PRIMENJENA PSIHOLOGIJA, 2019, Vol. *12*(2), STR. 205-233

UDK: 364.63/.634-053.5
Originalni naučni rad
doi: 10.19090/pp.2019.2.205-233

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CAN WE USE SAME PREDICTORS FOR BOYS VS GIRLS PEER AGGRESSION?[2]

Using the theoretical framework of Bronfenbrenner's ecological model of peer aggression, the aim of the present study was to examine if we could use the same predictors of peer aggression at schools for boys and girls. The research included 880 participants, elementary school students from the fifth to the eighth grade, who self-estimated aggressive behavior toward their peers, affective empathy, impulsivity, parental behavior, peer acceptance, a number of friends, exposure to media, school climate, perception of neighborhood dangerousness, and also nominated aggressive peers and gave data about the school achievement and a number of friends. The same number of their parents gave data about family SES, while 107 teachers estimated attendance of parents at the parent-teacher meetings and other school events. Multivariate multilevel modeling revealed different predictors of boys vs girls peer aggression. Selected predictors of ecological model better explained peer aggression in boys than in girls. The main differences were in individual characteristic and family microsystem, whereas more statistically significant predictors were for boys, while some distal predictors in an interaction with individual characteristics and family microsystem were important in the explanation of boys' aggressive behavior. The overall results indicate that gender, as a biological category, had a strong influence on peer aggression. Psychological characteristics, as well as parental upbringing, better explained boys' than girls' aggressive behavior. These findings are very important for the school policy, which means that the intervention and prevention programs for peer aggression should differ depending on the child's gender.

Key words: gender, ecological model, peer aggression, predictors

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Primljeno: 19. 03. 2019.
Primljena korekcija:
09. 06. 2019.
Prihvaćeno za štampu:
16. 06. 2019.

[2] Preliminary data were presented at 17th European Conference on Development Psychology (Braga, Portugal, 08th -12th September 2015). Oral presentation was titled *Testing the ecological model of peer violence behavior on primary school students in Croatia*.

Introduction

Gender as Predictor of Peer Aggression

Gender is probably the most examined individual characteristic of peer aggression. Almost all studies have shown that boys are more physically and verbally aggressive toward their peers (Espelage, Bosworth, & Simon, 2000). Olweus (2010) has shown that boys are more physically and verbally aggressive than girls, and furthermore, equally or even more aggressive when it comes to indirect and relational types of aggression, especially for the primary school children. Gender differences in verbal aggression decrease with age, while they stay throughout the adulthood for physical aggression. Data are not so clear for indirect and relational types of aggression, indicating more indirect aggression for girls in adolescence (Björkqvist, 2018; Dinić, Sokolovska, Milovanović, & Oljača, 2014; Olweus, 2010).

One of the most examined approaches is the social-ecological perspective, which takes account of reciprocal interplay among individuals involved in the peer aggression, and its complex contexts is Bronfenbrenners' ecological model (Bronfenbrenner, 1979; Espelage & Swearer, 2004; Olweus, 1998). The child (individual) is in the center of ecological model, with his/her own psychological, biological, and behavioral characteristics, which represent the infrasystem. Individual factors influence the way in which the child is involved in aggression: as a perpetrator or a victim (Espelage & Swearer, 2004). The child is surrounded with different contexts which he/she interacts in. The microsystem is the closest context and has a direct influence on the child's development. The microsystem usually includes the child's interaction with the family, peers and the school. Relations in the microsystem or the interaction between different microsystems (e.g., interaction of the family and the school system) make a mesosystem. The exosystem has a distal influence on the child's development, which refers to the indirect environmental influence on the child (e.g., community and neighborhood). The exosystem variable influences the child through his/her microsystem (e.g., influencing his/her family or the school). The most distal context is the macrosystem that refers to broader social context, like the culture and country policies (Slee & Shute, 2003). Applying ecological approach to the problem of peer aggression, numerous studies have shown that being a male is a significant predictor of peer aggression and bullying. For example, Kim, Orpinas, Kamphaus, and Kelder (2011) first tested influences of four risk domains (individual, family, community and media) on the development of peer aggression, and found that being a male was a statistically significant predictor of peer aggression. Lee (2011) tested all levels of the ecological model on American and Korean students, and showed for both groups of students that being a male was a good predictor of bullying. You, Kim, and Kim (2014) study on Korean secondary school students found that being a male was a significant predictor for verbal and physical bullying (You et al., 2014).

Furthermore, the same results were obtained for Taiwan students (Wei, Williams, Chen, & Chang, 2010), and also for Croatian students (Velki, 2018b).

However, studies that would examine a moderate role of gender in predicting peer aggression are lacking, especially in Europe. In Serbia, one study examined a moderate role of gender in the relationships between empathy and peer violence among adolescents (Dinić, Kodžopeljić, Sokolovska, & Milovanović, 2016), but starting point was not the ecological model of human behavior. Different cultural influences in Europe vs USA, especially in the traditional countries like Croatia (Ilišin, Bouillet, Gvozdanović, & Potočnik, 2013; Sekulić, 2014), could also have more effect on gender differences in all the levels of the ecological model. This is more obvious in more traditional countries, where the gender differences are greater (Rajhvajn Bulat, & Ajduković, 2012; Keresteš, 2002). The main purpose of this study was to examine these gender differences in predicting peer aggression in the traditional European country like Croatia.

Gender Differences in Potential Predictors of Peer Aggression

The most prominent gender differences in the potential predictor of peer aggression were found on an individual level and within the family microsystem, i.e., parental upbringing of children.

Deficiency in empathic concern and compassion was connected to antisocial and aggressive behavior in many studies (Espelage, Mebane, & Adams, 2004; Feshbach, 1997). Gender differences in empathy were found mostly for the affective aspect of empathy (i.e., empathic concern about other people's feelings), whereas boys showed a lower level of affective empathy (Kaukianien et al., 1999; Özkan & Gökçearslan, 2009). Also, there was stronger correlation to aggressive behavior and bullying for boys (Carlo, Raffaelli, Laible, & Meyer, 1999; Espelage & Swearer, 2004; Gini, Albiero, Benelli, & Altoè, 2007). In the study on secondary school students, gender moderated only the relation between cognitive empathy and physical violence, in a way that there was a significantly negative relation only among boys (Dinić et al., 2016).

Generally, the studies have shown that a hyperactive behavior, especially in children within dominate problems of impulsivity, is associated with aggression toward peers and bullying (Craig, 1998; Velki & Dudaš, 2016). Impulsive children have lower threshold on frustration, and consequently they act more aggressively in different situations (Olweus, 1998). Furthermore, ADHD is more commonly diagnosed in boys than girls, 4 vs. 1, (Velki, 2018a) and the dominant symptoms for boys are hyperactivity and impulsivity, which usually significantly interfere with peer interactions (Biederman et al., 2002; Cantwell, 1996; Ramtekkar, Reiersen, Todorov, & Todd, 2010; Rucklidge, 2010; Velki & Romstein, 2016).

