, 1998; Baron-Cohen et al, 1999 in: Gál, 2015)

RESULTS

The statistical probes were carried out by the ROPstat program package. ROPstat is a statistical program package which includes the complete collection of the standard one-variant methods and also provides a wide scope of robust techniques and rich analyses with ordinal scale variants. ROPstat devotes special attention to pattern-recognition procedures. (Authors of ROPstat: Prof. Dr. Vargha András, Bánsági Péter Consultant: Prof. Dr. Lars R. Bergman, Stockholm University)

Connor – Davidson Resilience Survey (CD – RISK)

Comparison of 2-variant independent samples according to SEX and development categories.

n=64

Table of sample elements				
<i>Index</i>	SEX	Groups according to ,DIAG'		
	<i>group</i>	<i>typically de-veloping</i>	<i>ADHD</i>	<i>TOTAL</i>
1	boy	11	8	19
2	girl	21	24	45
	TOTAL	32	32	64
Table of Sample Means (CD – RISK)				
<i>Index</i>	SEX	<i>typically de-veloping</i>	<i>ADHD</i>	<i>MEAN</i>
1	fiú	28,55	24,5	26,52
2	lány	24,57	23,29	23,93
	AVERAGE:	26,56	23,9	

Summary of variant analysis (unweighted-means analysis)

	Degree of freedom	Standard deviation	F	p-value	Omega2	Eta2_parc
SEX	1	87,999	1,697	0,198	0,011	0,028
DIAG	1	92,917	1,792	0,186	0,012	0,029
SEX x Diag	1	25,063	0,483	0,49	0	0,008
Error	60	51,847				

Typically developing group averages according to SEX and development categories: Boys =28,55, Girls=24,57. The average of ADHD groups show a difference – Boys = 24,5, Girls= 23,29 compared to the typically developing groups, but this is not a significant difference between the groups.

Results of the Conners Child Behaviour Survey

Conners opposition subscale

Table of SAMPLE MEANS (Con_op)

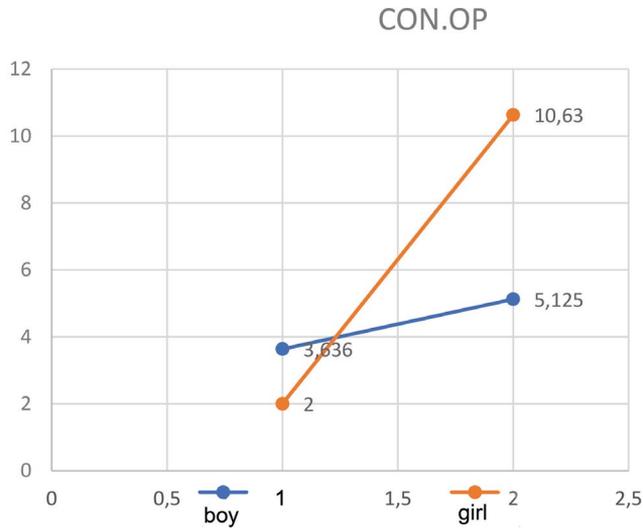
Index	SEX	typically developing	ADHD	Mean
1	boy	3,636	5,125	4,381
2	girl	2	10,63	6,313
	Mean:	2,818	7,875	

Table of STANDARD DEVIATION (Con_op)

Groups according to 'DIAG'			
Index	SEX	typically developing	ADHD
1	boy	3,749	3,834
2	girl	2,966	4,179

Degree of freedom	Standard deviation	F	p-value	Omega2	Eta2_par	
NEM	1	48,912	3,574	0,064+	0,025	0,056
DIAG	1	335,149	24,492	0,000***	0,232	0,29
NEM x Diag	1	166,869	12,194	0,001***	0,111	0,169

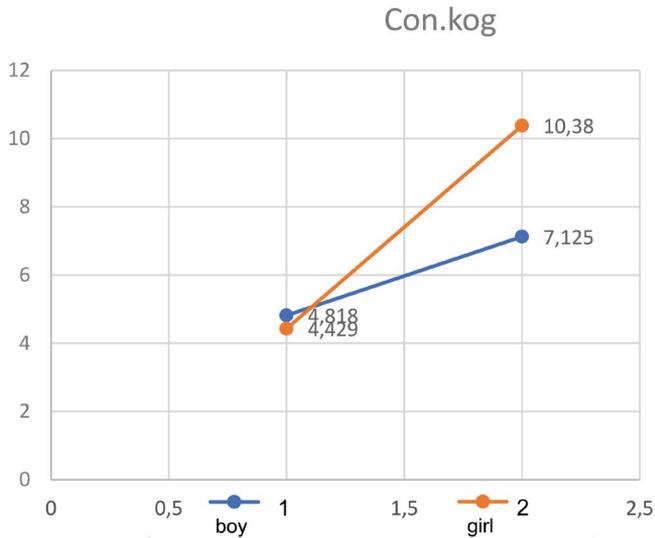
Both according to sex ($F(1,60)=3,574$, $p=0,064$) and diagnosis ($F(1,60)=24,492$, $p<0,001$), the difference shows at least a tendency level, and the interaction is significant ($F(1,60)=12,194$, $p<0,001$).



