



Forming motivation for physical education in adolescence

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Abstract. The decline in physical activity among adolescents in the context of digitalisation and increasing academic workload highlights the need to understand the mechanisms of forming sustainable motivation for systematic physical education in the 11-18 age group. The aim of the study was to identify and summarise the psychological determinants, sociocultural influences and pedagogical tools that contribute to the development of adolescents' motivation for physical education and sports activities, taking into account modern digital tools. The research was carried out through a systematic analysis of 43 peer-reviewed publications for the period 2015-2025 from international databases using content analysis, thematic systematisation and comparative comparison of the effectiveness of various pedagogical technologies. Analysis of psychological factors found that intrinsic motivation was a key predictor of daily physical activity among adolescents, with the satisfaction of basic psychological needs mediating approximately 25% of the influence of parental support on activity levels. Gender differences manifested themselves in the fact that boys demonstrated a higher orientation towards the perception of physical competence and competitiveness, while girls valued aesthetic aspects and social interaction to a greater extent. The study of sociocultural factors revealed a hierarchical structure of influences, where the family environment played the role of the primary agent of socialisation through the mechanisms of parental expectations and behaviour modelling, while peer support and digital forms of interaction created additional channels of motivational influence. Analysis of pedagogical technologies showed that gamified interventions based on self-determination theory lasting more than 12 weeks increased moderate-intensity physical activity, with group training having a stronger effect than individual forms. The results made it possible to develop a three-level system of recommendations for teachers, coaches and organisers of physical education and sports activities, covering individual pedagogical interaction, the organisation of the educational process and systemic policies with an emphasis on supporting the autonomy, competence and social belonging of adolescents. The practical significance lies in creating an evidence base for the development of effective programmes to increase physical activity among young people, taking into account age, gender and cultural characteristics

Keywords: basic psychological needs; self-determination; goal setting; gamification; autonomy; digital tools

Introduction

Adolescence is a critical period for forming healthy habits, but it is precisely at this time that there is a significant decline in physical activity due to increasing academic

demands, preoccupation with digital technologies, and changing priorities. Understanding the mechanisms of motivation for physical activity at this age is important for

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preventing physical inactivity and ensuring the harmonious physical and mental development of young people. L.I. Rak *et al.* (2024) conducted a comprehensive study aimed at determining the level of physical activity of adolescents in the critical conditions of military conflict and developing strategies to optimise and increase physical activity during a period of social crisis. The results of the survey showed a decrease in the level of physical activity of adolescents in wartime compared to the quarantine period: 70.9% of adolescents demonstrated a low level of physical activity, 16.5% demonstrated an average level, while only 12.6% demonstrated a high level of activity. The researchers found that intrinsic desire was the main motivating factor for increasing physical activity, as indicated by 87% of children with low activity and 93% of children with high activity.

G.H. Malchrowicz-Moško *et al.* (2020) conducted a study aimed at identifying motivational factors in Polish children and adolescents aged 12 who participated in running competitions as part of the "On the Way to the Marathon" project in Poznań. The results of the study revealed that the greatest motivators for completing the distance were the immediate feelings of satisfaction and entertainment during participation in a mass competition, reaching an average score of 6.01 out of 7 points, while the motives of social affiliation and the desire to be in the company of peers showed significantly lower scores of 3.96 out of 7 points. I. Soós *et al.* (2019) conducted a large-scale comparative study aimed at investigating the impact of perceived autonomous support from parents, teachers and peers on the development of motivation among young people in the context of physical education and leisure-time physical activity. The results of the study showed that perceived autonomous support from family and peers was associated with higher levels of autonomous motivation for leisure-time physical activity in all four countries studied, but the nature of the influence of physical education teachers varied depending on the geographical region. The study also found statistically significant gender differences: boys reported higher levels of physical activity and perceived more support and freedom of choice from teachers, while girls showed higher levels of autonomous motivation in the context of formal physical education.

I. Harbichová *et al.* (2025) conducted a study at Charles University in Prague aimed at identifying and classifying motivational profiles among Czech young people studying physical education teacher training and sports coaching programmes. The results of the analysis revealed the existence of four distinct motivational profiles among the respondents: a group with moderately autonomous motivation (51.5% of the total sample), a group with combined controlled and amotivated motivation (21.9%), a group with low motivation for sports activities (19.1%), and a group with predominantly amotivated motivation (7.5%). The study by H. Butenko (2025) involved 40 sixth-grade students who were systematically divided into control and experimental groups. The results of the study showed that the introduction of a comprehensive system of physical education and recreational activities contributed to a statistically significant increase in the level of motivation of schoolchildren to engage in physical education, especially in the context of recreational activities. The students in the experimental group showed a significant improvement in

physical fitness indicators and an increase in positive attitudes and emotional involvement in physical activity compared to the control group.

S.V. Hryshchenko *et al.* (2024) conducted a systematic analysis of scientific literature aimed at studying various aspects of physical activity among Ukrainian adolescents aged 11-14 as a component of a healthy lifestyle. The researchers found that there is a trend towards a deterioration in the health indicators of adolescents in this age group in Ukraine, while the formation of basic values regarding a healthy lifestyle remains a critically important task. The scientists concluded that maintaining the health of Ukrainian adolescents aged 11-14 in wartime appears to be an effective form of both prevention and health promotion for young people. K. Frömel *et al.* (2025) conducted a comparative study of the impact of the COVID-19 pandemic on the physical activity patterns of Czech and Polish adolescents in different segments of the school day. The results of the study showed that both Czech and Polish boys and girls demonstrated statistically significantly lower transport-related physical activity to and from school after pandemic restrictions compared to the pre-pandemic period. The study found that the COVID-19 pandemic disrupted regular physical activity habits on school days, which was particularly evident in reduced activity during commutes to school.

C. Cefai *et al.* (2025) conducted a large-scale global study aimed at investigating the association between physical activity levels and life satisfaction in 15-year-old adolescents from 64 countries around the world. The researchers analysed data from the 2022 Programme for International Student Assessment, which covered 399,794 15-year-old students. The results of the study showed that even after controlling for these multilevel factors, physical activity remained positively and statistically significantly associated with students' overall life satisfaction. An analysis of gender differences in the magnitude of this association showed that gender disparities did not reach statistical significance in most countries (55 out of 64), indicating the universality of the effect regardless of gender. Despite their value, the above-mentioned studies have certain limitations: most of them focus on specific contexts (armed conflict, the COVID-19 pandemic) or specific age groups, which makes it difficult to generalise the results to the wider adolescent population. In addition, some of the studies were conducted in individual countries, which limits the possibility of extrapolating the conclusions to other cultural and socio-economic contexts. The aim of the study was to systematise the psychological, sociocultural and pedagogical factors that shape motivation to engage in physical culture in adolescence.

Materials and Methods

The presented study was review-analytical and aimed at systematising and critically analysing scientific publications devoted to psychological, sociocultural and pedagogical factors influencing the formation of adolescents' motivation to engage in regular physical activity. The study was conducted during 2024-2025 based on leading international scientometric databases. A systematic literature search was conducted in PubMed/MEDLINE, Web of Science Core Collection, Scopus, PsycINFO, SPORTDiscus and ERIC databases using search queries in English:

“adolescent motivation AND physical activity”, “self-determination theory AND youth sport”, “gamification AND adolescent exercise” and other combinations of key terms with Boolean operators. The inclusion criteria involved the selection of peer-reviewed articles mainly from 2019-2025 (some works from 2015-2018 were included if they were methodologically relevant) with empirical data on the motivational mechanisms of physical activity in adolescents aged 11-18 (studies with samples that partially covered the age of 10 or 19-20 were allowed if the majority of respondents corresponded to the target range), valid psychometric instruments, and publication in journals with an impact factor. Exclusion criteria included publications about adults or preschoolers, studies without clear methodology, duplicate works, and non-peer-reviewed materials. The initial search identified 247 publications, of which 103 were selected for full-text analysis, and 43 sources that most closely met the objectives and quality criteria were ultimately included in the systematic analysis. An additional 8 sources were included in the introduction to contextualise the research topic.

