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**THE INCIDENCE OF MACHIAVELLIANISM IN EARLY AND
MIDDLE ADOLESCENT PHYSICALLY ACTIVE GIRLS**

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Abstract

This paper aims to find out if regular and intensive physical activity in the life of adolescent girls may affect their moral principles in behaviour towards other people, especially a personal tendency to be unemotional, detached from conventional morality and manipulative. The aim of the study is to demonstrate unequivocal effect (direct or mediate) of physical activity on the occurrence of Machiavellian personal features in behaviour and thinking among early and middle adolescent girls. This study compared the control group (non-physically active) and experimental group (physically active) of Slovak girls aged 11 to 15 years old. A modified version of Christie and Geis's 1970 questionnaire was used. Basic somatic parameters were obtained and related to Machiavellian personality traits. Machiavellianism was found to correlate with age ($r=0.19$; $p<0.05$). The direct impact of sport is significantly evident among 13-year-old physically active girls ($p=0.06$), only, as they showed higher scores of Machiavellianism than non-physically active 13-year-old girls. The mediate impact of Machiavellianism (through body habitus) was significant. Correlations with body height of ($r=0.108$; $p<0.049$) were found. Machiavellianism showed a significant impact among 13-year-old girls. The mediate impact of sport was significantly proved in physically active girls at the age of 12 (body height, $r=0.348$; $p=0.05$; body weight, $r=0.332$; $p=0.063$), and in non-physically active girls at the age of 15 (BMI, $r=0.298$; $p=0.073$; WHR, $r=0.479$; $p=0.003$). Physical activity has a direct impact on the formation of the psyche among sport-oriented young girls. Sport supports and also accelerates Machiavellianism already evident at an early age.

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1. Introduction

As Fehr, Samsom, & Paulhus (1992) mention, the concept of Machiavellianism is derived from the writings of the 16th-century Italian author, Niccolo Machiavelli. In his treatises, *The Prince* and *The Discourses*, Machiavelli presented his view of people as untrustworthy, self-serving, and malevolent, and advocated that a ruler maintains power in an exploitative and deceitful manner. Some four centuries later, during the 1960s, Richard Christie proposed that the tendency to accept Machiavelli's worldview was a measurable individual difference variable. Kowalski (2001) notes that the “Dark Triad” of traits, which consists of Machiavellianism, narcissism, and psychopathy, are considered to be socially aversive personalities. Machiavellianism is characterized by manipulative behaviours, insincerity, and callousness (Christie & Geis, 1970). Out of the three Dark Triad traits, Machiavellianism refers to manipulative strategies of social conduct that are not correlated with general intelligence, and that do not necessarily lead to success (Wilson, Near & Miller, 1996). Kerig & Sink (2010) describe that the phenomenon appears to be most relevant to the use of “sneaky”, emotionally damaging behaviours that are less likely to draw negative attention to the perpetrator. McHoskey (2001) claims that Machiavellianism is more strongly related to men's than women's behaviour. Peeters et al. (2010) found that the prevalence of Machiavellianism is higher in adolescents who engage in indirect bullying, since social manipulation is required for successful acts of relational aggression. These children, as LaFontana & Cillessen (2002) say, may perceive aggression and manipulation as necessary to maintain social status or power within a group. Wilson, Near & Miller (1996) found out that Machiavellianism was positively associated with loneliness, whereas narcissism showed a nonsignificant negative correlation with loneliness, and negatively correlated with emotional intelligence. Machiavellianism refers to a tendency to exploit others to one's own advantage by adopting a manipulative interpersonal style. Byrne & Whiten (1988) state that although the construct of Machiavellianism arose only just under 50 years ago, it has previously been described by a set of skills including cognitive ability for adaptation to complex social situations. A part of these skills was the ability to manipulate others for the aim of obtaining relevant resources. These capabilities were known as Machiavellian intelligence and were considered a significant evolutionary advantage. McHoskey (1999) figures out that individuals with a large extent of Machiavellianism exhibit motivational orientation focused on control that is manifested in financial aspirations for success, power and competition, as opposed to building community, care for themselves and family matters. Individuals with a large extent of Machiavellianism accorded to focus on success and winning at any cost. Generally speaking, as proved by Hawley (2006), these individuals are more focused on their own goals than the goals of others. Austin, Farrelly, Black & Moore (2007) point out that individuals with a large extent of Machiavellianism are emotionally distant when interacting with others, with interpersonal orientation oriented cognitively rather than emotionally. For this reason, Wilson, Near & Miller (1996) state that individuals with a large extent of Machiavellianism have difficulties maintaining a healthy, long-term relationships with others and are more focused on short-term relationships in which they are successful. Gable & Dangelo (1994) outline that individuals with a large extent of Machiavellianism have lower ethical standards than others, less embarrassment of unethical behaviour and a greater intention to behave unethically in the future. These individuals are willing to sacrifice truth and morality for their own interests, rather than being constantly untrue, unethical. Fehr, Samsom & Paulhus (1992) add that at the

