




# The relationship between health consciousness and sport involvement in the Hungarian Middle class

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## ABSTRACT

Social classes are often influenced by numerous factors such as education level, labor market position, income, and property ownership, including housing and consumption. This also extends to sports sociology, where sports consumption can play a role. It is worth noting that the middle class may exhibit different consumption habits compared to both lower and upper classes. A recent survey was conducted to investigate differences in sports engagement, health status, and the consumption of general and specific food supplements across different social strata. Statistical analysis revealed a strong correlation between sports conservatism and sports engagement. However, no correlation was found between sports consumption and social stratification levels. Individuals who participate in sports tend to be more health-conscious and have a higher intake of supplements, particularly protein and vitamins. Among the middle class, those who were highly involved in sports appeared to consume more supplements related to digestion. This suggests that sports engagement among the middle class is linked to health consciousness and selective supplement consumption when compared to other social classes.

## KEYWORDS

middle class, sports engagement, sports conservatism, food supplements consumption

## 1. INTRODUCTION

Social stratification is a key topic in sociology, as it refers to the systematic inequalities that exist between different social groups within a society. According to [1], individuals and groups have varying levels of access to rewards based on their position within the stratification system. Although stratification is often associated with assets or property, it can also be influenced by other factors, such as gender, age, religious affiliation, or military rank. Andersen and Taylor [2] distinguished between estate, caste, and class stratification systems. According to the authors, class determines the access that different people have to resources and places groups in positions of privilege or disadvantage. The authors noted that members of each class tend to share similar opportunities and a common way of life. The influence of class extends beyond economic factors to encompass language, dress, mannerisms, taste, and other preferences. Giddens and Sutton [1] outlined the various types of class systems,

including slavery, caste systems and estates. Both approaches share a common focus on the specification of the middle class.

From an educational and research perspective, leading sociologists [1] provide insight into the realities of the topic. Providing an overall picture of global circumstances is difficult, given that countries, nations and cultures differ. Moreover, it is such a sensitive topic that there is no available data. Most popular sociological sources refer to conditions in the UK and USA. Some novel trends indicate that occupation still plays a role, albeit not as important as it used to. The rapid economic transformation since the 1970s has made the measurement of class even more problematic, leading some to question the usefulness of class itself as a central concept. Occupational class schemes are not necessarily well suited to capturing the dynamic processes of class formation, mobility and change. Regarding the other dimension, the income and wealth, difficulties also arise, since reliable information about personal wealth is difficult to obtain. This is mostly because it is a sensitive question, particularly for the upper classes. Nevertheless, the contemporary occupational class schemes [3] are widely used in Britain, and other Western countries/societies, and the model seems to be gaining influence. It is worth noting that the stratification approaches are still strongly related to individual wealth, as in [4] regarding the middle class. However, upcoming postmodern theories suggest that we have moved beyond the era of social classes, as [5]. Schulze [6] suggested that society is best understood by balancing daily time between physical, social, and leisure components, and how leisure time is spent. This formulates social milieus and experience groups instead of defining individuals' lifestyles by occupation and financial wealth.

Before the Second World War, estate models were prevalent in Hungary. Erdei [7] developed a precise picture of Hungarian society, defining the theory of double society. From the 1960s onwards, the study of social stratification became a regime-tolerated sociological topic, and Hungarian researchers have developed various models of social stratification with the aim of defining the different social classes more precisely. Various models have been proposed to define Hungarian social stratification, ranging from the two-class-one stratum system paradigm theory to newer models, such as work nature groups [8], status groups [9], the L-model [10], and the double triangle model [11]. Recent contributions to the field include 'Class Number 2014' [12], employment classes, and the class model [13, 14]. The Hungarian Central Statistical Office (KSH) published the results of the systematic census using three stratification models: the classic work-nature groups, the social-employment layer scheme, and the normative-functionalist model of class structure [15].

It is worth noting that an individual's social status can have a significant influence on their way of life. The term middle class encompasses a wide range of individuals in various occupations, including those in the service industry, education and healthcare [1]. It includes two sub-classes: the service class and the intermediate class. However, it is

important to note that, despite this growth, significant wealth disparities between the upper and lower classes may persist. Hetesi [16] suggested that individuals from lower socioeconomic classes may aspire to middle-class lifestyle. Social classes are defined by numerous factors such as education level, labour market position, income, property ownership (including housing and consumption), and cultural lifestyle (including reading habits, cultural activities, and recreation).

A recent publication by Hungarian researchers [17] examined the correlation between social stratification and living conditions. The article noted that 'class' is a highly contested concept within the social sciences. This topic is particularly relevant in the study of post-socialist societies. Notably, the ruling state-socialist elites claimed that their power emanated from the working classes, as defined by the class categories of Marxist-Leninist ideology. This ideology also served to classify their enemies. The middle class was presented as a normative ideal, whose members were said to possess respectable incomes, wealth and a good education, as well as being active participants in public affairs. However, according to recent research, the middle class in Hungary is small and financially vulnerable. It appears that only around one third of the population has a middle-class standard of living.

In the context of sports sociology, participation in sports and active recreation during holidays is also considered as a defining factor [18]. Pursuing of sports and consuming food supplements are often associated with each other when aiming to improve better performance or maintain a healthier lifestyle.