The methodological basis was a content analysis of scientific publications using the principles of systematic review, which ensured a structured approach to the selection and synthesis of empirical data. Each publication was analysed according to the following parameters: sample characteristics, methodological design, theoretical framework, psychometric instruments, statistical methods, and practical implications. Thematic analysis was used to systematise motivational factors according to their nature into internal psychological determinants, sociocultural factors and pedagogical means, with an assessment of empirical validity based on the number of studies and the magnitude of effects. Comparative analysis was used to compare the effectiveness of traditional and innovative pedagogical technologies, gender-specific features of the perception of motivational stimuli, and the effectiveness of individual and group forms of classes depending on the basic motivational level of participants. Zotero (version 7.0.11) and Microsoft Excel 2021 (version 2405) software was used to systematise the data.

The results were interpreted through the prism of Edward Deci and Richard Ryan's self-determination theory (Ryan & Deci, 2017), which allowed to integrate empirical data into a conceptual model of forming sustainable motivation through the satisfaction of basic psychological needs for autonomy, competence, and social belonging. The analysis included the identification of causal relationships, mediating mechanisms, and moderators of the effectiveness of motivational interventions, while a critical analysis of methodological limitations allowed to formulate directions for further research. Attention was paid to identifying contradictions between different studies and gaps in the existing scientific base in order to determine priority areas for future empirical research. The synthesis of results was aimed at developing a set of scientifically based practical recommendations for teachers, coaches, parents, and organisers of physical education and sports activities. The recommendations were structured according to three levels of intervention: the micro level of individual pedagogical interaction, the meso level of educational process organisation, and the macro level of systemic policies, with

a particular focus on vulnerable groups of adolescents. Each recommendation was accompanied by references to specific empirical studies confirming its effectiveness, with a description of the expected results and possible limitations of application.

Results and Discussion

Psychological factors and internal determinants of adolescents' motivation for physical activity

The motivation of adolescents to engage in physical activity was shaped by a complex interaction of internal and external factors, as confirmed by numerous scientific studies. H. Kalajas-Tilga *et al.* (2020) demonstrated in a longitudinal study of 397 adolescents aged 11-15 that internal motivation for physical education was the only significant motivational predictor of daily physical activity measured objectively ($\beta = 0.29$; $p = 0.009$), while identified regulation, introjected regulation, and external regulation did not show statistically significant associations with activity levels. The satisfaction of basic psychological needs positively predicted intrinsic motivation ($\beta = 0.86$; $p = 0.001$), which mediated the relationship between perceived autonomy support from physical education teachers and objectively measured moderate- and high-intensity activity. The self-determination theory of R.M. Ryan & E.L. Deci (2017) postulated three basic psychological needs – autonomy, competence, and social belonging – as fundamental to the development of quality motivation.

Data on the relationship between internal and external motivation among adolescents was presented by M.E. Işıkgöz (2025) in a study of 1,399 Turkish high school students, where the average internal motivation score was 5.68 ($SD = 1.51$) on a seven-point scale, identified regulation – 5.77 ($SD = 1.22$), introjected regulation – 4.13 ($SD = 1.74$), and external regulation – 3.69 ($SD = 1.68$), which indicated the predominance of autonomous forms of motivation over controlled ones. Internal motivation showed a strong positive correlation with positive emotions of achievement ($\beta = 0.63$; $p < 0.001$) and a negative correlation with negative emotions ($\beta = -0.68$; $p < 0.001$), while external motivation showed only a weak correlation with positive emotions ($\beta = 0.07$; $p < 0.001$) and did not correlate significantly with negative emotions. R.K. Dishman *et al.* (2018) tracked 260 adolescents from grades 6 to 9 and found an annual decline in all forms of motivation, including intrinsic motivation (-0.100 units per year), integrated regulation (-0.138), identified regulation (-0.104), introjected regulation (-0.089), and external regulation (-0.095). Physical activity declined less in adolescents who maintained higher levels of intrinsic motivation or integrated regulation, but only if they maintained a high level of enjoyment goals compared to other students, confirming the interaction between the quality of motivation and the content of goals as a modifier of the effect. R. de Oliveira Barbosa *et al.* (2024) surveyed 553 Brazilian adolescents aged 12-15 and found that autonomous motivation mediated 25% of the association between parental support and physical activity, 38% of the relationship between the satisfaction of basic psychological needs by peers, 83% by teachers, and 70% between the perception of the environment and activity. Autonomy, competence, and relatedness, which formed the core of self-determination theory, influenced motivation by creating an environment

that satisfied these needs: support for autonomy by physical education teachers positively predicted the satisfaction of psychological needs ($\beta = 0.81$; $p = 0.001$), which in turn strengthened intrinsic motivation and indirectly increased the levels of physical activity among adolescents aged 12-17.

Gender differences in body perception were found to be significant predictors of motivational attitudes. K. Sick *et al.* (2025) in a longitudinal study of Canadian adolescents ($n = 7,884$; 52.2% girls; mean age 14.4 years) demonstrated that a positive self-concept and perception of physical attractiveness in 9th grade predicted continued participation in physical education in 10th grade, predominantly among boys. For boys, each unit increase in global self-concept predicted a 4% increase in the likelihood of continuing physical education ($OR = 1.04$; 95% CI : 1.01-1.07; $p < 0.05$), while for girls this effect was statistically insignificant ($OR = 1.02$; $p > 0.05$). With regard to the perception of physical attractiveness, girls and boys showed gender differences: boys who reported the most positive perception of their own appearance were 12% more likely to continue physical education than their peers who expressed dissatisfaction with their appearance ($OR = 1.12$; 95% CI : 1.02-1.22; $p < 0.05$), while for girls this relationship remained statistically insignificant.

S. Pavlović *et al.* (2025), in a study of 398 pupils of secondary educational institutions aged around 10 years, identified gender differences in the relationship between physical self-concept and physical activity. Among boys, the highest levels of activity during physical education lessons were associated with higher perceived sports competence ($M = 3.86$, $SD = 0.47$ in the most active group compared with $M = 2.19$, $SD = 0.88$ in the low-activity group; $p = 0.01$), whereas gender differences were evident in that girls with the highest activity levels showed higher ratings of satisfaction with their physical appearance ($M = 3.94$, $SD = 0.61$ compared with $M = 3.12$, $SD = 0.39$ in the low-activity group; $p = 0.01$), with no significant differences in perceived sports competence. Intrinsic motivation was found to be strongly associated with activity: in the most active group, boys demonstrated a score of 5.29 ($SD = 0.39$) compared with 3.66 ($SD = 0.36$) in the low-activity group, while among girls the corresponding values were 5.11 ($SD = 0.13$) and 3.92 ($SD = 0.75$).

Fear of failure and achievement striving proved to be critical motivational factors in adolescent sport.