same time, these individuals are more tolerant towards people who perpetrate unethical behaviour; the more common types of strategies for handling these individuals include lying. Wilson, Near & Miller (1996) emphasise that having taken into account socio-biological perspective, Machiavellian behaviour is considered as a type of social intelligence, which represents the non-cooperative strategy in game theory. The argument for an evolutionary justification of Machiavellianism disputes the findings of Vernon et al. (2008), who found that Machiavellianism behaviour depends more on the environment and less on heredity, than other reference psychological traits. It was found that Machiavellian behaviour is unrelated to general intelligence. Machiavellian behaviour increases with age from childhood to late adolescence, and then decreases again (Wilson, Near & Miller, 1998).

2. Problem Statement

Machiavellianism is a very interesting phenomenon, especially in the case of adolescents. Interestingly, it appears in the context of the social climate of today's youth, which is dominated by individualism. Increasingly, the slope of the concept of competition is already evident in primary schools. Children respond to the period of social change in their own individual way. Some of the most competitive and predatory ones are able to meet increasing demands and adapt to changing conditions, others are not. Current developments of this phenomenon shows signs of psychosocial evolution. On the one hand, Machiavellian traits enable one to achieve success and better adapt to external conditions, but on the other hand, such a person may seem immoral and emotionally distant. In our contribution, we try to inspect Machiavellianism neutrally. It is generally known that physical activity has an impact on the human body as well as on the human psyche. As the independent variable performs a sport that generally improves endurance, fitness, and the ability to carry a burden, they will also form positive personality traits.

3. Research Questions

1. What is the difference in the extent of Machiavellian psychological traits between physically active and physically non-active adolescent girls in each age group?
2. What is the direct effect of regular and intense physical activity on the extent of Machiavellian psychological traits in adolescent girls in each age group?
3. What is the mediate effect of regular and intense physical activity by means of body habitus on the extent of Machiavellian psychological traits in adolescent girls in each age group?

4. Purpose of the Study

The main aim of the study is to determine the impact of sport on the psychical development of adolescent girls. The side aims are:

1. To show a direct impact of sport influence on Machiavellianism among girls by comparing Machiavellian scores between physically active and physically non-active girls in each age group.

2. To show a mediate impact of sport influence on Machiavellianism among girls by means of a relationship among somatic parameters (body height, body weight, BMI, WHR) and Machiavellian score in each age group.

