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The Influence of Decisional Balance, Self-Leadership, Self-Efficacy, And Stages of Change on Adopting Exercise Behaviors in Chinese Gen Y

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Abstract

This research aims to investigate the application of the transtheoretical model in the fields of management, psychology, and health behavior, with a specific focus on gaining a profound understanding and conducting quantitative studies. Proposed by American psychologists James O. Prochaska and Carlo C. DiClemente in 1983, the transtheoretical model has evolved into a crucial theory in the realm of management. It seeks to dissect the various stages individuals undergo when attempting to alter unhealthy behaviors, serving as a basis for formulating intervention strategies. The research delves into the application of the transtheoretical model in the domain of physical exercise, emphasizing the significance of quantitative research. Through the widespread use of questionnaire surveys, encompassing a diverse sample of participants, a total of 659 questionnaires related to physical exercise behavior were collected from Gen Y in Chengdu, China. Detailed analysis and statistical processing of this data allow the research to present more accurate and objective conclusions, thereby further substantiating the practical application of the transtheoretical model across diverse fields. Focusing on Gen Y in China, the research explores the relationships among Stages of Change, Decisional Balance, Self-Leadership, and Self-Efficacy. The utilization of quantitative research assists in clearly capturing and quantifying the exercise behavior and attitudes of the Y generation, providing robust support for the development of relevant policies and intervention measures. In summary, this research underscores the pivotal role of quantitative research in exploring the transtheoretical model. Through extensive questionnaire surveys and data analysis, the study provides a reliable foundation for theoretical applications, analyzing the relationships among Stages of Change, Decisional Balance, Self-Leadership, and Self-Efficacy. This contributes to a more comprehensive understanding and quantification of physical exercise behavior and the characteristics of the Chinese Gen Y, ultimately enhancing the credibility and practicality of the research.

Keywords: Stages of Change, Decisional Balance, Self-Leadership, Self-Efficacy, Gen Y

1. Introduction

The Transtheoretical Model is a theory in the fields of psychology and health behavior. Initially proposed in 1983 by American psychologists James O. Prochaska and Carlo C. DiClemente, it was further developed in 1984. "Stages of Change" is often referred to as the "Transtheoretical Model." This model has been developed for several decades in the international academic community, spanning areas such as management, social behavioral science, and health

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education. In the late 20th century, scholars began applying it to the domain of physical exercise. Subsequently, Chinese scholars started incorporating this theoretical model into their research, as evidenced by Hu (2021). The Transtheoretical Model formulates intervention strategies based on the different behaviors and corresponding psychological needs of individuals at different stages. Scholars Guo and Yang (2019) note its application to changing unhealthy behaviors. After its proposal by James O. Prochaska and Carlo C. DiClemente, Sonstroem & Amaral (1986) applied the Transtheoretical Model to studies related to changes in physical fitness and exercise. Their research focused on 220 males over 30 years old from Rhode Island, USA. Using self-reported data on their physical exercise over the past four years, the researchers differentiated the stages of physical exercise into precontemplation, contemplation, preparation, action, and maintenance. They implemented interventions based on the belief statements from the participation regularity in the fitness exercise plan results, derived from Fishbein and Ajzen's (1975) research theory. The study found typical correlations between nine belief statements in the main difference function components and the stages adopted in fitness exercise, revealing the widespread application of the Transtheoretical Model in research on physical fitness and exercise (Prochaska & Marcus, 1994).

O'Connor (1994) proposed the adoption of the Transtheoretical Model in physical education, particularly emphasizing the application of change processes at each stage. Therefore, that study selected students as research subjects and applied the emphasized processes at each stage of the Transtheoretical Model in the context of physical education classes to explore the stage changes among different groups. Prochaska & Norcross (1994) suggested exploring individual behavior change based on the Transtheoretical Model, emphasizing different stages, and applying different change processes and levels throughout the development of change. The study applied the Transtheoretical Model to investigate 12 behaviors, including weight control, reducing high-calorie diets, and physical activity, demonstrating the general applicability of the theory. Rodgers, Courneya & Baydu (2001) studied middle school students, university students, and adults, confirming the widespread applicability of the Transtheoretical Model. This further affirmed the suitability of applying the Transtheoretical Model to various groups. In a study by Liao & Li (2019) exploring the impact of health education based on the Transtheoretical Model on blood pressure control in outpatient hypertensive patients, 200 hypertensive patients from a tertiary hospital in a certain city in China were randomly divided into an observation group and a control group, with 100 patients in each group. The observation group was divided into stages according to the Transtheoretical Model, and a health education program for blood pressure control behavior was developed. In the Transtheoretical Model, the stages of change refer to the chronological sequence of behavior change, constituting the core content of the theory (Müller et al., 2002). It consists of five stages, and the detailed definitions for each stage are provided in Table 1:

Table 1: Five Stages of the Transtheoretical Model and their Definitions.

Stage	Definition
Precontemplation	No intention to take action in the next 6 months
Contemplation	Intending to take action in the next 6 months
Preparation	Getting ready to take action in the next 30 days and have taken some behavioral steps in preparation
Action	Change has occurred but is less than 6 months
Maintenance	Change has occurred and has exceeded 6 months

Source: (Müller et al., 2002).

The target population for this research is the Chinese Gen Y. According to the definition provided by Sima & Pugsley (2018), individuals born between 1984 and 1999 are classified as the Y generation in contemporary China. Jean M. Twenge (2006), in the book "More Confident, More Assertive, More Powerful Than Ever Before – And More Miserable," delves into the definition of the Millennial generation, describing their characteristics and differences from the previous generation. The Millennial generation, commonly referred to as Gen Y, typically includes those born between 1984 and 1999. Through a review of relevant literature, the researcher has identified some unique characteristics and trends in the physical exercise behavior of Chinese Gen Y. Firstly, there is a reliance on digitization: being products of the digital age, Chinese Gen Y tends to use smartphones, fitness apps, and social media to track and share their physical activities. This makes it easier for them to access health information, exercise plans, and social support. Secondly, there is a diversity in exercise preferences: Chinese Gen Y is more willing to explore various exercise modalities, including yoga, running, gym workouts, outdoor adventures, and e-sports. They have a higher demand for diverse and personalized exercise options. Next is an emphasis on social interaction: compared to previous generations in China, Chinese Gen Y places a greater emphasis on social interaction. They prefer exercising with friends, joining sports teams, or participating in social sports activities, contributing to the enjoyment of exercise, and sustaining motivation. Following this is a focus on health and well-being: Chinese Gen Y demonstrates a higher concern for health and well-being. They recognize the importance of exercise for both physical and mental health, and they are more inclined to seek guidance from fitness trainers, nutritionists, and mental health professionals. Subsequently, there is a sustainability focus: many individuals in Chinese Gen Y are highly concerned about environmental protection and sustainability issues, which may influence their exercise choices. For example, they may prefer cycling, hiking, or participating in eco-friendly activities. Lastly, there is a tendency to challenge traditional notions: Chinese Gen Y sometimes challenges traditional fitness concepts and standards, such as ideals about body image. They emphasize self-acceptance and body positivity.

