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EDITED BY
Enrique Ortega-Toro,
University of Murcia, Spain

REVIEWED BY
Isabel Castillo,
University of Valencia, Spain
Aurelio Olmedilla,
University of Murcia, Spain

*CORRESPONDENCE
Laura Primo
✉ l.primo@alumnos.upm.es

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How young people's perceptions of their physical education lessons and social skills varied in terms of sociodemographic features. The case of a rural area of China

Laura Primo[1]*, Juan González-Hernández[2], Yin Yang[3] and Cristina Lopez de Subijana[1]

[1]Social Sciences Applied to Sport, Physical Activity, and Leisure Department, Universidad Politécnica de Madrid, Madrid, Spain, [2]Personality, Assessment, and Psychological Treatment Department, Universidad de Granada, Granada, Spain, [3]School of Psychology, Beijing Sport University, Beijing, China

The aim of this study was to examine whether motivation, support, basic-needs satisfaction, and social skills in physical education lessons differed among Chinese secondary students from rural areas depending on their sociodemographic profiles. Two hundred and seven students enrolled in a camp organized by a non-profit organization in Chengdu province (15.8 ± 0.8 years, 74% female and 26% male) completed validated Chinese versions of the pertinent questionnaires. Appropriate social skills were perceived higher by women that by men ($z = 2.2$; $p = 0.014$; $r = 0.16$). Inappropriate social skills ($z = 2.9$; $p = 0.021$; $r = 0.22$) were perceived higher among those students with lower annual home income (50,000 yuan or less). Perceived autonomy support ($z = 2.9$; $p = 0.002$; $r = 0.20$), basic-needs satisfaction ($z = 2.9$; $p = 0.002$; $r = 0.20$), and physical-education motivation ($z = 4.2$; $p < 0.001$; $r = 0.30$) were higher among students who practiced physical activity or sport outside school. Students who practiced during their physical-education team-sports lessons reported higher motivation for physical education ($z = 2.9$; $p = 0.002$; $r = 0.20$) than those who practiced individual sports. The findings from this study are relevant to practitioners who work with students from these underprivileged rural areas.

KEYWORDS

physical education, physical activity engagement, sport, China, rural, self-determination theory, secondary school, income

1 Introduction

1.1 The context of physical education (PE) and sport in Chinese rural areas

Theory and research converge in pointing to the importance of structured, after-school activities as important assets in the positive development of youth, as they are associated with such positive indicators of development as higher academic performance in high school, a greater likelihood of attending college, and greater autonomy and satisfaction in one's first job (Holt et al., 2020). More specifically, there is a distinct disparity between what urban and rural children experience in terms of sports resources (e.g., human, facilities, etc.), which clearly

affects the likelihood of rural students' participation in these activities (Jin, 2016). Another feature in China's rural areas is the socioeconomic status. Children from low socioeconomic-status families and minority groups are highly vulnerable to these risk factors, and they frequently confront academic, social, and behavioral challenges (Cheung, 2017). According to Taylor and Carlo (2021), the developmental trajectories of millions of children are impacted by the dangerous and unsuitable environments in which they are born and raised. This is the case for a considerable proportion of students involved in the present study, who are usually referred to as "left-behind children." These children stay in their rural hometowns with their grandparents while their parents work in large cities (Hu et al., 2020). Thus, children in rural areas do not enjoy as many educational opportunities as those in urban areas in China.

In the context of this study, in this area of rural China with the context just mentioned PE is even a more crucial tool for fostering a child's overall development. It is clear that upholding and safeguarding students' sports rights is essential for their academic performance, physical and mental health, intelligence development, and modeling of their behaviors (Hao, 2012; Jin, 2016). Globally, many children and adolescents do not to meet physical activity (PA) recommendations [Hollis et al., 2016; World Health Organization (WHO), 2020]. Empirical studies have documented a lower PA rate among children at-risk in China (disparities in opportunities to practice PA may be due to socioeconomic status or to whether the area they live is a rural or urban area) (Cheung, 2017) so the physical-inactivity trend is rapidly increasing (Lu et al., 2017). PE rarely receives the credit it deserves in China's schools, therefore, parents and students frequently exhibit little concern for the PE subject and sport in general, thus making the PE teacher's work more difficult. One explanation for this poor recognition of PE is the insufficient financial coverage received (Hao, 2012; Jin, 2016). According to Jin (2016), other reasons include the exam-focused education, living pressure, and a low sense of duty among certain PE teachers. These variables interact with one another, making it more challenging to find a solution (Jin, 2016). However, according to the recent measures implemented by the Chinese government, children now have PE class every day of the week (Xinhuanet, 2021), which may mean a change of perspective on future trends. As PE professionals, we should work harder to change the state of school PE in China by making pedagogic proposals that enable them to adhere to classes, making them stimulating tools for an active lifestyle even outside the school environment (Jin, 2016).