Many studies have shown that parental upbringing have a direct influence on the children's aggressive behavior, for example a higher level of parental discord (You et al., 2014), low parental monitoring, and parental attitude supporting

fighting (Kim et al., 2011), more inductive parenting (Lee, 2010, 2011), harsh discipline and physical punishment (Schwartz, Dodge, Pettit, & Bates 1997; Shields & Cicchetti, 2001), lack of parental warmth and support (Olweus, 1998; Veenstra et al., 2005), were associated with aggressive behavior and bullying. What is more important is that these findings are under the influence of gender differences, which means that parents treat boys and girls differently (Zahn-Waxler, Shirtcliff, & Marceau, 2008), especially in a traditional society such as the post war society of Croatia (Groebel, 1999; Keresteš, 2002). Generally, the parenting style for boys promotes rough-and-tumble practices (Maccoby & Martin, 1983; Ruble & Martin, 1998), and use of more physical control and punishment (Endendijk et al., 2017; Kochanska, Barry, Stellern, & O'Bleness, 2009; Lytton & Romney, 1991), whereas the parenting practices for girls promote caring and close interpersonal relationships (Gilligan, 1982), while the parental control is characterized by support, empathy and interpersonal closeness (Wood & Eagly, 2012). Furthermore, meta-analytic studies in the Western countries have revealed that parents use more physical punishment for boys (Lytton & Romney, 1991), while mothers use more supportive speech with girls (Leaper, Anderson, & Sanders, 1998). Generally, it could be concluded for the traditional society that the parenting style for girls is more sensitive and supportive with more warmth and interpersonal closeness, while it is more harsh and disciplining with use of power for boys (Mandara, Murray, Telesford, Varner, & Richman, 2012; Tamis-LeMonda, Briggs, McClowry, & Snow, 2009).

Although a significant number of the above-mentioned studies have found gender differences in some personal and family characteristics, these differences have not yet been put in a direct connection to peer aggression. Furthermore, there were no studies starting from the ecological models, taking into account all the levels of the model, which tested gender differences in prediction of peer aggression.

Current Study

The study goal was to determine the gender differences in predicting peer aggression among primary school children in Croatia, Europe, by applying Bronfenbrenner's ecological model. The predictors for boys' and girls' peer aggression were tested separately. In addition, the outcome variable, aggression toward peers, was a multivariate measure that consisted of three measures of aggressive behavior towards peers**.** The previous researchers found gender difference in peer aggression, i.e., boys being more aggressive toward their peers than girls (Olweus, 2010). Furthermore there were found some gender differences in personal traits (a lower level of empathy and a higher level of impulsivity within boys; Carlo et al., 1999; Gini et al., 2007; Velki & Dudaš, 2016), and moreover in parental upbringing (more harsh discipline and more autonomy in traditional upbringing of boys, and more warmth and inductive reasoning for girls; Kochanska et al., 2009; Mandara

et al., 2012; Tamis-LeMonda et al., 2009; Velki & Bošnjak, 2012). Therefore, it was assumed that these gender differences would also have influences on the prediction of peer aggression. As variables from the distal level of ecological model did not have a direct influence on the child's behavior, but had an indirect influence through variables on the closer level of the ecological model (Bronfenbrenner, 1979), it was assumed that gender differences in prediction of peer aggression would be found only for interactions between variables from proximal (microsystem and mesosystem) and distal levels (exosystem), and not for variables from the distal level per se. Variables from the distal level could predict peer aggression in the same way for both genders.

Hypotheses

H1: Different predictors of peer aggression in boys and girls would be found on an individual level of Bronfenbrenner's' ecological model (i.e., personal traits such as the level of impulsivity and empathy, i.e., empathy and impulsivity are more strongly related to peer aggression among boys than among girls).

H2: Different predictors of peer aggression in boys and girls would be found on the microsystem level of Bronfenbrenner's' ecological model (i.e., family characteristics such as parental punishment, autonomy and warmth).

H3: Different predictors of peer aggression in boys and girls would be found on the mesosystem level of Bronfenbrenner's' ecological model (i.e., family characteristics in interaction within the school variables, such as parents' attendances at PTA, and the family income inequality among the students in the same class).

H4: At a distance level, exosystem, there would be no gender difference in prediction of peer aggression since these variables do not have a direct influence on students. Instead, they influence the closer level of ecological model through variables.

H5: Different interaction effects would be found for boys and girls as a consequence of different gender predictors on the closer level of ecological model (i.e., individual, micro, and meso-system level variables).

Method

Participants

Elementary school students from the eastern part of Croatia were chosen to participate in the research. Students from the fifth to the eighth grade from 58 classes from 6 schools participated in the research. The average number of students in a class was M = 22.72 (SD = 4.23), ranged from 14-33 students per class. A total number of participants was 880 students (52% of girls), as well as their parents (N = 880, 19% of fathers, 61% of mothers, and 20% of those who did not check

the gender). The average age of students was *M* = 12.8 (*SD* = 1.15), with the range from 10 to 15 years. Students' teachers (*N* = 107) also participated in the research (10.2% of male, 82.2% of female and 7.6% of those who did not check the gender).

Instruments

Demographic data. Students filled out a special form with demographic data, e.g., age, gender, a number of best friends, peer acceptance (2 items), and the school achievement (6 grades: the academic achievement from the previous grade and term, the final grade in Mathematics and Croatian at the end of the previous school year, and at the end of the previous term).

Peer Aggression among School Children Questionnaire (Velki, 2012). This instrument was designed for the self-assessment of peer aggression and victimization based on the behavioral approach, and it consisted of two scales (*k* = 38). The scale of peer aggression among children measured the frequency of aggression committed against peers at school, and the scale of peer victimization measured the frequency of experienced aggression at school. Only the scale of peer aggression was used for the purpose of this research. The scale of peer aggression among children (*k* = 19) consisted of items describing verbal aggression (the item example: *I spread gossip about someone*), physical aggression (the item example: *I hit or push someone*) and cyber aggression (the item example: *I insult others through social networks, like Facebook, Twitter, etc.*). Children indicated the frequency of every committed form of aggression on a 5-point Likert scale (from "*never*" to "*always/nearly every day*"). The result for the scale was computed as an arithmetic mean of responses to the corresponding items. The internal consistency for Peer Aggression Scale was Cronbach α = .83.

Peer Nomination and Self-nomination of Peer Aggression (Velki, 2012). The sociometric technique of peer nomination and self-nomination of peer aggression based on the definitional approach was applied in the research. The students were given definitions of three different types of peer aggression (verbal, physical, and cyber), and were asked to nominate the classmates from the name list of their class who behaved in the described way more often than the other students from the class. It was possible for a student to nominate himself/herself for the aggressive behavior. The definition of verbal peer aggression included behaviors such as teasing, gossiping, mocking, insulting, etc. The definition of physical peer aggression described a person who punched, pushed, hurt, threatened, etc. The definition of cyber peer aggression was also presented. The total score of peer nomination for every student was formed based on the proportion of nomination from all the students who filled peer nomination and theoretically ranged from 0 (without any nomination/self-nomination) to 3 (nomination/self-nomination for all three types of peer aggressive behavior).

