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COOPERATIVE LEARNING IN PHYSICAL EDUCATION INCREASES SELF-ESTEEM IN FOURTH GRADERS

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Abstract:
Accepting heterogeneity as an opportunity for social and knowledge learning and not just perceiving it as a burden is a major task for current school systems and consequently also for teachers. One possibility of successfully dealing with heterogeneity is cooperative learning. Due to its prosocial characteristics, physical education (PE) is particularly suitable for the use of cooperative forms of learning and teaching. Cooperative learning is able to fulfill the double task of PE by promoting the development of personality and enabling the development of current movement and sports culture. However, there are still only a few studies examining the positive effects of cooperative learning in PE classes on personality development and the psychosocial health of school children. The aim of the present study was to examine the effect of cooperative learning in PE classes on the self-esteem of fourth-graders in comparison to traditional forms of learning. A total of 127 girls and boys took part in the study (66 intervention group, 61 control group, 60% male). The mean age of the total sample at the beginning of the study was 10.2 ± 1.4 years. The intervention group received PE according to the curriculum, which was carried out through cooperative forms of learning, e.g. cooperative games. The control group received no cooperative learning intervention. There were no group differences with regard to age, sex or number of participants at the beginning of the study. Statistical analysis revealed significant time-by-group differences resulting in self-reported general athleticism (p<.001), attractiveness (p=.015), agility (p=.014), strength (p<.001), coordination (p<.001) and overall self-esteem (p<.001) with a significantly greater improvement within the intervention group. Overall, this research was able to show the positive effects of cooperative learning in PE lessons on the self-esteem of fourth-graders. Cooperative learning in PE requires appropriate qualification offers for future teachers in order to expand their repertoire of methods for this learning structure. The new understanding of teaching aims to help students actively experience their own knowledge and skills during cooperation with classmates.

Keywords: cooperative learning, physical education, elementary school, self-esteem

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1. Introduction

In recent decades, demands on teaching and learning have changed radically in our society. The constantly changing society with rapidly increasing knowledge, the breaking up of traditional family structures and the structural changes in the economic and working world require the development of key competences (Communication from the Commission to the European Parliament, the council, the European Economic and Social Committee, & the Committee of the Regions, 2009). Key competences are to be understood as acquirable, general skills, attitudes and knowledge elements that are useful in solving problems and acquiring new competences in as many content areas as possible. In this way, the ability to act has the chance to develop and that offers the possibility to meet both individual and social requirements. Consistent integration of cooperative teaching and learning structures is a prerequisite for developing and improving these key competences. Present school practice mostly uses structures that create homogenous learning groups. In contrast, the potential of alternative, internally differentiated, open, reform-oriented and student-independent teaching methods for successfully dealing with heterogeneity are emphasized (Decristan, Fauth, Kunter, Büttner, & Klieme, 2017). This is usually based on the idea that differences in teaching practice should no longer be used in the sense of social inequality, but used productively (Kleickmann et al., 2013).

Cooperative learning was developed in the 1970s based on concerns that students have few opportunities to demonstrate their personal skills in traditional and competitive learning environments (Johnson, Johnson, & Johnson, 2002; Slavin, 1995). Combining social and academic learning, the structure of cooperative learning has been seen as a way to improve interpersonal and social skills. Cooperative learning is characterized by students working in small groups to help each other to deal with learning materials (Slavin, 1989). As cooperative learning continues to be non-competitive, teachers have new opportunities to impart knowledge to students (Singh & Agrawal, 2011). The structure of cooperative learning combines the acquisition of knowledge with the opportunity or necessity of mutual help (Slavin, 1995). It does not present a fundamentally new invention of teaching strategy but combines principles of various student-centered or experience- and problem-oriented approaches. The teacher acts in a subordinate role, i.e. she or he takes on an accompanying function in order to educate the students to work independently. This enables students to solve problems independently, develop learning strategies and use different concepts of learning. The promotion of students' interaction does not only serve the pure acquisition of knowledge but also the strengthening of social skills.