1.2 Non-profit organizations as support to the rural educational system in China

Some organizations have tried to improve the educational level in the rural areas of China supporting education infrastructure, school programming and teacher training in rural communities, including building and renovating schoolrooms, libraries, teachers' offices, kitchens, play areas and multi-storey and multi-room school buildings to accommodate large student populations. Among such projects is Chengdu Linyin Public Welfare Service Center (*Future China*), a non-profit organization that aims to help secondary students discover their professional interests and expand their knowledge horizons by arranging summer and winter camps where excellent university professors from prestigious universities in China and overseas serve as peer mentors to secondary students who lack resources. For us, this organization is especially interesting, because it has a long-term vision in terms of the educational opportunities of students, in the same way that we do, because we want to know how the PE lessons that these students attend could influence their future lifestyle. The camps are often held in Gulin County, which is near the confluence of southern Sichuan and northern Guizhou, in the Wumeng Mountains on the north side of the Dalou Mountains.

1.3 Self-determination theory (SDT) and social skills in PE environments

This study approaches social skills as global life competencies within education and PE settings. Social skills are a person's capacity to get along with others and to engage in prosocial activity, which impacts their popularity among classmates, teachers, parents, and other relevant adults, which are the skills required for good interpersonal functioning (Matson et al., 2010). Some academics have suggested that PE and sport environments may help young people improve their social skills (e.g., communicational skills and value-based expressions) in terms of developmental objectives (Anderson-Butcher and Bates, 2018; Nascimento Junior et al., 2021). Moreover, these abilities, which are developed within the PE and sport environment (e.g., empathy, altruistic behaviors, and forgiveness), could be transferred to other life scenarios (Turnnidge et al., 2014). PE and sport may help to both fostering social abilities in anticipation of and protecting antisocial behaviors and social violence (Rodríguez-Franco et al., 2023) and to promote children's PA and develop lifelong exercise habits.

Therefore, it is essential for researchers and practitioners to understand children's motivation for PE. According to SDT, motivation can be considered as a continuum that spans the following categories: intrinsic motivation, extrinsic motivation, and amotivation. There is a greater drive and desire to participate in an activity when the level of one's self-determination is higher (Ryan and Deci, 2017). To energize human conduct, three fundamental psychological needs must be met: autonomy, competence, and relatedness. People try to satisfy these demands as they are necessary for one's personal growth and well-being. Greater self-determination is a result of these demands being fully met (Ryan and Deci, 2017). On the other hand, the beneficial effect of teachers' autonomy support on students' self-determined motivation and engagement has been well-documented in specialized disciplines such as PE (Ntoumanis, 2005), and it is essential to successfully promoting the satisfaction of basic psychological needs (BPN) what, consequently, leads students to higher self-determined behaviors (Ryan and Deci, 2017).

Considering the scarcity of studies on PE lessons as a main topic in Chinese rural areas and researchers' responsibility to improve the personal development of those at risk, this study aims to examine if motivation, perceived support, basic-needs

Abbreviations: PE, Physical Education; PA, Physical Activity; WHO, World Health Organization; SDT, Self-determination Theory; M, Tool means; SD, Standard deviation.

satisfaction, and social skills in PE lessons, varied regarding the socio-demographic profile of Chinese secondary students from rural areas. In order to create new programs, policies, and methods for teaching PE, we believe that the findings of this study will be helpful to educators, policymakers, and teachers. This study hypothesizes, based on Taylor and Carlo (2021), Fin et al. (2017), and Manzano-Sánchez and Valero-Valenzuela (2018) studies, that students who participate in after-school PA or sport, are involved in team sports in the PE lessons, and belong to families with high yearly income: (i) will perceive higher support from parents, teachers and friends, (ii) will present a higher level of satisfaction of their basic needs, (iii) will be more intrinsic motivated to the PE lesson, (iv) and will present higher level of inappropriate social skills.