Empathy questionnaire (Ivanović & Buško, 2008). Empathy questionnaire measured the degree of empathy in the primary school students (from the

fifth to the eighth grade), and it was divided into two parts (k = 22): affective and cognitive aspects of empathy. As cognitive aspects of the empathy scale had low internal consistency, only the affective aspect of the empathy scale was used for the purpose of the research. The affective aspect of empathy (k = 10) was defined as the experience of emotion as a reaction to the emotional state of another person, and only this subscale was used in the research (the item example: *I enjoy watching when someone opens a gift and looks happy*). Participants indicated their agreement with the described behavior on a 5-point Likert scale (from "*does not apply to me at all*" to "*it fully applies to me*"). The result for the subscale was computed as an arithmetic mean of responses to the corresponding items, and theoretically ranged from 0 to 4. The internal consistency for the subscale of affective empathy was satisfactory, Cronbach α = .79.

Parental Behavior Questionnaire (Keresteš et al., 2012). Parental Behavior Questionnaire examined the most common behavior of a mother and a father towards a child. There were three versions of the questionnaire, for the mother, for the father, and for the child. Only a version of the questionnaire for a child, which consisted of two identical questionnaires, one related to the mother's behavior, and the other to the father's behavior, was used in this research. Each of these two questionnaires consisted of 29 items. Participants indicated their agreement with the described mother's/father's behavior on a 4-point Likert scale (from "*not true at all*" to "*completely true*"). The result for each subscale was computed as an arithmetic mean of responses to the corresponding items, and theoretically ranged from 1 to 4. The questionnaire had a total of 7 subscales: Warmth (k = 4, e.g., *He/She shows me he loves me*), Autonomy (k = 4, e.g., *He/She admits me and respects as person*), Intrusiveness (k = 4, e.g., *He/She interrogates me about everything*), Supervision (k = 4, e.g., *He/She knows my friends well*), Permissiveness (k = 3, e.g., *He/She is being permissive to me*), Inductive Reasoning (k = 5, e.g., *He/She explains me why I need to abide by the rules*) and Punishment (k = 5, e.g., *He/She yells when I behave badly*). Combined scores of mother's and father's behavior was used for the purpose of the research. The internal consistency of subscales ranged from Cronbach α = .70 to α = .86. In preliminary analysis subscale Permissiveness did not have significant correlation with peer aggression r = .06 (p > .05), so it was left out from further analysis.

Impulsivity Scale (Vulić-Prtorić, 2006). Impulsivity scale was a part of the wider self-assessment HIP scale (Scale hyperactivity-impulsivity-attention, k = 19) designed to assess hyperactive, impulsive behaviors and attention problems. Only Impulsivity scale (k = 4, e.g., *Interrupt or disturb others in what they do or say*) was used for the purpose of the research, on which participants self-evaluated the frequency of the described behavior that occurred to him/her in the last 6 months on a 5-point Likert scale (from "*never*" to "*very often*"). The result for the subscale was computed as an arithmetic mean of responses to the corresponding items, with internal consistency Cronbach α = .72.

Scale of Perception of Neighborhood Dangerousness (Velki, 2012). Scale of Perception of Neighborhood Dangerousness consisted of 6 items that measured

different types of dangerousness to which children were potentially exposed in the neighborhood. It was a self-assessment scale on which participants indicated their agreement with the statements (e.g., *There's a drug in my neighborhood*) on a 5-point Likert scale (from "*strongly disagree*" to "*strongly agree*"). The total score was computed as an arithmetic mean of responses to all items. Internal consistency was Cronbach α = .81.

Exposure to the Media Scale (Velki, 2012). This self-report scale consisted of three items related to the amount of time children spent with media (watching TV daily, playing computer games, and browsing the Internet weekly). Students indicated the frequency of time spent with every media on a 5-point Likert scale (from "*never*" to "*more than 10 hours of watching television per day and more than 10 hours per week for the Internet and computer game*"). The total score was obtained as an arithmetic mean of answers to all the items. Internal consistency was Cronbach α = .66.

Croatian School Climate Survey for students (Velki, Kuterovac Jagodić & Antunović, 2014). Croatian School Climate Survey for students measured a global school climate, i.e., the sense of safety and belonging to the school, the relationship of teachers and students, and parental involvement at school. It was a self-assessment scale (k = 15) on which participants indicated their agreement with statements (e.g., *I enjoy learning in my school*) on a 5-point Likert scale (from "*strongly agree*" to "*strongly disagree*"). The total score was computed as an arithmetic mean of responses to all items. Internal consistency was Cronbach α = .92.

Attendance of Parents at the Parent-Teacher Meetings and Other School Events (Velki, 2012). To evaluate the frequency of parents' attendance to individual meetings, PTA meetings, and school events, homeroom teachers were asked to estimate the frequency of parents' arrivals. The homeroom teacher evaluated parents' arrival on a 3-point Likert scale by circling the corresponding number, whereas "1" meant that parents of that child never came, "2" that parents of that child sometimes came and "3" that parents of the child regularly came. The total score was computed as an arithmetic mean of two responses.

Socio-economic Status of the Family (SES: Velki, 2012). The parents provided data on socio-economic status of the family. Three different aspects related to socioeconomic status (employment, income and education level) were measured. A parent who filled out the questionnaire had given the information for himself/herself and for the other parent (the child's father/mother). The parents' answer for every aspect of SES was scored from 1 (lowest SES) to 4 (highest SES). The total score was computed as an arithmetic mean of all items (k = 6). Parents gave demographic data about gender and age, and also about the age of their partner.

Procedure

Ethical Commission of the Faculty of Social Sciences at University of Zagreb (Study of Psychology), and Ethical Commission of the Faculty of Education at Uni-

versity of Osijek approved the research. Cross-sectional data were collected during the summer school semester. During the teachers' meeting, it was explained how the research would be carried out. Also, all the teachers were asked to complete Croatian School Climate Survey for teachers and Policy against bullying at schools. For parents who did not come to PTA, the written material was send to their home. The homeroom teachers were asked to prepare a list of students from their class, so that the instruments (a sociometric procedure) could be prepared. At the next PTA meeting, the main researcher explained the purpose of the research and asked parents for a written consent for the child's participation. About 70% parents gave the informed consent for their and children's participation in the research. Parents also gave data about the family socio-economic status. Students' data were collected collectively during classes at schools. Before the data collection, students were clearly reminded of possibility to give up at any time, and they were guaranteed confidentiality of the data obtained in the research. Data collection lasted for about 45 minutes. During students' filling out the questionnaires, the homeroom teachers evaluated the frequency of parents' attendance to PTA and other school events.

Results

Most of the variables were obtained based on the arithmetic means of the above-described items of the questionnaires and scales. The average values of the sum of the students' academic achievement from the previous year and from the previous term were used for the variable School Achievement. The index of income inequality was obtained on the basis of the families' socioeconomic status. It provided a more precise measure of inequality within a particular group, in this case within the class which the child attended.

All the variables met the assumptions for conducting the multivariate multilevel modeling analysis (variances were not zero, there was no perfect multicollinearity, the predictors were not correlated with the external variables, assumptions about normal distribution of errors and linearity were also met).

Multivariate Multilevel Modeling

At the first level of the model, the latent construct or the multivariate outcome (a measurement model) was defined, which consisted of three measures of aggressive behavior towards peers (self-assessment of aggressive behavior, peer nomination, and self-nomination for aggressive behavior), previously set up to *z*-scores. In order to facilitate the interpretation, all predictor variables were centered on the overall mean (grand-mean centering method).

