

# Research on the Mechanism of the Function of Running App and Sports Achievement -The Mediating Effect of Personal Effort

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## ABSTRACT

This study is based on the goal setting theory and the theoretical framework of self-efficacy, combined with the questionnaire survey method to design, and construct a running app mechanism of action scale. With 634 as the research object, the model was verified through the SEM data processing technology and further explored whether personal efforts play an intermediary role in this process. Research shows that goal setting, knowledge sharing, timely feedback, and socialized comments have a positive impact on sports achievements, and personal efforts play a part of the intermediary role in the relationship.

**Keywords:** goal setting; knowledge sharing; timely feedback; socialized comments; sports achievements; personal efforts

## 1. RESEARCH BACKGROUND

In recent years, with the development of IT technology, mobile Internet, and intelligent terminals, application apps have continued to emerge. Exercise apps can record data such as exercise trajectory, calorie measurement, and exercise volume. Exercise participants can obtain corresponding exercise knowledge through the App, which is widely loved by exercise participants. In 2019, the State Council issued the "Outline for Building a Powerful Sports Country". The outline pointed out that five strategic tasks should be implemented to improve the physical literacy and health of the people, including "promoting the intelligent development of national fitness" and "supporting wearable sports equipment and smart sports." The specific measures of "R&D and manufacturing of equipment" achieve the goal of being a sports power.

In the field of sports discipline research, the earlier concern about the application research of App in the field of sports can be traced back to the early research of Zipu Wang (2014) [1]. He believes that mobile apps have important research and practical applications in the future of sports research and the sports industry. value.

Yaoyao Lin (2019) [2] conducted an in-depth research on the willingness to use apps based on the theory of expectations. The research showed that increasing users' perceived usefulness can increase user satisfaction, and both perceived usefulness and satisfaction can increase app willingness to use Apps. scholar Zhang Mingxin (2018) [3] studies the relationship between App users' attitudes, subjective norms, perceptual behavior control, behavior intentions and usage behaviors from the perspective of planned behavior theory, and then determines the appearance of running behavior.

Scholar Mou Xiangqian (2020) [4] uses the method of word frequency analysis to study the user's willingness to run from the perspective of increasing user experience, cognition + thinking experience, action + sensory experience, association + emotional experience and other dimensions.

To sum up, scholars' research on the application of sports apps mainly focuses on explaining the motivations for users to use apps and increase the frequency of use of apps by influencing motivations, and finally achieve the goal of physical fitness. However, there are few existing studies on the following issues: one is how the various

functions of the app affect the user's psychological process during exercise during the user's use of the app.

This project researches the relationship between the various functions of the user when using the App and the sports achievement. On the one hand, it provides a new theoretical research perspective for the tele motion psychology, and on the other hand, it can provide a theoretical basis for the improvement and enrichment of the functions of the enterprise, and help the enterprise obtains a sustained competitive advantage.

## **2. RESEARCH HYPOTHESIS AND CONCEPT DEFINITION**

For the convenience of research, this research selected the most common running exercises in national fitness. Under normal circumstances, running activities have a rigorous exercise process. From pre-running preparations, including pre-running plan design, running knowledge reserves, running equipment, during running, self-motivation when slack occurs, running pace control, running After stretching. In this process, how to control so that running can be effectively realized, so that the whole people can actively participate in sports activities and finally achieve the goal of national fitness.

### **2.1 Effort**

Self-efficacy is an important concept put forward by psychologist Bandura in 1977<sup>[5]</sup> <sup>[6]</sup>. He believes that human behavior, human internal factors, and environment interact with each other. Self-efficacy is the result of measuring and evaluating one's own ability, which in turn regulates people's choice of behavior and the degree of effort and determines their ability to perform in the task. In the case of certain physical conditions, the degree of improvement in subjective conditions helps the appearance of behavioral results.

Taking running as an example, the completion of a certain level of running goal is affected by the body's own quality, many internal factors and the external environment. For mass sports participants, under certain physical conditions, the completion of running behavior is the same as that of the individual. Related to the intrinsic elements. When the body is exhausted and breathing is difficult, the individual's self-motivation can prompt the individual to continue to complete the running behavior.