M.J. Schmid *et al.* (2021), in a longitudinal study of 155 young individual-sport athletes (mean age 16.47 years), traced the relationship between motivational patterns and subsequent sporting success over a period of 2.5 years. Athletes with high intrinsic achievement motivation who simultaneously demonstrated low levels of fear of failure had twice the likelihood of competing at the international level compared with the control group ($OR = 2.12$; 95% CI : 1.03-4.33; $p < 0.05$). In contrast, athletes characterised as “fear-of-failure athletes” showed a significantly lower probability of reaching the highest level of competition ($OR = 0.29$; 95% CI : 0.11-0.82; $p < 0.05$). Mean fear-of-failure scores in the group of fear-of-failure athletes were 1.12 ($SD = 0.57$), whereas in the most successful group this indicator was only 0.14 ($SD = 0.22$), demonstrating a substantial difference in motivational profiles. Q. Hu *et al.* (2023), in a study examining the impact of coaching style on fear of failure in 252 active athletes, found that a controlling coaching style was negatively correlated with satisfaction of basic psychological needs ($r = -0.356$; $p < 0.001$) and positively correlated with controlled attachment to sport ($r = 0.364$; $p < 0.001$), which in turn strongly predicted fear of failure ($\beta = 0.28$; $p < 0.001$). Satisfaction of basic psychological needs demonstrated a powerful protective effect against fear of failure ($\beta = -0.36$; $p < 0.001$), with this effect being mediated through a reduction in controlled attachment. The model showed that basic psychological needs and controlled attachment mediated 71.18% of the total effect of coaching style on fear of failure (95% CI : 0.395-0.899). Gender differences in the manifestation of fear of failure were also substantial. F. Ahmedov *et al.* (2025), in a study of 279 athletes aged 12-29 years, identified a strong positive correlation between pre-competition anxiety and fear of failure across all groups ($r > 0.50$); however, boys demonstrated higher levels of both pre-competition anxiety and fear of failure compared with girls, with psychological difficulties intensifying with age. The evidence points to a complex interaction between intrinsic and extrinsic motivational factors regulating adolescents’ participation in physical activity, with different types of motivation exerting differentiated effects on behaviour and sport commitment. Below, in Table 1, a structured classification of the main motivational factors influencing adolescents’ physical activity is presented, with an emphasis on their psychological content and methods of enhancement.

Table 1. Classification of motivational factors of adolescents’ physical activity by psychological content

Type of motivation	Psychological basis	Manifestations in adolescents	Stability of the motive	Methods of enhancement
Intrinsic process-oriented	Enjoyment of the process	Joy derived from movement and play	High	Variety of exercises
Intrinsic outcome-oriented	Goal achievement	Improvement of performance	Moderate	Goal setting
Extrinsic social	Recognition by others	Approval from peers	Low	Group-based training
Extrinsic material	Rewards	Prizes, certificates	Very low	Reward systems
Health-related motivation	Concern for health	Disease prevention	Moderate	Educational programmes
Social-communicative	Communication	Friendship, team involvement	High	Team sports
Aesthetic	Physical beauty	Body shaping	Moderate-high	Fitness, dance

Source: developed by the authors based on research by D. M. Litt *et al.* (2011), J. Martins *et al.* (2021), L. Liu *et al.* (2025)

As a conclusion drawn from Table 1, there is a qualitative difference between intrinsic and extrinsic motives in terms of their stability and psychological consequences, since intrinsic process-oriented and social-communicative

motivation show the highest stability precisely because they satisfy the fundamental psychological needs for autonomy, competence and relatedness. In contrast, extrinsic material motivation proves to be the least stable, as it does not

engage deep psychological mechanisms of self-regulation and is easily displaced when external conditions change. Equally important is the relationship between the type of motivation and adherence to participation: when adolescents are motivated by intrinsic factors (enjoyment of movement, attainment of competence, social interaction), they demonstrate a higher proportion of long-term engagement in physical activity and lower dropout rates from sport, whereas reliance on material rewards often leads to a phenomenon of “demoralisation”, whereby the cessation of rewards causes a sharp decline in motivation even when initial interest was present. A further notable feature is that aesthetic and health-oriented motivation occupy an intermediate position, combining elements of intrinsic enjoyment with the pursuit of external outcomes. This indicates that the most effective programmes for promoting physical activity should integrate several types of motivation simultaneously, particularly taking into account the needs for competence and relatedness as key drivers of behavioural change in adolescents.

S.G. Goddard *et al.* (2025) presented a structured goal-setting approach based on the principles of specificity, measurability, attainability, relevance and time limitation. Goal specificity enabled adolescents to clearly understand the targeted aspects of sporting activity. Measurability ensured objective assessment of progress and the provision of positive feedback on achievements. Personalisation of goals on the basis of existing capabilities and individual interests was associated with increased intrinsic motivation among adolescents who set individual goals aimed at a 5-10% improvement relative to their own baseline, rather than normative benchmarks. K.R. Ylitalo *et al.* (2023), in a study of 151 adults, identified an association between self-regulatory strategies and physical activity levels at follow-up: each one-unit increase in a self-regulation strategy score was associated with an additional 20.5 MET-minutes (metabolic equivalent of task) of daily physical activity ($b = 20.5$; $SE = 9.8$; $p = 0.04$), after adjustment for age, sex and baseline physical activity levels. Self-monitoring of physical activity, goal setting and self-reward constituted the self-regulation strategies showing the greatest frequency of change from baseline to follow-up.

C.B. Phillips *et al.* (2020), in a study of 85 adults, identified a moderating role of delay discounting in the effectiveness of financial incentives for increasing physical activity. Delay discounting indices ranged from a log geometric mean k of -8.75 to -1.39 ($M = -4.93$; $SD = 1.60$). At the lowest levels of delay discounting, the difference in effect between immediate and delayed rewards amounted to 3,105 steps per day from baseline to the intervention phase ($b = 3,105$; $p = 0.004$), whereas at the highest levels this difference was 2,698 steps per day ($b = 2,698$; $p = 0.012$). Delay discounting indices were negatively correlated with age ($r = -0.32$ among younger individuals). S. van de van de Groep *et al.* (2023), in a neuroimaging study of 96 adolescents aged 10.16-20.21 years, identified age-related differences in temporal discounting of rewards. Younger adolescents demonstrated higher levels of delay discounting, whereas older adolescents showed a greater willingness to wait for larger delayed rewards. The area under the curve as a measure of temporal discounting was higher in older adolescents ($F(1,94) = 7.20$; $p = 0.009$; partial $\eta^2 = 0.07$), indicating lower

impulsivity. Social context modified temporal discounting: when choices involved an immediate reward for a friend compared with a delayed reward for oneself, the area under the curve (AUC) was 0.52 ($SD = 0.24$), which was significantly lower than in conditions where rewards concerned only the individual (AUC = 0.58; $SD = 0.25$; $p = 0.002$). Activation in the subgenual anterior region and the ventral striatum was positively correlated with impulsivity in the choice of immediate rewards.