Within physical education (PE), great potential for using the structure of cooperative learning exists. The structure of cooperative learning enables the development of current movement and sports culture ('education for sport') and the development of personality in sense of general educational skills ('education through sport', e.g. co-determination, self-determination, solidarity; Casey and Goodyear (2015)) The structure of cooperative learning is therefore appropriate in PE classes in order to

satisfy the double task of PE, since both professional and social-psychological content are integrated into the teaching process. Cooperative Learning in PE is reflected in an improvement of social and methodological skills. Furthermore, this learning structure may help to improve the sustainability of learning outcomes compared to traditional forms of teaching and learning in sports (Neber, Finsterwald, & Urban, 2001).

2. Literature Review

There is evidence that cooperative learning in PE classes can contribute to the physical competence, social competence, cognitive skills and affective development of children and adolescents (Goodyear & Casey, 2015). Previous research showed that learning outcomes are interrelated in several ways whereby academic and social learning can be assumed to be equal and on the same level (Casey, 2013). For example, Lafont (2012) assumes that improvement in communication skills (social learning) leads to an improvement in the understanding of motor skills. Additionally, an increase in motor performance and tactical decisions as a result of the improvement in communication skills were reported. Students also mentioned an improvement in their throwing and catching skills due to increased confidence, happiness, and self-esteem. Confidence and happiness as well as increased self-esteem evolve as a result of positive feedback and encouragement from members within teams (Dyson, 2001). Cooperative learning in PE lessons can support the development of interpersonal skills (empathy, communication). Recent research showed an improvement in relationships between team members, the ability to actively listen and of sharing ideas to build new ideas and improved mutual understanding after using forms of cooperative learning in PE lessons (Casey, 2013). The development of social skills throughout cooperative learning in PE lessons was reflected in the improvement and building of empathy, respect, caring and support from peers (Bayraktar, 2011). One reason for the development and improvement of social skills might be the development of leadership skills in students (Darnis & Lafont, 2015).

The self-determination theory (Deci & Ryan, 1985) was the basis for a research on children and adolescents with an average age of 14 years during PE lessons (Cecchini et al., 2010). The authors found that the use of cooperative learning in PE lessons had a positive effect on motivation. The improvement of social integration led to an increase in intrinsic motivation which in turn led to an increasing intention to do sports (Cecchini et al., 2010). It can be assumed that cooperative learning structures in PE lessons help young people do sport out of their own interests. Thus, cooperative learning in PE lessons may have a significant impact on lifelong participation in sports.

A previous study suggested an improved inclusion of children with disabilities due to the use of cooperative learning in PE lessons (Cervantes, Cohen, Hersman, & Barrett, 2007). Cooperative learning in PE lessons is therefore appropriate within heterogeneous groups with the aim of inclusion.

Regarding the effect of cooperative learning and self-concept in youth, the study by Al-Hayek (2014) examined the impact of cooperative learning strategies in basketball. Overall, 49 students (18 male) were included in the recent study. The study lasted a total

of eight weeks. Self-esteem was assessed using the Tennessee-self-concept scale. Results of statistical analysis showed significant differences between girls and boys in the intervention group (cooperative learning) and control group (traditional forms of learning). There was a significantly greater improvement within the intervention group with regard to all three dimensions (physical, personal, social) of self-concept. The results also showed that there were no statistically significant gender differences.

Current studies were often limited to cognitive or motoric effects of cooperative learning in PE. Indeed Al-Hayek (2014) examined psychological effects (self-esteem), the study was limited to cooperative learning in basketball lessons. Additional studies are required to understand more completely the key effects of cooperative learning in PE on psychological outcomes. In order to properly address this question, the aim of the current study was to examine the effects of cooperative learning in PE lessons with regard to self-esteem in fourth graders. Final, the research question of the current study was: Can cooperative learning in PE lessons for fourth-graders compared to traditional forms of learning lead to an increase in self-esteem in boys and girls?