### **2.2 Goal setting.**

In their research, Edwin A. Locke and Hughes <sup>[7]</sup> <sup>[8]</sup> found that external stimuli (salary rewards, job feedback, supervisory pressure) all affect motivation through goals. Goals can direct activities towards goal-related behaviors, allowing people to adjust the degree of effort according to the degree of difficulty, and ultimately

affect the persistence of behavior. In 1967, the "Goal Setting Theory" was put forward, which believed that the goal itself has a motivating effect. The goal turns people's needs into motivations, so that people's behaviors work in a certain direction, and their behavior results are consistent with the established ones. Make adjustments and corrections in time to achieve the goals.

Goal setting theory believes that goals have two attributes, the difficulty and clarity of the goal. The clarity of a goal refers to the content of the goal, which can be clear or vague. A clear goal can be that the goal setter is clearer about the work content, the more you understand the results of the goal behavior, the more you can reduce the blindness of the behavior, enhance the self-control level of the behavior, guide the participants to implement the behavior needed to achieve the goal, and finally obtain the corresponding behavior result.

The difficulty of the goal, the degree of difficulty of the goal is a subjective concept of evaluation, related to the ability and experience of the participants. Under normal circumstances, the behavior result has a linear relationship with the difficulty level of the goal. When the actor has a certain ability, the actor will adjust the degree of effort according to the difficulty of the goal, and finally achieve the result.

Before participating in the running activity, the user can set himself the goal of this activity, such as completing a 3km jog, 5km or 10km, or further increasing the difficulty, such as increasing the pace requirement or running time requirement. Whether or not runners set clear goals before running has a direct impact on the completion of running activities.

Hypothesis 1a: The setting of running goals before running has a positive relationship with sports achievements.

Hypothesis 1b: The degree of effort plays a mediating role in the relationship between goal setting and sports achievement.

### **2.3 Knowledge sharing**

Most people believes that the purpose of running can be accomplished by just running up. But in fact, running is a very professional sport, such as how to adjust breathing during running, how to control pace, how to control between fast running and jogging, and how to stretch and warm up before and after running. Etc., these running skills require very complete knowledge to complete.

In the past, the acquisition of these professional knowledge could only be obtained through professional coaches. But for the goal of a nationwide fitness powerhouse, relying on offline guidance from professional coaches cannot meet the needs of the society. Nowadays, sports apps have added links to sports-related

knowledge and sports skills video modules. In this way, most people can obtain various running-related professional knowledge. Through knowledge learning, it will help the public to acquire running-related skills and complete physical exercise projects. .

Scholar Dongsong Cai (2018) <sup>[9]</sup> studied the mechanism of knowledge link sharing behavior in WeChat Moments, because personal emotions and cognitions, social subjective norms and impression management, and interpersonal interaction urge individuals to make knowledge sharing behaviors. One function of this type of App is to obtain corresponding professional knowledge. There are two main ways to share knowledge of sports apps. One is related courses offered by the platform, and the other is that platform users share their own running knowledge through the platform's social functions.

Hypothesis 2a: The knowledge sharing function of sports App positively affects sports performance.

Hypothesis 2b: Effort level plays a mediating role between knowledge sharing and athletic performance.

## **2.4 Socialized comments**

After the run is completed, the user will share the results of the run in the form of pictures and personal opinions in the virtual community. The runners will evaluate and discuss the data. In addition to simple praise, they will also share the psychological journey of the run, and these psychological processes will positively motivate runners to continue participating in running.

Li Xinkui's research shows that Moments sharing is a user's self-expression, but is actually a self-disclosure behavior. This kind of sharing, or just a few words, or posting a few photos, or using a few emojis, or even a link without any text, can often instantly generate a feedback action in the circle of friends, and like it as an expression. Scholars will This stress response is called "ice cream" aesthetic pleasure. In addition, the comfort of "anytime, anywhere" and "anywhere" brought about by sharing comments is just like what Jean Baudrillard calls "cool". This "cool" of switching between reality and virtual arbitrarily makes users feel emotional about WeChat. rely. And this kind of aesthetic pleasure and emotional dependence will induce users to actively participate in running activities.