The results indicated a high level of both sports conservatism (how people view sports as a national issue) and sports engagement (the relationship between society and the sports sector). It has been suggested that sport can have a positive impact on public health, academic achievement, employability, skill development and confidence, with long-lasting potential effects. To gain a comprehensive understanding of sustainability issues, the wider relationship between sports and society must be considered. The topic of food supplements in sports has received significant attention from researchers, as demonstrated by publications in journals such as *Nutrition* and works by [19].

A recent survey has yielded a wealth of data on sports participation and the physical and mental well-being of the population. The survey explored the potential relationship between sports engagement and food supplement consumption, as well as the effect of social stratification on this relationship. No changes to the content have been made. The hypothesis was that individuals of a higher social class tend to engage more in sports and exhibit more conservative tendencies, and that greater engagement in sports is associated with a greater awareness of food supplements and dietary habits. Among the middle class, greater sports engagement has been observed to be linked to an greater awareness of dietary habits and mental well-being. Furthermore, this group tends to consume digestive and mental health supplements more regularly than other

demographic categories. The investigation also aimed to examine key concepts and defining trends in order to explore the current issues surrounding the topic. Additionally, it identified areas where further research is needed.

## 2. LITERATURE REVIEW

The topic of the social class and the related social classifications emerged early in the history of sociology. Looking back at centuries of sociological works, it seems that fundamentals of the topic, such as the several types of class systems (e.g. slavery, caste, the clan and class), form the basis of the approach. The latest comprehensive books [1–2, 4] appear to take a similar approach; the main difference is the application or the lack of diverse social lenses (e.g. functionalism, conflict theory, symbolic interactionism and, more recently, feminism [4]). The details of the middle class are mostly covered, and the identification method based on these literatures is categorisation based on financial income (socioeconomic categorization) However, other categorisation methods, such as self-classification method [20], also exist. Nevertheless, the emergence of the postmodern theories suggests that science have moved beyond the era of class-based theories. Novel, influential theories, such as [5] and [6] predicted the decline of class-based theories and proposed alternative classifications that are less dependent on labor-related or socioeconomic statuses.

Parallel with the international development of sociology, the interest in the subject emerged even in the early works of the national sociologist in the journal of XX. Század (20th Century). Despite the challenging circumstances relating to the authority after the World War II until the emergence of the new democratic regime, research and theories related to stratification were among the most significant sociological achievements of this period.

Early theories on the middle class focused primarily on their working habits as a determining factor in their social standing. However, a novel approach has emerged as researchers have started paying more attention to the consumption habits and leisure activities of diverse groups. In the past, leisure activities have been used as a means of social classification [21]. According to [22], people from different social classes tend to play different sports, often influenced by their social status. It is worth noting that certain sports have retained their aristocratic nature. These sports are often played in private sports clubs where membership is highly sought after and may be challenging to obtain. Examples of such sports include golf, sailing, and tennis. In contrast, there are several sports that are enjoyed by people from all levels of society. For instance, football was originally played by the upper classes but has since become widely popular among people from all social backgrounds.

It is also worth considering that, in many cases, active participation and consumption as a supporter or audience member are often distinct [23]. According to the social stratification theories of socialist regimes, individuals were classified into different working categories or layers [24].

Each category was associated with a particular lifestyle. For example, intellectuals were expected to consume higher-level culture, whereas peasants were expected to consume lower-level cultural components. According to [24], cultural capital is defined as the consumption of both high culture, such as theatre, museums, classical music, and books, and new culture, such as the internet, community pages, and leisure sports activities.

International research demonstrates varying relationships between social stratification and sports engagement across diverse cultural contexts. A review of studies from Western European countries shows that while sports participation is influenced by social class, the relationship is hardly linear, and more complex models are needed to understand this relationship [25]. Another study from United Kingdom supports the idea that social class influences sports engagement. According to this study, individuals from higher and middle class have higher participation rates for sports which require high financial investment, whereas working class participate in football and community-based activities [26].

Similar notions and findings are implied by studies conducted in Australia and Canada where sports participation is directly impacted by social class, in particular, with middle-class families investing more in children's organized sports activities [27]. However, this pattern does not hold true for Nordic countries. Class based sports participation parities are minimum in Nordic states, which may be due to the institutional frameworks in place, which moderate the relationship between social stratification and sports engagement [28]. These international findings and lack of studies examining social class-based sports participation provide essential context for examining whether similar patterns exist within Hungarian society and inform our first hypothesis regarding the relationship between social class and sports participation.

The primary hypothesis (H1) addresses the relationship between social stratification and sports participation. The authors assert that "social stratification plays a significant role in determining sports participation," specifically stating that "the higher the social class the higher the number of people engaged in sports." This hypothesis is grounded in theoretical expectations that individuals from higher social classes would have greater access to sports opportunities due to their financial resources and leisure time availability.

Contemporary international literature reveals a growing convergence between sports engagement, health consciousness, and dietary supplement consumption across developed economies. Studies conducted in the United States of America have shown that individuals with higher sports involvement may exhibit greater health awareness and supplement usage, particularly protein, vitamins, and specialized performance enhancers [29]. Similar findings have been reported by studies conducted in some European countries that individuals highly engaged in sports activities are more likely to gather information related to nutrition and food supplements as well as invest more in health-promoting products [30]. Notably, studies conducted on

Japan and South Korea suggest similar trends as western countries with middle-class sports enthusiasts showing similar consumption patterns regardless of cultural background [31].