At the second level, variables that varied within a group (i.e., among the students) were defined. The following variables were tested as predictors: infrasystem: age, af-

fective empathy, impulsivity; microsystem-family: parental punishment, parental inductive reasoning, parental warmth, parental autonomy, parental supervision, parental intrusiveness; microsystem-peers: number of friends, peer acceptance; microsystem-school: school success; exosystem; time spent using media, and perception of neighborhood dangerousness. At the third level, variables that varied between classes were defined. Three variables were tested as predictors: the school climate (estimated by the students - microsystem-school), parents' attendance at the PTA meetings and other school events (mesosystem), and the index of income inequality (mesosystem). At the fourth level, variables that varied between schools (e.g., school policies against bullying, and the school climate assessed by the teachers) were defined, but the intraclass correlation coefficient (ICC) did not show a statistically significant variation between schools, so these variables were excluded from the further analysis. Therefore, the model that had 3 levels had been tested, and the above described analysis had been repeated twice separately for boys and girls. The analyses were done on the variance components (VC) of the covariance structure matrix by using the ML (maximum likelihood) estimation method. First, the basic models (Model A and Model A1) were tested with all the potential predictors. Then, there were tested variations of predictors from the second level of the model (between students), and from the third level (between classes), and models were built with significant variations. Afterwards, the potential interactions were tested, and final models (Model B and Model B1) were built based on significant interactions. Comparisons of the obtained model were tested by using the indicators of model fit.

Table 1 shows the basic descriptive statistics of all variables included in the research. Most of the variables were obtained based on the arithmetic means of the above-described items of questionnaires and scales. For the variable School Achievement, there were used the average values of the sum of the students' academic achievement from the previous year (a general achievement, the mathematics grade and the grade form Croatian) and from the previous term (a general achievement, the mathematics grade and the grade from Croatian). The achievement in mathematics and Croatian (with the general academic achievement at the end of the school year/term) was chosen because students in the primary school mostly had very good and excellent grades. This decreased the variability of the general academic achievement. Croatian and mathematics were usually considered to be the basic subjects in the primary school. Therefore, the criteria were more severe in comparison to some other subjects (Vrdoljak & Velki, 2012). Thus, it was expected that the variability would be higher in these variables in relation to the general academic achievement.

The index of income inequality was obtained on the basis of the families' socioeconomic status. It provided a more precise measure of inequality within a particular group, in this case within the class which the child attended. The value span ranged from 0 (representing the same income group) to 1 (representing a maximum inequality within the group). The index of income inequality was calculated based on Deatons' formula (1997):

$$G = \frac{N+1}{N-1} - \frac{2}{N(N-1)u}(\Sigma_{i=1}^{n} P_i X_i)$$

whereas *N* was a number of participants, u an average population income (the average SES for the specific class), *P* a rank of income of persons *i*, with income *X* (SES of that person). Accordingly, the richest person had a rank 1, and the poorest person had a rank *n*.

Table 1
Descriptive statistics for all variables included in the research

Variables	*N*	*Min*	*Max*	*M*	*SD*	*Sk*	*Ku*
Variables on the first level (multivariate outcome)							
self-assessment of aggressive behavior	879	1.00	3.42	1.30	0.30	2.50	3.73
self-nomination for aggressive behavior	720	0.00	3.00	0.46	0.72	1.67	2.51
peer nomination for aggressive behavior	720	0.00	3.00	0.24	0.56	2.46	3.82
Variables on the second level							
affective empathy	879	0.20	4.00	2.96	0.70	-1.00	1.15
impulsivity	869	1.00	5.00	2.40	0.79	0.63	0.63
number of friends	879	0.00	25.00	4.34	3.51	1.66	3.13
peer acceptance	879	1.00	3.00	2.64	0.48	-1.27	1.00
school achievement	876	1.17	5.00	3.75	0.89	-0.37	-0.74
parental inductive reasoning	877	1.00	4.00	3.12	0.64	-0.66	-0.15
parental punishment	874	1.00	4.00	2.11	0.63	0.37	-0.19
parental warmth	874	1.00	4.00	3.56	0.52	-1.62	2.52
parental autonomy	872	1.00	4.00	3.52	0.50	-1.38	2.02
parental intrusiveness	870	1.00	4.00	2.17	0.69	0.38	-0.39
parental supervision	874	1.00	4.00	3.17	0.64	-0.73	0.10
time spent using media	873	1.00	5.00	2.83	0.87	0.48	-0.57
neighborhood dangerousness	870	1.00	5.00	4.18	0.76	-1.27	1.71
Variables on the third level							
school climate	880	1.41	3.35	2.32	0.42	0.52	-0.11
index of income inequality	880	0.02	0.17	0.09	0.03	0.41	1.42
parent's attendance at school	880	1.68	3.00	2.26	0.29	-0.74	-0.79

Notes. N - number of participants*; Min* - minimum*; Max* - maximum*; M* - arithmetic mean*; SD* - standard deviation*; S* - skewness*; K* - kurtosis.

Results have shown (Table 2) that 23% (level 2; ICC=0.2300) of the total variability in boys' peer aggression can be explained by differences among stu-

dents, while only 6.55% (level 3, ICC=0.0655) of the total variability can be explained by differences among classes. For girls' peer aggression, 27.15% (level 2, ICC=0.2715) of the total variability can be explained by differences among students and 6.66% (level 3, ICC=0.0666) of the total variability can be explained by differences among classes.

Table 2
Estimates of null model of multilevel modeling for the criterion variable peer aggression for boys and girls

	Parameters	Boys	Girls
Fixed effects	Intercept	.119*	-.110*
Variance components			
Level 1	variability in aggression (individual differences)	.909**	.467**
Level 2	variability in aggression within classes	.297**	.191**
Level 3	variability in aggression between classes	.085*	.047*
Indicators of model fit			
	-2 Log Likelihood	3270.772	2660.173
	Akaike's Information Criterion (AIC)	3278.768	2668.173
	Hurvich and Tsai's Criterion (AICC)	3278.812	2668.214
	Bozdogan's Criterion (CAIC)	3302.740	2692.241
	Schwarz's Bayesian Criterion (BIC)	3298.739	2688.237

Note. * $p < .05$. ** $p < .01$.

The predictors of boys' peer aggression explained 50.43% of the variance on the level 2 (between students), but nonetheless significant 14.09% still remained unexplained. On the third level, 60.54% of the variance (between classes) was explained, and another 3.19% of unexplained but insignificant variance (Table 3, variance components in Model A) remained.

For girls' peer aggression on the level 2 (between students), predictors explained 48.93% of the variance, but still remained significant 17.73% of unexplained variance. On the third level, predictors explained 58.21% of the variance (between classes), and another 3.56% of unexplained but insignificant variance remained (Table 3, variance components in Model A1).