J.B. Courtney *et al.* (2021) conducted a longitudinal study of a nationally representative sample of 2,785 American adolescents from 11th grade to four years after graduation to determine the dynamics of physical activity and the role of motivation in its planning. Physical activity decreased by 0.31 days per week from 11th grade to the first year after graduation ($b = -0.31$; $\beta = -0.22$; $p < 0.001$), but did not change significantly from the first to the fourth year after graduation ($b = -0.08$; $\beta = -0.04$; $p = 0.052$). Autonomous motivation was positively associated with physical activity throughout the study period ($b = 0.23$ - 0.33 ; $\beta = 1.90$ - 4.37 ; $p < 0.001$). Planning physical activity directly correlates with its implementation ($b = 0.44$; $\beta = 0.21$; $p < 0.001$) with individual variability of the effect. R.K. Dishman *et al.* (2018) in a prospective study of 187 adolescents from grades 5 to 11 established the modifying role of self-efficacy in relation to changes in goals and beliefs about the necessity of physical activity. Physical activity was more limited in students who had decreased self-efficacy and: retained limiting beliefs about physical activity, were not sufficiently motivated to improve their physical fitness, or had improved body composition and expanded social circles. The interaction between changes in self-efficacy and changes in the perception of limiting factors was significant ($z = 4.30$; $p < 0.001$), as was the interaction between changes in self-efficacy and goals for improving appearance ($z = 10.63$; $p < 0.001$). Students with greater declines in self-efficacy and low motivation to improve physical fitness showed greater declines in physical activity. A. Deng *et al.* (2023) in a 16-week study of 113 low-income American adolescents (55.64% girls; mean age 11.29 years) found that physical activity increased by an average of 6.36 minutes per 8 weeks (coefficient = 6.36; $p < 0.001$), with a total increase of approximately 12.72 minutes over 16 weeks. Change in intrinsic motivation was a significant positive predictor of change in daily high-intensity physical activity (coefficient = 2.57; $p = 0.035$), while change in autonomous extrinsic motivation was not a significant predictor ($p = 0.473$). Gender and race/ethnicity had a negligible effect on the rate of change in physical activity during the study (gender $p = 0.067$; race $p = 0.79$), indicating similar rates of improvement in physical activity across all groups.

Thus, adolescents' motivation to engage in regular physical activity is shaped by a complex interaction of internal psychological mechanisms and external contextual factors, where the satisfaction of basic psychological needs for autonomy, competence, and social belonging is a fundamental prerequisite for the development of sustainable motivational patterns. Empirical data demonstrate the qualitative superiority of autonomous forms of motivation over controlled ones in predicting long-term commitment to physical activity, especially when different types of motives are harmoniously integrated and aligned with

individual psychological characteristics, including physical self-concept, body image, and gender-specific motivational profiles. At the same time, the effectiveness of motivational interventions is largely determined by the level of development of adolescents' self-regulatory competencies, in particular, their ability to adaptively set goals, plan and self-monitor, which reveal age dynamics and sensitivity to the social context, which needs to be taken into account when developing differentiated physical education programmes for different age groups of adolescents.

Socio-cultural and environmental factors influencing the motivational sphere of adolescents

L. Liu *et al.* (2025) in a study of 1,286 schoolchildren from different regions of China found parental expectations to be a significant positive predictor of adolescent sports activity ($\beta = 0.208$; $t = 7.634$; $p < 0.001$). The effects of parental expectations differed depending on the components of physical activity: the strongest influence was on the frequency of training ($\beta = 0.238$; $p < 0.001$), slightly weaker on intensity ($\beta = 0.202$; $p < 0.001$) and the smallest on the duration of training ($\beta = 0.184$; $p < 0.001$). Parental expectations explained about 5.7% of the variance in adolescents' sports activity ($R^2 = 0.057$), exerting their influence on motivation indirectly through the satisfaction of basic psychological needs. The sequential mediating effect of parental expectations regarding physical activity through the satisfaction of basic needs and motivation to exercise was 0.052, representing 24.88% of the total effect. According to Y. Jiang & Y. Xiao (2024), based on a sample of 500 adolescents and their parents, family influence on children's physical activity had a direct positive effect on regular physical exercise ($\beta = 0.148$; effect size = 32.81%). The satisfaction of basic psychological needs mediated 25.05% of this influence ($\beta = 0.113$), while the satisfaction from performing exercises additionally mediated 20.39% ($\beta = 0.092$). The sequential mediating effect through self-efficacy and enjoyment of

exercise was 0.097 (effect size = 21.50%), revealing a multi-level mechanism of the family environment's influence on the duration of physical activity in adolescents. The family environment influenced both the immediate behaviour model and internal psychological mechanisms.

Gender-specific mechanisms of parental influence can be traced in a study by Y. Yaffe & O. Levental (2023) on a sample of 308 adolescents (143 boys, 165 girls). An authoritarian parenting style was associated with higher autonomous motivation in adolescents indirectly through parental physical activity practices ($\beta = 0.26$; $p < 0.05$), including modelling, encouragement and monitoring. The authoritarian parenting style demonstrated a similar, albeit smaller, positive effect on boys' motivation to engage in physical activity ($\beta = 0.18$; $p < 0.05$). The indirect relationship between paternal authoritarian parenting and adolescents' motivation for physical activity through parental practices was significantly stronger for girls ($\beta = 0.31$) than for boys ($\beta = 0.22$). D.J. Phipps *et al.* (2025), based on data from 88 Finnish parent-child pairs, found that parental autonomous motivation was positively associated with parental autonomous support ($\beta = 0.34$; $p < 0.01$), which, in turn, predicted children's perception of autonomous support ($\beta = 0.41$; $p < 0.001$) and children's autonomous motivation ($\beta = 0.28$; $p < 0.01$). The indirect effect of parental autonomous motivation on children's physical activity, mediated by parental autonomous support, children's perception of such support, and children's autonomous motivation, was 0.039 (95% CI: 0.018-0.062; $p < 0.001$). Parental autonomous motivation was positively associated with both parental physical activity ($\beta = 0.47$; $p < 0.001$) and joint parental-child physical activity ($\beta = 0.29$; $p < 0.01$), forming a mechanism for the transmission of motivational patterns within the family. Table 2 below summarises the main levels of socialisation influence on adolescent physical activity, demonstrating their agents, nature of action, and factors that can both strengthen and weaken motivation for physical activity.

Table 2. Multilevel system of social factors shaping adolescents' motivation for physical education

Level of influence	Agents of socialisation	Mechanisms of influence	Positive factors	Negative factors	Degree of influence (%)
Micro level (family)	Parents, siblings, relatives	Modelling, reinforcement, family support and expectations	Joint training, emotional and material support, positive family expectations regarding health	Parental indifference, criticism, excessive demands without support	35-42%
Meso level (education)	Physical education teachers, coaches, specialists	Teaching motor skills, motivation, informational support of competence	Professionalism of the teacher, enthusiasm, a supportive class atmosphere	Formalism, coercion, poor-quality conditions, insufficient number of sessions	22-28%
Meso level (peers)	Friends, team members, classmates, social networks	Group pressure, social identification, imitation, emotional support	Friendly environment, positive competition, sense of belonging	Bullying, social exclusion, negative group dynamics	18-24%
Macro level (media and promotion)	Bloggers, media personalities, advertising campaigns, social media	Information provision, promotion, formation of norms and standards, demonstration of role models	Positive role models, promotion of a healthy lifestyle, viral motivation	Unrealistic standards of beauty, cult of appearance, pressure towards perfection	9-16%
Macro level (public policy)	Government bodies, sports policy, local authorities	Creation of a regulatory environment, ensuring accessibility, regulation of conditions	Accessible gyms and swimming pools, infrastructure development, national programmes	Underfunding, weak infrastructure, formalism in programmes	5-12%

Table 2, Continued

Level of influence	Agents of socialisation	Mechanisms of influence	Positive factors	Negative factors	Degree of influence (%)
Mega level (culture and values)	Society, cultural norms, traditions, mass media	Formation of values and norms, construction of desired behaviours	Cult of health, traditions of physical culture, support of sport as part of identity	Cult of consumption, sedentary lifestyle, low social value of physical activity	2-6%

Source: developed by the authors based on research by L. Liu *et al.* (2025), Z. Li *et al.* (2025), S. Ge *et al.* (2025)

The hierarchy of social influence shown in Table 2, where the family environment demonstrated an almost threefold predominance over state policy and cultural norms, reflected the decisive role of parents as primary agents of socialisation in shaping motivational attitudes in the early stages of development. Positive and negative factors at each level functioned asymmetrically: parental criticism and lack of support influenced the overall picture of motivation, while the professionalism of the coach modified the motivational profile in the direction of competence development. The indirect systemic influence of macro levels (state, media, culture) worked through the transformation of microsystems: state policy on the accessibility of sports facilities influenced the physical activity of adolescents mainly through the expansion of opportunities for family activities and interactions with peers, rather than as an autonomous factor. The research results indicated that strategies to increase motivation for physical activity involved strengthening family and peer support as fundamental structures, while state and media interventions were effective in combination with improvements in the microsocial context.

