

Article

Does Leisure Contribute to the Improvement of Individual Job Performance? A Field Tracking Study Based on the Chinese Manufacturing Industry

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Abstract: Theories of work–life balance (WLB) examine the dynamics of the relationship between work and life, but no universally accepted conclusion has yet been achieved. This study examines the effect of leisure time on job performance using first-hand data obtained in a field study in the Chinese manufacturing industry. The results reveal that the relationship between leisure participation and individual job performance presents an inverted U-shaped nonlinear relationship. Endogenous testing and robustness testing also demonstrated the reliability of the findings. In this study, we identified an “opportunity window” which promotes the best individual job performance, with an average daily leisure time threshold of 4.7 h. Our analysis of the underlying mechanism showed that leisure participation has an impact on job performance through physical health and happiness. This study advances the literature on the leisure economy and provides insights into work–life balance and optimal leisure time allocation on a daily basis.

Keywords: leisure time; leisure participation; field tracking study; job performance; Chinese manufacturing industry



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1. Introduction

Work and leisure are two intricately connected components in an individual’s daily activities. Management scholars, labor economists and psychologists have examined the relationships between work and leisure (including relationships of conflict, balance and promotion) and have analyzed their impact on job performance [1–5]. With regards to individuals’ time allocation of work and leisure, the impact of leisure participation on job performance has become an emerging topic and has received increasing research attention in recent years [6–8]. As labor productivity and material living standards continuously improve, people’s disposable/free time further increases (China National Bureau of Statistics, 2019). When the increase in leisure time leads to a decrease in working time, the rate of economic growth slows down [9]. Therefore, to maintain healthy economic growth and work–life balance simultaneously, it is essential to understand the dynamics of people’s leisure time allocation and its contribution to job performance.

Many scholars have carried out relevant research on the economic effects of leisure time [9,10]. Despite the extensive research on the economic effects of leisure time [2,9–12], the extant literature has neglected to examine the optimal amount of leisure time [13]. Although the body and mind recovery theory in psychology and the family work balance theory in sociology have better explained the important role of leisure in the short

term [6,14], the optimal amount of time that should be allocated to leisure remains largely unknown, and this is the mechanism by which leisure promotes individuals' job performance. Therefore, in this study we aimed to answer the following two questions. First, is there an appropriate amount of daily leisure time to promote individuals' optimal job performance? Second, if the optimal amount of leisure time exists, what are the impact channels of leisure time on job performance? The study is going to look into these issues. Specifically, this paper focuses on the economic effects of residents' daily leisure time, and tries to solve the problem of the existence of optimal amount of leisure time that promotes individual job performance and the mechanism of leisure time on job performance.

In this paper, we empirically tested the relationship between residents' daily leisure time and job performance through field research in the context of Chinese manufacturing factories using 24-h log books. The reason why we choose this study context is that the Chinese manufacturing industry has maintained a favorable position in the world the past 40 years and it created a Chinese miracle based on the high-speed growth of the manufacturing industry [14]. However, in recent years, the Chinese economy has begun to enter a downstream channel, and the economic growth rate in the first quarter of 2022 fell to 4.8% [15]. This leaves China and the whole world asking what else can be done for workers' job performance in addition to tradition methods. The findings of the study can help answer the above questions.

This study is an initial attempt to examine the job performance of people's daily leisure time allocation. It contributes to the research on the leisure economy by identifying the optimal amount of leisure time to promote individuals' job performance, which advances the literature on work–life balance. Specifically, compared to previous studies, this study contributes to the existing leisure research in the following two respects. First, this study demonstrates an innovation in research perspectives. This study examines the optimal amount of leisure time that promotes individuals' work performance from a micro perspective. In contrast with previous studies on the optimal number of holidays, this study advances the existing literature by analyzing the job performance of individuals' daily leisure time, which is an essential component of people's total leisure time and is more meaningful in examining individual's work performance on a working day [16]. Second, the study presents an innovation in relation to the relevant mechanisms. Starting from the two channels of physical health and happiness, in this study we verified the mechanism of leisure time and its effect on individuals' job performance.

The structure of this paper are as follows: the second part is a literature review, which discusses the relationship between leisure time and job performance. The third part is the research hypothesis. The fourth part is the selection of research methods and data description. The fifth part is empirical analysis; The last part is the conclusion and implications.

2. Literature Review: Leisure and Job Performance

Leisure is defined and measured in a variety of ways. In this study, leisure refers to free time, which has nothing to do with the work and labor required to allow people to survive and which can be arbitrarily controlled by individuals [17]. Leisure and work are two fundamental aspects of life that are closely connected to each other. Researchers have reported that leisure time and leisure activities enhance individuals' physical and mental health [18,19], promote their quality of life and wellbeing, and further improve the quality of individuals' work [13,20,21]. In research focusing on the work–life balance, five different models have been proposed to explain the relationship between work and leisure: segmentation, overflow, compensation effect, benefit and conflict [6,22,23].

