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Study on the Relationship between Upgrading of Sports Consumption Structure and Subjective Happiness of Chinese Residents--An Empirical Analysis Based on CGSS Data

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SUMMARY: *With the help of information from the CGSS 2024 survey, the paper explores the impact of sports consumption structure upgrade of Chinese residents on their subjective well-being and the processes through which this is achieved. The construction of an ordered classification logistic regression model and an ordinary least squares (OLS) model reveals the direct influence of the upgrade of the sports consumption structure. In this context, the upgrading of the sports consumption structure significantly and positively affects the subjective well-being of residents in the sense that the higher is the degree of structure upgrade, the better subjective well-being the residents would have. Furthermore, the paper finds some differences depending on different income groups. The paper shows that the influence of the sports consumption structure upgrading on subjective well-being is statistically significant at the 1 percent confidence interval level for residents whose yearly income does not exceed 20,000 yuan and at the 5 percent confidence interval level for residents who earn between 20,000 and 50,000 yuan annually.*

KEYWORDS: *Ordered Categorical Logistic; OLS model; CGSS; Subjective well-being*

1 Introduction

With the reforms and open policies implemented since its launch, China has seen tremendous progress in its productive forces, with the comprehensive national strength improved by leaps and bounds. At the same time, the strategic significance of the sports industry is also growing. In particular, in this field, sports consumption has been endowed with many roles and functions [1-3]. In 2018, China announced its ambition to improve the consumption ladder upgrade of rural residents to reduce the difference in consumption between cities and villages, hoping thereby to better satisfy its people's desire for a high quality of life [4, 5]. In 2019, with the Opinions of the General Office of the State Council on Promoting National Fitness and Sports Consumption and Promoting the High-quality Development of the Sports Industry, China further recognized the indispensable nature of the sports industry in fulfilling its citizens' desire for a better life. In this respect, through issuing these two policy documents one after another, the Chinese government was able to lay down a good foundation for realizing the new mission demands, improving the well-being of the Chinese citizens, ensuring this feeling of well-being in the long run, and promoting the health of their physical and psychological well-being and

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creating a healthy atmosphere for everyone [6-9].

In the marketing of sports consumer services, enhancing the well-being of sports consumers is now viewed as an important strategy to promote the sports service sector's development, while sports consumption behaviors can also be considered healthy leisure activities [10-12]. As subjective well-being constitutes an essential criterion for people's quality of life, it plays an important role in social life, and improvements in it also bring practical benefits not only to the residents themselves, the society as a whole, and even the government administration, and how to improve the people's sense of well-being is an important issue for social development [13-17]. Currently, Chinese residents' demand for sports has caused a change in the social consumption structure and consumption pattern, and sports consumption occupies an important position in promoting people's good life [18, 19]. The government has equally acknowledged the large impact of sports consumption on urban economic development. This has been achieved through efforts aimed at the bigger picture of making sure that the feeling of gain, happiness, and security in people’s lives is made more fulfilling and more sustainable [20-22]. The academic community has strived to measure the connection between sports consumption behavior among Chinese citizens and their subjective well-being, it is possible to see the extent to which sports consumers' sports consumption affects their subjective well-being, which provides a new perspective for sports marketers, enterprises and governments.

Currently, researchers have explored the interaction and unidirectional mechanism of action between sport consumption and SWB through a variety of analytical models and analytical methods. Using the concept of stimulus-organism-response framework, Guo et al. [23] formulated a conceptual model to study how sports consumption behaviors affect subjective well-being. From their study, it was established that sports consumption behaviors have a significant effect on subjective well-being in individuals with both social support and self-esteem playing the role of mediators in the process. Integrating a variety of analytical approaches, KIM et al [24] reported that propensity to consume under different types of recreational sport participation directly or indirectly affects consumer well-being, and that there is a structural relationship between the two and the propensity to achieve goals. According to Thormann et al. [25], regression analysis was used to determine that spectators who opted for sustainable transport when going to sports events had higher subjective well-being, while those who recycled regularly experienced its positive influence. Wicker [26] used Ordinary Least Squares regression models to determine the degree to which various forms of sports participation trips affected subjective well-being; he discovered that vacations and training camps had a positive impact, while training courses had a negative one. Zhijun et al. [27] applied factor analysis and multiple regression analysis to determine the relationship between sports tourism consumption and subjective well-being based on survey results obtained from rural residents in China; they discovered that such a mode of consumption increased employment chances. Moreover, the more positively people evaluated sports tourism consumption, the greater was the degree to which it impacted subjective well-being, and participation acted as an intermediary factor in this process. According to Tang & Wang [28], community and cultural benefits played a vital role in increasing subjective well-being among Macanese citizens; on the contrary, quality of life and resources allocation issues negatively impacted the phenomenon.