Maslow's hierarchy of needs theory believes that the demand for social group attributes can stimulate behavior.

In the sports app, individual runners can form a running group. The platform will arrange a variety of online and offline competitions. Each member of the running group will contribute to the group's task indicators when they complete their runs. When the group is honored for completing the task indicators, the individual's achievement from the group is far greater than the individual's sense of accomplishment. This group belonging will positively encourage the individual to show positive behavior.

Hypothesis 3a: After sports individuals share the data in the virtual community, the social evaluation will be positive for sports performance.

Hypothesis 3b: Effort level plays a mediating role between socialized comments and athletic performance.

## **2.5 Timely feedback**

Goal setting theory believes that, in addition to the motivational effect of the goal itself, when an individual implements a behavior, the individual always compares the results of behavior feedback with the goal. This comparison allows the individual to understand the gap between the goal and the goal in a timely manner. By continuously adjusting the degree of effort, we can shorten the gap and finally make the goal achieved.

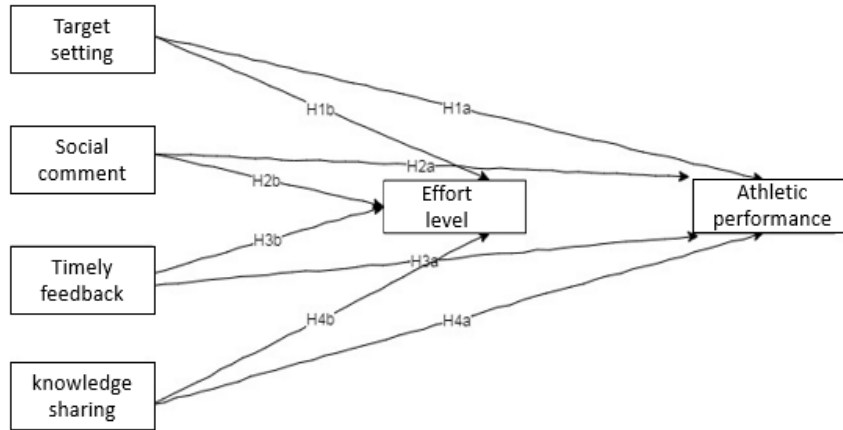
The running app has the function of timely reporting, which can report timely pace, heart rate, and running distance in time. Just like the function of an escort, you can adjust your own behavior according to the goal, and then make the body form a certain habit, which is the goal Achieved.

Hypothesis 4a: When running, the app's timely feedback function positively affects sports performance.

Hypothesis 4b: Effort level plays a mediating role between timely feedback and athletic performance.

## **2.6 Sports achievements**

Sports achievements refer to the achievements made in the course of sports. In this study, the main focus of the study is the performance achieved by running apps. The main subjects of the study are ordinary people rather than professional athletes. For the convenience of the study, the study selects the amount of exercise that ordinary people can achieve, such as 3km jogging and jogging. Jogging for 5 kilometers.



Picture 1 Frame of the concept

**3. RESEARCH DESIGN**

**3.2 Research scale**

**3.1 Research sample**

This study uses college students as the research sample. In recent years, with the implementation of the National Fitness Strategic Plan, the frequency and time of college students' participation in sports activities have increased significantly, and they are also users of various sports apps. Various types of data are representative. The data collection time starts on March 1, 2021 and ends on the 31st, with a duration of 1 month.

The questionnaire contains seven parts: basic information of the subject, target dimensions, social comments, target feedback, sports knowledge, effort level, and performance. The scale uses the Likert five-point scoring method (1-5 points means from very inconsistent to very consistent). The larger the score, the more recognized the subjects are.

