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Socioeconomic status and physical activity among adolescents: the mediating role of self-esteem

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Submitted

Abstract

Physical activity is an essential part of a healthy lifestyle in adolescence. Previous studies have shown physical activity to be associated with socioeconomic status and self-esteem; the latter association may mediate the former, but evidence on this is lacking. The aim of our study was to explore the associations of socioeconomic status and the self-esteem of adolescents with physical activity, and their joint effects. A sample of 3,694 elementary-school students from Slovakia (mean age 14.3 years, 49% boys) completed the Rosenberg Self-esteem Scale and answered questions about their parents' educational level and about the frequency of their physical activity. Results revealed that adolescents with higher socioeconomic status were significantly more likely to report physical activity at least five days per week and to report higher self-esteem. In logistic regression the association of socioeconomic status with physical activity decreased after adding in self-esteem, suggesting that at least a part of this association is mediated by self-esteem. To conclude, youths from lower socioeconomic groups have already been identified as a target group. Our findings suggest that it is important in promotion programs to focus not only on the enhancement of their physical activity but also on their self-esteem as a possible mediator.

Introduction

Regular physical activity is a part of a lifestyle which leads to physical health benefits such as reduced risks of coronary heart disease, diabetes and obesity but also to mental health benefits like reduced risks of depression, anxiety and mood disorders (Penedo & Dahn, 2005). Healthy lifestyle patterns that include regular physical activity can be traced back to childhood and adolescence. Those stages of development are crucial for adopting healthy lifestyles that have consequences for current and future physical and mental health (Hallal, Victora, Azevedo & Wells, 2006). Despite the well-known health benefits of regular exercise, recent international studies (Currie et al., 2008; 2004; 2000) show a lack of sufficient physical activity among adolescents, indicating a potentially serious public health problem (Hallal, Victora, Azevedo & Wells, 2006). It is therefore important to identify possible determinants for the specific target groups.

Social inequalities have been found in the physical activity of adolescents, adolescents with low-educated or low-income parents being less physically active (Currie et al., 2008; Mota, Ribeiro & Santos, 2009; Richter et al., 2009; Piko & Keresztes, 2008). One explanation for this is that parents with a higher education level may help students develop more positive attitudes towards health and health-related behaviors, and a high family income may support the engagement in certain sports having high costs. Moreover, intrapersonal factors may contribute to social inequalities in physical activity and influence the connection between the socioeconomic status of youths and their engagement in physical activity. Several studies (Veselska et al., 2009; Birndorf, Ryan, Auinger & Aten, 2005; Rhodes, Roffman, Reddy & Fredricksen, 2005) have shown that adolescents from higher socioeconomic groups report higher self-esteem. In turn, self-esteem has been shown to be significantly associated with physical activity (Penedo & Dahn, 2005; Parfitt & Eston, 2005). Though associations between self-esteem and socioeconomic status or self-esteem and physical activity were explored in the above mentioned studies, there is a lack of evidence on the role of self-esteem in the relation between socioeconomic status and physical activity. We assumed that self-esteem as an intrapersonal factor may not only mediate but also moderate the relation between socioeconomic status of adolescents and their physical activity. Therefore, the aim of this study was to explore the associations of socioeconomic status and self-esteem with physical activity and the possible influence (mediation or moderation) of self-esteem on the association between socioeconomic status and physical activity by assessing their joint effects.

Methods

Sample and procedure

The study sample consisted of 3,725 adolescents in the 8th and 9th grades at elementary schools in the major cities of Bratislava (600,000 inhabitants, Western Slovakia), Zilina (156,000 inhabitants, Northern Slovakia) and Kosice (240,000 inhabitants, Eastern Slovakia) as well as other smaller cities (10,000 – 40,000 inhabitants) in the eastern region of Slovakia. The sample was made up of 49% boys, with a mean age of 14.3 years (SD 0.65; range 11-17 years). Students younger than 13 and older than 16 years old were excluded to make the sample more homogeneous and to avoid age extremes which could influence the findings. After this exclusion, the study sample consisted of 3,694 students (mean age 14.3 years, SD 0.62), with 24.6% coming from Bratislava, 21.3% from Zilina, 32.1% from Kosice and 22% from other eastern region cities.

