THE INFLUENCE OF COOPERATIVE LEARNING ON PROSOCIAL BEHAVIOUR OF PUPILS OF YOUNGER SCHOOL AGE

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The article was supported by a Grant Agency GAPF of the Faculty of Education, Catholic university in Ružomberok

Abstract: The aim of this study is to present the results of empirical findings of cooperative learning's influence on prosocial behaviour of pupils of younger school age. Cooperative learning has been implemented in two experimental classes into teaching the subject Natural Science for two years. We verified its effectiveness through the questionnaires My Class Inventory (MCI), Prosocial Tendencies Measure (PTM) and through Sociometric rating questionnaire (SO-RA-D). We found out that cooperative way of teaching positively influenced the prosocial behaviour of younger school children.

Keywords: cooperative learning, prosocial behaviour, classroom climate, social competences, younger school age

1 Introduction

By the end of the younger school age period, the character of social relationships in a classroom, the level of acceptance of a pupil by the group is a significant determinant not only in the area of pupil's performance, but it also influences the formation of future social relationships and potential social behaviour. Due to different areas, the effectiveness of cooperative learning has been researched mainly abroad (Johnson, D. W. & Johnson, R. T. 2009). In Slovakia, complex researches of prosocial behaviour in connection with the above mentioned way of teaching on the first level of elementary schools have not yet been undertaken. The difficulty of prosocial behaviour measuring may be in this age conditioned by social and cognitive development, while the biggest leap in its development was proved by N. Einsenberg (1983, pg. 849) in the period between childhood and early adolescence. Based on this fact we assume that stimulation of the affective component of a personality, especially of pupils in younger school age (the area of experiencing, evaluation and behaviour), can significantly contribute to further moral development in the time when many character features are just beginning to form. In the programmes for education of good character or development of prosocial behaviour (Lickona, T. 1992; Berkowitz, M. & Bier, M. 2004; Battistich, V. & Solomon, D. et. al. 1989) experts recommend implementation of cooperative activities.

In our research we have focused on finding out (a) whether and how has social dynamics changed in the classroom due to implementation of cooperative teaching strategies; (b) whether and what kind of changes occurred in the evaluation of the classroom due to interactions in cooperative groups; (c) how did the prosocial tendencies in elementary school pupils' behaviour change under the influence of cooperative learning. The research problem was analysis of the changes in prosocial behaviour of 4th grade pupils at the elementary school under the influence of cooperative learning.

2 Methodology of Research

General Background of Research
The aim of the research was to find out the influence of cooperative teaching strategies on prosocial behaviour of pupils at the first level of elementary school.

We set the following hypotheses:
H_1: When using cooperative learning, statistically significant differences will occur between the input and output values of some of the examined parameters from the MCI questionnaire.

H_2: Implementation of cooperative learning will cause statistically significant change between input and output values of sociometric indices in the experimental group.

H_3: Implementation of cooperative learning on Natural Science classes will cause statistically significant difference between the input and output measurements of the Prosocial Tendencies Questionnaire.

Sample of Research
The scope of the sample of research has been ensured by available selection, conditioned by willingness of teachers to participate on the research. The sample of research consisted of 9-10-year-old pupils of 4th grades of elementary schools, while experimental group (EG) consisted of the classes 4.C and 4.A (n = 39 pupils), control group (CG) consisted of 4.A and 4.B classes from another elementary school (n = 32 pupils).

Instrument and Procedures
The Prosocial Tendencies Measure – Revised (PTM-R) questionnaire (G. Carlo & B. Randall, 2002), was used to identify to what extend and with what type of prosocial behaviour (Altruism, Compliant, Emotional, Public, Anonymous, Dire) the pupils of EG a CG identified themselves with the most/the least.

My Class Inventory (MCI) (B. J. Fraser & D. L. Fisher, 1986), which identified the current psycho-social climate in the classrooms in the following variables: Satisfaction, Friction, Competitiveness, Difficulty, Cohesiveness.