**Table 1** Questionnaire design

Dimension	topic	Question number
Target setting	I set a specific running pace.	x1
	I set a specific running pace.	x2
	I set a specific pace to complete the time.	x3
	I set a challenging pace.	x4
	I set a difficult pace to complete the time.	x5
	I set pace goals for multiple stages.	x6
	I adjust the pace goal according to different stages.	x7
Social comment	The likes of others make me work harder.	a1
	The instructive comments of others are helpful to me.	a2
	Critical comments from others make me work harder.	a3
Timely feedback	I pay attention to the pace data for each run.	b1
	I will pursue a faster pace when the data feedback that I have achieved the pace goal.	b2
	I will work harder to achieve the pace goal when the data reports that I am still far from the goal.	b3
Knowledge sharing	The professional courses in the sports app are helpful to me.	c1
	The professional knowledge about running in the sports app is helpful to me.	c2
	Learning to use professional running equipment is helpful to me.	c3

Effort level	I strive to complete the running goal when I feel tired	m1
	I stick to the running goal when I am breathing difficulties	m2
	I insist on completing the amount of exercise set by the goal.	m3
Athletic performance	Run at a pace of 3km	y1
	Run 5km pace	y2

**4. DATA ANALYSIS**

**4.1 Descriptive analysis**

From table 2, we can see that the subjects of this survey are college students, and women account for a relatively large proportion of males to females. In their grades, the proportions of freshmen to seniors are

relatively even, and the survey respondents live in families. The proportion of land in cities, towns and rural areas is relatively even. Young people accept new things quickly and are willing to use Internet products. They are the main force in using sports apps. The grades and residences of college students in this questionnaire are evenly distributed, so the college students in this survey are more representative of.

**Table 2** Basic information of the subject

gender	male	258	40.10%
	Female	385	59.90%
grade	Freshman	173	26.90%
	Sophomore	201	31.30%
	Junior	186	28.90%
	Senior year	83	12.90%
Place of residence	City	248	38.60%
	town	241	37.50%
	Rural area	154	24.00%
total		643	100%

Data source: questionnaire

**4.2 Reliability and validity analysis**

**4.2.1. Reliability analysis**

Reliability analysis refers to checking the consistency between the scores of each item in the scale and reflects the trustworthiness of the scale's measurement and evaluation results. Commonly used in academia Cronbach's Coefficient to test and measure the reliability of the scale, The larger the  $\alpha$  coefficient, the more reliable the result. We can see that the alpha coefficients of each scale are 0.845 above in table 2, the alpha coefficient of the total questionnaire is 0.892. Generally speaking, the scale data is best to be greater than 0.8. It can be explained that the questionnaire has good reliability and the item design is reasonable.

**4.2.2 Validity analysis**

Validity analysis refers to whether the questionnaire items can truly reflect the construct, and whether the data structure is consistent with our expectations of the construct. According to the suggestion of Anderson and Gerbing (1998), applying structural equation model to process data, the number of samples should be more than 150. The number of samples in this study is 643, Meet the sample size requirements. The fit index of the structural equation is shown in the table, and the simulation fit meets the requirements. The structural model in this study has a good overall fit. In this study, the Average Variance decimation value (AVE), combined reliability (CR) As an evaluation index of validity. For specific information. The details of table 4:

**Table 3: Scale validity analysis**

Variable name	Item	Normalized factor loading	AVE	CR
Target	x1	0.807	0.6705	0.9342
	x2	0.719		
	x3	0.851		
	x4	0.853		
	x5	0.835		
	x6	0.832		
	x7	0.827		
Social comment	a1	0.857	0.7102	0.8802
	a2	0.865		
	a3	0.805		
Timely feedback	b1	0.848	0.7197	0.8851
	b2	0.852		
	b3	0.845		
Knowledge sharing	c1	0.876	0.7526	0.9011
	c2	0.898		
	c3	0.827		
Effort level	m1	0.856	0.7284	0.8894
	m2	0.872		
	m3	0.832		
Athletic performance	y1	0.912	0.8218	0.9022
	y2	0.901		

Data source: questionnaire

It can be seen From table 3 that the standardized factor loads are all greater than 0.7, the AVE values are all greater than 0.6, and the CR values are all greater than 0.8. When the load of each factor is greater than 0.5, the

AVE value is greater than 0.5 and the CR value is greater than 0.7, the aggregate validity of the scale is considered to be high. Therefore, it can be explained that the scale has good convergence validity.