Kim et al [29] demonstrated that sports event viewing consumption promotes viewers' subjective well-being in the context of fan behaviors and media consumption by fulfilling the hedonic, life-meaningful, and social needs experienced by viewers. It was shown by Kinoshita et al. [30] that there exists a correlation between the viewing of sports media and self-reported subjective well-being, based on the stimulation of the brain and an increase in the structural

volume of the brain regions responsible for well-being. It is also worth noting that sports which are not very popular were shown to have a tendency to create a positive correlation. Guo et al. [31] showed that there were three pathways through which media about sports events positively influenced subjective well-being. Ramchandani et al. [32] used the concept of subjective well-being as a construct to evaluate the influence of sports events' viewing on subjective well-being, emphasizing the direct and indirect effects on this measure through inspirational effects. Jang et al. [33] focused on the issue of time; consumers with low identification had a higher sense of life purpose after recalling their historical consumption experience than at 15 minutes post-consumption, whereas consumers with high identification had a higher dyadic value after recalling their historical consumption experience, which delayed hedonic adaptation, thus contributing to subjective well-being enhancement. The study by Kim & James [34] analyzed the influence of sports consumption on subjective well-being over different time frames using ecological momentary assessment and multilevel structural equation modeling. The findings revealed a positive connection between subjective well-being and participation in sports as well as watching sports events. However, when it comes to sports consumption media, it can show both positive and negative influences on subjective well-being depending on its context.

As for Song et al. [35], the researchers used structural equation modeling and a nonprobability sample in their study and proved that participation in such leisure sports activities as playing golf and skiing and ostentatious consumption of these sports activities led to an increase in the level of individuals' perceptions of subjective well-being. Also, Gan & Jiang [36] found the confirmation of a positive correlation between the frequency and intensity of sports activities carried out by people and their subjective well-being. This correlation differed for people of different ages, marital status, political status, etc. In addition, Wen et al. [37] identified that frequent fitness and physical activity performed by residents of neighborhoods with high density of leisure facility infrastructure positively impacted their subjective well-being except for the white-collar employees of China, which, in its turn, increased the consumption of leisure and fitness activities. In their research Liu & Zhong [38] used the data obtained from the 2018 China General Social Survey (CGSS) database and determined that the sports activities performed by people positively impacted their well-being via increased subjective class identity and better health; however, this correlation was stronger for elderly participants. Finally, Armbrecht et al. [39] established the fact that participation in serious sport and leisure activities and undergoing training led to increased equipment consumption. Nevertheless, no impact of such behavior on subjective well-being was detected, and it was associated with decreased enjoyment.

Using the 2024 CGSS database, this research explores the impact that the upgrading of the sports consumption structure can have on the subjective well-being of Chinese residents through the use of an ordered classification logistic model and ordinary least squares. Residents are categorized according to their three income groups, and the ordered classification logistic model is used again in a grouped regression analysis to determine if there is any significant difference in the impact of the upgrading of sports consumption structure on subjective well-being for residents in each income category. An endogeneity test was also conducted by applying the instrument variable approach as well as two-stage least square regression. The inclusion of "degree of social trust" and "education level of parents of respondents" in the above process supports the conclusion that upgrading the sports consumption structure significantly affects subjective well-being.