Sociometric rating questionnaire (SORAD) (V. Hrabal, 1979), analyses the structures of the current state of social relations and interactions in a classroom. This research tool enabled us to quantify the data on the level of individual index of influence - III, individual index of popularity - IIP and individual index of sympathy – IIS of each pupil. The calculation of individual indices enabled us to calculate the group indices of influence (GII), popularity (GIP) a sympathy (GIS) in each classroom. As the GII informs about the group cohesion and the GIP enables us to assess the emotional atmosphere of classrooms, by comparison with MCI we verified the variables of cohesiveness and Competitiveness of a classroom.

During implementation of cooperative learning (33 lessons) we used in the EG the method of participatory observation and interview with the intention to understand how the designed cooperative activities in the subject Natural Science influenced the manifestations of prosocial behaviour of pupils. The interview helped us to provide intervention into social skills of pupils that we consider to be indicators of social interaction and psychological climate. Through observation we focused on cooperation, communication, commitment, following the rules, responsibility for the role (work) in a group, helping, sharing, supporting, occurrence of problems and dealing with them in cooperative groups.

Data were processed by the statistical program STATISTICA 8.0 (StatSoft Inc., Tulsa, OK, USA). For main comparison of experimental and control group we used the nonparametric Wilcoxon signed-ranks test. Next we processed the analysis of the differences of pre-test and post-test data (the data corresponded to a normal distribution) by multivariate/univariate One-way ANOVA test. Correlation statistics was generated through Spearman Rank Order correlation test. We displayed the outputs in descriptive statistics.

3 Results of Research

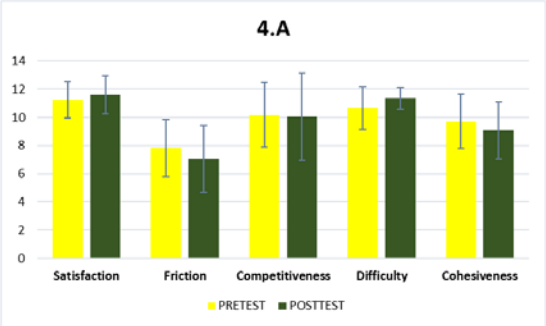
When verifying the hypothesis H_1 within input comparison, we assumed that there will be no significant differences between the classes. Analysis of the multivariate (One-way ANOVA) test

proved our assumption, p = 0.10 > 0.05. Statistically significant changes in evaluation of the classroom climate appeared after the experiment in the class 4.C of the experimental group (Tab. 1/A, p = 0.001240 < 0.05), specifically in the variables friction (Tab. 1/B, p = 0.001497 < 0.05) and competitiveness (Tab. 1/B, p = 0.000067 < 0.05).

Tab.1: A) Results of the analysis of the multivariate (One-Way ANOVA) test;
B) Univariate test in MCI in the 4.C class (EG)

A	Test	Value	F	Effect	Error	p
Intercept	Wilks	0,002879	2216,486	5	32	0,000000
TEST	Wilks	0,549172	5,254	5	32	**0,001240**

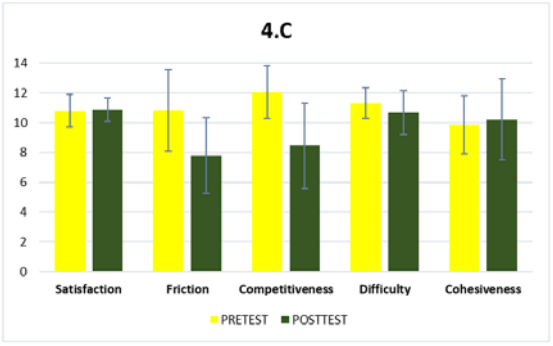
Graph 2: Comparison of variables in the MCI questionnaire in CG