Meanwhile, according to the tracking data from the China Media Group's Financial Channel "China Beautiful Life Survey" from 2017 to 2022, the number of participants in sports in China increased by 10.2% from 2017 to 2022. Looking at data from different age groups over the past decade, the population aged 60 and above has traditionally shown higher levels of sports participation. However, in 2020, the number of people under the age of 40 surpassed those aged 60 and above for the first time. The survey indicates that the COVID-19 pandemic has made young people pay more attention to sports and health. The survey also revealed the top ten cities in China with a passion for sports: Chengdu, Changsha, Guangzhou, Hohhot, Kunming, Hefei, Urumqi, Wuhan, Xining, and Xi'an.

In July 2023, Chengdu hosted the World University Games, and according to the research by Quan (2023), the Chengdu Universiade created sustainable material wealth and cultural achievements. In preparation for the Universiade, the local government underwent the largest-scale transformation in over 30 years. The renovated venues are well-equipped, with a greater emphasis on post-event sustainability and the needs of nationwide fitness. The World University Games is considered a significant sporting event, attracting widespread attention locally and internationally. It inspires local youth to engage in sports for several reasons: 1) Igniting Interest and Enthusiasm: The Universiade brings together various sports and outstanding athletes, sparking the interest of local youth in different sports.

Watching these competitions can ignite enthusiasm for a specific sport. 2) Setting Examples: Athletes at the Universiade often represent the best levels from various countries. Their success and professional spirit can serve as examples for local youth. This role-model effect may inspire young people to actively participate in sports and strive for excellence. 3) Providing Participation Opportunities: The Universiade is usually accompanied by various celebrations and community activities related to the competitions. These activities offer opportunities for young people to engage in sports, whether as athletes, volunteers, or spectators. 4) Promoting Sports Facility Construction: Hosting the Universiade typically involves investment in constructing sports facilities. These facilities become legacies after the competition, available for local residents to use. The improvement of such facilities provides Chengdu's youth with more exercise venues and opportunities. 5) Raising Sports Awareness: The Universiade brings sports into the public eye, contributing to an increased awareness of sports. More publicity and media coverage can stimulate interest in participating in sports activities. In conclusion, international sporting events like the Universiade often contribute to the development of local sports and enhance people's focus on health and physical activities.

The application of the Transtheoretical Model in sports has been extensively studied. Ma, Bai & Li (2008) mentioned the integration of the Transtheoretical Model with behavior change. They conducted a comparative analysis of students' physical exercise behavior, exercise volume, and the distribution of behavioral stages before and after intervention. This involved utilizing tools such as the Physical Exercise Behavioral Stage Inventory, a self-developed Physical Exercise Behavior Scale, and a Physical Activity Level Scale. The researchers targeted students at different exercise stages and provided appropriate interventions, using the distribution of students' behavioral stages and level of exercise for different sports to identify patterns. Consequently, they derived the classification of students' behavioral stages according to the Transtheoretical Model. Sun, Zhang & Liu et al. (2008) observed that in the distribution of students' stages within the Transtheoretical Model of behavior change, the preparation stage was predominant, followed by the intention stage, action stage, pre-contemplation stage, and maintenance stage. The Transtheoretical Model divided students' physical exercise into five stages, effectively addressing the challenges faced by teachers or coaches in understanding students' exercise habits and styles. Wang (2019) employed the Transtheoretical Model for a health intervention on students' sedentary behavior. An objective evaluation of the overall perspective and effectiveness was conducted. Using a multi-stage sampling method, fourth-grade students at our school were selected and divided into a control group and an intervention group. Targeted interventions for sedentary behavior were applied to the intervention group, and a comparison of the stages of sedentary behavior before and after the intervention was made between the two groups.

Ma (2017) conducted a study using convenience sampling, selecting 982 college students as research subjects. Employing a cross-sectional survey method, the study aimed to examine the relationship between behavior change stages under the Transtheoretical Model and participation in physical exercise. The results indicated that the majority of college students' participation in physical exercise was in the pre-action stage, and there were significant differences in the behavior change stages of physical exercise between male and female college students. Initially applied in the field of health behaviors such as weight loss, smoking cessation, and alcohol restriction, the application of the Transtheoretical Model has evolved to encompass a broader and more in-depth range of research as it aims to promote the

establishment and maintenance of healthy behaviors. This expansion is evident in the extensive research, with notable breakthroughs in both depth and breadth (Müller et al., 2002; Mechanick et al., 2013). Research has confirmed that applying the Transtheoretical Model to the assessment and intervention of exercise behavior is highly applicable and can enhance individual compliance. Currently, the use of the Transtheoretical Model in health education interventions to induce behavior change is a popular research direction (Medeiros et al., 2016). Schumann et al. (2006) applied the Transtheoretical Model to smoking cessation research, pointing out that traditional methods cannot accurately reflect dynamic changes in patients before behavior change occurs. The Transtheoretical Model assists interveners in understanding patients' willingness and perspectives on behavior change, enabling the design of more reasonable health education plans. Noora et al. (2012) demonstrated that individuals can benefit from health communication strategies tailored to the stages of the Transtheoretical Model, increasing the frequency of exercise, and reducing unhealthy dietary habits. Kaplan (2021) suggested that training and follow-up based on the Transtheoretical Model can alter the lifestyle of type 2 diabetes patients, leading to improvements in BMI, blood pressure, and metabolic outcomes. Huang et al. (2015) highlighted the utility of the Transtheoretical Model in assessing changes in exercise behavior and levels of physical activity in patients after heart surgery, providing a foundation for rehabilitation training interventions.