Robust two-way analysis of variance (Connors opposition)
 Welch-probe to test the SEX group effect: $F(1; 26,8) = 3,503$ ($p = 0,0722$)+
 Welch-probe to test DIAG group effect: $F(1; 26,8) = 24,003$ ($p = 0,0000$)***
 Johansen-probe to test SEX x DIAG interaction: $\text{Khi}2(1) = 10,540$ ($p = 0,0012$)**

Conners cognitive subscale

Groups accordig to 'DIAG'				
Index	SEX	typically developing	ADHD	MEAN
1	Boy	4,818	7,125	5,972
2	Girl	4,429	10,38	7,402
AVERAGE:		4,623	8,75	

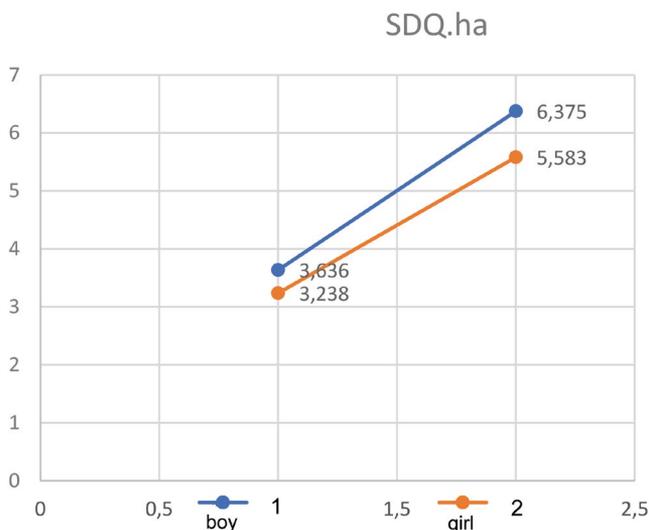


According to the diagnosis, there is a significant difference in the Conners cognitive subscale between the groups. ($F(1,60)=11,279$, $p=0,001$), the normal mean is 4,623, ADHD mean is 8,75.

SDQ (Strengths and Difficulties Questionnaire
– Abilities and Difficulties Survey, the hyperactivity subscale)

Index	SEX	typically developing	ADHD	MEAN
1	fiú	3,636	6,375	5,006
2	lány	3,238	5,583	4,411
ÁTLAG:		3,437	5,979	

Degree of freedom	f	Standard deviation	F	p-value	Omega2	Eta2_par
SEX	1	4,639	0,928	0,339	0	0,015
DIAG	1	84,686	16,934	0,000***	0,202	0,22
SEX x Diag	1	0,507	0,101	0,751	0	0,002
Error	60	5,001				



According to diagnosis, a significant difference can be detected between the treatment and the control group ($F(1,60)=16,934$, $p<0,001$), the normal mean is 3,437, ADHD mean is 5,979.

SDQ peer-relations subscale

Table of Sample Means (Sdq_kt)

Index	SEX	typically developing	ADHD	MEAN
1	Boy	2,364	4,125	3,244
2	Girl	2,619	2,958	2,789
AVERAGE:		2,491	3,542	

According to diagnosis, there is a significant difference between the typical group and the group with ADHD. ($F(1,60)=5,005$, $p=0,029$), the normal mean is 2,491, ADHD mean is 3,542.



Test of resilience by groups comparing the SDQ Peer Relations Problems and the Prosocial Scale. Correlation between social relations data appearing in the subscales of SDQ Peer Relations Problems and Prosocial Scale and the degree of resilience (Dvorsky & Langberg, 2016).

The Pearson coefficients by groups in Resilience and Peer Relations

	The correlation between the score of resilience and the SDQ Peer-relations problem subscale		The correlation between the score of resilience and the SDQ Prosocial Scale subscale	
Group with ADHD	r = -0,090	p = 0,6229	r = 0,452**	p = 0,0094
Typically developing group	r = -0,136	p = 0,4574	r = 0,468**	p=0,0070

Significant correlation was proven only in prosocial behaviour. The correlation was positive which may infer that the more typical prosocial behaviour is, the higher the degree of resilience is and vice versa. The result partially backs up the hypothesis in line with the data available in professional literature.