Job performance is considered an important parameter in the field of work. According to Borman and Motowidlo [24], job performance is a specific description used to measure employees' achievement in a goal-oriented work plan. An extensive body of literature on individual job performance focuses on the relationship between job performance and job-related factors, such as working conditions, the organizational environment and in-

dividual endowment (e.g., personality and emotional intelligence) [25,26]. Recently, the effects of non-working factors, such as an individual's participation in leisure activities in daily life, on job performance have been receiving increasing research attention [27]. Representative viewpoints include "effort-recovery theory" [28], the "personality consistency hypothesis" [29], and "purpose-investment theory" [30]. When the content, nature and structure of leisure have production attributes, leisure's positive benefits can effectively promote economic growth [31]. Beyond restoring physical strength and achieving personal development, people engaging in leisure activities during their free time can also add value to and reproduce production factors such as human capital [32]. For this reason, Du et al. [33] suggested that participating in leisure activities during leisure time is an important investment in human capital and social capital accumulation.

At the empirical level, scholars have started to explore the impact of leisure participation on individual job performance [8,16]. Early scholars focused mainly on the effect of leisure activities, such as reducing work pressure, improving life and work satisfaction, relaxing the body and mind and relieving chronic diseases, from the perspectives of management, psychology, medicine and sociology [34]. Leisure not only relaxes an individual's body and mind, but also improves his/her personal development and qualification, which eventually promotes work efficiency [7]. Song [11] studied the relationship between leisure time and work efficiency, arguing that the physical recovery and self-development obtained in free time are value-adding processes that are part of the reproduction of human capital. More recently, Wei and Li [8] revealed that an active lifestyle effectively promotes individuals' job performance. Unlike the previous studies on the linear impact of leisure participation on work, Xie et al. [16] reported that the relationship between leisure and working passion exhibits an inverted U-shaped trend. The impact of leisure activities on job performance depends on the choice of leisure activities, for example, planned and informative leisure activities enhance individuals' passion for work. In addition, perceived organizational leisure support also helps employees to relieve stress, restore energy and enhance their performance at work [3].

Research on the relationship between leisure activities and job performance is still far from reaching a consistent conclusion. For example, regardless of the evidence for the positive effects of sport leisure activities in reducing stress, promoting health and relieving depressive symptoms [35], social leisure activities, cultural leisure activities and creative leisure activities have shown the opposite effects on job performance in different empirical studies [6,36]. Previous studies have reported that leisure time has negative and positive effects on job performance [12,27]. However, little is known about the appropriate amount of leisure time to allocate in order to promote the optimal economic output. Although Barrera and Garrido [10] have studied the relationship between the number of public holidays and economic growth, the micro perspective on the effect of daily leisure time on economic output has been ignored. In addition, the mechanisms of leisure time on job performance remain to be explored and verified. The present study attempts to fill the abovementioned research gaps to identify the optimal daily leisure time that promotes the best job performance, and to test the mechanisms by which leisure time affects job performance.

3. Research Hypotheses

3.1. *The Optimal Choice between Leisure and Work*

According to resource recovery theory [28], leisure is vital for employees to replenish a person's psychological and psychophysiological resources. Some studies have shown that the incomplete recovery process caused by lack of leisure time will damage work performance by affecting physical health [37]. Based on self-determination theory [38], leisure time can increase an individual's decision latitude and foster intrinsic motivation and happiness which will facilitate recovery from work stress [6,39]. As we know, job stress will reduce work performance, and leisure time can help individuals relieve job stress [40].

An empirical study has shown that if not fully rested at the weekend, an individual's job performance will decline afterwards [41].

However, too long leisure time is not conducive to the improvement of individual job performance. Based on the theory of learning effect, individuals need a certain working time to be familiar with work and master work skills. In other words, an individual's job performance requires a certain working time, which is called a fixed cost. Thus, an individual's job performance can increase with an increase in working time at such intervals [42]. Some studies believe that continuous working hours can help individuals improve their work skills, and then help to improve labor productivity [43]. Of course, excessive working hours are not conducive to the improvement of individual labor productivity and will lead to an increased fatigue effect, according to the research consensus of scholars [44]. In economics, fatigue effect refers to the decrease in individual energy and work efficiency with the increase in working time [43].

To sum up, for individuals, personal time allocation involves finding a balance between leisure time and work. On the one hand, too much leisure time can easily lead to a decline in individual job performance. Some researchers have argued that a necessary working time is a guarantee of individual work efficiency [45]. On the other hand, working hours that are too long will increase the individual's fatigue effect. With a longer continuous working time, the marginal fatigue effect increases [46]. Studies have confirmed that the individual fatigue effect increases with a reduction in leisure time, which eventually leads to a decline in job performance. In other words, too much or too little leisure time is not conducive to the improvement of individual job performance. Therefore, it has been widely recognized by scholars that a work-life balance helps to improve individual work efficiency [47–49]. Therefore, we believe that there is an optimal amount of leisure time to improve individual work performance.

Based on the above literature review, the comprehensive net effect of leisure on job performance presents a nonlinear relationship, and some optimal amount of leisure time exists. For this reason, in this study we applied the following two research hypotheses.

Hypothesis 1 (H1). *Leisure time and job performance are related in a non-linear way, meaning that too little and too much leisure time both impair job performance.*

3.2. The Mechanism of Leisure Time on Job Performance

On the one hand, leisure time can significantly promote individual physical health. According to Sonnentag [50], leisure activities can enhance individual physical health by achieving psychological detachment and self-relaxation. Previous studies have also confirmed that physical health plays a positive role in promoting individual job performance [51], because adequate leisure and rest can improve the physical and mental health of workers and make them more relaxed and alert during working hours, so as to improve labor productivity [42]. A large number of medical studies have proved that leisure time can help individuals eliminate work pressure and mental fatigue [52], and leisure activities can also promote individuals' positive emotional self-regulation, enhance the secretion of neurotransmitters and have a significant antidepressant effect [53]. Therefore, leisure time can improve individual work performance by improving physical health.