Chen (2016) implemented health education based on the Transtheoretical Model for 118 hypertensive patients, effectively promoting regular exercise among them. Wang et al. (2019) applied the Transtheoretical Model to postoperative pulmonary rehabilitation exercise for lung cancer patients, resulting in a significant improvement in treatment compliance and quality of life for the intervention group at the 3rd and 6th months post-surgery. Wang et al. (2021) utilized the Transtheoretical Model to specify the focus of each stage of rehabilitation intervention, formulating personalized intervention strategies that effectively enhanced joint function and quality of life for elderly patients undergoing hip joint replacement. Li et al. (2019) and other studies have indicated that follow-up methods based on the Transtheoretical Model provide precise and effective interventions for post-percutaneous coronary intervention (PCI) patients, facilitating the transformation from passive compliance to active participation and ultimately improving their quality of life. In a study involving 126 breast cancer patients, Tong et al. (2014) highlighted the effectiveness of using the Transtheoretical Model to enhance patient compliance with adjuvant treatment, regular check-ups, and long-term medication adherence. The Transtheoretical Model has been widely adopted in research within the fields of physical exercise and medical health. Zhao (2019) conducted a survey on the physical exercise habits of young individuals during their leisure time, revealing that only 3% of students engage in physical exercise during their leisure time, with the majority opting to use that time for activities such as using their smartphones or watching movies.

Feng (2020) conducted a survey on 783 young individuals from 8 universities in Shanxi Province, revealing that 37.80% occasionally participate in physical exercise, while 31.03% never engage in any form of physical exercise. Shan (2020) surveyed 3000 young people from 5 universities in Jilin Province, finding that 28% of students dislike physical exercise, and some students are compelled to engage in physical exercise due to school physical assessments or activities. Li et al. (2021) investigated the status of physical exercise among young people in ordinary universities in Guangdong Province, discovering that the frequency of physical exercise among college students is mainly concentrated in 2 to 3 times per week. Moreover, 8.56% of college students exercise only once a week or not at all. In a study by

Yang et al. (2022) on the physical exercise habits of young medical university students, it was found that 48.86% of the respondent's exercise for less than 30 minutes each time. Additionally, 32.26% of the surveyed individuals reported exercising to the extent of feeling no sensation or only a slight warmth throughout the body. These findings suggest that contemporary young individuals lack awareness of physical exercise, engage in exercise with low intensity and frequency, lack proper exercise plans, fail to develop exercise habits, and have insufficient awareness of physical health. Considering the existing research results, the overall physical health level of university students is poor, largely due to weak health awareness, inadequate self-health awareness, insufficient knowledge of sports theory, and poor lifestyle choices. Scholars like Wang (2018) and Chen et al. (2020) have found, through surveys, that the policy attitudes of university students appear positive. However, during physical tests, there are negative attitudes such as aversion to hardship and fatigue, and indifference to test results, leading to inaccurate reflections of the real physical condition of young individuals.

2. Literature Review

2.1 Historical of Research

Based on the relevant literature from scholars such as Chen, Ruan & Xue (2016), Liao & Li (2019), Wang, Yang & Liu (2019), Liu, Mao & Chen (2022), the researchers have delineated the relationships between Decisional Balance, Self-Leadership, Self-Efficacy and Stages of Change on Adopting Exercise Behaviors.

2.1.1 Decisional Balance and Self-Efficacy

Firstly, there is a positive correlation between decisional balance and self-efficacy. Decisional balance refers to an individual's cognitive balance when facing behavior change, while self-efficacy represents an individual's confidence level in successfully implementing behavior change. In the context of exercise behavior, individuals who perceive themselves as more balanced in decision-making often have higher levels of self-efficacy, believing in their ability to successfully implement changes in exercise behavior.

2.1.2 Self-Leadership and Self-Efficacy

Secondly, there is a positive correlation between self-leadership and self-efficacy. Self-leadership refers to the process by which individuals manage their emotions, motivation, and behavior to achieve goals. Research indicates that individuals with higher levels of self-leadership typically exhibit a stronger sense of self-efficacy, believing in their ability to adopt and maintain exercise behavior.

2.1.3 Self-Efficacy and Stages of Change on Adopting Exercise Behaviors

Next, there is a positive correlation between self-efficacy and stages of change in adopting exercise behaviors. The higher the individual's self-efficacy level, the more likely they are to experience positive progress in the stages of change related to exercise behavior. Individuals with high self-efficacy are more likely to succeed in stages such as problem awareness, consideration of behavior change, decision-making, taking action, and maintaining behavior.

2.1.4 Decisional Balance and Stages of Change on Adopting Exercise Behaviors

Subsequently, there is a positive correlation between decisional balance and stages of change in adopting exercise behaviors. Individuals who perceive a higher decisional balance are more likely to make positive progress in different stages of exercise behavior change, including problem awareness, consideration of change, decision-making, taking action, and maintaining behavior.

2.1.5 Self-Leadership and Stages of Change on Adopting Exercise Behaviors

Additionally, there is a positive correlation between self-leadership and stages of change in adopting exercise behaviors. Individuals with the ability cultivated through self-leadership are more likely to experience positive changes in different stages of exercise behavior, including problem awareness, consideration of change, decision-making, taking action, and maintaining behavior.

2.1.6 Self-Efficacy in Decisional Balance, Self-Leadership, and Stages of Change on Adopting Exercise Behaviors

Finally, self-efficacy plays a mediating role in decisional balance, self-leadership, and stages of change in adopting exercise behaviors. The individual's level of self-efficacy may indirectly influence the process of exercise behavior change by affecting decisional balance and self-leadership. This mediating effect emphasizes the crucial role of self-efficacy in decision-making and self-leadership.