2 Rationale and research hypotheses

2.1 Theoretical foundations

2.1.1 Subjective well-being

Subjective well-being can be defined from an emotional perspective in psychology. It puts much focus on the overall evaluation of the quality of a person's life from a personal point of view, thereby working as a holistic measure for determining life quality psychologically by showing how well the person copes socially with their surroundings. Early theoretical constructs of subjective well-being focused on proving how external factors such as events and situations form subjective well-being, but some studies have proved that the internal constructs of individuals determine how external factors are perceived by individuals, which influences the formation of individuals' well-being. Research has accordingly shifted to studying the factors inside the body that have the biggest influence on subjective well-being. This has led to the increased use of theories like comparison theory and self-determination theory. According to the self-determination theory, there is a development need within each individual. As long as this need is fulfilled appropriately, a person is expected to grow towards health and making wise decisions, thereby being able to enjoy the joy that comes from living rationally and positively. In comparison theory, however, subjective well-being occurs when a person compares their reality to a reference point. Comparisons may be made either horizontally, which is done concerning other people, or longitudinally, where a person's present situation is compared with what they have experienced in the past. If the reality turns out to be better than the reference point, then a person is expected to have high levels of subjective well-being.

2.1.2 Current situation of sports consumption structure

Before the reform and opening-up policy, living conditions and the quality of life of residents of China had been relatively low, and the level of consumption had stayed basically on the level of clothes, food, house, and transportation. After the implementation of the policy of reform and opening up, with the flexible implementation of many national economic policies, there has been an obvious improvement in the living standard of residents, as well as tremendous change in the consumption pattern. In today's context where people's consumption has risen, the emphasis has been placed on the pursuit of living quality and diversified spiritual needs. In this way, consumption is not limited to the basics of clothes, food, house, and transportation but gradually extends to the consumption of recreation, in which sports consumption plays a prominent part.

Sports consumption belongs to the consumption of residents, and its structure refers to the proportional relationship between various sports products and sports services consumed by residents in their daily life. The following are some dimensions in the sports consumption of residents: number of sports products and services; variety of sports consumption goods and services; share ratio of sports consumer goods and services in total consumption; and form of sports consumer goods and services.

The development of the sports industry in China has continued at a steady pace every year, and this trend received a strong impetus in connection with the Winter Olympics in Beijing 2022 due to good conditions from the state level. Based on statistical information, the number of active users in the sport and fitness industry exceeded 930 million by February 2024, and the number of registered athletes on professional fitness apps was close to 80 million people, among which women constituted 52.6%. These figures illustrate the degree to which sports have become a part of the lifestyle of the residents of China. From the age level, after 00, after 90

generally very interested in fitness, fat loss, while other age groups, such as after 70, after 80 this group is more exercise through walking, and after 90, after 00 fitness, fat loss need to buy exercise courses and equipment, but also from the side of the sports consumers are generally young people. Middle-aged and elderly people tend to walk, obviously they are not the main sports consumers. Speaking about the geographical aspect, sports consumption in first-tier cities exceeds sports consumption in other urban territories significantly. The dynamics of sports consumption follow the financial condition of the population, and therefore, the income level of the population in the first-tier cities being rather high, sports consumption in these cities is higher than in other cities. The participation of residents in sports contributes to an increase in consumption in this area, namely, consumption of sports shoes and sportswear becomes especially high. As for the online purchase of sports shoes and sportswear by the residents, the proportion of the group aged 32 to 36 is larger, reaching 37.1%. In addition, due to the continuous updating and change of the products, their designs are becoming more and more fashionable and trendy, thus attracting more female consumers into the market. At the same time, with people's love for fat loss and fitness, it also drives the development of the catering industry, and a wide variety of fat loss meals and meal replacement foods have begun to appear on the market.

2.2 Research hypotheses

Sports consumption is now becoming an essential element in the consumption behaviors of the residents. From the perspective of self-determination theory, there are certain roles played by sports consumption concerning enlightening and educational roles, improving physical and mental health, and developing personality and intelligence. This way, sports consumption helps in the building up of human capital of individuals and also helps in making the individual develop comprehensively, so the increase in sports consumption and the optimization of its structure make it possible to satisfy the development needs of the residents, and thus to experience the sense of well-being brought about by this kind of active life. On the one hand, residents can enjoy more complete sports consumption facilities, rich forms of sports consumption and preferential policies, this then encourages sports consumption by the residents, thereby ensuring their well-being is enhanced. Not only that, but sports consumption also assists residents to increase the proportion of enjoyment and developmental commodities in their consumption behavior, hence enhancing the quality and levels of consumption, leading to higher satisfaction in terms of well-being. Based on this analysis, this hypothesis emerges:

Enhancement of sports consumption structure is positively associated with subjective well-being of residents.