Table 3
Predictors' models of multilevel modeling for peer aggression for boys and girls

		Boys		Girls	
		Model A	Model B	Model A1	Model B1
Fixed effects estimates	Intercept	.026	.019	-.047	-.041
Level 2	age	.051	.048	-.027	-.026
	affective empathy	-.148**	-.148**	.005	-.007
	impulsivity	.292**	.271**	.331**	.325**
	number of friends	-.010	-.023	-.014	-.024
	peer acceptance	-.086	-.079	-.022	-.035
	school achievement	-.050	-.041	-.042	-.039
	parental inductive reasoning	.165*	.155*	.044	.016
	parental punishment	.222**	.212**	.050	.055
	parental warmth	.151	.153	-.142*	-.146*
	parental autonomy	-.211*	-.221*	.076	.108
	parental intrusiveness	-.065	-.057	.007	.013
	parental supervision	-.071	-.081	-.051	-.068
	time spent using media	.116**	.103*	.067*	.065*
	neighborhood dangerousness	.153**	.123**	.163**	.158**
Interactions on the second level	parental punishment x neighborhood dangerousness	-	.138*	-	-
Level 3	school climate	.231*	.216*	-.032	-.027
	parents attendance at the school	.004	.014	.263*	.277*
	index of income inequality	6.755**	6.577**	.796	.797
Interactions between second and third level predictors	neighborhood dangerousness x school climate	-	.309**	-	-
	neighborhood dangerousness x income inequality	-	4.234*	-	-
	impulsivity x parents attendance at the school	-	-	-	.389**
Variance components					
Level 1	variability in aggression (individual differences)	.865**	.866**	.434**	.433**
Level 2	variability in aggression within classes	.147**	.125**	.098**	.093**

Level 3	variability in aggression between classes	.033*	.029	.020	.019
Indicators of model fit					
	-2 Log Likelihood	2979.74	2961.31	2434.30	2423.67
	Akaike's Information Criterion (AIC)	3021.742	3009.314	2476.301	2467.671
	Hurvich and Tsai's Criterion (AICC)	3022.653	3010.491	2477.15	2468.602
	Bozdogan's Criterion (CAIC)	3146.731	3152.154	2602.486	2599.869
	Schwarz's Bayesian Criterion (BIC)	3125.731	3128.147	2581.488	2577.873
Degrees of freedom	Number of parameters	21	24	21	22

Note. * $p < .05$. ** $p < .01$.

There were significant interactions of predictors on the second level of the model, and also there were significant variations of the second level predictor variables between classes (Table 4), so the final model was the Model B and B1.

Table 4
Variations of predictors from the second level of the model (between students), on third level (between classes) for peer aggression for boys and girls

Variance components		Boys	Girls
Level 1	variability in aggression	.863**	.433**
$Intercept_2$	within classes	.048	.030
	affective empathy	.061	-
	impulsivity	.005	.031*
	parental inductive reasoning	.044	-
	parental punishment	.000	-
	parental autonomy	.000	-
	parental warmth	-	.055*
	time spent using media	.012	.032*
	neighborhood dangerousness	.068*	.029
$Intercept_3$	between classes	.024	.018

Note. * $p < .05$. ** $p < .01$.

Model fit for multilevel models of boys' and girls' peer aggression (Table 3) was tested by using the χ^2 likelihood ratio test. Comparison of Model A with Model

B, $\chi^2 = 18.434$, $p < .01$, showed statistically significant improvement of model fit for Model B. Also, other indicators of model fit (AIC and AICC; Table 3) showed better model fit of Model B compared to models A. Therefore, it was decided to take into account the Model B as a final solution for the prediction of boys' peer aggression. The same results were obtained or girls' peer aggression. Comparison of Model A1 with Model B1, $\chi^2 = 10.628$, $p < .01$, showed a statistically significant improvement of model fit for Model B, while the other indicators of model fit (AIC, AICC, CAIC and BIC; Table 3) showed better model fit of Model B1.

Model B obtained the following significant predictors of boys' peer aggression that explained the variability between students: more impulsive behavior, less empathy, more parental punishment, more parental inductive reasoning, less parental autonomy, more time spent with media, and a greater perception of neighborhood dangerousness. There were two significant predictors on the third level, more negative school climate and index of income inequality (higher inequality), which explained the variability between classes. Furthermore, the model B had three significant interaction effects, i.e., between parental punishment and the perception of neighborhood dangerousness (Figure 1), between perception of neighborhood dangerousness and the school climate (Figure 2), and between perception of neighborhood dangerousness and income inequality (Figure 3).

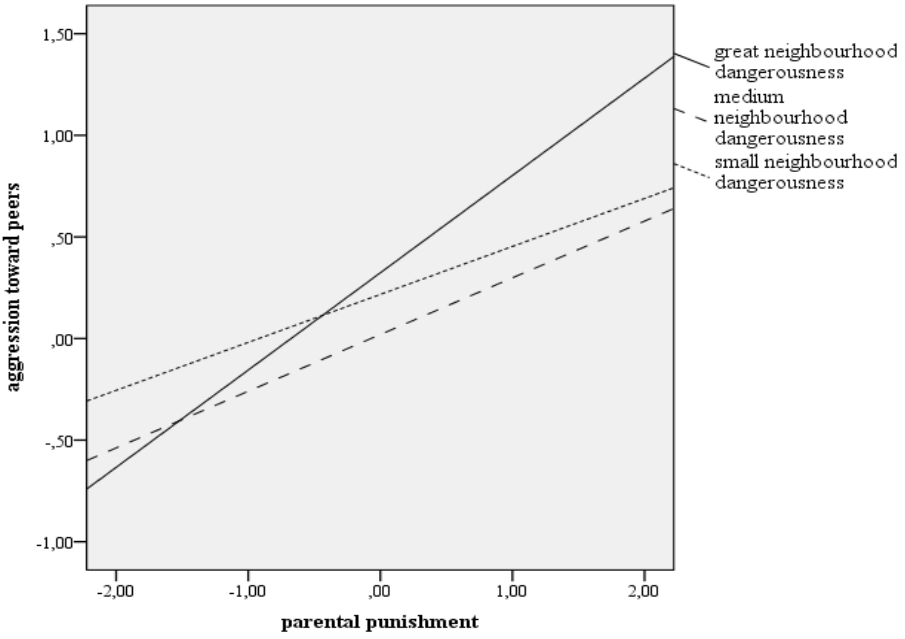

Figure 1. Interaction effects between parental punishment and perception of neighborhood dangerousness for aggression toward peers on the second level of the model (within the class) for boys.

Figure 1 shows the interaction effect of parental punishment and perception of neighborhood dangerousness on the second level of the model. In cases where the student perceived great neighborhood dangerousness, the parental punishment was more associated with boys' aggression towards their peers, but in situations where students perceived medium or low neighborhood dangerousness, this correlation was weaker.