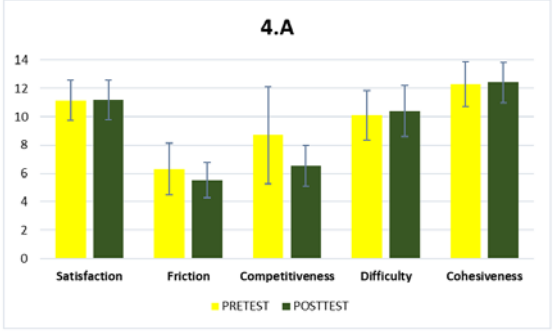


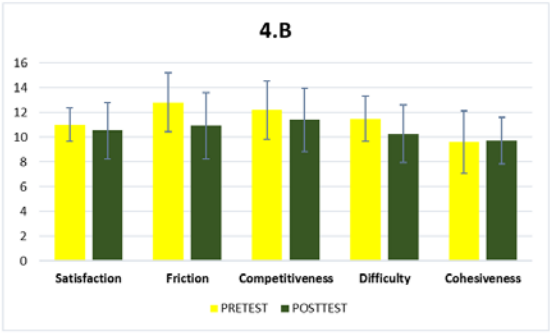
B	Degr. of	SATISFACTION				FRICTION				COMPETITIVENESS			
Intercept	1	4466,947	4466,947	4601,494	0,000000	3297,789	3297,789	440,2201	0,000000	4002,632	4002,632	668,0820	0,000000
Test	1	0,105	0,105	0,108	0,743843	88,526	88,526	11,8173	**0,001497**	121,684	121,684	20,3104	**0,000067**
Error	36	34,947	0,971			269,684	7,491			215,684	5,991		
Total	37	35,053				358,211				337,368			
		DIFFICULTY				**COHESIVENESS**							
Intercept	1	4598,000	4598,000	2660,772	0,000000	3820,026	3820,026	643,5709	0,000000				
Test	1	3,789	3,789	2,193	0,147349	1,289	1,289	0,2172	0,643958				
Error	36	62,211	1,728			213,684	5,936						
Total	37	66,000				214,974							

Statistically significant differences in the other classes were not marked. The change in the parameters of a classroom climate is illustrated graphically in EG and CG (Graph 1, 2).

Graph 1: Comparison of the variables in the MCI questionnaire in EG







We consider the more significant reduction of competitiveness in EG to be the result of the intervention. When verifying H_2 we found out statistically significant difference between the values of pre-test and post-test only in one of the observed classes in EG.

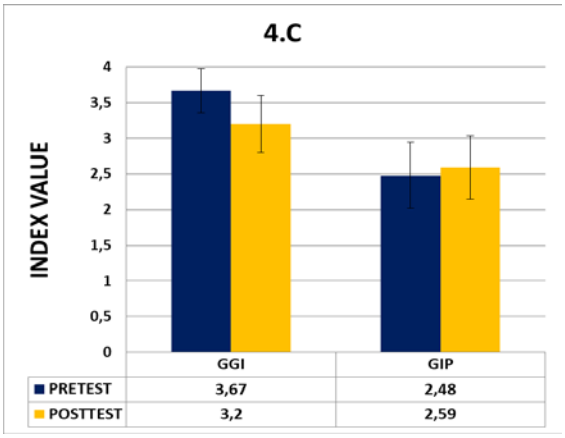
Tab.2: A) Results of the analysis of the multivariate (One-Way ANOVA) test;
B) Univariate test for the variables GII, GIP and GIS in the 4.C class of EG

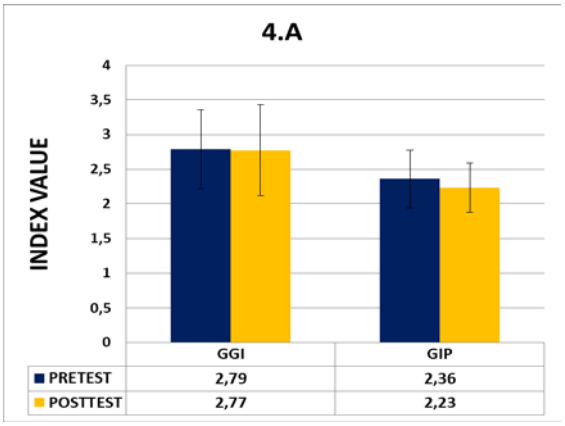
A	Test	Value	F	Effect	Error	p
Intercept	Wilks	0,009239	1215,366	3	34	0,000000
Test	Wilks	0,430436	14,997	3	34	**0,000002**