On the other hand, leisure time will have a significant positive impact on individual happiness. The increase in leisure time can significantly promote the improvement of individual happiness [54,55]. Meeting basic human needs for autonomy and relationships during leisure time with family and friends may also increase happiness and have persisting effects [56]. This is also confirmed by the relationship between working hours and happiness. Although there are significant occupational differences in the impact of excessive working hours on wellbeing, a large number of studies have confirmed that increasing working hours will seriously consume workers' energy, thus reducing people's happiness and health [57], because individuals need to adjust resources during working hours to meet work requirements, and excessive working hours will seriously affect employees'

wellbeing [58]. Psychological research further confirms that happiness will significantly enhance the improvement of individual job performance [59,60]. Therefore, leisure time can promote job performance by improving individual happiness.

Based on the analysis of the mechanism of the impact of leisure on job performance, in this study we applied the following research hypotheses.

Hypothesis 2 (H2). *The physical health and happiness are the channels through which leisure time affects individual job performance.*

4. Method

4.1. Study Approach and Context

Compared to traditional research methods, a field study is a more realistic and natural method of data collection [61]. As field studies combine observation, recording and interviews in a real environment, the distortion of the information provided by subjects in a laboratory or the psychological interference caused by the subjects in an experiment can be avoided. In view of the obvious advantages of field research in the collection of behavioral economics data, this method is very suitable for studying the relationship between individual leisure time and job performance; it is possible to observe and record the daily time allocation of specific groups for data analysis.

In this study, the authors empirically tested the relationship between daily leisure time and job performance through field research in the context of Chinese manufacturing factories using 24 h logbooks. The reason for this choice of study context was that the Chinese manufacturing industry has maintained a favorable position in the world over the past 40 years with its high-speed growth [14]. It is therefore meaningful to use data from the Chinese manufacturing industry for this analysis.

4.2. Questionnaire Design

The questionnaire consisted of three parts. The first part related to the participant's demographic characteristics, including gender, education level, age, marital status and family size. The second part examined the individual's job performance using criteria from the Bureau of Labor Statistics of the United States Department of Labor (<http://www.bls.gov/tus/questionnaires.htm>, accessed on 15 June 2018), including monthly salary, length of service, occupation level, daily workload and standard working hours. The third part collected leisure time information. In accordance with the criteria of the American Time Use Survey (ATUS), which is sponsored by the Bureau of Labor Statistics and conducted by the U.S. Census Bureau (<http://www.bls.gov/tus/>, accessed on 15 June 2018), leisure time in this study specifically included seven types of leisure activities. The specific activity names contained in each type of leisure activity are shown in Table 1. The individual's physical health and happiness were measured by the Likert five scale of self-evaluation.

As individuals in different industries and job positions have significant differences in terms of their time allocation, in this study we selected employees in the same workshop in a listed manufacturing company in Hubei as the research participants. In other words, all employees had the same daily work tasks. The company was a typical representative of China's traditional manufacturing industry, with 600 employees and 3700 square meters of production workshop. Its major business activities included processing materials supplied by clients, assembling supplied parts, processing supplied materials and samples and so on. To further overcome the differences in time allocation caused by different working environments and jobs, the research team randomly selected 80 participants from 600 employees in the same workshop as the observation subject. Since the employees' job was to assemble industrial products and all employees had the same work tasks, the job performance could be measured based on the number of tasks completed each day.

Table 1. Description of the questionnaire.

Variable	Leisure Activity Description
Entertainment time	Mainly includes the time that workers spend watching TV, watching movies or playing games online, browsing micro-blogs and other activities after work
Art time	Mainly refers to the time spent listening to music, watching theatre shows, practicing calligraphy, painting, reading and other activities after work
Recreation time	Mainly refers to time spent on exercise, fitness and other sports activities
Social time	Mainly refers to time spent attending parties, discussing business or group activities with colleagues and friends
Passive activity time	Mainly refers to time spent on passive activities, such as playing mahjong, gambling and drinking
Consumption time	Mainly refers to the time spent on consumer activities, such as shopping and massages
Workplace leisure time	Mainly refers to the time spent drinking tea, chatting, resting, etc., at work
Physical health	How do you feel about your physical condition? The response options are “very healthy,” “relatively healthy,” “average,” “relatively unhealthy” and “very unhealthy,” to which we assign values of 1 to 5, respectively
Happiness	How do you feel about your life? The response options are “very happy,” “relatively happy,” “average,” “relatively unhappy” and “very unhappy,” and we assigned each a value as an integer from 1 to 5

In this study, 20 college students were recruited as research assistants for the project. Before entering the site to collect data, research assistants were given special training, following the requirements of the American Time Use Survey User’s Guide.