3. Material and Methods

3.1. Study Sample Recruitment

The structure of cooperative learning in PE was carried out at three elementary schools in eastern Germany. The schools are inclusive, with special education needs in learning and physical and motoric development. The sample includes three fourth-graders, one fourth-grader from each school. Finally, six classes which were selected for study participation by the director were included in the final study sample. The two classes per school were cluster-randomized using a dice method (even number=intervention group, odd number=control group).

3.2. Measurement Instruments

Prior study beginning informed consent for their children to participate in the study was obtained from all parents. The physical self-concept questionnaire (PSK) by Dreiskämper and colleagues was used to measure physical self-concept (Dreiskämper, Tietjens, Hohnemann, Naul, & Freund, 2015). This questionnaire is based on the German translation of the Physical-Description-Questionnaire (PSDQ; (Stiller & Alfermann, 2007)), whereby only seven instead of the eleven original PSDQ scales with a total of 21 items are used. Each subscale consisted of three items with a total score of 21 items. Due to the inclusive orientation of the schools examined, this questionnaire was preferred, since scales on a higher level of abstraction (global physical self, self-esteem, health, body fat and physical activity) were not used in PSK. In this way, it can be ensured that all students have sufficient linguistic and cognitive levels to be able to answer the questionnaire adequately. The seven subscales of PSK are: general athleticism (GA); attractiveness (AT), endurance (E), agility (A); strength (S), coordination (C) and speed (SP). The questions were answered on a three-point rating scale: (0) fully not agree; (1) partly agree; (2) fully agree. With a total of 21 items, a minimum of 0 points and a

maximum of 42 points could be achieved. In each subscale, a range of 0-6 points was awarded.

Internal consistency of the subscales was between Cronbach's alpha .57 (AT) and .82 (SP). Overall, the internal consistency of PSK was rated as good (Dreiskämper et al., 2015). The confirmatory factor analysis showed an acceptable model fit for a seven-factor model with three items for each subscale. This justifies a shortening form of the original scale. To control for validity, correlation analyses were carried out between sex, motor skills and BMI of children. Validity was proven to be sufficient, with fluctuations between r=.39 and r=.66 (Dreiskämper et al., 2015). Lower correlations could be explained by not sufficiently mental representation in girls and boys at the age examined.

Furthermore, sociodemographic data such as age and gender (female, male, diverse, none) were collected from students prior to the study.

3.3. Study Implementation

The structure of cooperative learning (intervention group) was accomplished in cooperation with PE teachers in the first school half of 2021/22. PE lessons were accompanied by a pedagogical specialist so that PE teachers were exonerated and students had a second contact person. The second class of fourth-graders served as a control group in each school. Sociodemographic data and the PSK questionnaire were recorded within the intervention and control groups at the beginning and the end of the school half. No changes were made to PE lessons of the control group. The intervention group received PE according to the curriculum with support from the structure of cooperative learning, e.g. cooperative games. Cooperative games are games that put the individual and his/her actions in the background. The focus lies in the group (the team), which is supposed to reach a certain goal together or solve a given task.