3 Data sources and research methodology

3.1 Data sources

In this paper, the data come from the China General Social Survey (CGSS). CGSS is a joint research project initiated by the Department of Sociology of Renmin University of China and the Center for Social Research of Hong Kong University of Science and Technology. The data come from the year 2024, and the respondents covered are people from 22 provinces, autonomous regions, and municipalities but not special administrative regions like Tibet, Qinghai, Ningxia, Hong Kong, Macao, and Taiwan. There are 3,522 observations in the raw data, with 3,311 valid observations. Since some observations have missing data related to key variables such as subjective well-being and sport consumption, these observations are removed from the analysis. Therefore, there are finally 2,522 observations in the analysis sample.

3.2 Selection of variables

In terms of the explanatory variables, based on the problem under study, the explanatory variable in this paper is residents' happiness (Happ). Currently, the evaluation and survey of residents' happiness around the world often adopts residents' self-assessment measurement, which can effectively reflect the level of individual happiness to a large extent, and the results of this measurement can be compared among different individuals. Therefore, this paper is based on the questionnaire information in CGSS and combines the results of the questionnaire survey to obtain the residents' happiness. The happiness of the residents was assessed through an interview question: “How happy are you?” Five possible answers for the respondents were “very unhappy,” “relatively unhappy,” “living between happiness and unhappiness,” “relatively happy,” and “completely happy,” coded in this order from 1 to 5.

As far as the explanatory variable is concerned, the main indicator is the sports consumption structure upgrading (Proportion), which was evaluated in this research paper by means of a special upgrading coefficient. Since in the current study the focus is made on the structure of sports consumption, the following assessment will be conducted based on the amount of spending on the goods and services of this type. The sports consumption structure upgrading level can be described by the proportion of the non-essential part of sports consumption among all expenditures on this type of consumption.

The control variables can be grouped into two major categories. The first category is related to the impact of individual and household factors on the well-being of the respondents, and this includes gender (Gender, where 1=Male, 2=Female), age and its square (Age_squ), labor force participation (Employ, 1=employed, 0=unemployed), educational attainment (Edu, where the educational variable has been coded from 1 to 7 in the following manner: 1=Illiterate or Semi-Illiterate, 2=Primary School, 3=Junior High School, 4=Senior High School/Secondary or Vocational High School, 5=College, 6=Undergraduate, 7=Postgraduate), marital status (Mar, 1=Married, 0=Unmarried/Divorced/Widowed), political status (Party, 1=Party Member, 0=Non-Party Member), general health status (Health, where the health variable has been categorized into five points, from 1=Unhealthy. Type, which is divided into 6 levels corresponding to 0 to 5), annual per capita income (Avg_finc), and household size (Family size). Another category controls the influence of residents' psychological characteristics on their own sense of happiness, including perception of social Status (Status, with a score ranging from 1 to 5, indicating an increasing level of perception), interpersonal Trust (Recog, with a score ranging from 1 to 5, indicating an increasing level of perception), and perception of social equity (Trust) Trust level =1, lack of trust =0) and income class perception (Fair, with scores ranging from 1 to 5, indicating an increasing perception level).