Comparison of Mentalisation by groups

The Faux Pas test: children with ADHD perform significantly lower on the Faux Pas test compared to the typically developing children.

Descriptive statistics of Faux Pas indices by groups

Variant	Typically developing group		Group with ADHD	
	Mean	Standard deviation	Mean	Standard deviation
Faux Pas correct identification score	4,250	1,078	3,937	1,343
Faux Pas correct rejection score	4,500	0,916	4,063	1,190
Faux Pas Total score	8,750	1,191	8,000	2,125
Faux Pas Story comprehension score	9,500	1,016	8,781	1,039

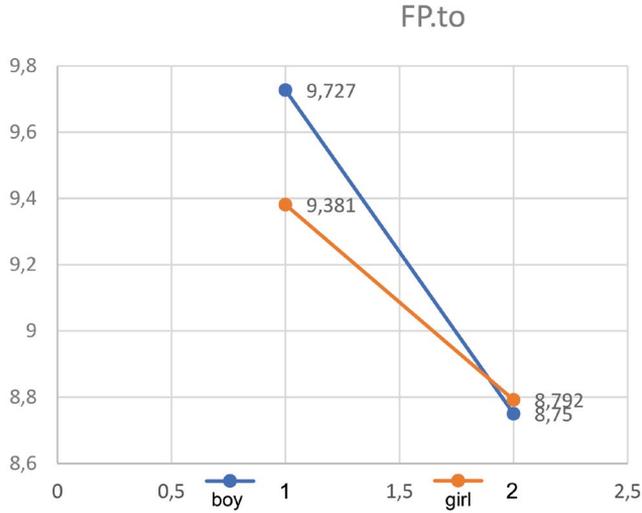
The group with ADHD reached a lower score in every respect than the typically developing group but only the story comprehension score shows a significant difference when comparing the means. In the typically developing group, due to the violation of normality (skewness: $-3,150^{***}$ and kurtosis: $12,193^{***}$ alapján) I tested stochastic equality by applying the **Mann – Whitney probe** (According to the equality of variances the O'Brien - test: $F(1; 62,0) = 0,715$ ($p = 0,4011$) and the Levene – test: $F(1; 62,0) = 0,066$ ($p = 0,7977$), it is not violated. Based on the Mann – Whitney probe, in the story comprehension task a significant difference can be detected (**$Z = 3,339$ ($p = 0,001$)^{***}**). Partially justifying the hypothesis, the result confirms the test of Földi et al (2016).

Faux Pas Story Comprehension

Index	SEX	typically developing	ADHD	MEAN
1	Boy	9,727	8,75	9,239
2	Girl	9,381	8,792	9,086
	AVERAGE:	9,554	8,771	

Summary of variance analysis (unweighted-means analysis)

Degree of freedom	f	Standard deviation	F	p-value	Omega2	Eta2_parcc
SEX	1	0,304	0,282	0,597	0	0,005
DIAG	1	8,041	7,469	0,008**	0,093	0,111
SEX x Diag	1	0,493	0,458	0,501	0	0,008
Error	60	1,077				



According to diagnosis, there is a significant difference in the story comprehension subscale between the typical group and the one with ADHD. ($F(1,60)=7,469$, $p=0,008$), the normal mean is 9,554, the ADHD mean is 8,771.

We suppose there is a relationship between the data of the SDQ Peer Relation Problems and the data of the Prosocial Scale regarding peer relations and the story comprehension level of the Faux Pas measuring mentalisation. (Banerjee és Watling, 2005; Banerjee, et al, 2011).

The correlation test by groups, the scores of the two subscales defined in the SDQ hypothesis (peer relation, prosocial scales) and the scores of the subtest of the Faux Pas test measuring mentalization (Faux Pas correct identification, Faux Pas correct rejection, Faux pas total score and story comprehension) in the following tables:

Pearson correlation coefficients of mentalization and peer relationships in the ADHD group

	ADHD group			
	<i>Faux Pas correct identification</i>	<i>Faux Pas correct rejection</i>	<i>Faux Pas</i>	<i>Faux Pas Story comprehension</i>
SDQ Peer – relation problems	$r = -0,104$ $p = 0,5713$	$r = -0,153$ $p = 0,4020$	$r = -0,152$ $p = 0,4078$	$r = -0,274$ $p = 0,1295$
SDQ Prosocial Scale	$r = 0,446^*$ $p = 0,0105$	$r = 0,278$ $p = 0,1233$	$r = 0,437^*$ $p = 0,0123$	$r = 0,394^*$ $p = 0,0256$