A meta-analysis of studies focused on sports engagement impacted by social stratification relationship is mediated by health consciousness, where sports participation increases awareness of nutritional needs, subsequently driving supplement consumption [32]. Several studies conducted in Middle East and East Asia indicate that among middle-class populations, sports engagement correlates with consumption of specialized supplements targeting digestive health and mental well-being, reflecting sophisticated understanding of holistic health approaches [33]. These global patterns support our hypotheses regarding the relationships between sports engagement, health consciousness, and supplement consumption, while positioning our Hungarian study within the broader international research landscape. In light of the above discussion, the following hypotheses are proposed:

- H1:** Individuals belonging to higher social classes are more likely to participate in sports than those from lower social classes.
- H2:** Individuals with higher levels of sports engagement are more likely to use dietary supplements.
  - H2a:** Individuals who are strongly engaged in sports are more likely to consume protein, mineral, and vitamin supplements than those with lower engagement.
  - H2b:** Individuals who are strongly engaged in sports report higher levels of knowledge about dietary supplements.
  - H2c:** Individuals from higher social classes are more likely to consume dietary supplements than those from lower social classes.
- H3:** Higher levels of sports engagement are associated with greater health consciousness.
  - H3a:** Individuals who are more engaged in sports pay greater attention to their dietary habits and mental health.
  - H3b:** Among individuals outside the middle class, higher levels of sports engagement are associated with better cognitive and physical health outcomes.
- H4:** Among the middle class, individuals with higher sports engagement are more likely to consume dietary supplements targeting digestive and mental health.

### 3. MATERIALS AND METHODS

According to [34], questionnaire surveys can serve exploratory, descriptive, and explanatory purposes. They are used in research where the individual interviewee is the subject of the study. Questionnaire surveys are probably the best method available to social researchers when they want to collect original data on a population that is too large for direct observation. Questionnaire surveys are an excellent

tool for assessing the attitudes and opinions of large populations [35]. The questionnaire variables were sorted into four dimensions: sports engagement; health status; the consumption of general and specific food supplements; and the basic features of the respondents. The sports engagement variables (e.g. sports engagement and sports conservatism) were mostly adopted from the works of [35] and [18], the variables related to health status were defined independently, the variables related to food consumption relied partially on the works of [22] and the final dimension partially relied on the work of [36]. The questionnaire was coded into a Google Drive online form editor for easier self-completion and evaluation, after which a link was created for completion. The questionnaire was made available primarily to university students majoring in sports engagement from courses, such as Sports Organization, Sport and Recreation Management, and Sports Economics and to students with different levels of sports engagement (from other economic education courses). The aim was to achieve the highest possible response rate in accordance with the specifics of the exploratory research. The questionnaire was available to complete between 12/09/2023 and 03/11/2023. Admission was self-guided, but instructor assistance was provided per course. At the end of the survey, the questionnaire database was stored in .xls format. After reviewing and correcting the database, the data was recorded and evaluated in an IBM SPSS Statistics (.sav) file (version 23) [37]. In total, data from 335 respondents were recorded across 134 variables.

Examining the socio-demographic background of the respondents (Table 1), it can be concluded that 43% of the sample were male and 57% were female. The respective proportions of the male and female populations were 47.9, and 52.1 [38], so the sample can be considered representative in terms of gender based on the Chi-squared test ( $\chi^2 = 1.54$ ;  $P = 0.214$ ), which could not detect differences in the proportions.

Table 1. Distribution of the middle-class sample across gender, age, and place of residence

Gender	Counts	% of Total
Male	144	43.0%
Female	191	57.0%
<b>Age in years</b>		
18–21	266	79.4 %
22–25	33	9.8 %
26–30	13	3.9 %
31–40	6	1.8 %
41–50	9	2.7 %
Over 50	6	1.8 %
missing	2	0.6%
<b>Place of residence</b>		
City	137	40.9 %
Village/other	57	17.0 %
County town	128	38.2 %
Capital	11	3.3 %
missing	2	0.6%

$N = 335$ .

Source: Authors' own research results.

## 4. RESULTS

### 4.1. Bibliometric analysis and research aim

A thorough literature review was conducted to investigate the relationship between the middle class and their engagement in sports and their attitudes towards sports conservatism and use of food supplements. Academic databases such as Scopus and Web of Science were searched using carefully selected keywords to identify articles shedding light on these dynamics. The keywords “middle class”, “sports engagement”, “sports conservatism”, “food supplements”, and “nutritional supplements” were the keywords used to search for relevant research articles in English. Priority was given to articles in English with the specified keywords in the titles, abstracts, and keywords when searching the Scopus and Web of Science databases. Consistency was maintained across both databases. Following the initial search, the results were thoroughly reviewed and compared against our predetermined criteria encompassing relevance to the themes of the study, language, and scholarly merit. This meticulous selection process led to the identification of a corpus of articles forming the basis of our bibliometric analysis.

These selected articles played a key role in shaping the current research landscape and highlighting gaps in the middle class’s participation in sports, their attitude towards sports conservatism, and their use of dietary supplements. The rigorous methodology enabled a comprehensive range

of literature to be gathered, which was essential for examining the complex relationship under investigation. This laid the foundation for a detailed exploration of the middle class’s engagement in sports and related behaviours.

Figure 1 presented the author’s keyword map, illustrates the complex interplay of interconnected topics organized into thematic clusters. The keywords such as ‘dietary supplements’, ‘food intake’, and ‘nutritional supplements’ act as focal points for a broader discourse on nutrition and lifestyle. The close association between the terms ‘physical activity’ and ‘nutritional supplements’ suggests a significant overlap in the research examining nutrition’s role in physical and sporting activities.