The descriptive statistics of each variable are shown in Table 1. From the descriptive statistics, we can see that Chinese residents' evaluation of happiness is 4.01, 4=comparatively happy, 5=completely happy. Chinese residents' feelings about happiness are relatively happy, and it can be concluded that the overall happiness of Chinese residents is relatively good. The average value of the sports consumption structure upgrading water is 0.501. The average age of the control variable sample as a whole is 39.78. People at this age are precisely those whose family structure is more stable, and the residents' ideological development is mature, which is more credible for being able to combine a variety of factors to make a comprehensive evaluation of the sense of happiness. The education level in the sample is 2.7, (2=elementary school, 3 equals junior high school) the per capita education level is between elementary school and junior high school. The proportion of those who are married is 85%, the proportion of those who are employed is 77%, the health level of the sample group is generally good, the per capita annual income is 15,426 yuan, and the size of the family is more than 5 people, China is a clan society with kinship as a bond, and the larger the size of a family in China means that the family

is prosperous, so it is believed that the larger the size of the family, the greater the sense of well-being of its family members. The factor of perceived social status is 3.01, indicating that residents generally feel that their status in Nohkou is higher than the general level. The mean value of the residents' perceived evaluation of the income factor is 2.8, indicating that residents generally feel that their income is below the general level, and that the gap between residents' relative incomes significantly reduces their sense of well-being. The perceived social fairness factor is 0.57, and residents' evaluation of social fairness is high, which is likely to be the result of the current in-depth promotion of the Party and State's rural revitalization strategy.

Table 1: Descriptive statistics

Categories	Variable symbol	Mean	SD	Max	Min
Explained variable	Happ	4.01001	0.76711	1	5
Interpretation variable	Proportion	0.50125	0.24412	0.01452	0.9452
	Age	39.77502	12.78124	15	86
	Age_squ	1748.179	1142.76	214	8365
	Gender	0.58593	0.34262	0	1
	Party	0.07713	0.19822	0	1
	Mar	0.85288	0.50907	0	1
	Employ	0.77185	0.52118	0	1
	Edu	2.73965	1.27202	1	6
Control variable	Health	3.31342	1.04087	1	5
	Style	1.40794	0.96942	0	5
	Avg_finc	15425.963	18550.431	1.21537	302545
	Family size	5.01474	2.06409	1	15
	Status	3.01437	0.91839	1	5
	Recog	2.78644	1.03408	1	15
	Trust	0.56945	0.58727	0	1
	Fair	3.68452	0.88539	1	5

3.3 Modeling

Due to the discrete and ordered data characteristics of the residents' well-being measures, the ordered categorical logistic method was used for parameter estimation:

$$Happiness_i = \alpha + \beta Struc_i + \gamma Z_i + \varepsilon_i \quad (1)$$

In equation (1), $Happiness_i$ represents the happiness level of the ith resident, $Struc_i$ represents the coefficient of upgrading the sports consumption structure of the ith resident, and Z_i is a control variable (including age, gender, education, marital status, political identity and other control variables). α and β are the parameters to be estimated, γ is the vector of the coefficients to be estimated corresponding to the control variables, and εi is the random error term.

The ordered categorical logistic model treats residents' happiness as an ordered variable and requires the use of latent variables to derive the maximum likelihood estimator (MLE) estimator. Setting $Happiness_i$ as the latent variable, residents feel very unhappy ($Happiness_i=1$) when $Happiness_i$ is lower than the critical value of C_1, less happy ($Happiness_i=2$) when it is higher than C_1 but lower than C_2, and so on, and very happy ($Happiness_i=5$) when

$Happiness$ is higher than C_4. The specific expression is shown in equation (2):

$$Happiness_i \begin{cases} 1, Happiness_i^* \le C_1 \\ 2, C_1 \le Happiness_i^* \le C_2 \\ 3, C_2 \le Happiness_i^* \le C_3 \\ 4, C_3 \le Happiness_i^* \le C_4 \\ 5, C_4 \le Happiness_i^* \le C_5 \end{cases} \tag{2}$$

Alternatively, assuming that ε_i obeys a logistic distribution and that X contains all explanatory variables and represents the cumulative distribution function, $Happiness_i$ can be expressed as:

$$\begin{aligned} P\left(Happiness_i = 1\right) &= \Lambda\left(C_1 - X\beta\right) \\ P\left(Happiness_i = 2\right) &= \Lambda\left(C_2 - X\beta\right) - \Lambda\left(C_1 - X\beta\right) \\ &\cdots\cdots \\ P\left(Happiness_i = 5\right) &= 1 - \Lambda\left(C_4 - X\beta\right) \end{aligned} \tag{3}$$