**Table 4 Measurement model matching**

Model checking index	CMIN/DF	RMSEA	GFI	AGFI	CFI	TLI
Judgement standard	<3	<0.08	>0.9	>0.9	>0.9	>0.9
Model fit value	3.047	0.056	0.927	0.902	0.958	0.949

Data source: questionnaire

Table 4 shows that according to the structural equation model fitting criterion, the model in this study has a good degree of fit, and all indicators basically meet the requirements, indicating that the model and the collected data have reached the good match.

the SPSS's bivariate correlation analysis analyzes the correlation of each variable, and judges the strength of the correlation through the size of the correlation coefficient. The larger the absolute coefficient value, the higher the dependence relationship between variables.

The results are shown in the Table5:

**4.3 Correlation analysis**

This article used the Pearson correlation analysis in

**Table 5** Correlation coefficient

	Target	Social comment	Target feedback	Sports knowledge	Effort level	achievement
Target	1					
Social comment	.316**	1				
Target feedback	.348**	.312**	1			
Sports knowledge	.188**	.288**	.280**	1		
Effort level	.224**	.198**	.306**	.168**	1	
achievement	.359**	.168**	.277**	.167**	.249**	1
Cronbach coefficient	0.93	0.846	0.876	0.866	0.845	0.899

Note: \*\* Relevance is in 0.01 Significantly horizontally (two-tailed)

Data source: questionnaire

From table 5, we can be seen that there is a significant positive correlation between goals, social comments, goal feedback, sports knowledge, effort and performance. Setting clear goals, difficult goals, and staged goals will affect the degree of personal effort and help improve personal performance. Individuals participating in social comments in virtual communities will have emotional support and will also affect the individual's effort and performance. Goal feedback allows individuals to understand the gap between themselves and their goals in real time, so that they can adjust the amount of exercise and improve their performance. Mastering sports professional knowledge will increase personal self-confidence, guide the individual to work towards the goal, thereby improving personal performance.

Therefore, Assuming 1a, Assumption 2a, Assumption 3a, and Assumption 4a be verified.

**4.4 Intermediary effect test**

A mediating variable is an independent variable that affects a dependent variable through one or more variables, and this variable is a mediating variable. The purpose of studying mediation is to further explore the internal mechanism of the relationship between variables on the basis of known relationships. Scholar Wen Zhonglin et al. (2004) [10] proposed a mediating effect test procedure, by centralizing the hypothetical variables, three successive regression analyses, and testing whether the mediating variables have an effect by testing whether the standardized coefficients are significant.

**Table 6.** Goals affect performance through effort

Model	Independent variable	Dependent variable	Standardization factor	T-value	P-value	Adj.R2	F-value
Model1	Target	achievement	.359	9.738	.000	.128	94.835
Model2	Target	Effort level	.224	5.829	.000	.49	33.981
Model3	Target Effort level	achievement	.319 .178	8.579 4.772	.000 .000	.156	60.411

Data source: questionnaire

From table 6, we can see that goals will have a significant positive impact on performance, and goals will also positively affect effort. When the goal and effort enter the regression equation at the same time, the standardized coefficient of the goal is from 0.359 to 0.319, Which shows that the degree of effort plays a

mediating role between goals and performance. Since the target is in the model3 The normalization coefficient in is 0.319, P=0.000, So it is part of the mediating effect. The contribution rate of the mediation effect to the total effect is  $0.224 \times 0.178 / 0.359 = 11.11\%$ .

**Table 7.** Regression model of socialized comments and sports performance

Model	Independent variable	Dependent variable	Standardization factor	T-value	P-value	Adj.R2	F-value
Model1	Social	achievement	.168	4.323	.000	.027	18.686

		comment					
Model2	Social comment	Effort level	.198	5.121	.000	.038	26.225
Model3	Social comment	achievement	.124	3.194	.001	.074	26.614
		Effort level	.225	5.796	.000		