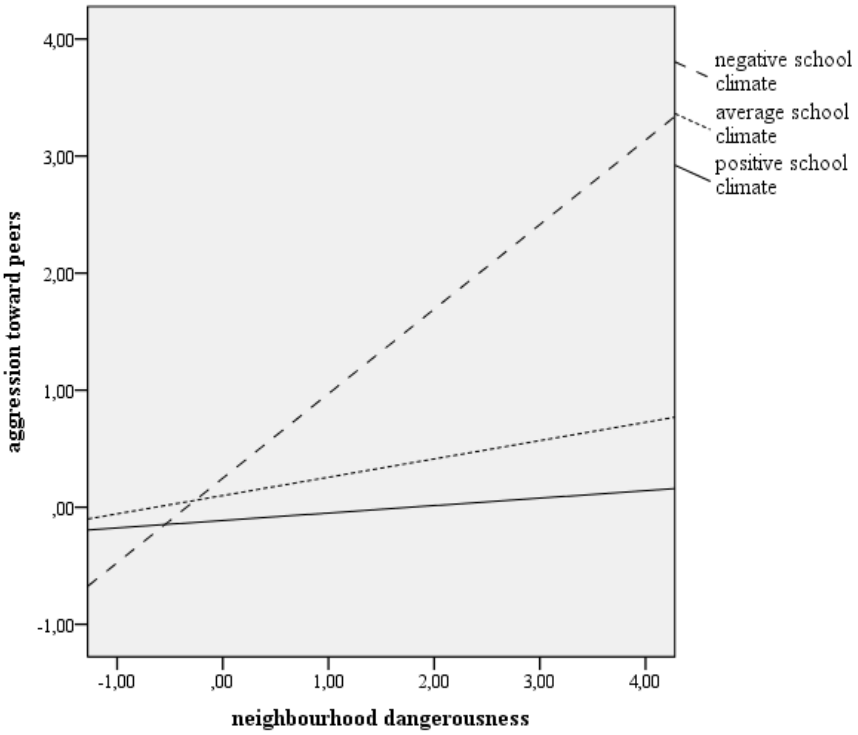

Figure 2. Interaction effects between perception of neighborhood dangerousness and the school climate for aggression toward peers on the third level of the model (between the class) for boys.

Figure 2 shows the interaction effect of perception of neighborhood dangerousness and the school climate on the third level of the model. In classes where students perceived negative school climate, the perception of neighborhood dangerousness was more strongly associated with boys' aggression towards peers. On the contrary, in classes where students perceived a positive school climate, there was almost no association between perception of neighborhood dangerousness and boys' aggression.

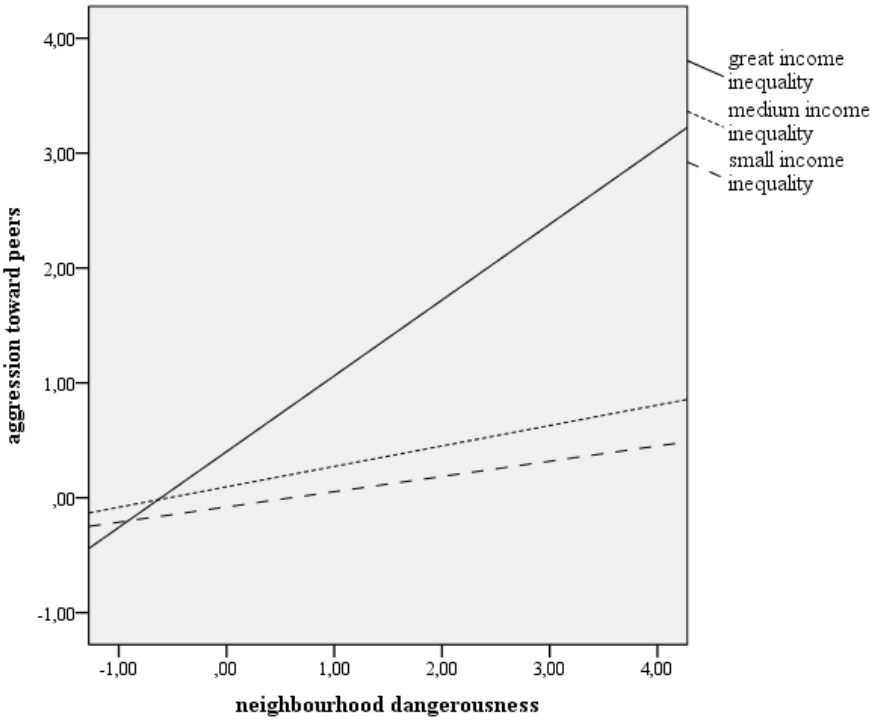

Figure 3. Interaction effects between perception of neighborhood dangerousness and income inequality for aggression toward peers on the the third level of the model (between the class) for boys.

Figure 3 shows the interaction effect of perception of neighborhood dangerousness and income inequality on the third level of the model. In classes where students perceived great income inequality between their families, perception of neighborhood dangerousness was more strongly associated with boys' aggression towards peers. However, in classes where students perceived low- or no-income inequality, there was almost no association between perception of neighborhood dangerousness and boys' aggression.

Model B1 obtained the following significant predictors of girls' peer aggression that explained the variability between students: more impulsive behavior, less parental warmth, more time spent with media, and a greater perception of neighborhood dangerousness. There was only one significant predictor at the third level, parents' attendance at school, which explained the variability between classes. Furthermore, the model B1 had one significant interaction effects, i.e., between impulsivity and parents' attendances at school (Figure 4).

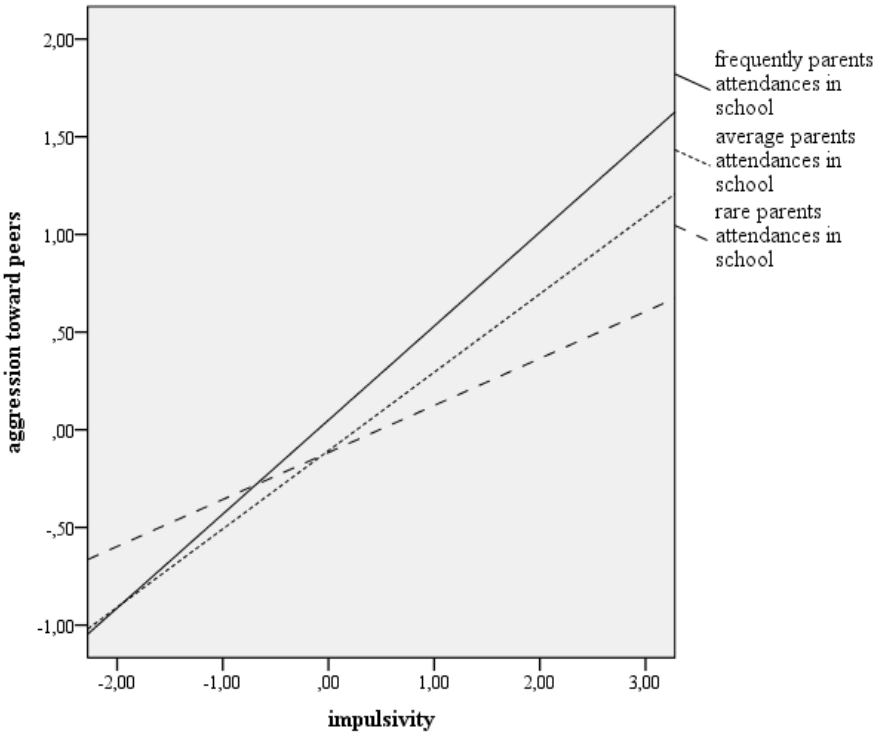

Figure 4. Interaction effects between impulsivity and parents' attendances at school for aggression toward peers on the third level of the model (between the class) for girls.

Figure 4 shows the interaction effect of impulsivity and parents' attendances at school on the third level of the model. In classes where parents often came to PTA, impulsivity was more strongly associated with girls' aggression towards peers, but in classes where parents rarely came to PTA, the association between impulsivity and girls' aggression was somehow weaker, but still significant.