4 Empirical analysis

4.1 Benchmark regression results

As noted in the regression model used in this study, residents' subjective well-being is an ordered categorical variable ranging from 1 to 5. Thus, an ordered categorical logistic regression is the preferred approach, followed by an ordinary least squares regression for model validation purposes. In this context, before undertaking the empirical analysis, correlation coefficients were calculated between the variables using the Pearson method, and the coefficients turned out to be less than 0.5, showing that correlations between the variables are relatively weak. Also, variance inflation factors (VIFs) were used to test for multicollinearity, and it appeared that age correlated with the squared term of age, but all other predictors had VIF values under 10 when the squared term of age was removed from the regression equation. This indicated that there were no signs of multicollinearity in the model, but the squared term of age was kept in the analysis as it reflects the true nature of the relationship between age and subjective well-being. The regression results showing the relationship between the development of residents' sports consumption structure and subjective well-being are displayed in Figure 1 and Table 2.

As seen from Model (1) in Table 2, there appears to be a possible cause-and-effect link between the improvement in sports consumption structure and subjective well-being of residents. More specifically, improvement in the sports consumption structure seems to be related to higher well-being levels among residents of China, and the positive correlation can be established even before other factors are considered. As per the results estimated through Model (2), the positive correlation holds good even after controlling for personal and household characteristics of the individuals, and the correlation is statistically significant at the 1% level. Model (3) further demonstrates the same results when residents' psychological characteristics are controlled for.

As it turns out, since the estimation coefficients produced by the ordered categorical logistic

model fail to provide sufficient quantitative analysis data, and only the signs and significance of the coefficients of the regression can help one determine if there exists any influence of sports consumption structure upgrading on subjective well-being among the city's residents, as well as the direction of influence, it was decided to use the OLS model in order to further explore this issue. As seen from the results of the OLS regression conducted, they are generally congruent with those obtained while using the ordered categorical logistic model in terms of direction and sign. In model (6), the coefficient of Proportion stays positive and significant at the 1% level, although it is slightly smaller than those previously found.

The graph shown in Fig. 1 clearly indicates the significant positive effect of sports consumption structure upgrading on subjective well-being among the population, thus confirming the hypothesis developed in this paper.

Table 2: The return of physical consumption and subjective happiness

Variable	Ordered Logit			OLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Proportion	0.425*** (7.856)	0.415*** (6.541)	0.325*** (4.052)	0.258*** (8.652)	0.195*** (6.524)	0.152*** (4.525)
Age	-	-0.052 (-1.152)	-0.056** (-2.654)	-	-0.001 (-1.054)	-0.041** (-2.415)
Age_squ	-	0.001*** (3.521)	0.002*** (3.524)	-	0.005*** (1.414)	0.001
Gender	-	-0.019*** (-1.635)	-0.014*** (-3.254)	-	-0.251*** (-3.254)	-0.145*** (-4.52)
Party	-	0.254*** (2.563)	0.125*** (4.152)	-	0.214*** (3.524)	0.006*** (4.141)
Mar	-	0.005** (4.251)	0.052** (4.852)	-	0.002** (7.635)	0.141*** (4.152)
Employ	-	0.256*** (2.417)	0.425** (7.963)	-	0.148*** (2.474)	0.139*** (3.524)
Edu	-	0.025* (2.652)	0.012 (0.963)	-	0.029* (2.471)	0.002 (3.521)
Health	-	0.145*** (3.524)	0.225*** (0.417)	-	0.119*** (2.784)	0.141*** (11.524)
Style	-	0.485*** (11.214)	0.635*** (10.474)	-	0.196*** (14.635)	0.009*** (16.524)
Avg_finc	-	0.256*** (2.524)	0.254*** (5.241)	-	0.198*** (4.967)	0.163*** (13.524)
Family size	-	0.263*** (3.652)	0.574*** (14.635)	-	0.196*** (5.568)	0.147*** (10.414)
Status	-	-	0.225*** (11.524)	-	-	0.141*** (7.635)
Recog	-	-	0.014*** (9.654)	-	-	0.084*** (10.635)
Trust	-	-	0.524*** (7.524)	-	-	0.115*** (0.365)
Fair	-	-	0.571*** (4.521)	-	-	0.096*** 6.524
N	2522	2522	2522	2522	2522	2522
R^2	-	-	-	0.022	0.124	0.213
ΔR^2	0.005	0.035	0.074	-	-	-
F	-	-	-	81.52	61.44	93.47

Note: ***, **, and * represent significant at the 1%, 5%, and 10% levels, respectively, as below. Data in parentheses are t-statistics.