Time allocation was divided into the following two parts: on-duty and off-duty. The amount of time allocated to the workers’ working hours was observed by research assistants and recorded every 10 min. Each research assistant was responsible for observing four participants. Two teachers were on-site to coordinate the 20 research assistants and to solve any problems encountered during the data recording process. The time allocation after leaving work was filled in by the participants themselves according to the time-diary method. Leisure time was defined as the sum of all kinds of leisure activities recorded in the time dairy. The data on the time allocation and job performance of each participant were recorded once a day and collection period lasted from 11 July to 19 July.

4.3. Data Processing

To ensure the objectivity and accuracy of the time allocation data records, the combination of an anonymous survey and double-blind entry was used for the data collection process. Seven hundred and twenty observation points were obtained from the observations and records of 80 employees for 9 consecutive days. After deleting employee leave and other invalid sample points, a total of 685 valid sample points were obtained. The descriptive statistics for each variable are shown in Table 2.

Based on the statistical information of the overall sample, the average monthly income of employees was approximately 2650 yuan (RMB). As the selected department’s work task was processing parts and components in traditional manufacturing, the employees were mainly young and middle-aged men; male participants accounted for 63.07% of the total sample, and the average age of the employees was 32.27 years old. Most of them (98%) had either middle school or high school education; 65% of the employees were at the primary skill level, and only 15% of the participants reached the advanced skill level; the average employment length in this company was 5.95 years. The average daily leisure time of participants was 6.21 h and the average working hours per day was 8.69 h. From the perspective of the classification of leisure activities, entertainment time (L1), such as watching TV, playing on mobile phones, and the workplace leisure (L7), were the top two individual leisure time allocations, followed by social time (L4) spent partying and eating, and enjoyable consumption time, such as shopping (L6). The subsequent category

was the time spent visiting museums, watching theatre shows, reading and other cultural activities (L2) and sports, fitness and other sports time (L3), whereas playing mahjong, poker, participating in gambling and other passive entertainment activities (L5) were the activities that respondents spent the least amount of time on.

Table 2. Descriptive statistics.

Variable	Meaning	N	Mean	S.D.	Min	Max
y_i	Job performance	673	12.37	8.12	4.9	21.6
Income	Income level	685	2647.9	738.4	1577.8	5337.2
Sex	Gender	685	1.63	0.50	1	2
Education	Education level	685	3.59	0.51	2	4
Age	Age	685	32.27	6.75	18	48
Skill level	Professional skill level	685	1.02	1.11	0	3
Work experience	Factory working years	685	5.95	4.36	0.16	25
Working time	Working time (hours)	685	8.69	2.40	4.15	11.33
Leisure time	Leisure time (hours)	685	4.35	2.24	0.17	14.33
L1	Entertainment time	685	118.26	113.0	0	670
L2	Art time	685	12.80	62.09	0	770
L3	Recreation time	685	14.41	35.6	0	240
L4	Social time	685	27.23	63.46	0	750
L5	Passive activity time	685	8.44	36.49	0	470
L6	Consumption time	685	19.80	53.88	0	500
L7	Workplace leisure time	685	75.90	72.48	0	230
Physical health	Physical health of workers	685	3.89	0.97	1	5
Happiness	Workers' happiness in life	685	3.47	0.65	1	5

Note: L1–L7 were calculated in minutes.

4.4. Selection of Measurement Method

Although scholars recognize that an increase in leisure time has a positive effect on economic efficiency by alleviating work fatigue, promoting enthusiasm and willpower, and then improving the quality of human capital [32,47–49], it can be seen from the above analysis that the influence of leisure time on job performance is non-linear. In other words, within a certain range, an increase in leisure time will help improve work efficiency; however, the leisure time cannot increase without a limit. When the optimal amount of leisure time limit is exceeded, the negative impact of leisure time on work efficiency becomes prominent. In order to test hypothesis 1, we used a threshold effect regression model to analyze the impact of leisure time on job performance. Specifically, “threshold regression,” as proposed by Hansen [62], was utilized to make strict statistical inferences regarding the threshold of leisure time. In this study, leisure time (l_i) is a “threshold variable,” and the corresponding threshold regression equation is as follows:

$$\begin{aligned} y_i &= \beta_1 x_i + \varepsilon_i, x_i \leq \gamma \\ y_i &= \beta_2 x_i + \varepsilon_i, x_i > \gamma \end{aligned} \quad (1)$$

where γ refers to the threshold to be estimated, y_i is the dependent variable job performance, x_i represents the core explanatory variable of leisure time, β_1 and β_2 are the influence coefficient of leisure time on job performance, C is the control variable of the evaluation equation, ε_i is the error term and x_i is the equation explanatory variable and is irrelevant to ε_i . To test whether there is a “threshold effect” in relation to leisure time (x_i), the corresponding null hypothesis is as follows:

$$H_0 : \beta_1 = \beta_2 \quad (2)$$

According to the above theoretical analysis of leisure time on individual work performance, $\beta_1 > 0, \beta_2 < 0$.