B	Degr. of	GROUP INDEX OF INFLUENCE				GROUP INDEX OF POPULARITY				GROUP INDEX OF SYMPATHY			
Intercept	1	449,3099	449,3099	3489,426	0,000000	244,7771	244,7771	1190,504	0,000000	244,7771	244,7771	496,5175	0,000000
Test	1	2,0793	2,0793	16,148	**0,000286**	0,1173	0,1173	0,570	0,455003	0,1173	0,1173	0,2379	0,628681
Error	36	4,6355	0,1288			7,4019	0,2056			17,7476	0,4930		
Total	37	6,7147				7,5192				17,8648			

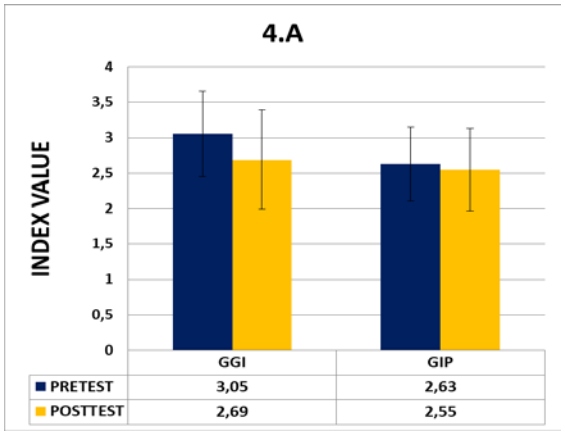
Significant reduction of GII (p = 0,000286; Tab. 2/B) indicates change of cohesion in the given classroom. Statistically significant differences between input and output values of group indices in other classes were not marked. We illustrate the change of values of individual indices graphically.

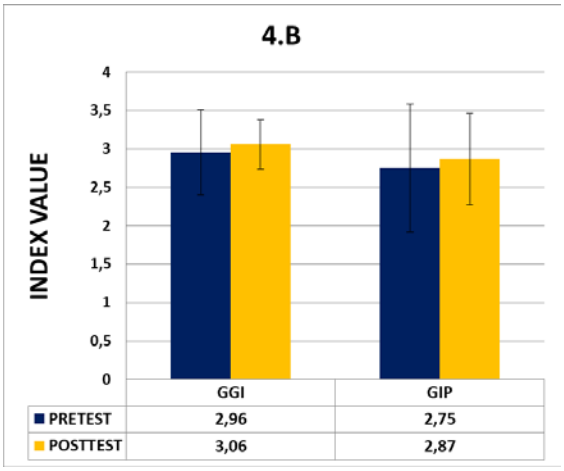
Graph 3: Comparison of input and output values of group indices of influence and popularity in EG





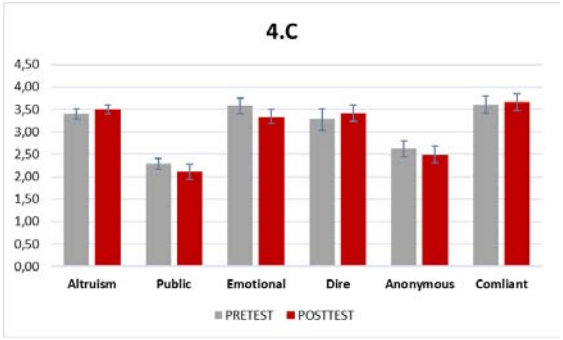
Graph 4: Comparison of input and output values of group indices of influence and popularity in CG