From table 7 we can see that socialized comments have a significant positive impact on performance, and socialized comments also positively affect effort. When social comments and effort enter the regression equation at the same time, the standardized coefficient of the target is from 0.168 to 0.124, which shows that the degree of

effort plays an intermediary role between the level of socialization and achievement. Due to socialized comments in the model3 The normalization coefficient in is 0.124, P=0.000, So it is part of the mediating effect. The contribution rate of the mediating effect to the total effect is  $0.198 * 0.225 / 0.168 = 26.52\%$

**Table 8** Timely feedback and sports performance regression equation

Model	Independen t variable	Dependent variable	Standardi zation factor	T-value	p- value	Adj.R2	F-value
Model1	Feedback	achievement	.277	7.268	.000	.075	53.091
Model2	Feedback	Effort level	.306	8.146	.000	.092	66.364
Model3	Feedback	achievement	.221	5.630	.000	.104	38.070
	Effort level		.181	4.622	.000		

From table 8, we can see that timely feedback theory will have a significant positive impact on performance, and timely feedback and comments will also positively affect the degree of effort. When timely feedback and effort level enter the regression equation at the same time, the standardized coefficient of the target drops from 0.277 to 0.221, indicating that effort level plays a

mediating role between timely feedback and performance. Since the standardized coefficient of timely feedback in Model 3 is 0.221 and P=0.000, it is part of the mediating effect. The contribution rate of the mediating effect to the total effect is  $0.306 * 0.181 / 0.277 = 19.99\%$

**Table 9** Knowledge sharing and sports performance regression equation

Model	Independen t variable	Dependent variable	Standardi zation factor	T-value	P- value	Adj.R2	F-value
Model1	knowledge	achievement	.167	4.288	.000	.026	18.390
Model2	knowledge	Effort level	.168	4.308	.000	.027	18.556
Model3	knowledge	achievement	.129	3.347	.001	.075	27.146
	Effort level		.228	5.910	.000		

From table 9 we can see that knowledge sharing will have a significant positive impact on performance, and knowledge sharing will also positively affect effort. When timely knowledge sharing and effort enter the regression equation at the same time, the standardized coefficient of the target drops from 0.167 to 0.129, indicating that effort plays a mediating role between timely knowledge sharing and performance. Since the standardized coefficient of knowledge sharing in Model 3 is 0.129 and P=0.000, it is a partial mediation effect.

The contribution rate of the mediation effect to the total effect is the contribution rate:  $0.168 * 0.228 / 0.167 = 22.94\%$

#### 4.5 Analysis and discussion

The clarity of the goal will allow individuals to clearly know the direction of their efforts and can well guide the individual to achieve the goal. In this process, the degree of personal effort will be very high, and personal effort will help it improve its performance. Difficult goals will motivate individuals to achieve them,



so that individuals will work harder to achieve the goals, which will improve their performance. Staged goals will allow individuals to achieve their goals one step at a time, and continuous efforts will also improve personal performance. Individuals participating in the virtual community on the sports APP can communicate and interact with other users. Social comments and likes will affect personal emotions, and these will affect personal efforts. If we are praised or recognized by others, we will work harder to achieve new goals. If we are guided by others, we will also work hard to make progress in a good direction. Paying attention to the pace of each run can let individuals know the gap between their performance and their goals and can better work hard to improve their performance. The sports APP provides personalized sports knowledge for us to learn. With the support of professional sports knowledge, our sports enthusiasm will increase, and we will work harder to achieve higher goals and continuously improve our performance.

## 5. CONCLUSIONS

This study presents that the personal effort level plays a mediating role in the psychological effects of ordinary sports participants during running, and reveals the influence of the built-in functions of sports apps on the effort level of runners and the influence on sports achievements. On the one hand, this research provides exercise guidelines for ordinary sports participants. In the process of exercise, they make full use of these sports apps to assist themselves in completing the amount of exercise scientifically and achieve the goal of physical fitness. On the other hand, this research also provides a theoretical framework for the management practice of enterprises. When designing products, enterprises should focus on improving the functions of the products from the perspective of more conducive to sports participants to complete the exercise. If the socialization function of the existing sports app lacks, enterprise should enhance the socialization function with other social app, for example, WeChat and Alipay. Through cooperation or strategic alliance among them, the port could be unblocked.

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