2 Methods

2.1 Participants

Based on cross-sectional design and due to the difficulty of accessing this type of participants, purposive sampling [use of members of the population (young people in rural China) with specific and significant characteristics or experiences] was conducted. The sample comprised 207 secondary students enrolled in the *Future China* non-profit organization camp for underprivileged students. They all lived in rural areas of the Chendgu province. Of the participants, 74% were women while 26% were men. The mean age was 15.9 (SD = 0.83) years, and they were in the last 2 years before taking the university-entrance exam (*gaokao*). Regarding the mean time spent on PA in their daily lives, they had 2.2 PE classes per week (SD = 0.57) lasting 41.3 min (SD = 5.0), it being the main sport practiced; individual PE lessons constituted 73% of PA while team sport constituted 27%. Furthermore, 52% of the students participated in after-school PA or sport. Last, 62% of the students' families earned an income higher than 50.000 yuan per year while 38% earned an income lower than 50.000 yuan per year.

2.2 Tools

The questionnaire survey was divided into five sections. First, the sociodemographic questions were about their age, gender, number of PE hours per week, the type of sport most practiced in the PE lessons (team or individual sport), if they practiced after-school PA or sport, and annual income in yuan.

Second, perceived support to the PE lesson from parents, teachers and peers was assessed using the short version of the learning climate questionnaire in its Chinese version (LCQ; Williams and Deci, 1996; Zhou et al., 2019). Each participant was presented with the same six items, including, "My teacher gives me the right to make choices." The students had to show their agreement with the statement on a 5-point Likert scale (from 1 = completely disagree to 5 = completely agree). This tool has been widely used and has previously shown good psychometric properties. In this study, reliability was measured using McDonald's coefficient. The coefficients were all higher than 0.90 for all the factors (0.91 for teachers; 0.92 for parents; 0.92 for peers; and 0.94 for the overall score).

Third, basic-needs satisfaction was assessed using the Chinese version of the activity-feeling states scale (AFS; Reeve and Sickenius, 1994; Zhou et al., 2017). This tool has nine items, three for each factor (autonomy, competence, and relatedness). Examples of the items are as follows: "I am doing what I want to be doing" for autonomy; "Competent" for competence; and "I have good friends close to me" for relatedness. Each item was measured on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). For this tool, McDonald's coefficients were 0.83 for autonomy, 0.81 for competence, 0.80 for relatedness, and 0.91 for the overall scale.

Student motivarion to the PE lesson was meeasured using the Chinese version of the perceived locus of causality scale (PLOC; Goudas et al., 1994; Yang et al., 2022). This scale assessed five dimensions of PE motivation: intrinsic motivation, identified regulation, introjected regulation, external regulation, and amotivation. Each dimension comprised four items for its measurement. The scale for this tool ranged from 1 (strongly disagree) to 5 (strongly agree). The overall McDonald's ω was 0.82. It ranged from 0.66 (introjected and external regulation) to 0.87. Factors with coefficients below 0.7 were maintained for scale completeness.

Finally, the students' social skills were evaluated using the Chinese version of the Matson evaluation of social skills with youngsters scale (MESSY; Kee-Lee, 1997; Matson et al., 2010). This tool has four dimensions: aggressiveness, antisocial behavior, pretentiousness and haughtiness, and loneliness and social anxiety. The scale comprises 62 items on a Likert scale of from 1 (not at all) to 5 (very much). The MESSY total score is in the direction of negative social skills and is calculated by reversing the ratings for the appropriate social skills subscale and summing the total with the total scale score for the Inappropriate social kills subscale. A high MESSY total score indicates inappropriate social skills, whereas a low total score indicates appropriate social skills. T-scores can be computed for the subscale scores and the total score (Matson et al., 2010). Later, we recoded the MESSY components to make them easier to grasp, so now a high MESSY total score denotes appropriate social skills. McDonald's coefficient were 0.86 for aggressiveness, 0.91 for antisocial behavior, 0.50 for pretentiousness and haughtiness, 0.69 for loneliness and social anxiety, and 0.87 for the overall scale. Factors with coefficients below 0.7 were maintained for scale completeness.