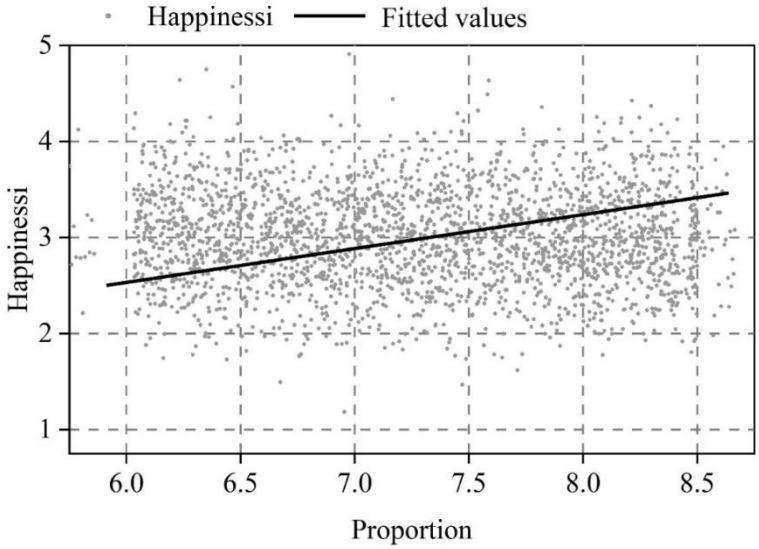

Figure 1: The relationship between physical consumption and subjective well-being

4.2 Heterogeneity analysis

The research continues with an attempt to explore whether there are any differences among the effects of sports consumption structure upgrading on subjective well-being of residents with respect to their income groups. Three income groups can be identified based on annual income of the interviewees, which include: below 20,000 yuan, 20,000 to 50,000 yuan, and more than 50,000 yuan. The analysis of regression group is conducted with the ordered categorical logistics model; findings can be found in Table 3. Positive correlation can be found in all three income groups, but the effect differs among them. Sports consumption structure upgrading affects subjective well-being in the low and medium income group significantly (at the 1% and 5% level correspondingly), whereas the effect of sports consumption structure upgrading in the high-income group cannot be statistically confirmed because of the relatively low impact, which means that the existing sports consumption market has not met the need of some higher income individuals yet.

Table 3: Heterogeneity analysis

Variable	(1)	(2)	(3)
Proportion	0.632*** (4.521)	0.252** (2.541)	0.014 (0.142)
Age	-0.011 (-0.14)	-0.063 (-0.145)	-0.041 (-1.41)
Age_squ	0.001 (1.412)	0.002* (1.852)	0.003 (1.741)
Gender	-0.365*** (-1.547)	-0.296*** (-2.14)	-0.159* (-1.52)
Party	0.041** (5.241)	0.524** (5.412)	0.096** (4.154)
Mar	0.052*** (4.251)	0.063*** (4.714)	0.263*** (5.632)
Employ	0.149*** (3.582)	0.635*** (0.741)	0.417*** (0.412)
Edu	0.069* (2.417)	0.052 (0.412)	0.073 (0.635)
Health	0.096*** (5.632)	0.259*** (0.414)	0.116*** (0.362)
Style	0.145*** (10.635)	0.417*** (13.251)	0.145 (10.635)
Avg_finc	0.214*** (3.521)	0.415*** (11.236)	0.145 (0.632)
Family size	0.251*** (1.524)	0.141*** (13.255)	0.148 (10.632)
Status	0.225*** (11.025)	0.141*** (9.524)	0.521*** (3.251)
Recog	0.415*** (5.241)	0.632*** (5.241)	0.441*** (3.214)
Trust	0.149*** (6.521)	0.014*** (3.521)	0.019*** (2.521)
Fair	0.119*** (3.254)	0.148*** (6.526)	0.254*** (3.522)
N	1523	1596	1052
ΔR^2	0.112	0.096	0.048