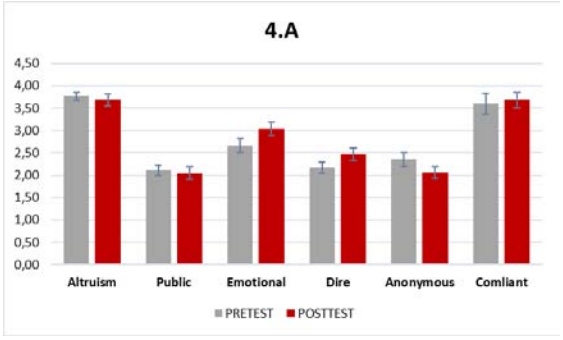




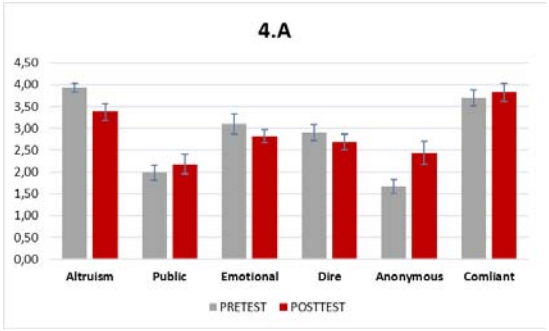
When comparing the input and output values of the PTM questionnaire we did not identify in any of the researched groups statistically significant differences in the variables altruistic prosocial behaviour, public prosocial behaviour, emotional prosocial behaviour, prosocial behaviour in a crisis, anonymous prosocial behaviour. The changes in tendencies to apply types of prosocial behaviour in individual classes of EG and CG are demonstrated in the graphs below.

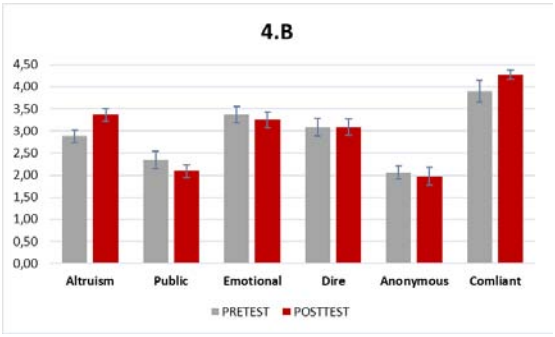
Graph 5: Overview of changes in tendencies to prosocial behaviour in EG





Graph 6: Overview of changes in tendencies to prosocial behaviour in CG





In general, it can be stated that pupils in experimental classes reached lower scores than pupils in control groups in post-test values in the tendency to apply public prosocial behaviour and higher tendencies to apply altruistic prosocial behaviour. The most significant tendencies of younger school children were proved in applying the requested prosocial behaviour. In order to prove significant differences only in the 4.C class of the EG, we worked out a correlation analysis of all the variables in order to detect the changes and identify the relationships and connections between the variables.

Tab.3: Correlation analysis of the pre-test and post-test variables in the 4.C class (EG)