Trained researchers and research assistants collected data between October and December 2006. The set of questionnaires was administered during two regular 45-minute lessons in a complete 90-minute time period on a voluntary and anonymous basis in the absence of the teachers. The overall response rate was 93.5%. Non-response was due to illness or another type of school absence. The local Ethics Committee approved the study.

Measures

Physical activity was assessed using a single question repeatedly used and validated in HBSC surveys (Currie et al., 2008; 2004; 2000): "Over a typical or usual week, on how many days were you physically active for a total of at least 60 minutes per day?" with answers (1) 0 days; (2) 1 day; (3) 2 days; (4) 3 days; (5) 4 days; (6) 5 days; (7) 6 days; (8) 7 days. We dichotomized the responses to this question for logistic regression into two categories, with the cut-off point at 5 days of physical activity per week, further denoted as sufficient vs. insufficient physical activity.

Socioeconomic status was assessed by parents' education level, defined as the highest level of education obtained from each parent of the respondents. Education level from both parents was combined into one indicator and was classified as: high (university), middle (secondary school) or low (apprenticeship or primary school only).

Self-esteem was assessed using the Rosenberg Self-esteem Scale (RSES) (Rosenberg, 1965). The 10 items of the RSES assess a person's overall evaluation of his/her worthiness as a human being (Rosenberg, 1979). Responses range on a 4-point scale from 1 (strongly disagree) to 4 (strongly agree). A global self-esteem factor can then be calculated, with the sum score ranging from 10 to 40. A higher score indicates higher self-esteem. Cronbach's alpha for global self-esteem was 0.76.

Statistical analysis

Standard descriptive analyses for the whole study sample and for different socioeconomic groups were performed in the first step. In the next step we performed hierarchical logistic regression in three models adjusted for gender. In Model 1 we explored the association between socioeconomic status and physical activity. In Model 2 we added self-esteem to explore the association between self-esteem and physical activity, and in the final Model 3 we added the interaction between socioeconomic status and self-esteem to assess whether self-esteem modifies the association between socioeconomic status and physical activity. All analyses were performed using SPSS version 16.

Results

Table 7.1 shows the descriptive statistics of all the study variables for the whole study sample and separately for three socioeconomic groups (low SES, middle SES, and high SES). Significant socioeconomic differences were found between the variables. Adolescents with higher socioeconomic status were significantly more likely to report physical activity on at least five days per usual week and also were significantly more likely to report higher self-esteem.

Table 7.1 Descriptive statistics of the study variables in the whole study sample and separately by socioeconomic status

	Whole sample (n = 3694)	1 Low SES (n = 345)	2 Middle SES (n = 1 626)	3 High SES (n = 1 441)	p	Post hoc analysis
Gender: n (%)						
Boys	1 765 (49.0)	131 (38.6)	753 (47.6)	765 (54.5)		
Physical activity: n (%)						
5 or more days per week	1 074 (30.5)	74 (22.6)	455 (29.3)	474 (34.3)	p < .001	1-2, 1-3, 2-3
RSE ^a : Mean (SD; range)	28.07 (4.45; 11-40)	26.58 (4.17; 13-39)	27.92 (4.49; 11-40)	28.69 (4.30; 11-40)	p < .001	1-2, 1-3, 2-3

^a Higher scores indicate higher self-esteem.

Table 7.2 presents odds ratios (OR) and 95% confidence intervals (CI) from the hierarchical logistic regression adjusted for gender. Model 1 shows the association between socioeconomic status and sufficient physical activity. High socioeconomic status significantly increased the probability of sufficient physical activity. In Model 2, after self-esteem was added to the analysis, the association between high socioeconomic status and sufficient physical activity weakened and higher self-esteem increased the probability of sufficient physical activity significantly. In the final Model 3, interactions between socioeconomic status and self-esteem were added. These interactions were not statistically significant. Gender was significantly associated with sufficient physical activity in all three models.

