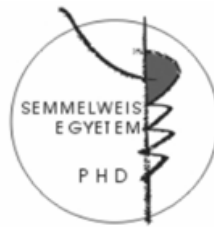


Aggression and Prosociality in Externalizing Disorders

Doctoral Thesis – English Version

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Introduction

Aggression and prosociality are important concepts in the description of human social processes as they can serve as a possible basis for categorization of emotionally relevant human relationships.

Aggression can be defined of intentional harmful behavior. An aggressive response related to the perception of threat is provided in the case of reactive aggression (RA) and a goal directed behavior is presented in the proactive form. RA and PA can be differentiated with various methods, although the distinction is not easy to make in some cases.

Small to moderate correlations of aggression and prosociality (helping behavior) were found in the available research, also subgroups with high scores for both behaviors were described. An argumentation for the distinct, not directly related dimensions of aggression and prosociality was provided in a former article from 2013, where the closest connection between PA and limited empathy was postulated.

Externalizing disorders are linked to aggressive and prosocial behavior through multiple pathways. The limited prosocial emotions specification of conduct disorder (CD) is strongly connected to PA, to the hypoactivity of the

hypothalamic-pituitary-adrenal (HPA) axis and to the atypical functions of the limbic and regulating prefrontal regions in the neural system. Oppositional-defiant disorder (ODD) and certain forms of CD can be characterized by elevated levels of RA and threat perception, hyperactivity of HPA axis response, atypical limbic functioning and emotional symptoms (irritability).

In the questionnaire based assessment of aggression, different sources of information (parent, teacher, self-report) are providing a basis for meaningful distinctions. According to Hungarian data, parent reported problems is more severe if compared to self reported data in the clinical population. Both types of aggression is elevated by the presence of CD, ODD and ADHD (attention-deficit/hyperactivity disorder) in the context of externalizing disorders. Literature about gender differences are ambiguous, although elevated levels of RA and PA were found in girls with externalizing problems, based on the results of a new international study.

Aims

Hypotheses for all three research conducted on adolescents with externalizing problems

1. Elevated levels of RA and PA by the presence of ADHD and CD/ODD, compared to control groups.

2. No difference of prosociality by the presence of ADHD and CD/ODD.
3. Higher problem scores and lower prosociality of parental report compared to self-report.
4. Description of gender differences in aggression and prosociality and their relation to externalizing problems. A specific hypothesis is not formulated due to ambiguous literature data.

Methods

First study - Assessment of adolescent boys with ADHD and control group

Participants in the clinical group were selected from the inpatients of a unit in Vadaskert Child Psychiatric Hospital diagnosed with ADHD. Data acquisition was done between 2010 and 2012. 22 adolescents fitted to the clinical group in age, IQ, gender, family background and place of living were included in the control group. After informed parental and self consent and completion of questionnaires, adolescents participated in a 60-70 minute long testing. An emotion recognition test (Facial Expressions of Emotion-Stimuli;

FEEST) and Raven Standard Progressive Matrixes test were included in the battery. Behavioral data were acquired with the Strengths and Difficulties Questionnaire (SDQ), the Inventory of Callous-Unemotional Traits (ICU) and the Reactive Proactive Aggression Questionnaire (RPA). Only behavioral data are discussed in the thesis.

Second study – Assessment and comparison of typically developing adolescents and adolescents with mixed clinical problems

The research was conducted in the context of the OTKA study named „Dimensional approach of externalizing disorders: aggression, suicidality and social aspects”. 13-17 year old adolescents were included in the sample. Participants in the clinical group were selected from the inpatients of units in Vadaskert Child Psychiatric Hospital. Data from 118 adolescents (52 girls) were analyzed. The 94 member of the control group (53 girl) consisted students from elementary and high schools in Budapest. After informed written consent parental and self report questionnaires were completed individually. M.I.N.I. interview was conducted in a face to face situation. RPA, SDQ and ICU questionnaires and the child version of the M.I.N.I. Neuropsychiatric Interview were employed in the study.

Third study – Assessment of adolescents with ADHD and clinical control group

After informed written consent, 391 adolescents (58 girls) with ADHD participated in the study who were hospitalized at Vadaskert Child Psychiatric Hospital in the period of 2012. January – 2014. December. The clinical control group also consisted 391 adolescents without ADHD diagnosis, who were hospitalized in Vadaskert Hospital during the same period. Control group was fitted in age (± 1 year) and gender to the ADHD group. After informed written consent parental and self report questionnaires were completed on the day of hospitalization. RPA, SDQ and ICU questionnaires were used in the study.

Statistical analysis in the studies

Data were analyzed by General Linear Model (GLM) in all three studies.