2.3 Procedure

The studies involving human participants were reviewed and approved by The Bioethics Committee of the Universidad Politécnica de Madrid (registration number 2022-012). Written informed consent to participate in this study was provided by the participants' legal tutor. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

2.4 Data analysis

Data analysis was performed using the SPSS version 26 software. As the data were not normally distributed, Spearman bivariate correlations and non-parametric comparisons were performed. For the comparisons, the Mann–Whitney U test was applied. In the case of the annual-income variable, the sample was divided into two groups

based on the median (50,000 yuan). The effect size was based on the *r* value, it being considered small (0.1–0.3), medium (0.3–0.5), or large (0.5–0.10; Cohen, 2013). The significance level was set at $\alpha = 0.05$.

3 Results

3.1 Descriptive statistics and correlations

The inappropriate social skills were inversely related to the overall measures of the perceived autonomy support, basic-needs satisfaction, and motivation for the PE lessons ($p < 0.01$ for all correlations; see Table 1). Thus, the higher students perceived their support, basic-needs satisfaction, and motivation for PE, the more appropriate their social skills were (MESSY was a reverse scale). All the measures were on a scale from 1 to 5, and autonomy support and basic-needs satisfaction were reported higher than PE motivation.

Table 2 shows the variables for the study regarding gender and regarding their practice of after-school PA or sport. Appropriate social skills were perceived higher by women than by men ($z = 2.2$; $p = 0.014$; $r = 0.16$). Perceived autonomy support ($z = 2.9$; $p = 0.002$; $r = 0.20$), basic-needs satisfaction ($z = 2.9$; $p = 0.002$; $r = 0.20$), and PE motivation ($z = 4.2$; $p < 0.001$; $r = 0.30$) were higher among students who practiced after-school PA or sport. Details on these differences are provided in the following analyses within each tool.

Table 3 shows the variables for the study regarding the type of sport practiced in PE lessons, and regarding the annual home income. Inappropriate social skills ($z = 2.9$; $p = 0.021$; $r = 0.22$) were higher among students with lower annual home income. Students who practiced during their PE-lesson team sports reported higher global motivation index for PE ($z = 2.9$; $p = 0.002$; $r = 0.20$) than those who practiced individual sports. Details on these differences are provided in the following analyses within each tool.

3.2 Sociodemographic comparisons in detail

Men perceived higher aggressiveness ($z = 2.6$; $p = 0.007$; $r = 0.18$) and pretentiousness and haughtiness ($z = 2.9$; $p = 0.003$; $r = 0.20$) than women. The antisocial-behavior dimension was perceived higher in students with lower income (50,000 yuan or less; $z = 1.8$; $p = 0.038$; $r = 0.16$). Students who practiced after-school PA or sports reported higher perceived support from teachers ($z = 3.6$; $p < 0.0001$; $r = 0.25$), parents ($z = 2.5$; $p = 0.011$; $r = 0.18$), and peers ($z = 2.0$; $p = 0.045$; $r = 0.14$). These students also showed a higher satisfaction with autonomy ($z = 2.9$; $p = 0.004$; $r = 0.20$) and competence needs ($z = 2.8$; $p = 0.005$; $r = 0.20$) than those who did not practice any after-school PA or sport. Additionally, students who practiced after-school PA or sport had higher intrinsic motivation ($z = 4.8$; $p < 0.001$; $r = 0.34$), higher regulated identification ($z = 3.4$; $p = 0.001$; $r = 0.24$), and less amotivation ($z = 3.4$; $p = 0.001$; $r = 0.24$). Regarding the type of sport practiced in the PE lessons, students who practiced team sport in their PE lessons perceived higher support from their teachers ($z = 2.2$; $p = 0.02$; $r = 0.16$), parents ($z = 1.8$; $p = 0.04$; $r = 0.13$), and peers ($z = 1.7$; $p = 0.045$; $r = 0.12$); they showed higher intrinsic motivation ($z = 3.4$; $p = 0.001$; $r = 0.24$), higher regulated identification ($z = 3.3$; $p = 0.001$; $r = 0.23$), and lower amotivation ($z = 2.2$; $p = 0.024$; $r = 0.16$).