Each color in the figure represents a cluster. Purple Cluster (Social Determinants) emphasizes gut microbiota and oral nutritional supplements, showing links to digestive health—a key aspect of your findings on middle-class supplement preferences. In the context of our study, this cluster may be of interest to the middle-class demographic, as it forms part of a growing body of literature exploring the impact of global challenges on dietary habits and health outcomes. Linked to the middle class’s involvement in sports is the intersection of purple, blue and green clusters. The analysis of this intersection adds contextual depth to the wider subject of nutritional supplementation and its societal implications. These insights were incorporated into the research, with the study being positioned within this landscape by examining how the middle class engages with sports and how this relates to their dietary supplement choices.

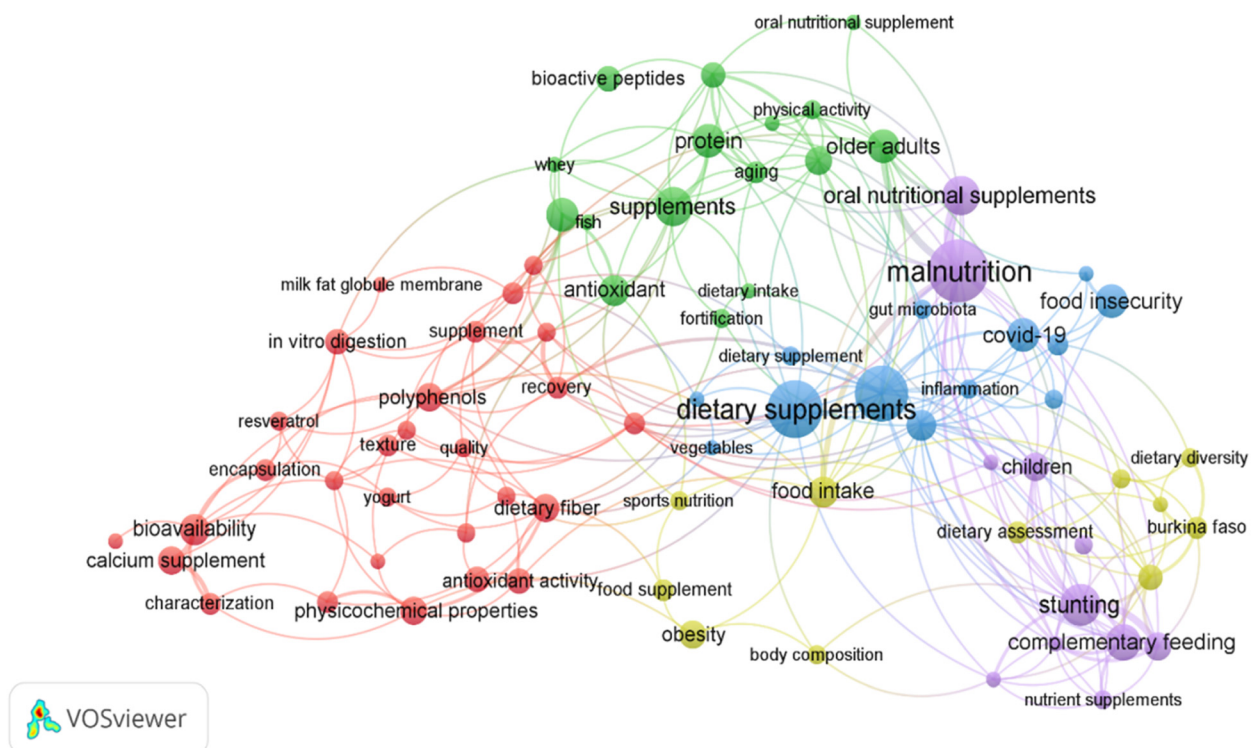


Fig. 1. Author keyword map

Source: Authors’ own construction using VOS Viewer.



- Physical activity and aging: The cluster on Physical Activity and Aging indicates a strong interest in understanding the effect of physical activity on health outcomes, particularly in older adults, which is relevant to middle-class lifestyles.

*Lower density areas:*

These areas could represent emerging fields or niches within research that have not been extensively explored, which may indicate potential areas for further investigation.

- Sports nutrition and dietary fiber: Further research in these areas, particularly in relation to middle-class sports participation, could be beneficial given their lower population density.
- Bioavailability and physicochemical properties: The current literature seems to place moderate emphasis on the technical aspects of nutrition, suggesting this is a specialised field of research that has not yet become saturated.

Another purpose of the study was to examine how the sports engagement and conservatism among the middle-class might affect dietary habits, particularly with regard to supplement intake. Disparities between areas of varying research intensity were also addressed by investigating the intersection between the well-researched field of dietary supplements and the lesser-explored area of sports nutrition among the middle-class population. In conclusion, the density map can be used to explore research areas that have not yet been fully investigated, while also providing context for well-established fields of study. The main objective was to enhance our understanding of the relationship between socioeconomic status, sports participation, and nutrition.