5. Results

5.1. Benchmark Regression Results

To explore the impact of individual leisure participation on job performance, the ordinary least squares (OLS) method was used to perform the benchmark regression. Because the income of assembly line employees is based on the piece-rate system, in this study we used the daily workload of employees as the proxy variable for the dependent variable of job performance, and for the core explanatory variable of leisure participation, we used leisure time as the proxy variable. Considering the impact of gender, education level, age, skill level and work experience on individuals' job performance, the above variables were selected as control variables. The results shown in Table 3 indicate that, compared with model 1, after adding the leisure time² term, model 2 had a better fit. The square term of leisure time was at the level of 1%, and the significance test showed that the influence of leisure time on job performance was nonlinear and this also supported hypothesis 1. Specifically, the influence coefficient of leisure time was $149.8 > 0$ and the coefficient of term of leisure time² was $-8.19 < 0$, which means that leisure time had an inverted U-shaped relationship with job performance. Within a certain range, as the leisure time increased, the individual's job performance also improved. After the optimal leisure time node was exceeded, the increase in leisure time significantly inhibited the improvement of individual job performance. The influence of control variables such as gender, education level, age, skill level and length of service on labor productivity was consistent with the results of previous studies.

Table 3. Employees' participation in daily leisure activities and job performance.

Variable	Model 1		Model 2	
	Coefficient	S.D.	Coefficient	S.D.
Leisure time	32.05 ***	10.38	149.85 ***	36.36
Leisure time ²			−8.19 ***	2.43
Sex	−620.98 ***	66.17	−623.96 ***	66.05
Education	126.07 ***	39.06	121.53 ***	38.91
Age	22.84 ***	3.96	23.18 ***	3.92
Skill level	81.23 ***	25.71	79.30 *	25.33
Work experience	8.28 ***	2.18	8.50 ***	2.22
_cons	1992.76	210.34	1625.80	233.76
R ²		0.5856		0.6340
N		685		685
Prob > F		0.0000		0.0000

Note: Leisure time² is square of leisure time; * and *** indicate the significance levels of 10% and 1%, respectively. _cons is a constant, which indicates the intercept term of the regression equation.

5.2. Endogenous Test

In the process of studying the impact of participation in leisure activities on individuals' job performance in this study, the endogeneity of the test results should be discussed. First, there could be a mutual cause-and-effect relationship between the independent variable of leisure time and the dependent variable of job performance. As leisure time can affect employees' work efficiency, in turn, the level of an individual's job performance can also significantly affect their amount of leisure time. Second, the model may have missing variables. Since many subjective and objective factors could affect job performance, there may be a risk of missing important explanatory variables in the control variables. Therefore, in this study we adopted two methods—increasing the control variables and instrumental variables—to overcome and alleviate the endogenous problems.

First, we increased the control variable. According to organizational theory, organizational support (organizational support) has a significant impact on individual job performance. Effective organizational support not only stimulates employees' passion for work, but also has a positive correlation with employees' job performance [3,63]. In addition

to objective factors, job satisfaction is also an important subjective factor affecting individual job performance [64,65]. The evaluation results of Model 3, shown in Table 3, show that, when the two explanatory variables of organizational support and job satisfaction were added, the inverted U-shaped nonlinear relationship between leisure participation and job performance remained robust.

Second, we used the instrumental variable method. Instrumental variables are used to estimate the causality of models when controllable experiments cannot be realized in economics, econometrics, epidemiology and related disciplines. In the regression model, when there is a correlation between explanatory variables and error terms (the endogenous problem), the instrumental variable method receives consistent estimators [66]. In a linear model, an effective instrumental variable should satisfy the following two criteria: first, there must be a correlation between this variable and the endogenous explanatory variable; and second, this variable must not be related to the error term. In this study we used data with explanatory variables lagging one period behind the instrumental variable of leisure time [67]. On the one hand, the individual's leisure time in daily life is relatively stable, and the leisure time of the previous day has a correlation with the leisure time of the next day. On the other hand, a period of lag in leisure time does not have a direct impact on the individual job performance in the current period. Studies have confirmed that non-working hours have an impact on the next day's job performance, but have nothing to do with the previous day's job performance [68]. The evaluation of the instrumental variable method of model 4 in Table 4 shows that the impact of leisure time on individual job performance were consistent with that of Table 3. According to the estimation equation of model 4, $y_i = 84.23x_i - 8.82x_i^2$. When the first derivative x_i is equal to 0, we obtain $x_i = 4.78$, that is, the optimal leisure time is approximately 4.74.

Table 4. Analysis of the regression results of the endogenous problems.

Variable	Model 3		Model 4	
	Coefficient	S.D.	Coefficient	S.D.
Leisure time	157.35 ***	36.59	84.23 ***	46.13
Leisure time ²	−9.03 ***	2.46	−8.82 **	3.01
Sex	−661.88 ***	70.62	−658.37 ***	71.16
Education	122.64 ***	41.18	118.74 ***	41.53
Age	24.57 ***	4.67	24.69 ***	4.61
Skill level	78.07 ***	27.16	83.86 ***	27.50
Work experience	7.76 ***	2.39	7.91 ***	2.39
Organizational support	−31.12	26.56	−24.85	26.06
Job satisfaction	−9.13	3.88	−9.21 **	4.07
Leisure satisfaction	−268.316	243.09	−308.24	230.00
_cons	1964.19	312.41	1625.80	233.76
R ²	0.6483		0.6568	
N	614		614	
Prob > F	0.0000		0.0000	

Note: Leisure time² is square of leisure time; ** and *** indicate the significance levels of 5% and 1%, respectively. cons is a constant, which indicates the intercept term of the regression equation. The result reported in model 4 is the estimation result of the instrumental variable method.