After delving into these relationships, the researcher gained a more comprehensive understanding of the interactions among decisional balance, self-leadership, self-efficacy and Stages of Change on Adopting Exercise Behaviors. Therefore, the researcher posits the following hypotheses:

H1: *In the Chinese Gen Y, there is a positive relationship between decisional balance and self-efficacy.*

H2: *In the Chinese Gen Y, there is a positive relationship between self-leadership and self-efficacy.*

H3: *In the Chinese Gen Y, there is a positive relationship between self-efficacy and the stages of change in adopting exercise behaviors.*

H4: *In the Chinese Gen Y, there is a positive relationship between decisional balance and the stages of change in adopting exercise behaviors.*

H5: *In the Chinese Gen Y, there is a positive relationship between self-leadership and the stages of change in adopting exercise behaviors.*

H6: *In the Chinese Gen Y, self-efficacy as a mediator between decisional balance, self-leadership, and the stages of change in adopting exercise behaviors.*

2.2 Research Theories

Liu, Mao & Chen (2022) research indicates that the weak awareness of physical health among young people has adverse effects on their exercise behavior. Studies using the Transtheoretical Model for cognitive-behavioral interventions have yielded positive results, demonstrating its effectiveness in changing erroneous perceptions and enhancing positive cognitions. In comparison to other models, the strength of the Transtheoretical Model lies in its detailed description of behavior change as a process. Moreover, it can employ corresponding change procedures based on different stages of change, conducting a more comprehensive and in-depth investigation of variables to derive corresponding factors promoting behavioral progress. The Transtheoretical Model focuses on how individuals transition from inactivity to

activity and then to maintaining activity, aiming to explain how behavior change occurs. The model delineates the process of how individuals shift from undesirable behavior to acquiring positive behavior, including elements like "stages of change," "self-leadership," "self-efficacy," and "decisional balance." Stages of change, the core content of the Transtheoretical Model, refer to the timing, motivation, and perseverance of individual behavior change, representing the chronological sequence of behavior change divided into five stages.

Change processes describe the process of modifying the behavior of the individual through the application of cognitive, emotional, behavioral, and interpersonal strategies and skills. Commonly described processes include consciousness awakening, dramatic relief, self-reevaluation, environmental reevaluation, social liberation, helping relationships, counterconditioning, reinforcement management, self-liberation, and social liberation. Change processes provide essential strategies for the stages of change. Self-efficacy refers to an individual's judgment and evaluation of their confidence and ability to complete tasks, serving as a crucial facilitator for individuals transitioning from lower stages to higher stages. Decisional balance describes the reasons and importance of whether behavior change occurs or not. It is the decision-making part of the Transtheoretical Model, including positive and negative factors, representing the perceived benefits of behavior change. The application of the Transtheoretical Model to promote exercise behavior among young people is highly valuable. Firstly, it enhances the participation of young people in physical exercise. The model provides elders with a reference for observing different stages of exercise behavior, allowing elders to strategize interventions based on different stages, facilitating targeted and planned interventions in the exercise behavior of the youth. Secondly, it contributes to the maintenance of positive exercise behavior among young people. The Transtheoretical Model uses a process to describe the change in exercise behavior, emphasizing various stages of exercise behavior change. By integrating the change process into five stages, it promotes positive changes in exercise behavior tailored to individual needs.

Yang et al. (2022) suggest that intentional interventions using the Transtheoretical Model can promote the initiation and maintenance of physical activity among athletes. Liu, Mao & Chen (2022) argue that the application of the Transtheoretical Model in intervening in youth physical exercise behavior is diverse rather than rigid, as it varies based on different factors such as individuals, timing, and situations, leading to different intervention forms. Elders should apply various change procedures in the intervention process according to different exercise stages, with a particular focus on the emotions and cognition of young individuals. During the intervention process, students can clearly perceive their progress, thereby enhancing their subjective initiative and actively seeking solutions to problems encountered during exercise. In recent years, in the field of health behavior, much progress has been made in the study of the Transtheoretical Model. Some Chinese scholars have conducted localized application studies on this model. However, research on the application of the Transtheoretical Model in teaching practices is still relatively lacking, leaving considerable room for development in its use within the curriculum. Currently, physical education curricula standards are continuously improving. However, in the implementation process, they are still influenced by thinking patterns and teaching models, such as excessive emphasis on skills or neglect of individual differences. This oversight neglects the emotional experiences of young people in the sports process, leading to doubts and misconceptions about physical exercise behavior among some youth, thereby affecting the cultivation of good exercise habits in youth. Therefore, scholars in the field should

strengthen in-depth research on the Transtheoretical Model and skillfully integrate it with physical exercise.

2.3 Conceptual Framework

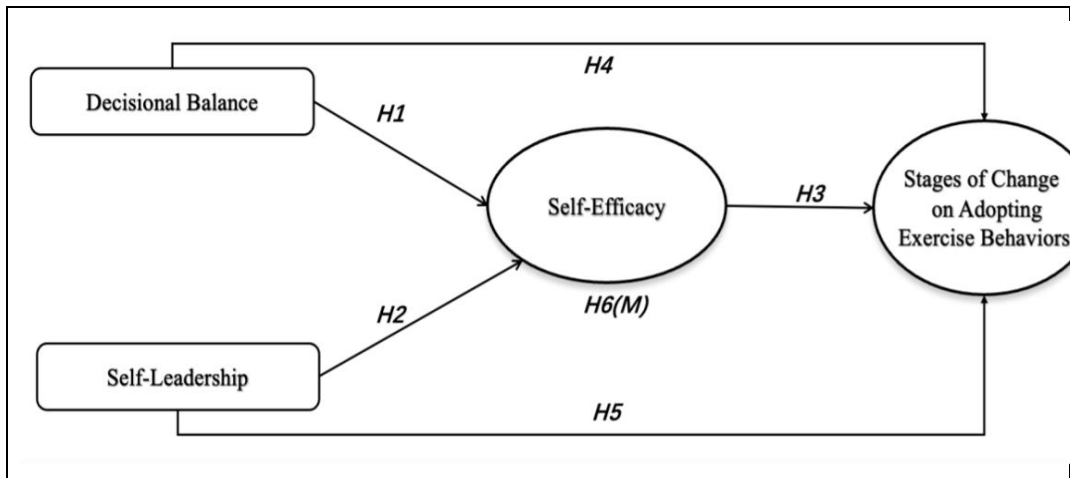


Figure 1: Conceptual Framework.

Source: Design by the Researcher (2023).

3. Research Methodology

3.1 Research Methods

This research employed a quantitative research approach to explore the exercise behaviors and associated factors of Chinese Gen Y. The advantage of quantitative research lies in its ability to provide quantitative data, enabling the researcher to quantify the relationships between different variables for a more comprehensive and objective understanding of the research subjects. Furthermore, quantitative research methods have broad applicability, allowing the analysis of large-scale samples to enhance the representativeness of research results. Through quantitative research methods, this study aimed to gather data on decisional balance, self-efficacy, self-leadership, and stages of change on adopting exercise behaviors among Gen Y within a larger sample scope, contributing to the revelation of the relationships among these factors. Statistical analysis will validate research hypotheses, providing a scientific basis for future intervention strategies and policy formulation.