4 Discussion

To intervene more effectively by planning PE classes based on student's individual needs, this study examined whether, in the PE lessons, motivation, perceived support, basic-needs satisfaction, and social skills varied regarding the sociodemographic profiles of Chinese secondary students sampled from a rural area in China. Although a few studies have been conducted on how these SDT variables and social skills differ depending on sociodemographic variables in the PE context in China, the power of this study lies in its consideration of participation in after-school PA or sport. Students who participate in after-school PA or sport perceived higher support from their social agents, present a higher basic need satisfaction and intrinsic motivation to PE lesson than those who do not participate.

In the following paragraphs, we describe the relevance of our findings in detail, which replicate and expand on previous research outcomes. We then propose practical implications and highlight the limitations of this study in the following paragraphs.

The results of the sociodemopraphic comparisons regarding social skills, partially supported the first hypothesis. Regarding support from social agents, those students who practiced after-school PA or sports perceived higher support from their teachers, parents, and peers. Furthermore, students who practiced team sports in their PE lessons also perceived higher support from their teachers, parents, and peers. Consistent with these ideas, according to Fin et al. (2017), the teacher's interpersonal style and psychological mediators may interfere with the commitment to engaging in PA. Ensuring that children perceive that they have adequate opportunity to develop competencies, self-direct behaviors, and be connected to others is therefore of paramount importance. There are many opportunities within PE lessons when teachers provide students with structure (e.g., rules, limits, and feedback) in the context of autonomy support (e.g., voice, choice, and initiative). In contrast, such opportunities are thwarted by conveying the same structure in the context of control (e.g., coercion, reward, and conditional regard). We did not find any significance difference either in relation to gender or family yearly income.

The results of the sociodemopraphic comparisons regarding social skills, partially supported the second hypothesis. Students who practiced after-school PA or sport showed a higher satisfaction of autonomy and competence needs than those who did not practice any after-school PA or sport. We agree with previous studies in which the most active groups had higher autonomy and competence levels than less active ones (Manzano-Sánchez and Valero-Valenzuela, 2018). Deci and Ryan (2013) reported that the ideal social context that favored more self-determined behavior stimulated the development of autonomy because this was an important factor that might influence individuals' ability to prosper, in addition to improving personal growth and satisfaction. We did not find any significance difference either in relation to gender, type of sport more often practiced in PE lesson or family yearly income.

The results of the sociodemopraphic comparisons regarding social skills, partially supported the third hypothesis. We found that those students who practiced after-school PA or sport had higher intrinsic motivation and less amotivation. Our results are consistent with those obtained by Manzano-Sánchez and Valero-Valenzuela (2018) that showed that the most active groups (putting

TABLE 1 Tools means (M) and standard deviations (SD).