5. Research Methods

The monitoring of psychical development and measuring of somatic state in Slovak girls aged 11 to 15 years old in Nitra (Slovak Republic) was conducted as transversal research. Research sample includes 330 experimentees in total, 164 physically active girls (PAG) who constitute an experimental group from a sport-oriented school and 166 non-physically active girls (NPAG) who constitute a control group. The calculation of chronologic age of the pupils was estimated to the date of measuring in decimal system in a tenth of year by IBP, as stated by Weiner & Lourie (1969). The basis of the study are data collected at 5 elementary schools and at 2 secondary grammar Slovak schools with a special focus on sport education. Measuring was realised on the base agreement of the school director and measured pupil (parent). Somatometric measuring was realised in frame of standard anthropometric methods (Martin & Saller, 1967; Fettera et al, 1967). The participants underwent the basic anthropometric measurements of body mass and body height, measured by a digital medical scale with a stadiometer (InBody BSM370, BioSpace, Seoul, South Korea). The BMI was calculated from body weight and body height, and classified in agreement with the following WHO standards: normal weight ($<24.9 \text{ kg/m}^2$), overweight ($<29.9 \text{ kg/m}^2$) and obese ($<34.9 \text{ kg/m}^2$) (WHO, 2012). The WHO states that abdominal obesity for females is defined as a waist-hip ratio above 0.85. The WHR was calculated from waist and hip circumference, and classified in agreement with the WHO standards (WHO, 2011). Waist circumference was measured in anthropometric point called *umbilicalis*. Hip circumference was measured through both trochanters and gluteal area. Psychological tests often used in sport practice figuring out the extent of so-called Machiavellianism. Machiavellian complex is composed of various spectra of psychological traits. This test is possible to classify as a scaling. In our study, we used no-origin, modified version of the test. The test expresses the level of agreement, or self-identification with listed statement. The average range moves between 24 to 30 points. There is a dependence in that a higher score suggests a higher level of Machiavellianism (Christie, 1970). We applied descriptive statistical methods for the base analysis of the investigated parameters. After calculating the Kolmogorov-Smirnov normality test for all parameters, which confirmed the normality of data distribution, we used the unpaired T-test for the evaluation of differences between PAG and NPAG. Pearson correlation coefficient was used for the evaluation of relationship between somatic parameters and Machiavellianism score. According to Cohen (1988), an absolute value of r of 0.1 is classified as small, an absolute value of 0.3 is classified as medium and of 0.5 is classified as large. Statistical analysis was performed by STATISTICA software (Version 12; Stat-Soft, Tulsa, OK, USA). The participants were informed regarding the purpose of this study and provided with a written consent before participation in the research process.

6. Findings

The achieved score of Machiavellianism turned out an interesting course, which indicates the mutual overtaking of PAG and NPAG in an increasing trend with age (Table 1). 11-year-old PAG scored more strongly (27.2 points) than NPAG (25.5 points). The difference between the groups reached 1.7 points. 12-year-old NPAG achieved a higher score (27.7 points) than PAG (26.4 points), the difference reached 1.3 points. 13-year-old PAG achieved a score of 29.9 points, which is significantly higher by 3.4 points ($p=0.006$) in comparison with NPAG who achieved 26.6 points. The difference in fourteen-year-old adolescents was minimal (0.5 points). 14-year-old PAG scored (28.4 points) and NPAG scored very similarly (28.9 points). The score achieved by 15-year-old PAG (30 points) was higher than in NPAG (28.2 points), but the difference (1.8 points) is not significant. Machiavellian score of PAG at the age of 13 is not different from the score at the age of 15, which means that sport supports and accelerates Machiavellianism in younger age. Regularly alternating values of score suggest a possible regularity in the formation of a Machiavellian trait. Sport probably moved the time of higher Machiavellianism score at the age of 11, to the younger age. At the entrance of 11-year old PAG to the sport class, the girls were probably prepared for higher demands and harder study conditions. It is possible that they thus better managed the transition from first to second stage of primary school, which may be one of the many psychical stressors for adolescents. Among NPAG, there was a slight and natural increase of Machiavellian score at the age of 12. This is the reason why we observed altering periods of increase and decrease of scores. The first decrease in PAG was at the age of 12 and the second decrease was at the age of 14, while in NPAG it was the opposite. The first decrease of NPAG was at the age of 13 and the second decrease was at the age of 15. We can say that there were differences in Machiavellian score between PAG and NPAG. Physical activity showed a direct impact on the formation of the psyche among sport-oriented young girls. Sport supports and also accelerates Machiavellianism already at an early age.