Current pedagogical approaches have shown differentiated effects on the motivation of different groups of adolescents. H. Zha *et al.* (2025) found in a study of 929 primary school students in southwestern China that cognitive activation teaching strategies (CATS) had a positive effect on physical activity ($\beta = 0.133$; $p < 0.001$) and health-related behaviour ($\beta = 0.087$; $p < 0.001$). Classroom engagement mediated this relationship, with a coefficient from cognitive activation to engagement of $\beta = 0.270$ ($p < 0.001$). Self-efficacy showed the strongest mediating effect, predicting both health-promoting behaviour ($\beta = 0.209$; $p < 0.001$) and physical activity ($\beta = 0.310$; $p < 0.001$). Cognitive activation predicted motivation ($\beta = 0.287$; $p < 0.001$) but did not significantly affect emotional regulation ($\beta = 0.039$; $p = 0.183$). Qualitative data revealed that teachers who used cognitive activation, goal setting, progressive challenges, and constructive feedback contributed to the creation of “productive conflict” in learning. Traditional teaching methods had negative consequences for the formation of positive motivation. A. Hoyo-Guillot *et al.* (2025) conducted an experimental study of 127 students who were divided into groups where sports education models (SEM; $n = 63$) and traditional methods (TM; $n = 64$), found that traditional methods were associated with a deterioration in prosocial values, in particular, positive assessment of others ($p = 0.037$; Cohen's $d = 0.311$). In addition, the TM group showed a significant decrease in the perception of the usefulness of physical education ($p = 0.016$; Cohen's $d = 0.455$), indicating demotivation associated with authoritarian teaching methods. In contrast, the SEM group showed an increase in three prosocial dimensions: giving ($p = 0.015$; Cohen's

$d = 0.474$), verbal comforting ($p = 0.019$; Cohen's $d = 0.333$) and solidarity ($p = 0.039$; Cohen's $d = 0.328$).

Innovative educational practices based on self-determination theory have successfully increased adolescents' interest. H. Paap *et al.* (2025) developed and described a longitudinal study that combined face-to-face and web-based support for the needs of autonomy, competence, and relatedness in physical education teachers. The study involved selecting 78 pupils in the first phase and 116 pupils in the second phase, with accelerometer measurements taken at baseline, after one month and after three months. It was expected that students in the experimental group would demonstrate significantly higher intrinsic motivation for physical activity and greater physical activity, as measured by accelerometers, compared to the control group. Teachers were provided with detailed materials on 9 specific behaviours related to supporting needs and 13 behaviours related to common threats to needs, developed based on the taxonomy of A. Ahmadi *et al.* (2023) and adapted to the context of physical education. Teachers completed weekly reports on providing support for realisation needs and avoiding common behaviours, demonstrating a systematic approach to transforming pedagogical practice.

Peer support is a powerful social factor in motivating adolescents to engage in regular physical activity, exerting its influence through multiple psychological mechanisms. Y. Zou *et al.* (2023) in a study of 2,087 adolescents in Shanghai found a direct positive effect of peer support on adherence to physical exercise ($\beta = 0.135$; $p < 0.001$; effect size 59%), mediated through self-efficacy and self-regulation. Peer support predicted self-efficacy with a coefficient of $\beta = 0.493$ ($p < 0.001$), which accounted for 42% of the indirect effect on adherence to physical exercise. The pedagogical model, peer encouragement, and joint participation in physical activity were the most significant components of support. Correlation analysis demonstrated a significant positive relationship between peer support and physical exercise ($r = 0.324$; $p < 0.01$), with a stronger effect in younger adolescent boys than in girls. Digital technologies have transformed traditional mechanisms of social influence, creating new forms of group interaction around physical activity. M. Zhang & X. Li (2024) found in a study of 1,312 Chinese adolescents that the use of the WeRun app was associated with healthy lifestyle behaviours indirectly through social support and social comparison, with no direct effect ($\beta = 0.018$; $p = 0.455$). Social support mediated 43.1% of the relationship between app use and healthy lifestyle behaviour ($B = 0.431$; $t = 7.183$; $p < 0.001$), while social comparison mediated 29.9% of this relationship ($B = 0.299$; $t = 6.102$; $p < 0.001$). The use of gamified elements, including leaderboards and likes, stimulated both competitive motivation and social support among users. WeRun had a positive effect on social support ($\beta = 0.262$; $t = 9.807$; $p < 0.001$)

and social comparison ($\beta = 0.300$; $t = 11.426$; $p < 0.001$), demonstrating the role of online communities in shaping motivation for physical activity.

Fitness influencers on social media function as a specific form of social modelling of behaviour that exhibits gender-differentiated effects. J. Durau *et al.* (2022) in two consecutive studies ($N_1 = 507$; $N_2 = 445$) found that the perceived motivational power of fitness bloggers was a stronger predictor of intention to exercise than attitude towards the blogger in both genders (women $\gamma = 0.541$, $p < 0.01$; men $\gamma = 0.518$, $p < 0.01$). Women who had a negative body perception showed an increase in their intention to exercise after watching the blogger's video ($\gamma = -0.180$; $p < 0.05$), but this effect was not found in men ($\gamma = -0.068$, n.s.). The blogger's reliability, knowledge, and attractiveness had a positive effect on perceived motivational force, with reliability being the strongest predictor for women ($\gamma = 0.379$, $p < 0.01$) and knowledge for men ($\gamma = 0.413$, $p < 0.01$). Engagement in training with YouTube fitness videos positively predicted the intention to exercise for both genders (women $\gamma = 0.431$, $p < 0.01$; men $\gamma = 0.426$, $p < 0.01$). Peer pressure and social norms modify adolescents' motivational profiles, creating differentiated patterns of engagement in physical activity. Y. Zhao *et al.* (2025) in a study of 571 Chinese adolescents aged around 12 years found that latent profile analysis revealed three motivation profiles: low motivation with high amotivation (8.45%), moderate motivation with high amotivation (60.61%), and high autonomous motivation (30.94%). The third profile showed significantly higher physical activity ($M = 0.176$; $SD = 0.893$) compared to the first profile ($M = -0.309$; $SD = 0.707$; $p < 0.001$) and the second profile ($M = -0.153$; $SD = 0.747$; $p < 0.001$). External regulation (which may reflect peer pressure and social norms) was positively correlated with physical activity ($r = 0.133$; $p < 0.001$), although this effect was weaker compared to internal motivation (r ranged from 0.152 to 0.172, all $p < 0.001$). Boys demonstrated significantly higher physical activity compared to girls ($F(3,364) = 4.714$; $p = 0.030$), indicating gender differences in sensitivity to group influences.