5.3. Robustness Test

To test the robustness of the findings of this study, the following two methods were adopted: super-sample analysis and the substitution of dependent variables. First, the authors conducted a super-sample analysis of the research results. While recording the time allocation of employees in the assembly line of state-owned enterprises, we also used the same time-log recording method to conduct on-site tracking research on the same workshop employees of a private enterprise. In nine consecutive days, time-configured data for 20 employees were recorded, and a total of 136 groups of valid data were obtained.

Second, in the selection of dependent variables, the authors used the day's comprehensive job efficiency. Compared with using the daily workload of employees to measure individual job performance, the individual's overall job efficiency in the day under study can better reflect the immediate work efficiency of the employee. The regression structure evaluation of models 5 and 6 in Table 5 show that the impact of leisure participation on individual job performance was consistent with the results presented in Table 3.

Table 5. Robustness test results.

Variable	Model 5		Model 6	
	Coefficient	S.D.	Coefficient	S.D.
Leisure time	−0.68	1.18	7.52 **	3.78
Leisure time ²			−0.40 **	2.49
Sex	9.06	17.08	5.36	17.25
Education	7.95	12.65	5.83	12.44
Age	−1.07 **	0.74	−1.23 *	0.76
Skill level	42.24 ***	7.71	44.07 ***	7.90
Work experience	2.22	2.14	1.95	2.10
_cons	30.90	100.42	17.71	94.90
R ²		0.5695		0.5832
N		136		136
Prob > F		0.0000		0.0000

Note: The dependent variable is the comprehensive job performance of the day; Leisure time² is square of leisure time; *, ** and *** represent the significance levels of 10%, 5% and 1%, respectively; model 7 is the result of the super-sample analysis and model 8 is the result of the replacement-dependent variable test. _cons is a constant, which indicates the intercept term of the regression equation.

5.4. Determination of the Optimal Amount of Leisure Time

5.4.1. Sectional Threshold Regression Model Estimation

The results of the benchmark regression process, shown in Table 3, demonstrate a significant inverted U-shaped relationship between leisure participation and job performance. Therefore, in this study, the mechanism of the effect of leisure activity participation on job performance may have a “threshold effect.” In other words, within different leisure time thresholds, there were significant differences in the mechanism of individual job performance. Therefore, the cross-sectional data analysis method of Hance [50] was used to perform the threshold regression analysis on the 685 observation points of the sample.

5.4.2. Threshold Effect Test

To select an appropriate number of thresholds, in this study, we sequentially estimated a single threshold, double threshold, triple threshold, and quadruple threshold. Due to the existence of redundant parameters, the F statistic may not show a normal distribution, so the bootstrap method should be used to estimate the critical value [69]. The model types, thresholds and test parameters of each model are shown in Table 6.

Table 6. Threshold effect tests of leisure time.

Model	N	BS	Threshold (Leisure Time)	AIC	BIC	HQIC
Single threshold	685	5000	4.67	8832.14	8852.38	8843.17
Double threshold	685	5000	4.67/6.33	8821.15	8860.11	8842.13
Triple threshold	685	5000	4.67/6.33/7.00	8843.45	8876.64	8834.27

Based on the results of the model's testing parameters, i.e., the Akaike information criterion (AIC), the Bayesian information criterion (BIC) and the Hannan–Quinn information criterion (HQIC), the model showed that the BIC value of a single threshold effect was the

smallest, whereas the AIC value with a double threshold effect was the smallest, and the HQIC values of the two were basically the same. When the AIC and BIC test results are inconsistent, the BIC test results should prevail [70]. Based on the results shown in Table 6, the value of BIC in the single-threshold case was the smallest, which suggests that a single threshold provides the best model. That is to say, the optimum average daily leisure time is 4.67 h.

In fact, when the parameter testing results between models are inconsistent, the result can be determined by means of a log-likelihood ratio diagram of threshold variables. In this study, the LR diagram of the threshold effect testing of leisure time on job performance in Figure 1 demonstrates an obvious “bottom” trend in the curve.

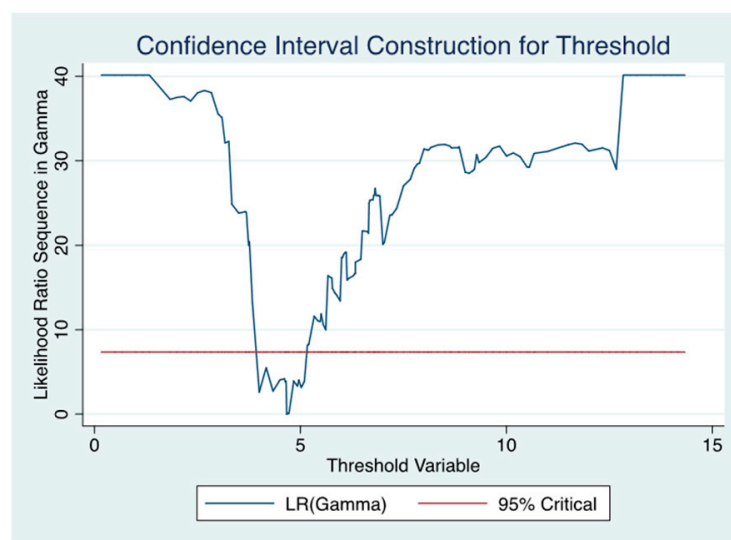


Figure 1. The LR diagram of threshold effect testing of leisure time in relation to job performance.