			PRETEST													
			MCI					PTM-R						SO-RA-D		
			Satisfaction	Friction	Competitiveness	Difficulty	Cohesiveness	Altruism	Public	Emotional	Dire	Anonymous	Compliant	II influence	II popularity	II sympathy
POSTTEST	MCI	Satisfaction	1,000000	0,439615	0,122780	0,045740	-0,242684	-0,106215	0,194710	0,296090	0,141032	0,189161	-0,027476	0,434946	0,132052	-0,188994
		Friction	-0,069627	1,000000	0,623332	-0,225938	-0,194979	-0,158060	0,114321	-0,064294	0,001876	0,567027	-0,294923	0,023850	0,001400	-0,086475
		Competitiveness	-0,076803	0,562616	1,000000	-0,444036	0,000000	-0,038967	0,319762	-0,206712	0,007947	0,278395	-0,145055	0,099029	0,001977	-0,294977
		Difficulty	0,155071	0,035905	-0,036444	1,000000	0,120682	-0,074803	0,101560	0,328913	0,195413	0,026088	-0,029646	-0,053176	0,297569	0,247365
		Cohesiveness	-0,193530	-0,348398	-0,376693	-0,264824	1,000000	-0,223146	-0,018228	0,521727	0,273405	-0,132208	0,134890	-0,122055	-0,096648	0,027978
	PTM-R	Altruism	-0,292897	-0,278992	-0,065571	0,019998	0,387254	1,000000	-0,319289	-0,385618	-0,387680	-0,565722	-0,020381	-0,153167	-0,188900	0,221193
		Public	-0,102833	0,148741	0,055259	-0,371945	-0,068790	-0,480834	1,000000	0,069020	0,205615	0,099387	0,187014	0,244536	0,585135	-0,262401
		Emotional	0,006952	-0,046702	-0,100298	-0,211287	0,137635	-0,486355	0,392418	1,000000	0,750333	0,092601	0,447338	-0,031887	-0,100797	-0,064188
		Dire	0,193687	-0,259951	-0,235542	0,056737	0,183817	-0,228136	0,286933	0,616699	1,000000	-0,038530	0,503426	-0,242586	-0,288558	-0,369471
		Anonymous	0,137892	0,163520	0,295519	-0,018836	-0,110487	-0,537963	0,351524	0,355556	0,249443	1,000000	-0,091616	-0,050331	0,054650	0,173875
		Compliant	0,090363	-0,100513	-0,298617	0,027423	0,228233	-0,485548	0,113810	0,807355	0,677609	0,303633	1,000000	-0,107736	-0,153253	-0,088843
	SO-RA-D	II influence	-0,336224	-0,069488	-0,222206	0,247194	0,073020	0,247575	-0,214140	0,196029	-0,070608	-0,380371	0,094758	1,000000	0,629957	-0,157036
		II popularity	-0,318657	-0,110695	-0,180894	0,355503	0,025886	0,157675	-0,335425	0,052167	-0,136956	-0,319757	0,103347	0,807744	1,000000	-0,010128
		II sympathy	-0,029056	-0,062268	-0,033873	-0,004432	0,423604	0,029441	0,148388	0,433118	0,492923	0,032730	0,526731	0,206063	0,255170	1,000000

These data indicate positive correlation of individual index of popularity (IIP) with public prosocial behaviour in pre-test, while in post-test this relationship wasn't statistically significant. After the experiment there was negative correlation of altruistic prosocial behaviour with public, emotional, anonymous and requested prosocial behaviour. The variables of competitiveness and friction in the classroom positively correlated in pre-test and also after the experiment.

4 Discussion

Within verification of $H_{1,}$ when comparing the values of variables from MCI questionnaire, we identified no statistically significant difference in the experimental class 4.C in evaluation of variables friction and competitiveness in a classroom, the reduction of which we consider to be the result of implementation of cooperative learning.

Friction in a classroom points to complications in relationships among pupils, extent and frequency of tension and conflicts, fights and inappropriate social behaviour. Through intervention we achieved in the given class improvement of pupils' social skills, which according to M. Vágnerová (2019, pg. 342) contribute to dealing with controversial situations and conflicts among peers. The author (Vágnerová, M. 2019, pg. 342) claims that the way of responding to conflict situations usually corresponds with the status the pupil has within the group. In favour of cooperative learning speaks also the finding that *group index of influence*, which influences the conformity of pupils and depends on social fitness (Hrabal, V. 1987, pg. 12), reached in the 4.C class EG *statistical significance* in favour of optimization of cohesive groups.

Significant decrease of *competitiveness* was marked in the experimental classes compared to the control classes, where in one of the classes in post-test competitiveness reached the highest score (4.B). We believe that changes in the values of competitiveness in EG (significant in 4.C class) happened due to implementation of cooperative learning which through cooperation eliminated perception of competitive relationships among pupils, the amount of efforts to excel or experiencing school failures. We also hypothetically assume that the decrease in values of competitiveness in both experimental classes indicates decrease of behaviour that maximizes relative advantages of an individual over others and that positively corresponds with the motives of prosocial behaviour.

Based on the given argument we confirm the hypothesis H_1 and at the same time state that significant decrease in values of variables friction and competitiveness in a classroom most correspond with implementation of prosocial forms of behaviour – help instead of conflicts, sharing ideas and feelings instead of striving for self-assertion, sharing the learning material and cooperation instead of competitiveness, etc.