Thus, the formation of adolescents' motivation for systematic physical education takes place in a multi-level system of social influences, where the family environment functions as the main agent of primary socialisation through the mechanisms of parental expectations, behaviour modelling and autonomous support, mediating its influence through the satisfaction of basic psychological needs and the formation of self-efficacy. The pedagogical influence of physical education teachers is implemented differentially depending on the chosen methodological approaches: transformational teaching style and cognitive activation strategies enhance intrinsic motivation by creating a task-oriented climate and supporting competence, while traditional authoritarian methods provoke demotivation and a deterioration of prosocial values. Peer support and digital forms of social interaction create additional channels of motivational influence through mechanisms of social comparison, group identification and behaviour modelling, with their effectiveness showing gender and age specificity, while macro-level factors (government policy, media, cultural norms) exert their influence mainly indirectly through the transformation of micro-social contexts,

indicating the need for integrated multi-level interventions to increase adolescents' motivation for physical activity.

Pedagogical technologies and methodological tools for stimulating adolescent motivation for physical culture and sports activities

M. Wang *et al.* (2025) in a meta-analysis of 16 randomised controlled trials with a total sample of 7,472 children and adolescents found that gamified interventions significantly increased moderate-intensity physical activity compared to control (standardised mean difference [SMD] 0.15; 95% CI 0.01-0.29; $p = 0.04$) and reduced body mass index (SMD 0.11; 95% CI 0.05-0.18; $p < 0.001$). However, gamified interventions did not have a statistically significant effect on sedentary behaviour (SMD 0.07; 95% CI -0.07-0.22; $p = 0.33$), daily locations (SMD 0.22; 95% CI -0.51-0.94; $p = 0.55$) or light physical activity (SMD -0.00; 95% CI -0.49-0.48; $p = 0.99$). Subgroup analyses revealed that self-determination theory-based interventions demonstrated a stronger effect on moderate-intensity activity (SMD 0.39; 95% CI 0.01-0.77; $p = 0.04$) compared to other theoretical paradigms. Studies lasting more than 12 weeks had a greater effect compared to shorter programmes. Virtual reality functioned as a promising technology for expanding access to physical activity and increasing motivation. Đ. Hajder *et al.* (2025) found in a systematic review and meta-analysis of 23 studies that virtual reality training significantly improved flexibility, motivation, and cognitive abilities, especially in populations with limited access to traditional exercise methods. The most pronounced effects were observed in programmes lasting 8-12 weeks with moderate to high intensity. Statistical analysis showed highly significant improvements in physical fitness ($M \pm SD = 74.3 \pm 8.2$; $p = 0.0029$), cognitive aspects ($M \pm SD = 82.1 \pm 6.7$; $p = 0.0022$) and health aspects ($M \pm SD = 77.5 \pm 7.9$; $p = 0.0069$). The effect sizes for virtual reality interventions ranged from 0.38 to 0.75 (Cohen's d), indicating moderate to large positive effects. Organising classes individually and in groups revealed differentiated effects depending on the motivational profile of adolescents. D. Novak *et al.* (2025) found in a randomised controlled trial of 976 Croatian students (mean age 19.4 ± 1.1 years) that group training significantly increased total physical activity time by more than 10 metabolic equivalent hours per week compared to individual exercise in the control group. When considering different types of activity, the effect of the intervention was stronger for vigorous activity (an increase of almost 6 MET hours per week) compared to walking (2.5 MET hours per week). Complex modelling of heterogeneity showed significantly greater variability in the experimental group, indicating a heterogeneous effect of physical activity and the possibility of different effects for adolescents with different initial levels of motivation. The use of fitness trackers and mobile applications demonstrated an indirect mechanism of influence on motivation through social comparison and support. W.W. Au *et al.* (2024) found in a meta-analysis of 30 studies that wearing a tracker contributed to an increase in moderate-intensity physical activity in children and adolescents. The effectiveness of wearing a tracker depended on the age of the participants: in adolescents over 13 years of age, the effect was greater through the mediation of self-control and goal setting, while in younger participants,

the effect was greater through peer support and family encouragement. Interventions lasting more than 12 weeks showed more sustainable results, while programmes that integrated wearables with multi-component interventions (including behavioural strategies and professional support) showed stronger and more lasting effects.

Emotional experiences during physical education classes mediate between the type of motivation and behavioural consequences. M.E. Işıkgöz (2025) found in a study of 1,399 Turkish high school students that intrinsic motivation showed the strongest links with positive emotions of achievement, particularly pride ($r = 0.73$; $p < 0.001$) and satisfaction ($r = 0.55$; $p < 0.001$). In the structural equation analysis, intrinsic motivation positively contributed to the emergence of positive emotions of achievement ($\beta = 0.63$; $p < 0.001$) and the disappearance of negative emotions ($\beta = -0.68$; $p < 0.001$). External motivation showed a weak positive correlation with positive emotions ($\beta = 0.07$; $p < 0.001$), while no significant correlation with negative emotions was found ($\beta = -0.02$; $p = 0.130$). The study found that constructive feedback and support for autonomy by physical education teachers were key mechanisms for satisfying the need for competence and autonomy, which led to the formation of intrinsic motivation and positive emotions of achievement. Innovative pedagogical approaches that give students more time for practical activities and independent study of the material show potential for enhancing autonomous motivation. P.K. Yip *et al.* (2023) found in a randomised controlled study of 111 young people that a “flipped learning” approach, in which students watched videos before class and had more time for practice in class, led to significantly higher autonomous motivation and moderately intense physical activity. In the experimental group, where the “flipped learning” approach was used, autonomous motivation before the third lesson was $M = 3.28$ ($SD = 0.66$) compared to the control group ($M = 3.24$; $SD = 0.61$). In the third lesson, the positive correlation between moderate-intensity physical activity and autonomous motivation was $r = 0.266$ ($n = 57$; $p < 0.05$) only in the experimental group. With an intervention duration of more than 12 weeks, the results remained stable, indicating that systematic feedback and activity choice increased long-term motivation.

Empirical studies reveal the nuances of the perception of autonomy and its impact on the long-term engagement of adolescents in physical activity. A. Beddoe *et al.* (2025) found in a qualitative study of 13 British male adolescents aged 13-17 that perceived autonomy was associated with motivation to participate in physical activity. Boys who received autonomous support from parents and coaches, including choice of activity and flexibility in goal setting, reported higher intrinsic motivation. In particular, respondents noted the availability of certain types of activities (e.g., running) that did not require special equipment or space as important factors in maintaining motivation. In contrast, boys who were constrained by rigid expectations either stopped physical activity or sought alternative activities. Participants reported discontinuing team sports due to feelings of coercion, excessive training duration, and loss of energy during activities that did not match their interests. The study found that praise for effort and constructive criticism, rather than praise for ability, were associated

with increased intrinsic motivation and long-term engagement. The competitive context of physical activity modifies motivational patterns depending on the balance between competitive and cooperative elements. M. del Mar García-Galán *et al.* (2025) found in a study of 240 Spanish students that a competitive approach to physical activity correlated with stronger commitment to both competitiveness and cooperativeness, but with a more noticeable concentration on higher levels of cooperativeness. Group activities such as sports and board games showed a stronger positive effect on cooperativeness (regression coefficients $\beta = 0.195$ and $\beta = 0.255$, respectively; $p < 0.0001$), while video games, which are more competitive in nature, had no statistically significant relationship with cooperativeness ($\beta = 0.066$; $p = 0.08$). A blurred approach in team sports activated both motivational systems with a higher level of team interaction and mutual support than in individual sports. The study found that properly formulated feedback with an emphasis on effort and group achievements strengthened achievement motivation in group activities.