Table 01. Comparison of average values of Machiavellian score by age

Age	Physically active girls			Non physically active girls			Unpaired T-test		
	n	M ± SD	Mdn	n	M ± SD	Mdn	D	t	p
11	29	27.2 ± 4,6	26.0	27	25.5 ± 5.8	26.0	1.7	1.241	0.220
12	32	26.4 ± 3,5	26.0	31	27.7 ± 4.0	28.0	-1.3	-1.373	0.175
13	34	29.9 ± 5,2	29.0	35	26.6 ± 4.6	27.0	3.4	2.857	0.006
14	37	28.4 ± 4,1	28.0	36	28.9 ± 3.6	30.0	-0.5	-0.504	0.615
15	32	30.0 ± 4,9	29.0	37	28.2 ± 4.5	28.0	1.8	1.573	0.120

Notes: n – number in subsample; M – mean; SD – standard deviation; Mdn – median;
 D – difference; t – t-test value; p – probability.

Table 2 shows in fact that the relationship between Machiavellian score, age and somatic parameters among early and middle adolescent girls were not significant by age aspect. This suggests that physical activity can play a key role in the relationship, although the age is a strong predictor (Table 3). Age is a strong factor in both groups (PAG and NPAG). The result is more significant in the group of girls with

physical activity. Table 3 shows the total trend of the relationship and confirms that age is a very strong factor for the dependence of the researched psychological trait on somatic habit.

Table 02. Relationship between Machiavellian score and somatic parameters by age without physical activity differentiation

Age	11 (n=56)		12 (n=63)		13 (n=69)		14 (n=73)		15 (n=69)	
	r	p	r	p	r	p	r	p	r	p
Age	-0.178	0.188	0.112	0.382	0.102	0.402	-0.046	0.696	0.032	0.790
Body height	-0.021	0.874	0.158	0.214	-0.043	0.724	-0.119	0.315	-0.042	0.732
Body weight	-0.146	0.282	0.207	0.102	-0.001	0.990	-0.206	0.080	0.074	0.543
BMI	-0.166	0.220	0.153	0.230	0.018	0.881	-0.173	0.142	0.098	0.419
WHR	-0.177	0.192	0.129	0.312	0.065	0.593	-0.095	0.423	0.098	0.423

Notes: n – number in subsample; r – Pearson's correlation; p – probability.

Table 3 points out the total trend (all girls) of the relationship between somatic parameters and Machiavellian score. There has been detected a slight positive significant linear correlation between Machiavellianism and body height ($r=0.108$; $p=0.049$). This relationship is generally valid throughout the entire period of early and middle adolescence. Body height has become an important factor for the development of Machiavellian traits in early and middle adolescent age period.

Table 03. Relationship between Machiavellian score and somatic parameters

	Girl total trend			Physically active girl trend			Non physically active girl trend		
	n	r	p	n	r	P	n	r	p
Age	330	0.197	0.000	164	0.218	0.005	166	0.181	0.020
Body height		0.108	0.049		0.093	0.235		0.104	0.182
Body weight		0.087	0.116		0.095	0.226		0.072	0.356
BMI		-0.071	0.197		-0.123	0.117		-0.019	0.810
WHR		0.038	0.494		0.057	0.471		0.020	0.795

Notes: n – number in subsample; r – Pearson's correlation; p – probability.

From table 4, it is evident that Machiavellian behaviour increases with age from early to middle adolescence, only in NPAG. Mainly, in 15-year-old PAG, the trend is opposite and significant, with the increasing age of Machiavellian score decreasing ($r=0.376$; $p=0.044$). Physical activity has become a “protect function” for retaining of good moral psychological traits. The Machiavellian score showed a positive medium correlation with body height ($r=0.3486$; $p=0.051$) in PAG at the age of 12. This fact is confirmed and strengthened by our results from table 3. Physical activity acted as a restorative factor for the development of Machiavellianism. Body height probably represents a socially dominant principle element. Similar situation occurred for body weight ($r=0.333$; $p=0.063$) in PAG at the age of 12.