Discussion

In accordance with the study goal, predictors for boys' and girls' aggression toward peers were checked separately and interpreted within the ecological perspective.

From an individual level of Bronfenbrenner's' ecological model, different predictors for boys' and girls' prediction of peer aggression were confirmed. Lower level of affective empathy was a significant predictor only for boys' aggressive behavior, but not for girls. Girls generally showed more empathic behavior (Espelage

& Swearer, 2004) and a genuine concern about other peoples' emotions than boys did. In contrast, boys with lower levels of affective empathy did not sympathize with other children, and showed no concern for their feelings without realizing that their aggressive behavior could hurt other children. Furthermore, higher degree of impulsivity in both boys and girls was a significant predictor of aggression toward peers. Interestingly, impulsiveness was a stronger predictor for girls than for boys. Such results could be explained by normative beliefs whereas boys' impulsive behavior was being more tolerated, especially in a traditional society like Croatia (Sekulić, 2014; Velki, 2018b). Moreover, the researches have shown that boys are more impulsive than girls (Craig, 1998). A smaller amount of impulsive behavior is considered a normal developmental feature of boys, and only high or extreme impulsiveness can be noted in connection to aggression. For girls, different normative beliefs prevail, girls are quieter and more peaceful than boys are, and a slight deviation from the average impulsive behavior in girls can be a good predictor of aggressive behavior.

From the microsystem level of Bronfenbrenner's' ecological model, different family predictors underline aggression in boys and girls. More punishment, more inductive reasoning and less autonomy are good predictors of aggressive behavior for boys. Harsh discipline, especially in families subject to corporal punishment, often borders with abusive parenting has proven to be a good predictor of aggression toward peers (Ahmed & Braithwaite, 2004). Previous studies have also shown that the punishment is more often used for boys living in traditional families (Endendijk et al., 2017; Kochanska et al., 2009). In addition to punishing, corrective educational practices also include alternative punishment, with the intention to regulate unwanted child behavior, but without the use of an aversive stimulus, e.g., explanation and teaching, ignoring inappropriate behavior, etc. (Delale & Pećnik, 2009). Therefore, inductive reasoning is probably the parent's reaction to boys' aggression. Lack of child's autonomy within the family, where the parents are over-involved in the child's educational and extracurricular activities, can lead to aggressive behavior toward peers (Barber, 2002). For traditional upbringing of boys, it is usual for parents to be over-controlling (Lytton & Romney, 1991). In relationships with peers, the boys are trying to compensate for the lack of autonomy in the family, and overly want to gain independence, usually by using aggression. For girls, only a lack of parental warmth is a significant predictor of peer aggression. Upbringing of girls in more traditional society includes more sensitive and supportive parental style with more warmth (Kochanska et al., 2009; Tamis-LeMonda et al., 2009), and a lack of warmth can cause problems in other significant relationships, such the ones with peers.

Apart from gender differences in the family upbringing, another predictor on the microsystem level is significant for boys' aggressive behavior but not for girls'. It is a negative school climate. At schools where the negative school climate prevails, students have no sense of belonging to school, they do not feel safe and welcome to school (Newman, Murray, & Lussier, 2001). As boys are likely to have more problems in the relationship with the teachers, consequently they will also have more negative perception of the school climate and show more aggressive behavior.

From the mesosystem level of Bronfenbrenner's' ecological model, different predictors are significant for boys' and girls' aggression toward peers. Greater family income inequality within class that boys attend is a significant predictor of boys' aggression, which is in accordance with the previous studies (Elgar, Craig, Boyce, Morgan, & Vella-Zarb 2009; Wilkinson & Pickett, 2006). Exposure to stressful life events, such as low socioeconomic conditions (poverty, loss of work, etc. which is typical for Croatian society), increase the psychological stress of parents and indirectly leads to failure and difficulties in parenting. It is more common in a traditional society that these family problems lead to harsh discipline that is more frequent in upbringing of boys. A significant predictor of aggression for girls is parents' attendance at school. In classes where parents more often come to school, there is more aggression in girls' behavior. It is possible that in classes where there is more aggression and more general problems, parents often come to school either independently or at the invitation of teachers. Furthermore, as aggressive behavior is more common in boys, when it is more pronounced. In girls it is more deviant from norms in some way, and therefore parents are more involved in solving such problems.

At distance level of Bronfenbrenner's ecological model, exosystem, there are no gender differences in prediction of peer aggression. Both predictors, time spent using media and perception of neighborhood dangerousness were significant for boys' and girls' aggression. Although, time spent using media proved to be a slightly stronger predictor for boys. Boys often spent time playing violent computer games (Barboza et al., 2009; Genitle & Walsh, 2002) and were more likely to watch violent contents on television (Kuntsche, 2004, Pšunder & Cvek, 2012). In most violent computer games and violent movies, the main heroes were men who actually served as a model that boys imitated in the school situations. The perception of neighborhood dangerousness proved to be a slightly stronger predictor for girls. Probably due to more sensitive and warmer upbringing of girls (Mandara et al., 2012; Tamis-LeMonda et al., 2009) where aggression was not a normative behavior for them, and perhaps even a small amount of violence was sufficient for girls to adopt and pass it on in the school situations.

Finally, different interaction effects for boys and girls were confirmed. Neighborhood dangerousness had moderation effect in connection between parental punishment and aggressive behaviors in boys. If boys lived in dangerousness neighborhood, the parental punishment was more strongly associated with boys' aggressive behavior. Boys who expressed aggressive behavior could have learned such behavior within the family where punishment was present (which was more for boys living in a traditional society). Furthermore, it was possible that parents in dangerousness neighborhood were more concerned about the safety of their child and were prone to strict discipline and punishment to protect it. Moreover, it was more likely that families on the margins of poverty lived in dangerous neighborhoods, in which common practice was strict punishment that often led to a child abuse (Buljan Flander & Kocijan Hercigonja, 2003; Cicchetti & Cohen, 2006).

Another significant interaction has shown moderation effect of the school climate in connection between the neighborhood dangerousness and peer aggression in boys. In the classrooms where the negative school climate prevails, the perception of neighborhood dangerousness is more strongly associated with boys' aggression toward peers. The moderating effect of the school climate has proved to be significant in other studies (Espelage & Swearer, 2009). This finding is very important because it points to the fact that the negative impact of the community (neighborhood dangerousness) can be neutralized if the child attends the school where he feels accepted and safe.

The final significant interaction has shown moderation effects of income inequality in connection between neighborhood dangerousness and peer aggression in boys. In classrooms where large differences in the family income prevail, neighborhood dangerousness is more strongly associated with peer aggression in boys. Children easily see the material differences (e.g., clothes, mobile phones, etc.) within these classes, which can cause frustration because they cannot change their position. A boy living in a dangerous neighborhood has stored many aggressive scenarios in his memory, and when he comes to a state of frustration caused by huge and obvious material differences, he is likely to recall an aggressive scenario stored in his memory (seen or experienced in a dangerous neighborhood) and will behave accordingly (Huesmann, 1994).