#### 4.2. Sports engagement, sports conservatism, and social stratification

According to [26], the activity is gaining popularity due to the establishment of industrial society and increased leisure time. This is why historically, members of the aristocracy and bourgeoisie were more likely to participate in sports, as their financial means and leisure time allowed for it. However, individuals from disadvantaged backgrounds often lack the opportunity to engage in sports and enjoy the associated benefits of physical activity due to a variety of social factors. While there may be some exceptions, their chances of participating in sports are generally much lower. The Youth 2000–2012 research suggested that social status, which encompasses factors such as gender, education, economic situation, type of place of residence, and student status, may have a considerable impact on a young person's involvement in sports [27]. Therefore, the authors explored the correlation between sports engagement and social status within the sample. The main hypothesis was that social classification plays a significant role in determining sports participation (H1). The higher the social class (as determined by self-administration and subjective income sensitivity), the higher the number of people engaged in sports." However, the primary results showed that there was no significant relationship between sports conservatism and social class

(Kruskal-Wallis statistic = 1.16;  $P = 0.561$ ), or between sports engagement and social class (Kruskal-Wallis statistic = 3.74;  $P = 0.154$ ). Therefore, H1 was rejected.

#### 4.3. Sports engagement, health-related conditions, and supplement

Goldsmith and Abel [26] stated: "At the same time, the attitude towards the healthiness of sport and, in the case of the Hungarian model, the importance of winning and competition has the greatest influence: the more important these are for the individual, the more motivated he or she is to engage in regular physical training. In this way, the more we can strengthen the key role of sport in health promotion in the value system of students, the more students could be persuaded to participate in sport, regardless of their social background". With regards to these statements, it may be worth considering the ways in which sport can contribute to maintaining good health. The hypothesis was as follows (H2): "Those who are strongly engaged in sports take dietary supplements more regularly, especially protein, mineral and vitamin supplements (H2a). Athletes also consider themselves to be better informed about dietary supplements (H2b), and social status impacts dietary supplement usage (H2c)". Results revealed that, overall, 54% of the respondents took some kind of dietary supplement, while 46% did not. A total of about 1,197 responses were received from people taking dietary supplements. A list of eight types of supplements was compiled from [22]. The results are illustrated below in Table 2. Vitamins were the most frequently taken dietary supplement in 23% of all responses (85.7% of all respondents indicated this), followed by minerals (19.2% of all responses and 71.7% of respondents) and multivitamins (with 15.1% of all responses and 56.4% of all respondents).

The authors proved H2a using two approaches. First, they studied the proportion of sports engagement categories among respondents taking individual dietary supplements (see Fig. 3). Then they examined the differences in the

Table 2. Distribution of the sample by supplement type consumption

Dietary supplements	Respondents (people)	Percentage of all responses (%)	Percentage of all respondents (%)
Vitamins	275	23.0	85.7
Minerals	230	19.2	71.7
Plant based	101	8.4	31.5
Protein	151	12.6	47.0
Fatty acid	112	9.4	34.9
Multivitamins	181	15.1	56.4
Intestinal flora related	87	7.3	27.1
Mentally related	60	5.0	18.7

Source: own data.

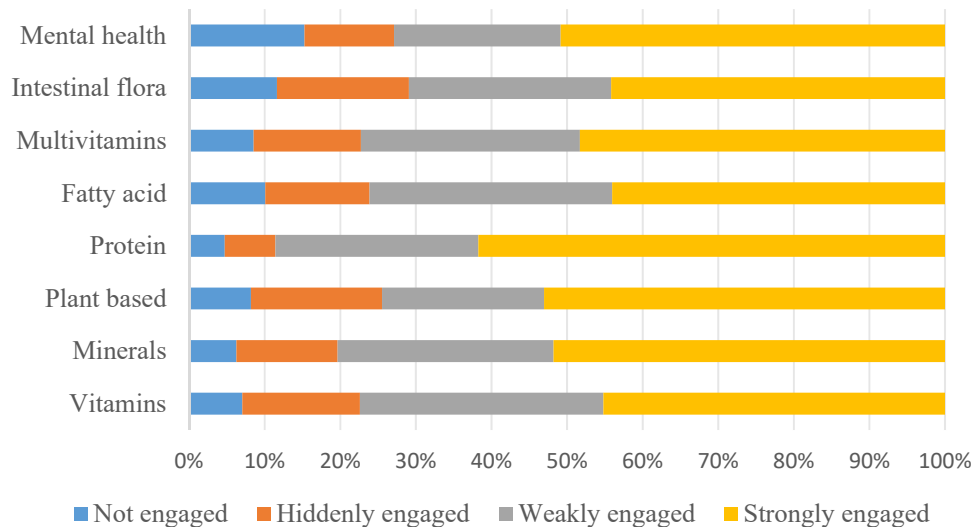


Fig. 3. The proportion of sport engagement categories among respondents taking individual dietary supplements  
Source: Authors' own research results.

average number of dietary supplements in each sports engagement group. Among those who took protein supplements, 62% were strongly engaged in sports, 27% were weakly engaged, and 11% were not or hiddenly engaged (see Fig. 3). Among those who did not take protein supplements, 28% were strongly engaged, 35% were weakly engaged, and 37% were not or hiddenly engaged in sports (Chi-square = 41.81;  $P < 0.001$ ). Among those who took minerals, 52% were strongly engaged in sports, 29% were weakly engaged, and 19% were not or hiddenly engaged (see Fig. 3). Taking the non-takers into consideration, 25% were strongly engaged in sports, 39% were weakly engaged, and 36% were not or hiddenly engaged (Chi-square = 22.71;  $P < 0.001$ ).

The average number of dietary supplements taken differed between the sports engagement categories (Kruskal-Wallis statistic = 9.99;  $P = 0.019$ ). The average of those who were strongly engaged in sports was significantly higher (4.08) than those who were weakly, hiddenly, or not engaged (3.41, 3.50, 3.44, respectively). Athletes took more supplements and other types of food. Based on the two analyses, H2a was supported.