Results

First study

Group effects (ADHD/control) were identified for all SDQ problem scales, except prosociality (SDQ emotional: $F_{(1,42)} =$

12.63; $p < 0.001$; SDQ conduct: $F_{(1,42)} = 46.43$; $p < 0.001$; SDQ hyperactivity: $F_{(1,42)} = 136.85$; $p < 0.001$; SDQ peer relations: $F_{(1,42)} = 16.44$; $p < 0.001$). Also, effects of source of information (parental/self-report) were tendentious on the hyperactivity and significant on the peer problems scale (SDQ hyperactivity: $F_{(1,42)} = 3.40$; $p < 0.07$; SDQ peer problems: ($F_{(1,42)} = 6.17$; $p < 0.02$). Interactions were also significant for the hyperactivity ($F_{(1,42)} = 19.73$; $p < 0.001$) and prosociality scale ($F_{(1,42)} = 9.20$; $p < 0.01$), parental report showed greater problems and less prosociality in the clinical group compared to self report and the pattern was reversed in the control group. RA ($F_{(1,42)} = 7.43$; $p < 0.01$) and PA ($F_{(1,42)} = 6.17$; $p < 0.018$) differed by the presence of ADHD. Age as a covariate also factored into the analysis in relation to PA ($F_{(1,42)} = 5.43$; $p < 0.025$), PA decreased as the adolescents grew older.

Second study

Elevated levels of RA were detected in the presence of ADHD ($F_{(1, 200)} = 7.3$; $p < 0.008$) and CD/ODD ($F_{(1, 200)} = 9.4$; $p < 0.003$). Interaction between presence of ADHD and clinical/control group was significant also ($F_{(1, 200)} = 4.1$; $p < 0.044$). PA differed only by the presence of ADHD ($F_{(1, 200)} = 5.4$; $p < 0.022$). Analysis of sel-reported SDQ data provided the following results: there were significant difference in emotional

($F_{(1, 207)} = 11.6$; $p < 0.001$) and peer problems ($F_{(1, 207)} = 12.2$; $p < 0.001$) by clinical/control group; in hyperactivity ($F_{(1, 207)} = 15.2$; $p < 0.000$) and conduct problems ($F_{(1, 207)} = 9.8$; $p < 0.002$) by the presence of ADHD; and in emotional problems ($F_{(1, 207)} = 7$; $p < 0.009$) and hyperactivity ($F_{(1, 207)} = 4.7$; $p < 0.034$). Interactions were detected between ADHD and clinical/control group on the conduct problem scale ($F_{(1, 207)} = 4.4$; $p < 0.038$) and also between gender, ADHD and clinical control group in relation to hyperactivity ($F_{(1, 207)} = 6.7$; $p < 0.01$). Analysis of SDQ scales by source of information and clinical/control group were also conducted. Significant differences were found by clinical/control group in conduct problems ($F_{(1, 155)} = 84.2$; $p < 0.000$), hyperactivity ($F_{(1, 155)} = 70$; $p < 0.000$) peer problems ($F_{(1, 155)} = 66.7$; $p < 0.000$) and prosociality ($F_{(1, 155)} = 20$; $p < 0.000$). Source of information also had an effect on prosociality ($F_{(1, 155)} = 6.4$; $p < 0.012$). Interaction between the two factors (source and group) were also significant in relation to emotional ($F_{(1, 155)} = 7.7$; $p < 0.006$) and conduct problems ($F_{(1, 155)} = 19.1$; $p < 0.000$), hyperactivity ($F_{(1, 155)} = 21.6$; $p < 0.000$). In the clinical group, RA scores correlated with symptoms (based M.I.N.I.) of impulsivity ($r = 0.20$; $p < 0.031$) and hyperactivity ($r = 0.27$; $p < 0.004$), aggressive symptoms of CD ($r = 0.32$; $p < 0.000$) and all symptoms of ODD ($r = 0.37$; $p < 0.000$). PA correlated with impulsivity ($r = 0.26$; $p < 0.005$), hyperactivity

($r = 0.28$; $p < 0.002$) and all symptoms of CD ($r = 0.32$; $p < 0.000$).

Third study

Analysis of the differences by the presence of ADHD was conducted by Repeated Measures GLM analysis and was reported in the Clinical Child Psychology and Psychiatry journal in 202. Age and comorbidity were analysed as covariates. RA and PA differed significantly by the presence of ADHD között ($F_{(1, 778)} = 24.29$; $p < 0.001$). Also an interaction between gender, ADHD and type of aggression ($F_{(1, 778)} = 4.89$; $p < 0.03$) was detected, girls with ADHD showed increased levels of RA in the sample. Related to age, a significant interaction arose with type of aggression ($F_{(1, 778)} = 16.15$; $p < 0.001$), levels of PA decreased with age. The presence of ODD/CD elevated levels of both types of aggression ($F_{(1, 774)} = 39.66$; $p < 0.001$). Based on self reported SDQ data scores differed by the presence of ADHD in conduct problems ($F_{(1, 757)} = 28.3$; $p < 0.000$), hyperactivity ($F_{(1, 757)} = 48.2$; $p < 0.000$) and total problems ($F_{(1, 757)} = 17.2$; $p < 0.000$). Gender differences were detected in emotional ($F_{(1, 757)} = 35.8$; $p < 0.000$) and total problems ($F_{(1, 757)} = 17.2$; $p < 0.000$), also in prosociality ($F_{(1, 757)} = 17.9$; $p < 0.000$). An interaction was also detected in relation to SDQ hyperactivity scale between gender and ADHD ($F_{(1, 757)}$)