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Aggressiveness/ antisocial behavior	1.50	0.29	*0.86*	0.134	0.444**	0.388**	0.753**	−0.113	−0.133	0.248**	0.299**	0.303**	−0.290**	−0.243**	−0.274**	−0.365**	−0.343**	−0.285**	−0.215**	−0.346**	−0.308**
2. Social skills/ assertiveness (inverse)	2.24	0.42		*0.91*	−0.007	−0.339**	0.385**	−0.408**	−0.395**	0.014	0.185**	0.329**	−0.395**	−0.458**	−0.275**	−0.454**	−0.449**	−0.280**	−0.343**	−0.425**	−0.387**
3. Pretentiousness/ haughtiness	2.02	0.36			*0.68*	0.329**	0.689**	−0.104	−0.103	0.158*	0.247**	0.247**	−0.239**	−0.232**	−0.232**	−0.222**	−0.269**	−0.234**	−0.136	−0.274**	−0.235**
4. Loneliness/ social anxiety	2.10	0.33				*0.69*	0.519**	0.116	0.197**	0.299**	0.236**	0.146*	−0.076	0.053	−0.005	−0.074	0.007	0.014	0.118	0.001	0.027
5. Global inappropriate social skills index	1.96	0.21					*0.87*	−0.232**	−0.186**	0.285**	0.399**	0.439**	−0.433**	−0.379**	−0.303**	−0.485**	−0.437**	−0.323**	−0.228**	−0.433**	−0.366**
6. Intrinsic motivation	4.02	0.80						*0.86*	0.765**	0.043	−0.278**	−0.496**	0.775**	0.470**	0.301**	0.373**	0.438**	0.350**	0.401**	0.360**	0.418**
7. Regulated identification	3.80	0.73							*0.74*	0.266**	−0.103	−0.379**	0.594**	0.496**	0.367**	0.402**	0.500**	0.372**	0.401**	0.369**	0.434**
8. Regulated introjection	2.88	0.89								*0.66*	0.583**	0.479**	−0.414**	0.000	−0.014	−0.046	−0.017	−0.041	−0.083	−0.043	−0.063
9. External motivation	2.63	0.79									*0.66*	0.640**	−0.676**	−0.222**	−0.160*	−0.239**	−0.229**	−0.249**	−0.220**	−0.203**	−0.243**
10. Amotivation	2.08	0.93										*0.87*	−0.872**	−0.396**	−0.282**	−0.332**	−0.385**	−0.314**	−0.319**	−0.354**	−0.372**
11. Global motivation index	1.21	0.73											*0.82*	0.470**	0.307**	0.396**	0.446**	0.368**	0.388**	0.374**	0.427**
12. Teachers support	3.88	0.75												*0.91*	0.549**	0.598**	0.837**	0.531**	0.423**	0.582**	0.577**
13. Parents support	3.75	0.86													*0.92*	0.506**	0.841**	0.434**	0.387**	0.478**	0.477**
14. Friends support	4.04	0.68														*0.92*	0.774**	0.470**	0.479**	0.604**	0.584**
15. Global support index	3.89	0.64															*0.94*	0.577**	0.503**	0.654**	0.652**
16. Autonomy needs	3.62	0.80																*0.83*	0.712**	0.692**	0.892**
17. Competence needs	3.71	0.74																	*0.81*	0.638**	0.873**
18. Attribution needs	3.69	0.77																		*0.80*	0.870**
19. Global basic needs satisfaction index	3.67	0.69																			*0.91*

Spearman bivariate correlations and McDonald's ω. *Significant correlation at $p < 0.05$; **significant correlation at $p < 0.01$.

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TABLE 2 Means (M) and standard deviations (SD), regarding gender and the practice after-school PA or sport.

	Gender				Practiced after-school PA or sport?			
	Men		Women		Yes		No	
	M	SD	M	SD	M	SD	M	SD
1: Teachers' support**	4.04	0.80	3.83	0.72	4.07	0.65	3.66	0.79
2: Parents' support**	3.81	0.84	3.75	0.87	3.87	0.90	3.62	0.81
3: Friends' support**	3.98	0.70	4.08	0.65	4.14	0.61	3.93	0.74
Global support index**	3.95	0.68	3.89	0.61	4.03	0.61	3.74	0.63
1: Autonomy needs**	3.74	0.71	3.58	0.83	3.77	0.75	3.45	0.83
2: Competence needs**	3.84	0.78	3.68	0.73	3.84	0.71	3.57	0.75
3: Attribution needs**	3.77	0.83	3.68	0.72	3.81	0.72	3.56	0.81
Global basic needs satisfaction index**	3.78	0.70	3.65	0.68	3.81	0.64	3.53	0.70
1: Intrinsec motivation**	4.21	0.79	3.98	0.79	4.27	0.70	3.76	0.81
2: Regulated identification**	3.92	0.76	3.78	0.70	3.96	0.70	3.63	0.72
3: Regulated introjection**	3.00	1.02	2.84	0.84	2.84	0.99	2.93	0.75
4: External motivation	2.60	0.87	2.64	0.76	2.55	0.81	2.71	0.75
5: Amotivation**	2.02	1.07	2.08	0.88	1.88	0.87	2.30	0.95
Global motivation index**	1.34	0.78	1.18	0.71	1.41	0.73	0.99	0.66
1: Aggressiveness/antisocial behavior*	1.56	0.27	1.46	0.29	1.49	0.30	1.50	0.29
2: Antisocial behavior	2.23	0.41	2.23	0.43	2.18	0.45	2.30	0.39
3: Pretenntiousness and haughtiness*	2.13	0.34	1.98	0.37	2.03	0.35	2.00	0.38
4: Loneliness and social anxiety	2.08	0.32	2.10	0.34	2.08	0.36	2.12	0.29
Global inappropriate social skills index*	2.00	0.19	1.94	0.21	1.95	0.21	1.98	0.20