The combination of the threshold values corresponding to each model in Table 6 and Figure 1 showed that the threshold value of the threshold variable of leisure time on job performance was 4.67 h. In other words, when the leisure time exceeds 4.67 h, its effect on job performance will be significantly different.

According to the estimation results of model 4 shown in Table 4, the optimal average daily leisure time is 4.74 h. This means that the optimal leisure time calculated through the analysis of both econometric models (see model 4 in Table 4) and through the threshold effect model evaluation (see Table 6) were relatively similar. In order to reduce the error, we can take the average of the two results—4.70 h ($4.70 = (4.74 + 4.67)/2$)—as the best leisure time.

5.4.3. Regression Equation Estimation for Different Levels of Leisure Participation

The above analyses indicate that there is a threshold effect of leisure participation on work performance, with the leisure time threshold of 4.7 h. To further explore the mechanism of the different levels of leisure participation, the sample was divided into two sub-samples, with the threshold of leisure time of 4.7 h as the critical point, and a regression estimation was performed on each of them individually. The specific results are shown in model 7 and model 8 in Table 7. For comparison, the estimation results of the full sample, i.e., model 1, are also listed in the table.

The estimation result of model 7 shows that when the threshold variable of leisure time was on the left side of the threshold (leisure time ≤ 4.7), the coefficient of the influence of leisure time on job performance was positive. When the leisure time was on the right side of the threshold (leisure time > 4.7), the inhibitory effect of leisure time on labor productivity in model 8 was significant. Some studies have reported that leisure time promotes the physical health and happiness through leisure activities and improves individual job

performance [31,60]. In other words, within a certain range, the increase in leisure time is conducive to the improvement of labor productivity.

Table 7. Regression equation estimation results under different levels of leisure time.

Variable	No Threshold Effect	Single Threshold Effect	
	Model 1	Model 7 (Leisure Time \leq 4.7)	Model 8 (Leisure Time $>$ 4.7)
Leisure time	32.05 *** (10.38)	13.67 (39.14)	−6.42 (3.67)
sex	−620.98 *** (66.17)	−348.41 *** (106.87)	−743.01 *** (81.43)
education	126.07 *** (39.06)	−62.81 (74.94)	178.09 *** (44.20)
age	22.84 *** (3.96)	−1.85 (6.16)	34.42 *** (4.15)
Skill level	81.23 *** (25.71)	−4.26 (43.77)	115.15 *** (27.03)
Work experience	8.28 *** (2.23)	12.69 *** (4.04)	6.62 *** (2.53)
_cons	1992.76 (210.34)	2930.71 (336.3161)	1938.81 (251.37)
R ²	0.5856	0.5048	0.5458
N	685	166	519
Prob > F	0.0000	0.0000	0.0000

Note: *** $p < 0.01$; Standard deviation in brackets.

5.5. Analysis of Mechanism of Action

The “inverted U-shaped” nonlinear relationship between leisure time and individual job performance is verified in this study. Further analysis of the threshold effect shows that there was a critical value of 4.7 h for leisure time. When the average daily leisure time was greater than 4.7 h, leisure participation had a significant inhibitory effect on job performance. In order to further test the mechanism of leisure time on individual job performance, this paper uses the mediating effect model to verify the channels of physical health and happiness.

Table 8 shows that the mediating effect of leisure on individual job performance through physical health and happiness passed the significance test. Specifically, the results of model 9—model 11 show that the mediating effect of physical health is $33.107 - 32.859 = 0.248$. The results of model 12—model 14 show that the mediating effect of happiness is $33.107 - 32.956 = 0.151$. This shows that, as an important part of daily life, leisure can directly affect people’s job performance by means of physical health and happiness. Some studies have confirmed that continuous participation in leisure activities will effectively alleviate the pressure of life, produce pleasure, and help to improve individual job performance [71]. In other words, leisure activities, as the lubricant of life, can help individuals recover their health from work pressure, improve their sense of happiness, and then promote individual job performance.

Table 8. Mediating effect test.

Variable	Mediating Effect of Physical Health			Mediating Effect of Happiness		
	Job Performance	Physical Health	Job Performance	Job Performance	Happiness	Job Performance
	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
Leisure time	33.107 *** (10.086)	0.462 *** (0.124)	32.859 *** (10.612)	33.107 *** (10.086)	0.284 *** (0.040)	32.956 *** (10.870)
Physical health			0.262 *** (0.105)			
Happiness						0.162 *** (0.032)
Control variable	Yes	Yes	Yes	Yes	Yes	Yes
_cons	2241.989	0.462	2189.346	2241.989	0.652	2243.248
R ²	0.5985	0.4329	0.6247	0.5985	0.4830	0.5871
N	685	685	685	685	685	685
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note: *** $p < 0.01$; Standard deviation in brackets.