Only one significant interaction has been found for girls, a moderating effect of parents' attendance at school in connection between impulsiveness and aggression in girls. In classes where parents often come to school, impulsiveness is more strongly associated with peer aggression in girls. Parents are more likely to come to school when there are more problematic behaviors, as well as impulsiveness in girls, which is closely related to aggression (Velki, 2018b). Parents will be more likely to come to school (either self-initially as parents who want to solve the problem or at the invitation of teachers) especially if the impulsive behavior occurs in girls, which is considered less normative and more deviating than in boys.

Generally, the current research has shown that the chosen predictors better explain aggressive behavior for boys than for girls. Less predictors have been significant for girls and generally, they are weaker than boys' predictors are. It can be concluded that there is a variety of factors underlying in boys vs girls aggressive behavior, and that predictors from the proximal level of Bronfenbrenner's' ecological model are more gender sensitive than the ones from the distal level.

Prevention and Policy Implications

Peer aggression mostly happens at school, during the break, lunch, on toilets and hallways, and even in the classrooms (Velki & Vrdoljak, 2013), so the prevention program is a good starting point in an educational institution, i.e., at school. As a place where children spent half, or even more, time of the day, educational experts should be the first ones introducing prevention programs at schools and in classrooms, also

including parents and the whole community in such programs. As the results of the obtained research show, different predictors influence boys' and girls' aggressive behavior. This must be taken into consideration when implementing the preventive programs. Different strategies and activities should be introduced to aggressive children, depending on their gender. Distal influence is equally important for all children, i.e., influence of media violence and neighborhood dangerousness. However, it is more important for boys to work on activities that facilitate empathy, like role-playing game or taking someone other's perspective, working on the strategies that will help them to cope with their negative emotions. Also, it is more important for boys to develop tolerance, because differences in income of their peers have appeared to be significant in prediction of their aggression. Furthermore, the school climate has been shown very important for boys' aggressive behavior, and that is something which the school can directly work on. A positive school climate, where all students feel accepted, safe and welcome, is something that is beneficial for all, including teachers, students and even parents. The obtained results have also shown different influences of parental upbringing on boys' and girls' aggressive behaviors. Harsh punishment and a lack of autonomy in boys, and a lack of parental warmth in girls, facilitate aggression in children. Knowing these differences in upbringing, the school can act as an educational institution for parents as well. Educational experts can organize lectures for parents or offer them a school counselling. Raising parents' awareness on how important is proper upbringing of children is essential for a good prevention, because it is almost impossible to achieve a long-term progress without parents help and involvement.

Contributions and Limitations of the Research

Several important contributions could be drowned from the obtained research. This is one of the first studies in Croatia, and in Europe, that has applied an integrative ecological approach to the issue of gender differences in predicting peer aggression. Previous studies have been mostly done in the USA, which has different cultural background. This is important for several reasons; firstly, the proximal and distal effects have been tested simultaneously within the specific traditional community, and secondly, gender differences for prediction of peer aggression have been tested on the same generation of students and in the same way for boys and girls, which gives us a good starting point for generalization of data for a traditional culture. Moreover, the line with practical implication can also be driven, i.e., within prevention programs that are not usually specific to gender. Furthermore, some important methodological contributions can be noted: the application of different approaches (definitional and behavioral), and methods of measurement of peer aggression (self-assessment, peer nomination, self-nomination), and collection of data on individual and contextual characteristics have been taken from several sources (i.e., students, parents and teachers), which provide a more realistic point of view.

However, it is significant to mention the shortcomings of the research. The selection of schools which participated in the survey was random, but all schools

were from one county, and only elementary school students participated in the research (from the fifth to the eighth grade), which limited the result generalization to other students' population. Although this county was the most affected by the patriotic war, and it was a good example of a traditional society, the results showed a slightly higher prevalence of peer aggression in relation to the data from the national sample (Rajhvan-Bulut & Ajduković, 2012). Some other possible limitations were the following: small proportion of students' fathers (19%) who participated in research, the research was not anonymous, which could produce socially desirable answers. Moreover, some other possible independent variables (e.g., parent's gender, self-concept, previous history of victimization, subculture, etc.), which could have influence on a child aggressive behavior, were not included in the research. Finally, the research was cross-sectional in its design.

Conclusion

The obtained research has confirmed the results from some previous studies conducted in Croatia and worldwide. Most studies of peer aggression and bullying have shown that the gender is a significant predictor (Kim et al., 2011; Lee, 2010; Wei et al., 2010; You et al., 2014), and furthermore that individual characteristics and parental styles differ depending on the child's gender (Gini et al., 2007; Mandara et al., 2012; Velki, 2018b). However, the obtained research has additionally shown that it is necessary to consider gender of perpetrators when predicting the peer aggression. Different mechanisms are found in background of boys' vs girls' aggressive behavior, which points out that it is essential to use different approaches, which are gender depending, in dealing with peer aggression at schools. In addition, it is necessary to examine gender differences in predictions of different types of peer aggression, such as physical, verbal or relational. In order to examine the influence of the society, i.e., traditional vs modern, future studies should examine the characteristics of different regions and sub-cultures, and especially the cross-cultural studies are desirable. Moreover, applying a longitudinal design is preferable.

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MOŽEMO LI ISTIM ČIMBENICIMA PREDVIĐATI VRŠNJAČKO NASILJE KOD DJEČAKA I DJEVOJČICA?

Primjenjujući ekološki pristup na problematiku vršnjačkog nasilja, cilj ovog istraživanja bio je utvrditi možemo li istim prediktorima predviđati vršnjačko nasilno ponašanje kod dječaka i kod djevojčica. U istraživanju je sudjelovalo 880 učenika (48% dječaka i 52% djevojčica) od petog do osmog razreda osnovne škole i isto toliko njihovih roditelja, kao i 107 nastavnika. Djeca su dala neke osnovne demografske podatke (dob, spol, školski uspjeh, broj prijatelja), nominirali su nasilne vršnjake te procijenili vlastito nasilno ponašanje, stupanj afektivne empatije i impulzivnosti, školsku klimu, roditeljsko ponašanje, opasnost susjedstva i utjecaj medija. Roditelji su dali podatke koji se odnose na socioekonomski status obitelji, a nastavnici koji se odnose na dolaske roditelja u školu. Multivarijantim višerazinskog modeliranjem utvrđeno je kako različiti prediktori predviđaju vršnjačko nasilje kod dječaka u odnosu na djevojčice. Općenito se pokazalo kako su odabrani prediktori bolje objasnili nasilno ponašanje za dječake nego za djevojčice. Glavne razlike bile su bile su u domenu individualnih karakteristika i obiteljskom mikrosustavu, odnosno više je statistički značajnijih prediktora dobiveno za dječake, a također su i neki distalni prediktori u interakciji s individualnim karakteristikama i obiteljskim mikrosustavom bili važni u objašnjenju nasilnog ponašanja u dječaka. Rezultati istraživanja pokazuju da je rod snažno utjecao na vršnjačku agresiju. Psihološke karakteristike, kao i roditeljski odgoj, bolje su objasnili vršnjačko nasilje u dječaka. Dobiveni nalazi su također vrlo važni za školsku politiku, tj. programi intervencije i prevencije vršnjačkog nasilja trebali bi se razlikovati ovisno o rodu djeteta.

Ključne riječi: ekološki model, prediktori, rod, vršnjačka agresija