4.3 Robustness Tests and Endogeneity Treatment

Both the ordered categorical logistic model estimation and the OLS estimation indicate that the effect of sports consumption structure upgrading on residents' subjective well-being is positive and significant, suggesting that the results are somewhat robust. However, the test neglects the causal relationship between the two, i.e., upgrading the sports consumption structure can enhance residents' happiness, and residents with a higher level of happiness will be more inclined to engage in upgrading the sports consumption structure, so further discussion on endogeneity is needed.

The instrumental variable approach and two-stage least squares (2SLS) estimator are adopted in this paper for the sake of additional robustness analysis. As for the selection of instrumental variables, this paper makes use of "degree of social trust" and "parents' education

level" which have been used by many researchers before.

Two-stage least squares estimations appear in Table 4. It should be noted that the result of the Hausman test shows that p-value is 0.058 less than 0.05; thus, the explanatory variables are endogenous variables. The F-statistic from the first stage equals 66.524 which is greater than 10, while the coefficient of instrumental variables has positive sign values. Moreover, the "degree of social trust" variable exceeds 1% significance level. Therefore, it can be safely stated that there are no weak instrumental variables. As regards the Sargan statistic, it equals 0.671 which exceeds 0.05; hence, the over-identification test is satisfied. The results of the second stage regression show that the effect of sports consumption structure upgrading on residents' subjective well-being has positive coefficient. Thus, it can be concluded that upgrading sports consumption structure does influence residents' subjective well-being.

Table 4: Estimated result of 2SLS

Variable	Stage regression	Second order regression
Proportion	-	1.632*** (0.052)
Social confidence	0.058*** (0.041)	-
The degree of education for respondents	0.008* (0.001)	-
N	2522	2522
R^2	0.184	-
Sargan	-	0.671
F	66.524	-

5 Conclusion

By using the data from CGSS 2024, this paper develops an ordered categorical logistic regression model to analyze the impact of the improvement of sports consumption structure on residents' subjective well-being. In light of the empirical findings, there is a strong evidence that improvement of residents' sports consumption structure has a considerable positive impact on their subjective well-being. More detailed investigation of such a relationship with respect to income group demonstrates that the improvement of sports consumption structure significantly affects both the subjective well-being of low-income group residents ($P<0.01$) and of middle-income group residents ($P<0.05$), but the corresponding impact for the group of high-income residents is rather small and insignificant ($P>0.05$). It can be assumed that in terms of its development the sports consumption market still cannot meet the needs of high-income residents. By solving the issue of endogeneity problem with two instrumental variables (i.e., "degree of social trust" and "education level of parents"), the positive effect proves to be statistically significant.

Based on the results obtained from the above discussion, this paper recommends the following policies to increase the effect of sports consumption structure upgrading on the subjective well-being of residents.

To begin with, it is important to pay more attention to developing sports consumption structure upgrading in resident groups. This means improving the sports service infrastructure of society, reducing the threshold of participating in sports consumption structure upgrading, and adopting people-oriented measures in this sphere. Secondly, the content of sports products needs to be improved to diversify the supply of sports goods and services, and at the same time,

the quality of products should also be raised. Thirdly, it is necessary to pay special attention to helping residents adopt a positive attitude towards the process of sports consumption structure upgrading, emphasizing the significance of understanding the values associated with this phenomenon. Finally, it is essential to consider gender aspects of sports consumption structure upgrading among residents and encourage equal treatment of men and women both in a social environment and in families. It should be mentioned that despite the quality of data obtained from the CGSS survey used in this paper, its scope regarding sports consumption structure upgrading is not quite sufficient for a comprehensive analysis of the impact of sports consumption structure upgrading on subjective well-being. Future research should try to overcome this problem using both quantitative and qualitative research techniques.

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