3.4. Statistical Analysis

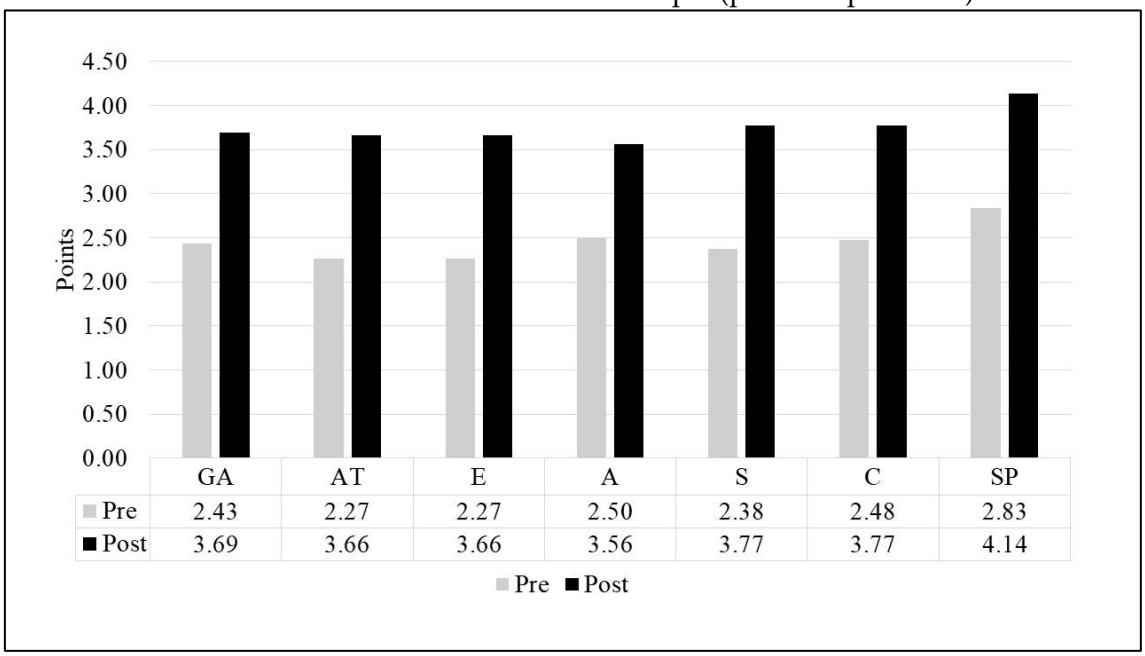
Statistical analysis was done using SPSS Version 26.0 (IBM Corp., released 2019). Analysis was performed using multifactorial ANOVA with repeated measurements. Levene test was done to check variance homogeneity. The group variable (intervention vs. control group) was used as an independent variable whereas overall self-esteem and subscales of PSK were used as dependent variables. Age and gender were used as moderators for the effect of cooperative learning and self-esteem. The level of significance was set at $\alpha \leq .05$.

4. Results and Discussion

A total of N=127 (66 in the intervention group, 61 in the control group) children in fourth grade took part in the study. Overall, 50.4% of participants were male. The mean age of the total sample at the beginning of the study was 10.2 ± 1.4 years. There were no significant group differences with regard to age (p=.513), sex (p=.321) or a number of participants (p=.915) at the beginning of the study.

Levene-test for homogeneity revealed no significance (p>.05), so variance homogeneity can be assumed. All subscales of PSK, as well as an overall score, resulted in increased perceived self-esteem for the total sample of fourth-graders (see Figure 1). Overall score resulted in a mean score of 17.16±3.71 points in the pre-test and a total mean score of 26.40±4.13 points in the post-test. This corresponds to an average improvement of 9.24±3.76 points for overall self-esteem in the total sample of fourth-graders.

Figure 1: Overview of results of subscales of PSK and overall self-esteem for overall sample (pre- and post- test)



Note: A=agility, AT=attractiveness; C=coordination; E=endurance; GA=general athleticism; S=strength, SP=speed.

Differences in subscales of the self-esteem scale and the overall scale between the intervention and control group were presented in table 1. Significant time-by-group differences resulted for GA (p<.001), AT (p=.015), A (p=.014), S (p<.001), C (p<.001) and overall self-esteem (p<.001) with significantly greater improvements within the intervention group. There were no significant differences with regard to age (*p*=.761) and gender (*p*=.438).