3.2 Research Design

The research design for this study is a cross-sectional study, aiming to understand the current status of exercise behaviors and associated factors among Chinese Gen Y. The research utilized the Transtheoretical Model as a theoretical framework to investigate the relationships between decisional balance, self-leadership, self-efficacy, and stages of change on adopting exercise behaviors. The cross-sectional research design involves a single data collection, measuring and comparing different variables to obtain information at a specific point in time. This design allows for the rapid acquisition of large-scale data for analyzing relationships between various factors. Through a questionnaire survey, the researcher can gain insights into the exercise behaviors and cognitive conditions of Chinese Gen Y at a specific time point. While cross-sectional research design cannot reveal causal relationships between variables, it provides a

robust starting point for more in-depth exploration of these relationships in future longitudinal studies.

3.3 Sampling Technique

The research sampling is drawn from Gen Y individuals in Chengdu, China, with the aim of representing this population's exercise behaviors and associated factors. The research employed a convenient sampling technique, distributing 750 questionnaires, with 659 valid responses obtained, utilizing a stratified random sampling method. Stratified random sampling is a method used to ensure the sample is representative at specific levels. This method divides the population into different strata, and then random sampling is conducted within each stratum. Elements within each stratum have an equal chance of being selected for the sample. The purpose of this sampling method is to ensure the sample includes representative elements from important subgroups of the population, allowing the researcher to infer population characteristics more accurately. Stratified random sampling helps reduce sampling errors, enhance sample representativeness, especially in situations with high population heterogeneity, and is commonly used in the field of management to ensure the generalizability and applicability of research conclusions.

4. Data Analysis

4.1 Descriptive Analysis

According to Table 2, the researcher collected a total of 659 samples from Gen Y in Chengdu, China. The gender distribution in the study's Gen Y sample is relatively balanced, with a proportionate representation of males and females. Regarding educational background, the majority of the sample holds a bachelor's degree or lower. In terms of monthly income, the primary distribution falls within the range of 3001 to 8000 yuan. These basic demographic characteristics provide valuable insights into the composition and representativeness of the research sample.

Table 2: Basic Characteristics of Gen Y Sample.

Basic characteristics		n	%
Gender	Male	303	46.0
	Female	338	51.3
	Preferred not to answer	18	2.7
Educational background	Diploma	326	49.5
	Bachelor's degree	142	21.5
	Master's degree	175	26.6
	Doctoral degree	16	2.4
Monthly income	3,000 yuan and lower	106	16.1
	3,001-5,000	212	32.2
	5,001-8,000	200	30.3
	8,001 or higher	141	21.4
Total		659	100.0

Based on the comprehensive analysis of the descriptive statistics presented in Table 3, Gen Y demonstrates relatively high average scores in decisional balance, self-leadership, self-efficacy, and Stages of change on adopting exercise behaviors, indicating overall good performance in

these areas. Additionally, the skewness and kurtosis values for each measurement item meet the requirements of a normal distribution. The absolute values of skewness are all less than 3, and the absolute values of kurtosis are all less than 10, suggesting that the sample is essentially normally distributed, indicating high data quality.

Table 3: Descriptive Statistics Result.

Variable	Measured item	Mean	SD	S	BK
Decisional balance	A1	3.637	0.792	0.261	-0.398
	A2	3.700	0.748	-0.014	-0.186
	A3	3.766	0.812	0.042	-0.802
	A4	3.958	0.807	-0.322	-0.376
	A5	3.839	0.822	-0.089	-0.641
Self-leadership	B1	3.859	0.776	-0.299	-0.176
	B2	3.741	0.816	-0.045	-0.411
	B3	3.848	0.826	-0.101	-0.736
	B4	3.803	0.824	-0.177	-0.442
	B5	3.496	0.872	-0.057	-0.173
	B6	3.445	0.939	-0.021	-0.381
Self-efficacy	C1	3.715	0.869	-0.349	0.092
	C2	3.815	0.892	-0.492	0.166
	C3	3.727	0.890	-0.294	-0.153
	C4	3.693	1.006	-0.264	-0.466
	C5	3.516	0.833	-0.335	0.537
	C6	3.616	0.899	-0.414	0.304
	C7	3.472	1.017	-0.219	-0.271
Stages of change on adopting exercise behaviors	PRN1	3.786	0.805	-0.258	-0.045
	PRN2	3.734	0.849	-0.240	-0.117
	PRN3	3.897	0.844	-0.456	0.028
	CON1	3.882	0.913	-0.436	-0.420
	CON2	3.847	0.850	-0.342	-0.150
	CON3	3.607	0.839	0.008	-0.325
	PPN1	3.847	0.854	-0.481	0.263
	PPN2	3.880	0.847	-0.448	0.088
	PPN3	3.778	0.843	-0.371	0.130
	ACN1	3.750	0.832	-0.139	-0.307
	ACN2	3.757	0.850	-0.140	-0.400
	ACN3	3.669	0.863	-0.104	-0.274
	MAE1	3.590	0.890	-0.060	-0.447
	MAE2	3.797	0.840	-0.295	-0.191
	MAE3	3.775	0.844	-0.331	-0.073

4.2 Reliability Analysis

In Table 4, the researcher conducted a reliability analysis on four study variables, including decisional balance, self-leadership, self-efficacy, and stages of change on adopting exercise behaviors. Through the reliability analysis, the researcher found that the measurement tools for these four study variables exhibit relatively high internal consistency. This implies that the researcher can use these tools to measure the corresponding variables with relatively high reliability, facilitating effective research and data analysis.

Table 4: Results of Reliability.

Variable	n	Cronbach's α
Decisional balance	Decisional balance	0.848
Self-leadership	Self-leadership	0.872
Self-efficacy	Self-efficacy	0.887
Stages of change Pre-contemplation	3	0.795 0.892

on adopting exercise behaviors	Contemplation	3	0.761
	Preparation	3	0.841
	Action	3	0.834
	Maintenance	3	0.791

4.3 Validity Analysis (CFA) + Correlation Analysis

Based on the provided data, the researcher conducted a confirmatory factor analysis (CFA) to assess the structural validity of the scales. First, the fit of the measurement model was examined using various fit indices, including χ^2/df , GFI, NFI, IFI, TLI, CFI, SRMR, and RMSEA. The results indicated a good fit for the measurement model. Subsequently, convergent validity, which refers to the high correlation between items of the same variable, demonstrating that these items reflect the same concept or dimension, was examined. The composite reliabilities (CR) in Table 5 are all above 0.7, and the average variance extracted (AVE) is also above 0.5. These results suggest good convergent validity of the measurement items, indicating that the items collectively reflect the concepts of the latent variables. This confirms the reliability and validity of the scales in measuring the relevant variables.