Pearson correlation coefficients of mentalization
and peer relationships in the typically developing group

	Typically developing group			
	<i>Faux Pas Correct identification</i>	<i>Faux Pas Correct rejection</i>	<i>Faux Pas</i>	<i>Faux Pas történetmegértés</i>
SDQ Peer – relation problems	r = 0,201 p = 0,2704	r = 0,028 p = 0,8799	r = 0,203 p = ,2651	r = 0,125 p = 0,4944
SDQ Proszociális Skála	r = -0,175 p = 0,3390	r = -0,064 p = 0,7281	r = -0,207 p=0,2553	r = -0,206 p = 0,2583

With regard to mentalisation, significant correlation could only be detected between mentalisation and prosocial behaviour in the ADHD group. The correlation is positive: the higher the score on the Prosocial Scale in case of individuals with ADHD, the better they perform in the correct identification of social blunder with regard to the total score. And also in the story comprehension dimension and vice versa. We may conclude that the hypothesis is justified.

SUMMARY OF RESULTS

The aim of our test is to examine the factors involved in the peer-relations of children and adolescents with ADHD-s and compare them with the control group and based on this to focus on the possibilities enhancing adaptive environmental adaptation.

1. The degree of resilience proved to be lower in the test samples of individuals with ADHD but there was no significant correlation between the typically developing and the ADHD groups.
2. The results of the **Conners Child behavior Survey** teacher and parent version prove that regarding the strength of the symptoms, there is a significant correlation between the ADHD and the control group – with special regard to the opposition indicating externalisation symptoms and social cognition. In case of ADHD, this predicts the peer relationship difficulties in line with previous studies.
3. According to the results, from the SDQ subscales, significant difference could only be detected in the hyperactive and the peer-relations subscales. During the resilience test by groups, we may find relationship in the context of SDQ Peer-relation Problems and Prosocial Scale. The correlation between the data of peer-relations appearing in the subscales of SDQ peer relation problems and the Prosocial scales and the degree of resilience is only justified in the prosocial behaviour. The correlation is positive which

concludes that the more typical the prosocial behaviour is, the higher the degree of resilience is and vice versa.

4. The group comparison of Mentalisation (Faux Pas) indicates that the children with ADHD score lower compared to the control group. According to the diagnosis there is a significant difference in the story comprehension subscale in the typically developing and the ADHD group. From the indices of the Faux Pas test measuring mentalisation ability, only the story-comprehension dimension proved to be significantly lower in the ADHD group compared to the typically developing group.

The Faux Pas test shows positive correlation with prosocial behaviour in the ADHD group in correct identification, total score and the story comprehension dimension, while in the typically developing group no correlation can be found.

5. From the data of the subscales of the SDQ Peer-Relations problems and the Prosocial Scale, and the level of the Faux Pas story comprehension measuring resilience, we have found that from the SDQ subscales the symptoms of the hyperactive, the emotional and behavioral problem and the scores of the subscales of the prosocial behaviour correlates with the total score measured on the CD-RISK scale in the typically developing group. In the ADHD group only the prosocial group shows correlation.

DISCUSSION

When reviewing the professional literature, it has already been mentioned that children and adults with ADHD show lower indices (indexes) than healthy people. What is more, when comparing the life quality of people with ADHD to people suffering from other mental disorders, only when comparing them to people with anxiety disorders and depression was their life quality better. (Veló et al, 2013).

Functional deterioration/immaturity may cause difficulties in school performance and peer-relations, yet, nearly 20% of people with ADHD adapt well. Despite the appearance of ADHD symptoms, there is no functional deterioration in case of social, emotional and school performance. As the formation of personal identity is a specific task of adolescence and peer relations play a leading role in this, it is important to explore the dimensions – emotional resilience and mentalisation - that enhance adequate adaptation. The factors connected to resilience and mentalisation in childhood could be the relationship to competent and caring adults, cognitive and self-regulatory abilities, self-control, empathy, optimism and positive self-image.

A further research task could be the clarification of how lower-order resilience correlates with the symptoms of ADHD and the functional weaknesses of

the illness, whether it has a mediation role in the successful adaptation to symptom difficulties. This is what the test of Shi et al (2018) draws attention to: it emphasized the mediatory role between the attention difficulties and the deterioration of life-quality.

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