The problem of getting teenagers involved in regular sports and physical education remains relevant in the context of high dropout rates, especially among girls. Y. Zhang *et al.* (2024) found in a systematic review of 11 studies that the main reasons for adolescents discontinuing sports activities included both psychological and structural factors. At the psychological level, perceptions of ability to succeed functioned as productive factors, while their absence predicted a higher likelihood of discontinuing participation. The study found that gender differences in discontinuing sports were significant, with higher rates among girls than boys. Coach leadership and the quality of the motivational climate determined critical factors: autonomous support, as opposed to a controlling style, was associated with a higher likelihood of continuing to participate in sports. Parental and peer support functioned as a significant protective factor in 60% of studies, demonstrating the consistent influence of the social system on retaining adolescents in sport. Physical activity is particularly important for adolescents with chronic diseases, where motivational barriers are combined with medical restrictions and social stigmatisation. B. Sañudo *et al.* (2024) in a systematic review of 52 controlled studies on a total sample of 2,352 children and adolescents with chronic diseases found that sports activities effectively improved both physical and psychosocial outcomes. The studies covered interventions for autism, cerebral palsy, AIDS (acquired immunodeficiency syndrome), obesity, cancer, and other chronic diseases. The average adherence was about 85%, with studies reporting adherence ranging from 75% to 100%. Psychosocial outcomes showed improvements in behavioural problems, social skills, executive functions, and health-related quality of life. Activities that included group sports and team interaction showed additional benefits in social integration and team building. The study emphasised that programmes lasting 8-12 weeks and occurring 2-3 times per week demonstrated an optimal balance between accessibility and effectiveness.

Long-term adapted physical activity programmes reveal specific strategies for preventing demotivation in vulnerable adolescent groups. N. Stöcker *et al.* (2024) in the KidsTUMove project described a comprehensive physical

activity programme for children and adolescents with chronic diseases, which was developed over 17 years (since 2007) with the participation of more than 2,750 children. Preliminary studies indicated that the WHO (World Health Organisation) recommendations for 60 minutes of daily physical activity and improved quality of life were achieved. The programme provided multidisciplinary supervision, including preliminary medical examinations, medical care and direct supervision during classes. Strategies to prevent demotivation included personalised support in small groups, parental involvement, establishing social contacts with peers with similar problems, and providing a variety of activities without pressure to perform. The study showed that participation in camps and regular groups was associated with a sustained improvement in self-esteem, reduced isolation, and the development of a sense of belonging to the community. Organised sports participation functions as a tool for social integration for adolescents from disadvantaged socio-economic backgrounds. T. Filges *et al.* (2024) conducted a systematic review of 13 studies of organised sports activities for low-income and at-risk youth and found that participation in sports activities had a positive impact on psychosocial functioning. The standardised mean difference for overall psychosocial adjustment at post-intervention was 0.70 (95% CI 0.28-1.11), with low heterogeneity. For depressive symptoms at 0-3 years follow-up, the standardised mean difference was 0.02 (95% CI -0.01-0.06), indicating a weak effect. The median number of participants in the studies was 316, ranging from 95 to 222. Interventions lasted from one week to 23 years, but most focused on short-term effects. The study emphasised that organised sports participation served as a resource for levelling risky and problematic behaviour in adolescents with unfavourable background circumstances. In addition, sports programmes with an emphasis on teamwork, social skills and positive responsibility showed greater effects on reducing problem behaviour and improving emotional functioning.

Thus, current pedagogical technologies for stimulating adolescents' motivation to engage in physical education and sports activities demonstrate the highest effectiveness when digital tools (gamification, virtual reality, fitness trackers) with the principles of self-determination theory, especially for programmes lasting more than 12 weeks, which ensures sustainable behavioural changes through mechanisms of self-control, social comparison and autonomy support. The organisational forms of classes have different effects depending on the motivational profile: group training mainly activates both competitive and cooperative motivational systems, enhancing social integration and team interaction, while individualised approaches with a choice of activities and flexible goal setting provide higher intrinsic motivation by satisfying the need for autonomy and competence. A critical factor in engaging adolescents in systematic exercise is the creation of a supportive motivational climate through transformational leadership by coaches, constructive feedback with an emphasis on effort and progress, and the involvement of parents and peers as agents of social support, which is particularly important for vulnerable groups, including adolescents with chronic diseases and adverse socio-economic status, where adapted programmes with personalised support demonstrate high

adherence rates (up to 85%) and comprehensive psychosocial effects alongside physical improvements.

Comprehensive recommendations

for motivating adolescents to engage in physical activity

The results of the analysis of scientific sources allowed to formulate a set of recommendations aimed at improving the effectiveness of motivating adolescents to engage in physical culture. These recommendations were based on the principles of contemporary psychology of motivation and physical education pedagogy and took into account the age-related features of the psychophysiological development of individuals aged 12-17. The organisation of the physical education teaching process requires the creation of conditions to satisfy the need for autonomy by providing the opportunity to choose the type of physical activity, the pace of exercise and the level of difficulty of the tasks. The implementation of the principle of variability involves the development of modular programmes in which the basic component is combined with elective areas. The need for competence is met through a system of graded tasks using physical fitness testing and a differentiated approach to the organisation of the educational process. S. Pavlović *et al.* (2025) found that among boys, the highest activity during physical education classes was associated with a higher perception of sports competence ($M = 3.86$, $SD = 0.47$ in the most active group compared to $M = 2.19$, $SD = 0.88$ in the least active group; $p < 0.001$), which indicates the importance of creating conditions for a sense of effectiveness in one's own activities. Working at an appropriate level of difficulty contributes to the accumulation of positive experiences of success and an increase in self-perceived competence. Feedback from the teacher should focus on the efforts made, the strategies used, and the progress made in relation to the student's previous results. A. Beddoe *et al.* (2025) showed that praise for effort and constructive criticism were associated with increased intrinsic motivation and long-term engagement, while praise for ability could lead to avoidance of challenges. Peer teaching, where more experienced students help less prepared ones, simultaneously satisfies the needs for competence and belonging of both parties involved.

The use of fitness trackers allows teenagers to monitor their own progress in objective terms, which increases their awareness of the effectiveness of training. Gamification of the learning process through the introduction of a system of points and achievement levels appeals to the interest in game mechanics inherent in adolescence, but should be accompanied by a gradual transition from external to internal motivators. Educational programmes for parents should focus on making them aware of the role of their own behaviour as a model for their children. Family physical activity creates a norm of healthy living and associates physical activity with positive emotions. Parental support should take the form of an autonomous style that recognises the adolescent's right to their own sporting preferences and emotional support. A controlling style has been associated with increased anxiety and a greater likelihood of giving up sport.

At the organisational level of educational institutions, it is necessary to rethink the content of physical education lessons by integrating various types of physical activity,

including the latest fitness trends, functional training, dance programmes and non-traditional sports. Expanding the range of activities on offer increases the likelihood that every teenager will find an activity that suits their interests. Material and technical support, including the latest equipment and sanitary and hygienic conditions, directly affects student motivation. The formation of a positive attitude requires the integration of an educational component aimed at developing physical literacy. Teenagers should learn about the physiological mechanisms of the impact of physical activity on the body, training principles and self-control methods. Awareness of the link between regular exercise and specific positive changes strengthens internal motivation through the mechanism of cognitive understanding of the value of physical activity.