= 4.9; $p < 0.028$). Parental and self report scores were different significantly in all problem scales (emotional: $F_{(1, 690)} = 78.2$; $p < 0.000$; conduct: $F_{(1, 690)} = 59.8$; $p < 0.000$; hyperactivity: $F_{(1, 690)} = 262.5$; $p < 0.000$; peer problems: $F_{(1, 690)} = 71.2$; $p < 0.000$) and prosociality ($F_{(1, 690)} = 13.9$; $p < 0,000$).

Conclusions

First study – Assessment of adolescent boys with ADHD and control group

Our first hypothesis and former published results were confirmed by our results. Both RA and PA were elevated by the presence of ADHD if compared to control group. Results corroborate that symptoms of ADHD can be related to more severe forms of both types of aggression. Second hypothesis was confirmed partially, self reported prosociality did not differ between groups, but parent reported scores did. Third hypothesis was also confirmed, peer problem scores hyperactiviy and prosociality scores were different by the source of information. In the clinical group, parents see greater levels of problematic behaviors if compared to self-report.

Second study – Assessment and comparison of typically developing adolescents and adolescents with mixed clinical problems

Our first hypothesis was mostly corroborated, presence of ADHD and also CD/ODD increased levels of RA, and ADHD was also connected to PA. In case of RA former results were replicated. RA scores correlated with M.I.N.I. defined symptoms of impulsivity and hyperactivity, aggressive symptoms of CD and all symptoms of ODD. PA correlated with impulsivity, hyperactivity and all symptoms of CD. These results are in line with the behavioral aspects of the neurodevelopmental model of aggression presented in the Introduction. Second hypothesis was partially confirmed, self reported prosociality did not differ between groups, but parent reported scores did. Parents provided lower prosociality also higher conduct, peer problems and hyperactivity thus corroborating third hypothesis and the few available results from literature. In this analysis, gender differences were not detected.

Third study – Assessment of adolescents with ADHD and clinical control group

Related to the first hypothesis and confirming literature data, presence of ADHD, also CD/ODD elevated levels of both RA and PA. Second hypothesis was also corroborated, prosociality scores differed only by gender (and not by diagnostic groups), girls provided higher scores, thus an empirical base was provided for the concept of the different dimensions of aggression and prosociality. Connected to the third hypothesis, problems scales of SDQ showed higher and prosociality lower scores for parental report compared to self reporting, so former results were also confirmed in this case. The interaction between gender, ADHD and type of aggression confirmed our fourth hypothesis and provided our most interesting result from a research standpoint. Presence of ADHD elevates levels of RA in girls significantly. This result underlies the risk of aggression for girls with externalization problems. In contrast to metaanalytic results in the literature, differences of RA and PA were not detected in relation to methylphenydate medication.

Comparison of results from the studies

First hypothesis and the neurodevelopmental frame of aggression – as presented in the introduction - were

corroborated with the result from the second study. RA scores correlated with M.I.N.I. defined symptoms of impulsivity and hyperactivity (prefrontal deficit), aggressive symptoms of CD (limited empathy) and all symptoms of ODD (emotional reactivity/irritability). PA correlated with impulsivity, hyperactivity (prefrontal deficit) and all symptoms of CD. The presence of ADHD elevated levels of both RA and PA in all three studies. These results replicate and extend former studies, confirm the role of impulsivity in the neurodevelopmental background both types of aggression, and underline the sensitivity of adolescents with ADHD in relation to aggressive behavior. Self-report based differences of prosociality were not detected in neither study in relation to ADHD, corroborating to the model that aggression and prosociality are not related directly at least, not in all of their forms and subtypes. Parental reports of problems, based on SDQ and ICU result, are more severe if compared to self report. The differences are stronger in clinical and externalizing populations. Elevated levels of RA in girls with ADHD are confirmed by results of a new international study and emphasizes the possible risk of aggression for girls with externalization problems.

New results of my doctoral work

1. Description of elevated levels of reactive and proactive aggression in populations of adolescents with externalizing problems and ADHD, compared to fitted control and clinical control samples.
2. Elevated levels of reactive aggression were detected in girls with ADHD, compared to boys also.
3. Levels of reactive and proactive aggression were significantly affected by profiles of comorbidity in adolescents with externalizing problems.
4. Different trajectories of aggression and prosociality can be argued. Parental problem scores are elevated if compared to adolescent self-report in the externalizing population.

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