There was also a strong correlation between sports engagement and information about dietary supplements. The Kruskal-Wallis analysis (Kruskal-Wallis statistic = 16.67;  $P < 0.01$ ) revealed that those who were strongly engaged in sports had a significantly higher average (3.16) than those who were weakly engaged (2.79), hiddenly (2.63) or not engaged at all (2.53). Therefore, respondents in the strongly engaged group considered themselves to be better informed, and H2b was fully confirmed.

Lastly, the authors studied the relationship between social status and dietary supplement usage. Among those who took supplements related to intestinal flora, there was a significantly higher proportion reported being from the upper class compared to those who did not take these supplements (16.2% vs 5.2%) (chi-squared = 9.56;

$P = 0.008$ ). Among vitamin users, a significantly higher proportion said they were from the middle class compared to non-users (88.4% vs. 80.0%) (chi-square = 7.91;  $P = 0.019$ ). Therefore, H2c could only be partially confirmed, for only vitamins and intestinal flora supplements.

#### 4.4. Sports engagement, health consciousness

Health inequalities are a particular form of social injustice in modern societies. They are present in all countries and affect different gender, age, and social groups [28]. This research can provide insight into whether increased levels of sports engagement may lead to greater awareness of healthy eating habits and mental health (H3a). Furthermore, there is a positive relationship between sports engagement and cognitive and physical health status among individuals who do not belong to the middle class (H3b). Examining the relationship between sports engagement and general or mental health, as well as attention to eating habits, using Kruskal-Wallis analysis revealed that love of eating food did not differ significantly based on sports engagement (Kruskal-Wallis statistic = 3.56;  $P = 0.313$ ). However, there were differences based on all other factors ( $P < 0.001$ ). Figure 4 illustrated that individuals who were strongly engaged in sports paid more attention to their health and eating habits. Considering these results, H3a could be confirmed.

It is possible that those who are not or hiddenly engaged in sports may not give much attention to the matter. Considering individuals who did not belong to the middle class, the following outcome was observed:

The Kruskal-Wallis analysis revealed that only cognitive health status (Kruskal-Wallis statistic = 12.11;  $P = 0.007$ ), actual health status (Kruskal-Wallis statistic = 11.25;  $P = 0.010$ ), and attention to eating habits (Kruskal-Wallis statistic = 10.62;  $P = 0.014$ ) differed significantly. As can be seen in Fig. 5, people who were heavily involved in sports

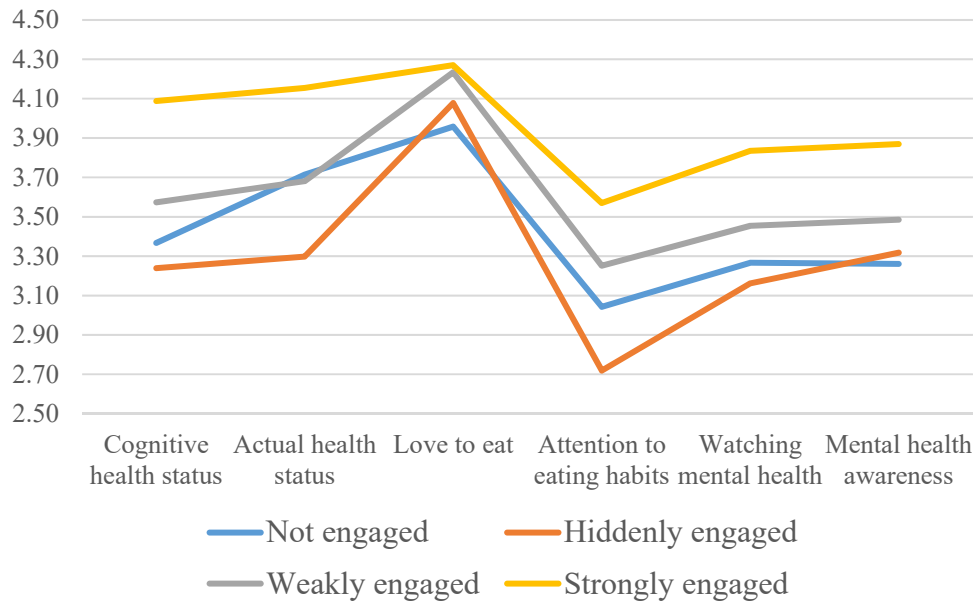


Fig. 4. Sports engagement and the different health related issues  
Source: Authors' own research results.