Table 04. Relationship between Machiavellian score and somatic parameters by age

	age	Physically active girl trend			Non physically active girl trend		
		n	r	p	n	r	p
Age	11	29	0.024	0.900	27	-0.305	0.122
	12	32	-0.129	0.502	31	-0.055	0.768
	13	34	-0.186	0.332	35	-0.150	0.389
	14	37	-0.161	0.402	36	0.065	0.705
	15	32	-0.376	0.044	37	0.085	0.616
Body height	11	29	-0.129	0.502	27	-0.068	0.736
	12	32	0.348	0.051	31	0.038	0.835
	13	34	-0.113	0.524	35	-0.087	0.619
	14	37	-0.192	0.253	36	-0.056	0.743
	15	32	-0.099	0.587	37	-0.056	0.739
Body weight	11	29	-0.186	0.332	27	-0.188	0.347
	12	32	0.333	0.063	31	0.091	0.623
	13	34	0.039	0.825	35	-0.076	0.664
	14	37	-0.187	0.267	36	-0.239	0.160
	15	32	-0.199	0.274	37	0.240	0.152
BMI	11	29	-0.161	0.402	27	-0.191	0.338
	12	32	0.201	0.268	31	0.082	0.659
	13	34	0.118	0.505	35	-0.069	0.692
	14	37	-0.108	0.521	36	-0.238	0.161
	15	32	-0.170	0.340	37	0.298	0.073
WHR	11	29	-0.376	0.044	27	0.018	0.925
	12	32	0.336	0.059	31	-0.060	0.748
	13	34	0.092	0.605	35	-0.032	0.852
	14	37	-0.032	0.848	36	-0.149	0.383
	15	32	-0.195	0.283	37	0.479	0.003

Notes: n – number in subsample; r – Pearson's correlation; p – probability.

Correlation analysis showed a significant slight positive linear correlation for the relationship between Machiavellianism and BMI in 15-year-old NPAG ($r=0.294$; $p=0.073$). This means that with increasing values of BMI index, Machiavellian score was increasing, too. Obesity showed a very similar, but stronger effect, estimated by WHR index with correlation with Machiavellian score in common population at the age 15. Values of WHR index showed a positive medium linear correlation with Machiavellian score ($r=0.479$; $p=0.003$). In these two cases, physical inactivity and obesity in common population can effect in favour of development of Machiavellian behaviour. This theory was confirmed by the trend of 11-year-old PAG, which showed a negative medium linear correlation for the relationship between Machiavellianism and WHR index ($r=-0.376$; $p=0.044$). This trend is typical for sport population, while WHR was decreased and optimized, Machiavellianism was developed.

7. Conclusion

The direct impact of sport is significantly evident among 13-year-old PAG ($p=0.06$), only, they showed a higher score of Machiavellianism than NAPG 13-year-old girls' group. Machiavellianism showed a significant impact among 13-year-old girls, mainly. The mediate impact of Machiavellianism (through body habitus) was significant, but low. We found out small correlations of body height ($r=0.108$; $p<0.049$). Body height has become an important factor for the development of Machiavellian traits in early and middle adolescent age period. The mediate impact of sport is low to medium, but Machiavellianism is significantly associated with the development of somatic parameters. Body height and body weight were significantly restorative factors for the support of Machiavellian behaviour among 12-year-old PAG, also BMI and WHR index were significantly restorative factors for the support of Machiavellian behaviour among 15-year-old NPAG. Physical activity has a direct impact on the formation of the psyche among sport-oriented young girls. Sport supports and also accelerates Machiavellianism already at an early age.

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