Table 1: Results for intervention- and control group

Scale	Group	Mean difference (SD)	Mean group difference (SD)	Significance (p)
GA	IG	1.73 (1.62)	1.09 (.03)	.000
	CG	.64 (1.65)		
AT	IG	1.73 (1.62)	1.70 (0,11)	.015
	CG	1.03 (1.51)		
E	IG	1.80 (1.51)	.37 (.07)	.176
	CG	1.43 (1.58)		
A	IG	1.42 (1.66)	.75 (.04)	.014
	CG	0.67 (1.70)		

S	IG	1.88 (1.29)	1.01 (.29)	.000
	CG	0.87 (1.58)		
C	IG	1.67 (1.73)	.97 (.16)	.002
	CG	0.70 (1.57)		
SP	IG	1.47 (1.65)	.34 (.01)	.254
	CG	1.13 (1.64)		
Overall self-esteem	IG	11.80 (6.11)	5.32 (.45)	.000
	CG	6.48 (6.56)		

Note: A=agility, AT=attractiveness; C=coordination; cg=control group; E=endurance; GA=general athleticism; IG=intervention group; S=strength, SD=standard deviation; SP=speed

5. Recommendations

This work was able to show the positive effects of cooperative learning in PE lessons on the self-esteem level of fourth graders for girls and for boys.

Cooperative learning in PE requires qualification offers for future teachers in order to expand their repertoire of methods for this learning structure. The new understanding of teaching aims to help students actively experience their own knowledge and skills during cooperation with classmates. Teachers should be able to enable such learning processes. However, this professional teaching requires adequate training and competences and teachers will have to gradually and continuously expand their repertoire of competences (Casey, 2013). It is important that cooperative learning methods are not only used once in PE classes but that this structure will be expanded and adapted again and again by PE teachers.

A further important point is the sufficient competence and experience of lecturers of universities and pedagogical colleges to prepare future teachers for heterogeneity in (PE) classes. It is not enough if lecturers just develop and present different teaching methods in purely theoretical terms. It is more important that they teach cooperatively themselves. This is one of the most important ways to penetrate the structure of cooperative learning (Ellis, 1990; Johnson & Johnson, 1989; Schniedewind & Davidson, 2000).

The structure of cooperative learning has been known since the 1980s and is still rarely used in (physical) education. Teachers often justify this with the increased preparation effort and the lack of suitable materials. The provision of teaching materials can relieve teachers and may relax the everyday school life of the teacher. Nevertheless, teaching materials would have to be adjusted accordingly to the students' needs. In order to reduce the effort, teacher colleagues may plan the lessons together and exchange teaching materials. Working in a team, also within the teaching staff, the joint planning and implementation of the lesson facilitate and the development of cooperative forms of teaching/learning may reduce the effort for the individual. The rule is: Two heads are better than one (Koriat, 2012). Students and future teachers have to be aware of the opportunity to promote the acquisition of knowledge through the interaction of several people with different levels of knowledge.

6. Conclusion

Heterogeneity is the starting point for learning. Less-abled children learn through imitation and more-abled children through the principle of "learning by teaching". The mutual support of students is used as a resource for dealing with heterogeneity. School inclusion and the associated heterogeneity require needs-based and individually adapted learning opportunities for all students. This applies not only to class lessons but also to PE. In the course of the special challenges of PE, the focus is on didactic approaches which allow ability- and individual- oriented lessons. One of these didactic approaches is that of cooperative learning, in which the variety of differences of students are seen as a resource and not as an obstacle, as mentioned above. Through the guiding principle of promoting professional knowledge and development on a social and personal level, the structure of cooperative learning can correspond to the dual task of PE. The current study confirms the positive effects of cooperative learning compared to traditional forms of learning in PE on the self-esteem of fourth-graders. Since self-esteem is positively related to success, mental health and doing sports, it can be seen as one important factor in the healthy growth of children (Orth & Robins, 2014).

Additionally, studies are needed to examine the long-term effects and effects of cooperative learning on further psychosocial variables (e.g. anxiety, self-efficacy etc.).

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Conflict of Interest Statement
The author declares no conflicts of interest.

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Dr. Carolin Schulze is a research assistant of social science perspectives on sport, exercise and health promotion at the Chemnitz University of Technology (Germany). Her research interests are in the fields of physical activity promotion in different settings, domain-specific determinants of physical activity in health inequalities and effects of physical activity and exercise on people with different psychological and physical disabilities. She focuses on psychological outcomes of physical activity like stress, self-esteem, self-efficacy and resilience.

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