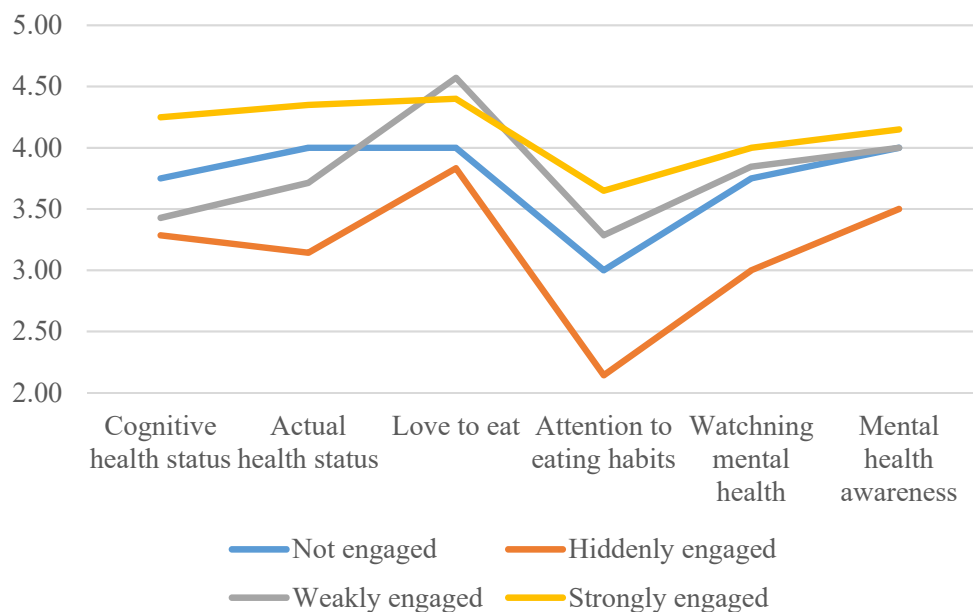


Fig. 5. Sports engagement and different health related issues outside the middle class  
Source: Authors' own research results.

outside the middle class had much higher average scores on these three factors, thus confirming the hypothesis H3b.

#### 4.5. The frequency of food supplement consumption

A positive relationship should exist between social status and the consumption of food supplements. The study provided insight into the use of mental health and digestive supplements. According to the final hypothesis, these supplements should be used more frequently by active members of the middle class (H4).

The Kruskal-Wallis analysis showed no significant differences in the frequency of use of supplements to maintain mental health (Kruskal-Wallis statistic = 6.06;  $P = 0.109$ ), but the frequency of use of supplements to protect the gastrointestinal system was significantly different (Kruskal-Wallis statistic = 9.97;  $P = 0.019$ ). Figure 6 also showed that the more severely engaged members of the middle class were more likely to take digestive supplements. The hypothesis H4 was partly confirmed.

The results of hypothesis testing are summarized in Table 3, below:

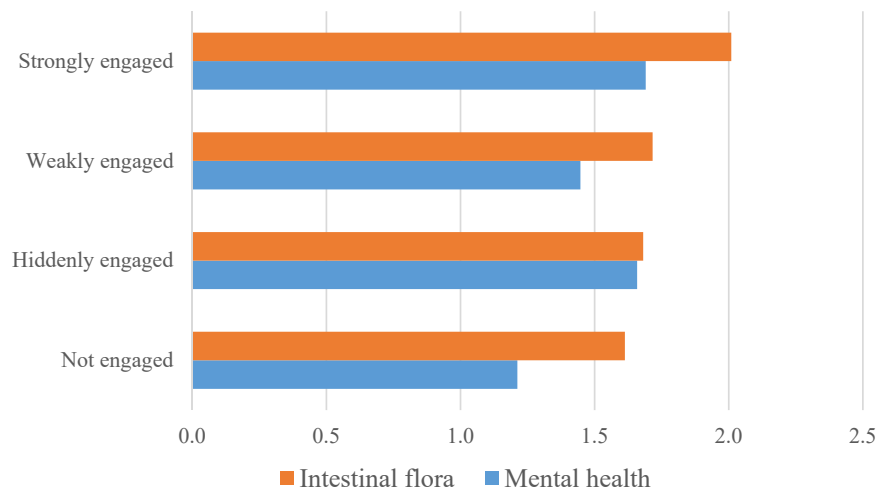


Fig. 6. The relationship of middle-class sports engagement with mental and gastrointestinal dietary supplements  
Source: Authors' own research results.

Table 3. Table summarizes the outcomes of hypothesis testing

Hypothesis	Description	Test statistic	Result
H1	Individuals belonging to higher social classes are more likely to participate in sports than those from lower social classes.	Kruskal-Wallis = 3.74, $P = 0.154$	Rejected
H2a	Individuals who are strongly engaged in sports are more likely to consume protein, mineral, and vitamin supplements than those with lower engagement.	Chi-square = 41.81 (protein), 22.71 (minerals), $P < 0.001$	Accepted
H2b	Individuals who are strongly engaged in sports report higher levels of knowledge about dietary supplements.	Kruskal-Wallis = 16.67, $P < 0.01$	Accepted
H2c	Individuals from higher social classes are more likely to consume dietary supplements than those from lower social classes.	Chi-square = 9.56 (intestinal flora), 7.91 (vitamins), $P < 0.05$	Accepted (partial)
H3a	Individuals who are more engaged in sports pay greater attention to their dietary habits and mental health.	Kruskal-Wallis = varies, all $P < 0.001$ except 'love of food' ( $P = 0.313$ )	Accepted
H3b	Among individuals outside the middle class, higher levels of sports engagement are associated with better cognitive and physical health outcomes.	Kruskal-Wallis = 12.11 (cognitive), 11.25 (health), 10.62 (eating habits), all $P < 0.05$	Accepted
H4	Among the middle class, individuals with higher sports engagement are more likely to consume dietary supplements targeting digestive and mental health.	Kruskal-Wallis = 9.97 (digestive), $P = 0.019$ ; 6.06 (mental), $P = 0.109$	Accepted (partial)

Source: own data.

## 5. DISCUSSION

The results of hypothesis testing summarized by Table 3, suggest that although sports are often praised for promoting social equality, subtle inequalities in access to sports and participation in daily physical activity have actually increased, despite the legal restrictions based on race, gender, or class. H1 was rejected, as the findings did not support the claim that social stratification significantly influences sports participation. It seems that even subjective or objective classification of sports engagement due to income and social status are not significant in case of Hungarian society.