Table 5: Convergent Validity Test Result.

Variable	Measured item	Factor loading	CR	AVE
Decisional balance	A1	0.663	0.851	0.535
	A2	0.783		
	A3	0.764		
	A4	0.760		
	A5	0.679		
Self-leadership	B1	0.628	0.874	0.538
	B2	0.754		
	B3	0.802		
	B4	0.777		
	B5	0.718		
	B6	0.709		
Self-efficacy	C1	0.712	0.888	0.533
	C2	0.751		
	C3	0.626		
	C4	0.790		
	C5	0.764		
	C6	0.714		
	C7	0.742		
Stages of change on adopting exercise behaviors	PRN1	0.731	0.847	0.526
	PRN2	0.866		
	PRN3	0.674		
	CON1	0.700		
	CON2	0.735		
	CON3	0.717		
	PPN1	0.786		
	PPN2	0.907		
	PPN3	0.725		

ACN1	0.770
ACN2	0.837
ACN3	0.771
MAE1	0.696
MAE2	0.815
MAE3	0.752

4.4 Correlation Analysis and Discriminant Validity

Based on the provided data, the researcher conducted a discriminant validity test using the Fornell and Larcker Criterion. According to the test results, the correlation coefficients between variables are all smaller than the square root of their respective AVE values. This indicates good discriminant validity among the variables, suggesting that the measurement tools can effectively distinguish between different concepts or dimensions. This further confirms the reliability and validity of the measurement tools.

Table 6: Discriminant Validity Test Result.

	Decisional balance	Self-leadership	Self-efficacy	Stages of change on adopting exercise behaviors
Decisional balance	0.731			
Self-leadership	0.603***	0.734		
Self-efficacy	0.527***	0.595***	0.730	
Stages of change on adopting exercise behaviors	0.709***	0.703***	0.724***	0.725

Note: Bold Numbers Are the AVE Square Root of Each Variable.

4.5 Difference Analysis

4.5.1 Difference Analysis on the Gender of Gen Y

According to the data analysis in Table 7, there are significant differences in the perception of decisional balance, self-leadership, self-efficacy, and stages of change in adopting exercise behaviors among different genders of the Gen Y. These results provide preliminary evidence of gender differences in the perception of the Gen Y, laying the foundation for further exploration of potential differences between genders.

Table 7: Difference Analysis on the Gender of Gen Y.

		n	Mean	SD	F	Sig.
Decisional balance	M	303	3.894	0.612	9.577	0.000
	F	338	3.685	0.628		
	Preferred not to answer	18	3.644	0.627		
	Total	659	3.780	0.628		
Self-leadership	M	303	3.795	0.672	6.817	0.001
	F	338	3.626	0.633		
	Preferred not to answer	18	3.436	0.723		
	Total	659	3.698	0.659		
Self-efficacy	M	303	3.770	0.715	10.889	0.000
	F	338	3.568	0.659		
	Preferred not to answer	18	3.182	1.061		
	Total	659	3.651	0.708		

Stages of change on adopting exercise behaviors	M	303	3.860	0.545	9.642	0.000
	F	338	3.712	0.517		
	Preferred not to answer	18	3.449	0.518		
	Total	659	3.773	0.537		

4.5.2 Difference Analysis on the Educational Background of Gen Y

According to the data analysis in Table 8, there are significant differences in the perception of decisional balance, self-leadership, self-efficacy, and stages of change in adopting exercise behaviors among individuals with different educational backgrounds in the Gen Y. These results provide preliminary evidence of educational background differences in the perception of the Gen Y, laying the foundation for further exploration of potential differences among various educational backgrounds.

Table 8: Difference Analysis on the Educational Background of Gen Y

		n	Mean	SD	F	Sig.
Decisional balance	High school diploma or lower	326	3.937	0.633	14.480	0.000
	Junior college diploma	142	3.601	0.576		
	Bachelor's degree	175	3.647	0.590		
	Master's degree or higher	16	3.613	0.634		
	Total	659	3.780	0.628		
Self- leadership	High school diploma or lower	326	3.775	0.679	2.965	0.031
	Junior college diploma	142	3.612	0.652		
	Bachelor's degree	175	3.636	0.628		
	Master's degree or higher	16	3.594	0.498		
	Total	659	3.698	0.659		
Self-efficacy	High school diploma or lower	326	3.726	0.758	2.907	0.034
	Junior college diploma	142	3.524	0.605		
	Bachelor's degree	175	3.615	0.651		
	Master's degree or higher	16	3.625	0.964		
	Total	659	3.651	0.708		
Stages of change on adopting exercise behaviors	High school diploma or lower	326	3.846	0.552	4.120	0.007
	Junior college diploma	142	3.714	0.492		
	Bachelor's degree	175	3.695	0.538		
	Master's degree or higher	16	3.654	0.434		
	Total	659	3.773	0.537		

4.5.3 Difference Analysis on the Monthly Income of Gen Y

According to the data analysis in Table 9, there are significant differences in the perception

of decisional balance, self-leadership, self-efficacy, and stages of change in adopting exercise behaviors among individuals with different monthly incomes in the Gen Y. However, there is no significant difference in the perception of decisional balance. These results provide preliminary evidence of income differences in the perception of the Gen Y, laying the foundation for further exploration of potential differences among various income groups.

Table 9: Difference Analysis on the Monthly Income of Gen Y.