*Significant difference between gender groups $p < 0.05$; **significant differences between those students that practice after-school PA or sport or not at $p < 0.01$.

together PE, PA, and sport of the day) presented had higher levels of intrinsic motivation and lower levels of amotivation. Fin et al. (2017) also showed that intrinsic motivation in PE classes directly correlated with satisfaction with and interest in future PA and sports activities. Practically, the results imply that adolescents must be aware of the benefits of PA and sport for their health (identified regulation) as well as enjoy and be satisfied by the activity itself (intrinsic motivation) without feeling compelled to engage in it to avoid punishment or responsibility (external regulation) or experiencing frustration and fear (demotivation) associated with these activities (Fin et al., 2017). Educational programs that stimulate the development of intrinsic motivation and more self-determined behavior, primarily in early school grades, may lead individuals to engage in regular PA and sports. Thus, the trend to abandon PA after finishing secondary school is lower (Moreno-Murcia et al., 2012). According to Williams and Deci (1996), autonomy is, indeed, a very important factor in the lives of young Chinese learners from rural areas. In their results, higher levels of autonomous motivation were associated with higher levels of perceived competence, interest, and perceived choice regarding schoolwork (Williams and Deci, 1996). Another interesting observation in the present study is the case of those students who practiced team sports in their PE lessons, who also showed higher intrinsic motivation and lower amotivation. PE holds a unique place, particularly in motivating children and adolescents to engage in PA (Chen and Wang, 2017); thus, as PE teachers, we have a crucial responsibility in this sense. We did not find any significance difference either in relation to gender or family yearly income.

The results of the sociodemopraphic comparisons regarding social skills, partially supported the fourth hypothesis. We have found significant differences in social skills by gender: Men's perceptions of both aggressiveness and pretentiousness and haughtiness were higher than women's. On the other hand, as mentioned before, other authors suggest that the abilities developed within the PE and sport environment (e.g., empathy, altruistic behaviors, and forgiveness) will be transferred to other life scenarios, protecting the students from inappropriate social behaviors and social violence in other life contexts (Rodríguez-Franco et al., 2023). Related to this topic, Ortega Vila et al. (2019) found that students who participated in team sports competitions specifically created to be of an educational nature showed more sporting attitudes and personal and social factors than those who did not participate in those competitions. However, we did not find significance differences on the students' social skills regarding the type of sport practiced in PE lessons (individual or team sport). We have not analysed the purpose for which the contents of the PE class have been designed, and perhaps that educational purpose is what makes the transfer to the improvement of social skills in life outside of sport, and not the fact that sport itself is individual or collective. We also did not find any significance differences regarding whether students practice or not after-school PA or sport. Lastly, antisocial behavior was perceived as higher in students with lower income (50,000 yuan or less).

TABLE 3 Means (M) and standard deviations (SD), regarding the type of sport practiced at PE lessons and the family yearly income.

	Type of sport				Family yearly income			
	Individual		Team		50,000 yuans or less		More than 50,000 yuans	
	M	SD	M	SD	M	SD	M	SD
1: Teachers' support*	4.03	0.60	4.22	0.90	3.92	0.65	3.87	0.84
2: Parents' support*	3.83	0.86	4.11	1.15	3.85	0.72	3.68	0.97
3: Friends' support*	4.07	0.63	4.45	0.46	3.99	0.68	4.15	0.63
Global support index*	3.98	0.59	4.26	0.71	3.92	0.58	3.90	0.67
1: Autonomy needs	3.72	0.78	3.78	0.97	3.65	0.77	3.65	0.86
2: Competence needs	3.84	0.70	3.80	0.91	3.69	0.73	3.77	0.78
3: Attribution needs	3.78	0.74	3.92	0.73	3.66	0.74	3.76	0.83
Global basic needs satisfaction index	3.78	0.65	3.84	0.76	3.67	0.66	3.72	0.76
1: Intrinsec motivation**	4.21	0.70	4.46	0.77	4.04	0.78	4.06	0.76
2: Regulated identification**	3.91	0.67	4.19	0.79	3.85	0.70	3.81	0.68
3: Regulated introjection	2.90	0.95	2.60	1.18	2.91	0.82	2.82	0.91
4: External motivation	2.56	0.78	2.49	0.92	2.56	0.75	2.63	0.80
5: Amotivation*	1.93	0.84	1.76	1.07	2.11	0.91	2.04	0.94
Global motivation index**	1.33	0.68	1.73	0.93	1.21	0.72	1.26	0.75
1: Aggressiveness/antisocial behavior	1.52	0.32	1.35	0.19	1.48	0.24	1.45	0.25
2: Antisocial behavior ***	2.20	0.44	2.15	0.44	2.28	0.43	2.15	0.41
3: Pretenntiousness and haughtiness	2.02	0.34	2.00	0.40	2.01	0.37	1.99	0.37
4: Loneliness and social anxiety	2.10	0.38	1.90	0.24	2.08	0.29	2.05	0.29
Global inappropriate social skills index ***	1.96	0.22	1.85	0.18	1.96	0.18	1.91	0.20