6. Discussion

The “inverted U-shaped” nonlinear relationship between leisure participation and job performance and the results of the threshold regression show that neither too little nor too much leisure time is conducive to the improvement of individual job performance. The lack of physical strength, energy and other fatigue relief caused by a lack of leisure time will have a greater impact on individual health, whereas excessive leisure time can easily lead to a decline in the individual’s “learning by doing” effect [72]. “Learning by doing” (also known as the “learning effect”) through continuous work can effectively promote increases in individuals’ work performance and productivity [73], as continuous work effectively improves the individual’s work skills and proficiency [74]. However, while continuous work brings about the “learning effect,” it will increase the individual’s “fatigue effect.” With a longer continuous working time, the marginal “fatigue effect” increases [45], which eventually leads the rate of return of the working hours to gradually decrease [75]. When the “fatigue effect” of the individual’s continuous work intensifies, appropriate leisure time is needed to relieve it. Therefore, working time that is too long or leisure time that is too long both hinder individuals’ work performance. In sum, maintaining appropriate leisure time to achieve a balance between work and leisure is the key to obtaining the best individual work performance.

In fact, the effect of income level on leisure time is also an important issue, because when a person’s income level increases, they will choose to take more time to relax rather than work [64]. Many empirical studies have also proven that income level can significantly affect individual leisure time [76]. In the field of leisure barriers, a large number of scholars have studied this problem, so we will not discuss it further here. The problem that should be considered in relation to this paper is that the influence of income level on leisure time can easily lead to two-way causality. That is, leisure time can affect job performance. In turn, income level also has an impact on leisure time. This two-way causality will affect the credibility of research conclusions. Therefore, when discussing the impact of leisure time on job performance, in this study we used the method of instrumental variables to solve the endogenous problem caused by two-way causality. Thus, the research conclusions of this paper are more credible.

7. Conclusions and Implications

7.1. Conclusions

This study examined the economic effects of residents’ daily leisure time. Specifically, in this study, we attempted to identify the optimal amount of leisure time that promotes

job performance, and the mechanism underlying the contribution of leisure time to job performance. Through on-site tracking field research on the leisure time allocation and job performance of 80 front-line employees in the Chinese manufacturing industry, the study revealed the following findings.

Firstly, an inverted U-shaped nonlinear relationship between leisure participation and job performance was verified. Generally, with an increase in leisure time, individual job performance showed an inverted U-shaped curve that first increased and then decreased. Secondly, leisure participation had a threshold effect on job performance. When the threshold variable leisure time was on the left side of the threshold (i.e., when leisure time ≤ 4.7 h), the influence coefficient of leisure participation on job performance was positive; when the leisure time was to the right of the threshold (i.e., when leisure time > 4.7 h), the inhibitory effect of leisure participation on job performance was significantly negative. Thirdly, the mediating effect test shows that physical health and happiness are the influence channels of leisure time on job performance.

7.2. Practical Implications

This study provides insights into employees' work–life balance and leisure time allocations with the aim of obtaining optimal leisure time and job performance simultaneously. First, companies and organizations should guide people to establish a beneficial concept of leisure. Influenced by traditional Chinese culture and Confucianism, many Chinese people have long regarded “getting rich through diligence” as a traditional virtue, and have not noticed or valued the positive effects of leisure on people's work and lives. It is necessary to guide individuals to correctly understand the meaning of leisure and apply the concept of a “combination of work and rest” in their daily life. The government and companies should pay more attention to the quality of adult leisure life, and implement the equal treatment of people's leisure time and job performance.

Second, the government and companies should promote the concept of optimal leisure time, educating citizens and employees to take the “best” amount of leisure time daily and adjust their leisure time and working hours accordingly. For a long time, Chinese people have been taking working hours that are too long and have observed insufficient leisure time. Therefore, the government should adopt a variety of measures to increase the income level and welfare of residents so that residents will “dare” to relax and “be happy” to relax. It is necessary to effectively increase the income level of middle-income groups and further promote the income distribution of enterprises to tilt them toward front-line workers.

Third, the government and companies should set up leisure facilities in public areas and workplaces to enhance the variety of leisure activities and promote active and healthy leisure participation. Business owners can set up recreational facilities, such as those for sports, fitness or art appreciation, for employees in their offices. Employees will obtain adequate rest and relaxation during their leisure time in the workplace, which can effectively promote the improvement of individual job performance and, at the same time, increase people's physical and mental health and overall wellbeing.

7.3. Study Limitations and Future Research

On the basis of previous studies on the economic effects of leisure time, in this study we not only studied the optimal amount of leisure time that promotes individual job performance from a micro perspective, but also further explored the mechanisms of leisure time on economic output. However, this study still has the following limitations. First, this study did not focus on the specific types and allocation of leisure activities. The categories of leisure activities and active/passive leisure participation may have different effects on people's health and wellbeing. For example, engaging in positive leisure activities (i.e., studying, reading and exercise) during leisure time can help individuals to release the pressure of work and life and maintain physical and mental health. On the other hand, engaging in some passive leisure activities (i.e., gambling, smoking and drinking) can

damage one's physical and mental health. Future research should examine the allocation of leisure time and the impact of different activities on people's work and life.

The second limitation of this study lies in the research sample. To ensure that the research subject was comparable in the study context, in this study we focused only on the traditional manufacturing industry in China and examined a small sample of 80 employees. Therefore, the research results may not be applicable to other industries or other countries due to the issue of generalizability. Future research should expand the sample scope to include employees in agriculture and the traditional/modern service industry and then verify the impact of leisure time on individual job performance in agriculture and the service industry.

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