	Monthly income	n	Mean	SD	F	Sig.
Decisional balance	3,000 yuan and lower	106	3.638	0.673	2.299	0.076
	3,001-5,000	212	3.796	0.633		
	5,001-8,000	200	3.799	0.583		
	8,001 and higher	141	3.835	0.641		
	Total	659	3.780	0.628		
Self-leadership	3,000 yuan and lower	106	3.542	0.762	5.730	0.001
	3,001-5,000	212	3.635	0.646		
	5,001-8,000	200	3.735	0.614		
	8,001 and higher	141	3.859	0.625		
	Total	659	3.698	0.659		
Self-efficacy	3,000 yuan and lower	106	3.372	0.849	9.365	0.000
	3,001-5,000	212	3.667	0.664		
	5,001-8,000	200	3.645	0.673		
	8,001 and higher	141	3.844	0.643		
	Total	659	3.651	0.708		
Stages of change on adopting exercise behaviors	3,000 yuan and lower	106	3.600	0.649	9.734	0.000
	3,001-5,000	212	3.723	0.533		
	5,001-8,000	200	3.795	0.482		
	8,001 and higher	141	3.948	0.472		
	Total	659	3.773	0.537		

4.6 Structural Equation Model

Based on the provided fit indices, the structural model demonstrates a good fit. These results indicate that the model fits the actual data well, allowing for a relatively reliable use of the model in research and data analysis. It's important to note that the analysis of structural model fit typically requires a comprehensive consideration of multiple indices to draw accurate and comprehensive conclusions.

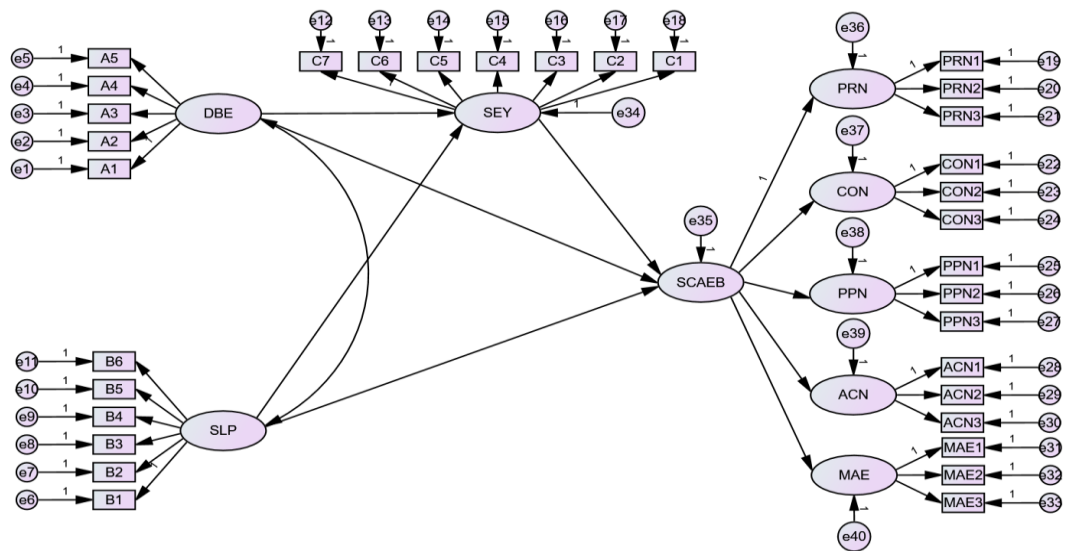


Figure 1: Initial Structural Model.

4.7 Test on the model path

The path coefficient for decisional balance on self-efficacy is 0.364, for self-leadership on self-efficacy is 0.647, for self-efficacy on stages of change on adopting exercise behaviors is 0.211, for decisional balance on stages of change on adopting exercise behaviors is 0.263, and for self-leadership on stages of change on adopting exercise behaviors is 0.219. All these coefficients are significant at the 0.001 level. These results support H1, H2, H3, H4, and H5, indicating a positive relationship between decisional balance and self-efficacy, self-leadership and self-efficacy, self-efficacy and stages of change on adopting exercise behaviors, decisional balance and stages of change on adopting exercise behaviors, as well as self-leadership and stages of change on adopting exercise behaviors.

Table 10: Path Test Result.

Path correlation			Unstandardized path coefficient	Standardized path coefficient	S.E.	T	P
Decisional balance	→	Self-efficacy	0.364	0.264	0.071	5.099	***
Self-leadership	→	Self-efficacy	0.647	0.435	0.083	7.792	***
Self-efficacy	→	Stages of change on adopting exercise behaviors	0.211	0.383	0.029	7.355	***
		Stages of change on adopting exercise behaviors					
Decisional balance	→	Stages of change on adopting exercise behaviors	0.263	0.346	0.04	6.555	***

Self-leadership	→	Stages of change on adopting exercise behaviors	0.219	0.267	0.043	5.08	***
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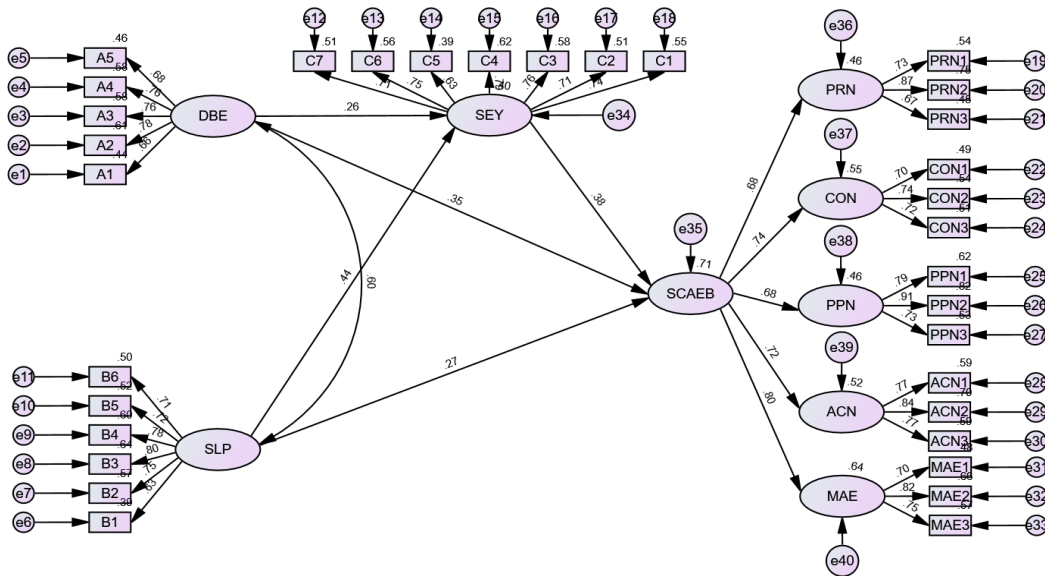


Figure 2: Adjust Model.