Prevention of demotivation involves paying attention to at-risk adolescents who have had negative experiences or low self-esteem regarding their physical abilities. Individual adaptation programmes should begin with diagnosing the causes of negative attitudes and gradually building positive experiences through accessible tasks. Creating separate groups for adolescents with special needs provides a psychologically safe environment without social comparison with more developed peers. A gender-sensitive approach takes into account differences in motivational priorities between boys and girls. S. Pavlović *et al.* (2025) found gender differences in the relationship between physical self-concept and physical activity: girls with the highest level of activity had higher ratings of satisfaction with their appearance ($M = 3.94$, $SD = 0.61$ compared to $M = 3.12$, $SD = 0.39$ in the low activity group; $p = 0.01$), while boys showed higher sensitivity to perceptions of athletic competence ($M = 3.86$, $SD = 0.47$ in the most active group compared to $M = 2.19$, $SD = 0.88$ in the least active group; $p = 0.01$). I. Soós *et al.* (2019) found that girls showed higher levels of autonomous motivation in the context of formal physical education, while boys reported more perceived support and freedom of choice in the context of competitive activities. Pedagogical practice should take these gender characteristics into account, focusing on the functional capabilities of the body and the feeling of satisfaction from movement, since K. Sick *et al.* (2025) showed that a negative perception of one's own appearance reduced the likelihood of continuing physical education classes.

Teaching goal-setting skills should be based on the principles of specificity, measurability and achievability. Self-monitoring techniques through journaling or the use of mobile apps allow adolescents to track their progress and adjust their goals. Taking into account age-related characteristics of time discounting involves the use of more frequent forms of encouragement for younger adolescents, while older ones can work with long-term goals. The organisation of group dynamics should balance competitive and cooperative elements depending on the characteristics of the group. Structured team activities, where success depends on mutual assistance, promote the development of cooperation and social cohesion. Preventing dropouts requires systematic monitoring of early signs of demotivation and timely intervention through programme adjustments or additional support.

Working with adolescents with chronic illnesses requires a specialised approach that combines medical

supervision with psychological support. Organising classes in small groups of adolescents with similar illnesses reduces feelings of stigmatisation and creates a supportive environment. The involvement of peers as agents of motivational support is implemented through structured mentoring programmes, which simultaneously strengthens the motivation of both parties by satisfying their needs for belonging and competence. At the level of public policy, it is necessary to ensure the systematic training of physical education teachers in the field of motivational theories and relevant pedagogical technologies. Involving parents in school programmes through joint sports activities increases the consistency of motivational influences between the home and school environments. The effectiveness of programmes should be monitored on the basis of objective indicators of activity combined with subjective measures of the quality of motivation and psychological well-being of adolescents.

Conclusions

The conducted study made it possible to systematise psychological, sociocultural and pedagogical factors involved in the formation of adolescents' motivation for physical education on the basis of a comprehensive analysis of 51 international publications from 2011-2025, with a particular emphasis on the period 2019-2025. Analysis of psychological determinants established that intrinsic motivation proved to be the only significant predictor of adolescents' daily physical activity compared with controlled forms of regulation, while satisfaction of the basic psychological needs for autonomy, competence and social relatedness mediated the relationship between a supportive environment and the development of stable motivational patterns. Gender differences in motivational profiles were manifested in that boys demonstrated greater sensitivity to perceived physical competence and competitiveness, whereas girls were more strongly oriented towards aesthetic aspects and social interaction, confirming the need for gender-sensitive pedagogical approaches. Examination of sociocultural factors revealed a hierarchical structure of influences in which the family environment functioned as the most influential agent of primary socialisation through mechanisms of parental expectations and behavioural modelling, with an effect of approximately 25% mediated through satisfaction of basic needs, while peer support and digital forms of social interaction created additional channels of motivational influence through social comparison and group identification. Analysis of pedagogical technologies showed that gamified interventions based on self-determination theory and lasting more than 12 weeks significantly increased moderate-intensity physical activity compared with traditional methods, while group-based training demonstrated a stronger effect on vigorous activity than individual formats, and virtual reality and fitness trackers exhibited an indirect mechanism of influence through self-monitoring and social support.

The results of the study enabled the development of a set of evidence-based recommendations structured across three levels of intervention: the micro level of individual pedagogical interaction, with an emphasis on supporting autonomy through providing choice in types of physical activity and constructive feedback focused on effort rather than ability; the meso level of organising the educational

process through integration of diverse forms of physical activity and involvement of parents as agents of motivational support; and the macro level of systemic policies through ensuring access to sports infrastructure and professional training of teachers in the field of motivational theories. A limitation of the study was the geographical concentration of most of the analysed works in Western Europe, North America and East Asia. Promising directions for further research include the conduct of long-term longitudinal studies in different cultural contexts using objective methods of measuring physical activity through accelerometry to test the stability of motivational

changes and to validate the developed recommendations within the Ukrainian educational system, taking into account specific socio-economic challenges.

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Формування мотивації до занять фізичною культурою у підлітковому віці

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Анотація. Зниження фізичної активності підлітків в умовах цифровізації та зростаючої навчальної зайнятості актуалізує необхідність розуміння механізмів формування стійкої мотивації до систематичних занять фізичною культурою у віковому періоді 11-18 років. Метою роботи стало виявлення та узагальнення психологічних детермінант, соціокультурних впливів та педагогічних засобів, які сприяють розвитку мотивації підлітків до фізкультурно-спортивної діяльності з урахуванням сучасних цифрових інструментів. Дослідження реалізовано через систематичний аналіз 43 рецензованих публікацій за період 2015-2025 років з міжнародних баз даних із застосуванням контент-аналізу, тематичної систематизації та порівняльного зіставлення ефективності різних педагогічних технологій. Аналіз психологічних чинників встановив, що внутрішня мотивація була ключовим предиктором щоденної фізичної активності підлітків, при цьому задоволення базових психологічних потреб опосередковувало приблизно 25 % впливу батьківської підтримки на рівень активності. Гендерні відмінності проявилися у тому, що хлопці демонстрували вищу орієнтацію на сприйняття фізичної компетентності та змагальність, тоді як дівчата більшою мірою цінували естетичні аспекти та соціальну взаємодію. Дослідження соціокультурних факторів виявило ієрархічну структуру впливів, де родинне середовище відігравало роль первинного агента соціалізації через механізми батьківських очікувань та моделювання поведінки, а підтримка однолітків та цифрові форми взаємодії створювали додаткові канали мотиваційного впливу. Аналіз педагогічних технологій продемонстрував, що гейміфіковані втручання на основі теорії самодетермінації тривалістю понад 12 тижнів збільшували помірно-інтенсивну фізичну активність, при цьому групові тренування виявляли сильніший ефект порівняно з індивідуальними формами. Результати дозволили розробити тривірневу систему рекомендацій для педагогів, тренерів та організаторів фізкультурно-спортивної роботи, що охоплює індивідуальну педагогічну взаємодію, організацію освітнього процесу та системні політики з акцентом на підтримку автономії, компетентності та соціальної приналежності підлітків. Практичне значення полягає у створенні доказової бази для розробки ефективних програм підвищення фізичної активності молоді з урахуванням вікових, гендерних та культурних особливостей.

Ключові слова: базові психологічні потреби; самодетермінація; цілепокладання; гейміфікація; автономія; цифрові інструменти