Although previous studies supported the assertion that income or social classes are a factor in sports engagement [39]. Some reasons behind rejecting H1 could lie in Hungary's distinct social and institutional fabric. There, chances to join sports are not strictly tied to wealth or class. Free public sports centers, school sports lessons, and accessible play areas might help level the field. This contrasts with other countries where class often limits access. Alternatively, for Hungary sports engagement may be more influenced by cultural norms or institutional access than by traditional class distinctions.

The results supported the hypothesis H2 and sub-hypothesis H2a and H2b and partially supported H2c. Data confirmed that athletes and individuals with high sports

engagement consumed more supplements as hypothesized. These are in line with results from earlier studies which observed higher rate of supplement consumption among elites and recreational athletes [19]. Similarly, our results showed that sports engaged individuals are more informed about dietary supplements. These results are aligned with previous studies that showed sports engagement leads to higher dietary knowledge leading to more informed health and dietary decisions [32].

H2c which examined the role of social status and supplement usage was partially supported. Although our data does not yield any trends across supplement usage, certain products for example vitamins and digestive supplements are consumed more frequently by upper- and middle-class respondents. This partial confirmation aligns with Bourdieu's (1978) theory of cultural capital which states that health behaviors such as consumptions of food and dietary supplements are class marking practices.

Several studies have confirmed that individuals from lower social classes are less convinced of the importance of participating in sports and exercise less than those from middle and upper social classes [39]. Meanwhile, individuals from educated middle classes view sport as a personal responsibility to take care of their bodies. The consumption of these different forms of capital varies among social groups.

The hypothesis H3, which stated that higher levels of sports involvement are associated with greater health consciousness, was supported. More specifically H3a was accepted, the hypothesis proposed that respondent highly engaged in sports report significantly higher focus on dietary habits and mental well-being. These findings align with the results of earlier studied that had shown link between physical activity and increased focus on health maintaining behavior [26]. The author notes that the upper middle class, comprising 10.5% of the Hungarian population and is mostly concentrated in urban areas, tends to be highly engaged in sports and consume supplements for physical and mental well-being.

The results partially confirmed H4, while no significant difference was found between the usage of mental health supplements across varying levels of sports engagement in the middle class. However, digestive health supplements were significantly more consumed by those with higher sports engagement. This indicate that the Hungarian middle class is particularly responsive to health trends such as gut health which is often intersect broader wellness and sports culture. The findings partially align with previous studies however lack of significant results for mental health supplements may indicate cultural or market specific factors in Hungary [33].

Together, the results for H3 and H4 support the notion that sports engagement not only reflects physical activity but also integrates into a broader framework of health-oriented behaviors, with varying degrees of influence depending on the health domain and sociocultural context. It could be argued that the organisation and cost of sports participation varies according to social class. As noted by [40], there appears to be a trend towards greater organisation and expense

towards physical and mental wellbeing amongst the middle and upper classes. This view was also supported by [41].

## 6. CONCLUSIONS

The theoretical section of the paper examined the Hungarian perspective on social stratification, covering a variety of models. The middle class was presented as a key element of modern societies. As previously mentioned, there was a correlation between class distinction and consumption habits. In light of this, it is worth considering whether there may be differences in the use of sports and dietary supplements among different social classes. A systematic literature review has identified thematic clusters and high- and low-density keyword areas. Author affiliation research revealed a significant concentration of research originating from the USA, England, and China, suggesting substantial output and potential collaboration between these countries. This survey aimed to identify differences in sports participation, health status, and dietary supplement use among different social classes, focusing on middle class characteristics.

Analysis of the sample suggested that individuals with a more conservative approach to sports were more likely to participate. 60% of respondents in the most conservative sports category reported involvement in sports. It has been also observed that athletes tend to consume supplements and other types of food more frequently. Furthermore, a notable relationship was found between sports engagement and knowledge about dietary supplements. Self-reported social status was found to impact intestinal flora and vitamin consumption. Across the entire sample, it appears that individuals who are highly engaged in sports, tend to pay more attention to their health and eating habits. Additionally, a higher level of exercise seemed to be associated with better cognitive and physical health status, particularly outside of the middle class. According to recent research, there appeared to be a relationship between middle-class individuals who are interested in sports and their likelihood of taking supplements to protect their gastrointestinal system. The study suggested that sports engagement is primarily associated with sports conservatism, and that this may explain differences in health issues and dietary supplement use.

The study is subject to several limitations that are acknowledged. First, the sample primarily consisted of university students mostly belonging to young adults age group which may limit the generalizability of the findings to the broader Hungarian population. The study collected the data utilizing the cross-sectional design which may restrict causal interpretations as variable associations do not imply directionality or temporal precedence. Although the study employed both subjective and objective measures, it may not have fully captured the complexity of socio-economic status and class identification.

Future researchers could expand on our studies finding by accumulating data from more diverse and representative sample across various age groups, income levels and

geographic regions from within Hungary. By employing longitudinal methodology, researchers can explore how sports engagement and health behaviors evolve with time and across social statuses. Qualitative approaches such as interviews and focus groups can be employed to gain rich insights into the motivation behind supplement use and sports participation across different social classes. Another avenue for future research could be examining the impact of digital and social platforms on health literacy and sports engagement.

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