* and ** significant differences between type of sport practiced at PE lessons individual or team sport at $p < 0.05$ and $p < 0.01$; *** significant differences between groups of income at home $p < 0.05$.

5 Conclusions, future studies and contributions

The results show how sociodemographic aspects may influence variables related to PE in a rural area of China. We hope that they interest scholars and motivate future research in this line, concentrating their future efforts on improving rural areas education, to help disadvantaged rural children improve their early intellectual and appropriate social skills and also to reinforce the contribution of PE in adolescents' acquiring PA habits. PE lessons have great potential for developing skills for their future lives; thus, it is important to pay the necessary attention to them so that habits of practicing PA are generated for the future (Curran and Standage, 2017). These students need fun and engaging ways to practice PE lessons, so that they can enjoy school and keep having an active lifestyle even when they are not in class. Thus, it is suggested that other studies should be conducted to assess the implementation of motivational strategies during PE classes and analyze the meeting of basic psychological needs, and perceived support in relation to PE lessons. As we have seen in this study and previous ones, if students are motivated by PE, they will spend more time in sports during their lives and will achieve this as life-long learning. We also consider appropriate to work on future longitudinal studies including these study variables or others that may provide greater depth to the data obtained (e.g., loneliness, social conflicts bullying, thoughts of equality, and values).

In addition, another interesting result was that antisocial behavior was perceived as higher in students with lower income (50,000 yuan or less). Future studies should continue focusing on how students develop prosocial and antisocial behaviors in rural areas, because the developmental trajectories of millions of children are impacted by the environments in which they are born and raised (Taylor and Carlo, 2021). A more prosocial, behavior-specific approach has important real-world implications for intervention development and policymaking. As rural communities progress, they may have access to more accessible and affordable educational opportunities. Fewer kids would be left behind, and more kids in rural areas would have access to higher-quality schooling. There is a clear need for the field of PE and sport to build on the existing understanding of global prosocial behavior and move toward a more nuanced and multidimensional understanding of prosocial development (Padilla-Walker and Carlo, 2015).

In future, it would also be interesting to analyze differences between students from rural and urban areas in the same country. Regarding the sample area (rural area of China), Lu et al. (2017) showed in a systematic review how children in suburban/rural regions engage in less PA than those in urban regions, specifically adolescents.

6 Limitations

This study has some limitations. First, the sample was from a limited geographical region (a rural area in Chengdu province, China). Therefore, the findings have limited generalizability, and more research work is required based on samples from other regions of China.

On the other hand, we have not analyzed the content of PE lessons, which would be very interesting in future studies in order to take into account other variables and then be able to guide the teaching-learning process in a more specific way according the lesson goals.

Another limitation is that the journal that can provide more information on this topic is written in Chinese by Chinese authors. For non-Chinese speakers, data from papers published in Chinese are not accessible for verification or reference. The inclusion criteria to publish in international peer-reviewed journals in English guarantee a minimum in report quality as well as general accessibility to the results. That is why, although some bibliography in the Chinese language was used, mainly English-language published studies were included in our review.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by The Bioethics Committee of the Universidad Politécnica de Madrid (registration number 2022-012). Written informed consent to participate in this study was provided by the participants' legal tutor. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

LP: Conceptualization, Data curation, Methodology, Writing – original draft, Writing – review & editing. JG-H: Conceptualization, Formal analysis, Visualization, Writing – review & editing. YY: Conceptualization, Formal analysis, Visualization, Writing – review & editing. CL: Data curation, Formal analysis, Funding acquisition, Methodology, Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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