We based our verification of the hypothesis H_2 on the analysis of group structure in a classroom, which according to J. Výrost (2019, pg. 240) informs about division of power in a collective, mutual sympathies and antipathies among the group members, perceived contribution of individuals to the group life.

Significant decrease in the group index of influence in the 4.C class suggests that there appeared regulation of relationships that results from social fitness of individuals from the point of view of values and norms of the group. Cohesion, which is represented by GII, has modified in a positive direction, pressure on conformity of group members in the 4.C class decreased, which probably means that intervention through which we taught pupils to cooperate, make compromises and to use argumentation to defend their opinions while respecting the opinions of others, was successful. Our interpretations correspond with the research described by P. R. Abelson (2004), who documented that highly cohesive groups exert great pressure on members with opposite opinion to accommodate to the majority and to be conforming. Group members eventually stopped exerting pressure on the individuals with opposite opinion, but they also stopped talking to them and assigned them with the least desirable tasks. This can also mean that the pupils in the 4.C class acquired the competences to cooperate and effectively communicate, which were manifested by the courage to "revolt" over socially influential group members, or in other words, by improving the position of the pupils whose opinion had no power in the group. Our interpretations correspond with the opinion of M. Vágnerová (2019, pg. 345), who states that the position of a pupil in a group can be understood as the result of implementation of social competences with the ability to assert oneself in an acceptable way.

It is important to add and accept the fact that pupils are subject to conformity out of desire to become popular or to be accepted by the group (Verešová, M. 2007, pg. 140). We consider it to be a natural phenomenon in younger school age. At this point we would like to point out that the ***group index of popularity*** was not statistically significant in any of the observed classes, while it positively changed in the 4.A class of EG and the 4.A class of CG. Improvement in the state of emotional atmosphere in a classroom – GIP were more significant in the experimental group, which again testifies in favour of cooperative teaching strategies.

Analyses of other indices provide interesting findings resulting from the correlation analysis in the 4.C class of the EG (Tab.3). Before implementation of cooperative learning (in pre-test) there has been positive correlation of the individual index of sympathy with the public prosocial behaviour ($p = 0{,}585135$). IIO shows the rate of acceptance of a pupil by his/her classmates (Hrabal, V. 1979, pg. 59) and informs about (non-) acceptance of a pupil by the group, of social (un-) fitness from the point of view of fulfilling the values and norms of the group. The tendency to apply public prosocial behaviour refers to providing help in order to achieve approval, appreciation and respect from other pupils (Carlo, G. & Randall, B. A. 2002, pg. 32). Based on this we assume that pupils in the 4.C class were becoming popular in the collective according to the way in which they provided help, appreciation, acceptance of other pupils and how they followed the norms accepted by the group. Such conformity eventually corresponds with conventional level of morality of pupils of this age. After the experiment (in post-test) correlation between the IIP and public prosocial behaviour was not so significant. However, the results indicate that the higher the altruistic prosocial behaviour was, the lower was the public, emotional, anonymous and requested prosocial behaviour (the value p reached negative values). In this sense we believe that fixed tendencies to altruistic prosocial behaviour, the motivation of which are sympathies and internalized norms and principals, are in case of some pupils a consequence of the transfer of adoption of the desired competences (cooperation, acceptance, tolerance, decentration, effective communication, etc.) which we have tried to achieve through cooperative learning into the consciousness, experiencing and successful interpersonal behaviour. As we have marked statistically significant changes in the experimental group in the 4.C class in the group index of influence, we state that the H_2 has been confirmed.

Verification of H_3 lied in the assumption that implementation of cooperative learning in the experimental group will result in statistically significant difference between input and output values of the Prosocial Tendencies Measure questionnaire. This hypothesis was not confirmed.

One of the reasons for the absence of significant changes in motivation to prosocial behaviour of pupils of younger school age might be the fact that "opportunities and diversity of prosocial behaviour increase at the age of adolescence, partly due to formation of new interpersonal relationships, cognitive and emotional development and changes in the social context" (Carlo, G. & Hausmann, A. & Christiansen, S. et. al. 2003, pg. 108). In addition, the authors of the questionnaire themselves claim that "cooperative behaviour contains different set of skills (including wider social and communication skills) from those reflected in the specific forms of prosocial behaviour included in the questionnaire" (Carlo, G. et. al. 2010, pg. 352).