Table 7.2 Associations of socioeconomic status and self-esteem with sufficient physical activity (on 5 or more days per week): odds ratios (OR) and 95%-confidence intervals (CI) for sufficient physical activity from hierarchical logistic regression.

		Model 1	Model 2	Model 3
		OR (95% CI) adjusted for gender	OR (95% CI) adjusted for gender	OR (95% CI) adjusted for gender
Gender	girls	1.00 ***	1.00 ***	1.00 ***
	boys	2.40 (2.05-2.82)	2.24 (1.90-2.63)	2.24 (1.90-2.63)
SES	low	1.00 ***	1.00 *	1.00
	middle	1.30 (0.96-1.75)	1.22 (0.91-1.65)	6.31 (0.74-53.89)
	high	1.57 (1.16-2.11)	1.43 (1.06-1.93)	6.32 (0.72-55.65)
RSE			1.05 (1.03-1.07) ***	1.11 (1.03-1.19)***
SES low*RSE				1.00
SES middle*RSE				0.94 (0.87-1.02)
SES high*RSE				0.95 (0.88-1.02)

*** p-value for the overall contribution of this variable to the model < 0.001

* p-value for the overall contribution of this variable to the model < 0.05

Discussion

In this study we explored the associations between socioeconomic status, self-esteem and physical activity among adolescents and the potential influence of self-esteem on the association between socioeconomic status and the physical activity of adolescents. Our results show that youths with high socioeconomic status engage in regular physical activity more often than their peers with middle or low socioeconomic status and also report higher self-esteem. The association of socioeconomic status with physical activity decreased after adding in self-esteem, suggesting that at least a part of this association is mediated by self-esteem. The connection between socioeconomic status and physical activity may thus be mediated by the self-esteem of adolescents.

Socioeconomic inequalities in the physical activity of adolescents have been found in previous research (Currie et al., 2008; Mota, Ribeiro & Santos, 2009; Richter et al., 2009; Piko & Keresztes, 2008) and our findings confirm their existence. The higher education of parents may help students develop positive attitudes towards health and health-related behaviors. Family income, on the other hand, may support the engagement in certain sports having high costs. In general it can be assumed that youths from lower socioeconomic groups are more vulnerable regarding low physical activity and are thus an important target group in the promotion of physical activity.

Additionally, our study provides information about the mediating role of self-esteem on this relation between socioeconomic status and physical activity. A higher socioeconomic status was found to be associated with higher self-esteem (Veselska et al., 2009; Birndorf, Ryan, Auinger & Aten, 2005; Rhodes, Roffman, Reddy & Fredricksen, 2005). Previous research has also revealed a connection between self-esteem and physical activity (Krahnstoeber davisona et al., 2007; Parfitt & Eston, 2005). Based on this connection, feelings of self-worth seem to play an important role in the connection between socioeconomic status and physical activity in adolescence. The lower socioeconomic status of adolescents might be reflected in their negative perception of self. Consequently, low self-esteem creates a barrier to their engagement in physical activity. Interventions focused on the strengthening of self-esteem might lessen the negative association between low socioeconomic status and insufficient physical activity. Parental, school and community involvement enhances these actions and provides the necessary background (Derzon, Wilson & Cunningham, 1999). Finally, self-esteem interventions need take into account possible differences between participants (e.g. age, gender, ethnicity or type of problems) (Haney & Durlak, 1998).

Strengths and limitations

This study has several important strengths, the most important being its large nationally representative sample and its high response rate. It also has limitations. First, only subjective self-reports were used for measuring physical activity. The main limitation, however, is its cross-sectional design, which makes it impossible to formulate conclusive statements about causality in our findings. They therefore need to be confirmed in studies with a longitudinal design.

Implications

Physical activity is an excellent way of enhancing physical health during adolescent years, and development of healthy patterns in adolescence can be tracked into adulthood (Hallal, Victora, Azevedo & Wells, 2006). Youths from lower socioeconomic groups have already been identified as a target group regarding physical activity. Our findings suggest that it could be important in promotion programs to focus not only on the direct enhancement of their physical activity, but also on the enhancement of their self-esteem, which was identified as possible mediator. This may offer a route to reach substantial gains in public health.

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