Considering the state of scientific knowledge and with regard to the fact that the largest leap in the development of prosocial behaviour was recorded between childhood and early adolescence (Eisenberg, N., 1998) we state that in order to validate the significant differences in motivation to help we should optimize the duration of intervention and implement it in the long term so that experiences from interaction in cooperative learning can be sufficiently reflected into moral consciousness, experiencing and subsequent behaviour. In addition, an expert in cooperative learning in the Czech Republic, H. Kasíková (2004, pg. 130) admits that effects of cooperative learning often show up only after a longer period.

Another way of interpretation refers to the results acquired by the means of a questionnaire. The results suggest that after the experiment pupils of both groups had strongest tendencies to behave prosocially on the basis of verbal or non-verbal request from others – *requested prosocial behaviour* (Carlo, G. & Randall, B. 2002, pg. 33). The results correspond with the findings of G. Carlo & B. Randall (2002, pg. 39), who state that these tendencies are more common for younger pupils than for adolescents and are more frequent than spontaneous help. It is a positive finding that the precondition of granting the request for help is understanding of the situation of another person, empathy and sense of social responsibility for helping others (Carlo, G. & Randall, B. 2002, pg. 39). The provided motives correspond with the stages of moral development of pupils of younger school age, which represent the transition between heteronomous and autonomous level of moral development (Kohlberg, L. 1963, pg. 14). By the means of cooperative learning we tried to develop such skills of pupils that would teach them to trust each other, listen and respect opinions of others, accept differences, take responsibility for their work and for their friends in the group, while we consider these competences to be the prerequisite for internalization of valuable prosocial values.

Higher values of tendencies to *altruistic prosocial behaviour*, the primary motives of which are sympathies and internalized norms and principles (Carlo, G. & Randall, B. 2002, pg. 32), are noticeable according to the post-test in the experimental groups. Even though more significant appearance of tendencies to altruistic prosocial behaviour in the positive direction were demonstrated in one class of the control group (the 4.B class), these values did not reach the level of pre-test values detected in the experimental groups. Quite significant tendencies to altruistic prosocial behaviour of pupils of younger school age in both

groups can be interpreted by the statement that pupils, with regard to the specifics of their developmental period, reach optimal level of moral knowledge (awareness of the rules, of the desirable values, de-centration, moral reasoning, decision making, self-awareness, etc.), which is the prerequisite of potential prosocial behaviour. However, if we compare the level of post-test values of public prosocial behaviour (lower values in the experimental group), which is according to G. Carlo et. al. (2003, pg. 111) connected with low level of prosocial moral reasoning and higher tendency to satisfy one's own needs, we may warily expect that the level of prosocial cognitive development is higher in case of pupils in the experimental group than that of pupils in the control group. We tried to influence this level by justification of advantages of cooperation in group work, establishing rules and norms of group work, targeting activities to necessity to respect opinions of others and to reach agreement, evoking feedback from classmates that affects self-awareness etc. Even though the hypothesis was not statistically confirmed, interpretation of the situation in the classes regarding prosociality of pupils suggests positive consequences of the intervention in favour of the experimental group.

5 Conclusions

By the presented research we have fulfilled our goal, which was to find out the influence of cooperative learning on prosocial behaviour of pupils of younger school age. We state that cooperative learning develops such interpersonal competences of pupils and forms such interpersonal relationships that contribute to improvement of social climate in the classroom. In the classrooms of younger school children prevailed requested prosocial behaviour, which is based on understanding of other person's situation, empathy and sense of responsibility. In groups where cooperative learning was implemented we detected higher values of tendencies to altruistic prosocial behaviour, which is connected with more mature level of moral consciousness. In these classrooms we also detected lower values in tendencies to behave prosocially in order to get social approval and increase one's own value and prestige.

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Primary Paper Section: A

Secondary Paper Section: AM