4.8 Mediating Effect Analysis

Decisional balance has a significant direct effect on stages of change on adopting exercise behaviors, with an indirect effect value of 0.101. The 95% confidence interval does not include 0, indicating that self-efficacy partially mediates the relationship between decisional balance and stages of change on adopting exercise behaviors. In other words, the impact of decisional balance on stages of change on adopting exercise behaviors comes from both the direct effect and the indirect effect through self-efficacy. Self-leadership has a significant direct effect on stages of change on adopting exercise behaviors, with an indirect effect value of 0.167. The 95% confidence interval does not include 0, suggesting that self-efficacy partially mediates the relationship between self-leadership and stages of change on adopting exercise behaviors. In summary, self-efficacy plays a crucial role as a partial mediator between decisional balance, self-leadership, and stages of change on adopting exercise behaviors, emphasizing its importance in the individual process of changing exercise behaviors.

Table 11: Mediating Effect Analysis Result.

Path correlation	β	Lower	Upper	P
Decisional balance→ Stages of change on adopting exercise behaviors	0.346	0.241	0.443	0.000
Self-leadership→ Stages of change on adopting exercise behaviors	0.267	0.164	0.381	0.000
Decisional balance→ Self-efficacy→ Stages of change on adopting exercise behaviors	0.101	0.048	0.167	0.000

Self-leadership→ Self-efficacy→ Stages of change on adopting exercise behaviors	0.167	0.105	0.244	0.000
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5. Discussions and Conclusions

5.1 Discussion

In this research, the researcher aimed to explore the application of the Transtheoretical Model in understanding exercise behaviors among the Chinese Gen Y. The research investigated the relationships between decisional balance, self-leadership, self-efficacy, and stages of change in adopting exercise behaviors. The results provide crucial insights into the interactions among these factors, offering practical suggestions for interventions and promoting exercise behaviors among the Chinese Gen Y. The findings of the research confirm the hypotheses regarding exercise behaviors in the Chinese Gen Y. Firstly, there is a positive correlation between decisional balance and self-efficacy, indicating that better decisional balance is associated with higher self-efficacy in exercise behaviors, explaining why the Chinese Gen Y is more likely to persist in exercise. Additionally, the researcher found a positive correlation between self-leadership and self-efficacy, suggesting that individuals with stronger self-leadership abilities tend to have higher self-efficacy, making it easier for them to engage in exercise behaviors. Results related to the stages of change in exercise behaviors were also validated. There is a positive correlation between self-efficacy and stages of change, meaning individuals with higher self-efficacy are more likely to progress through and maintain various stages of exercise behavior change. Similarly, there is a positive correlation between decisional balance and stages of change in adopting exercise behaviors, indicating that better decisional balance is associated with a more orderly progression through stages of exercise behavior change. Finally, the researcher examined the mediating effects and found that self-efficacy plays a mediating role between decisional balance and stages of change in exercise behaviors. This discovery underscores the importance of self-efficacy in facilitating the relationship between decisional balance and exercise behavior change. Similarly, self-efficacy also acts as a mediator between self-leadership and stages of change in exercise behaviors. In conclusion, the research findings support the hypotheses and highlight the crucial roles of decisional balance, self-leadership, self-efficacy, and stages of change in adopting exercise behaviors of the Chinese Gen Y. These insights are vital for developing tailored interventions and strategies to encourage the Chinese Gen Y to adopt exercise behaviors more actively, thereby promoting their overall health.

5.2 Conclusion

Through the research on the exercise behaviors and influencing factors of the Chinese Gen Y, this study provides important insights for understanding and promoting physical exercise behaviors among this population. The research utilized a transtheoretical model, focusing on the relationships between decisional balance, self-leadership, and the stages of change in adopting exercise behaviors, leading to several key conclusions. Firstly, the research results validate the study's hypotheses, indicating positive correlations between decisional balance and self-efficacy, self-leadership and self-efficacy, self-efficacy, and stages of change in adopting exercise behaviors, decisional balance, and stages of change in adopting exercise behaviors, as well as self-leadership and stages of change in adopting exercise behaviors. These results suggest that decisional balance, self-leadership, and self-efficacy play important roles in the exercise behaviors of the Chinese Gen Y. Secondly, the findings emphasize the mediating role

of self-efficacy between decisional balance and stages of change in adopting exercise behaviors. Self-efficacy plays a crucial role in facilitating the relationship between decisional balance and stages of change in adopting exercise behaviors and acts as a mediator between self-leadership and stages of change in adopting exercise behaviors. This implies that self-efficacy is a key factor that can promote the adoption and persistence of healthy exercise behaviors by influencing other factors. In conclusion, this study provides an in-depth exploration of the exercise behaviors and influencing factors among the Chinese Gen Y, using the transtheoretical model to draw important conclusions. These findings have practical significance for promoting the participation and maintenance of youth physical exercise behaviors, aiding in the development of targeted interventions and strategies. In the current context of digital reliance, diverse exercise methods, social interaction, health and well-being, sustainability concerns, and challenges to traditional beliefs, these conclusions offer important insights for understanding and addressing the health challenges of the new generation. However, it is important to note some limitations of this study. Firstly, the research employed quantitative research methods and did not delve into individuals' subjective experiences and emotions. Future research could consider qualitative methods to gain a deeper understanding. Secondly, the sample of this research was limited to data from Chengdu, without broader geographical coverage, so future studies could expand the sample range for increased representativeness. Lastly, the research focused on the Chinese Gen Y, and the results may not be applicable to other age groups or cultural backgrounds. Future research could further explore the applicability of these factors in different populations. In summary, this research holds significance for promoting the physical exercise behaviors of the Chinese Generation Y, offering profound insights for encouraging youth physical exercise behaviors. In the current societal context, these conclusions contribute to targeted health interventions, enhancing the physical health and quality of life for the younger generation. This research provides important clues and strategies for understanding and addressing the health challenges of the new generation.

References

- Chen, S. P., Liu, L. P., & Zhang, Z. J. (2020). Empirical analysis of the policy attitude theory model of the "National Student Physical Fitness Standards." *Journal of Xi'an Institute of Physical Education*, 37(2), 196-202.
- Chen, X. F., Ruan, C. A., Xue, X. L., et al. (2016). Effect analysis of health education promoting regular exercise for hypertensive patients based on the transtheoretical model. *Chinese Journal of Modern Nursing*, 22(10), 1402-1405.
- Feng, C. (2020). Study on the current situation and attribution factors of physical exercise of college students in Shanxi Province. Jinzhong: Shanxi Agricultural University, 2020.
- Hirvonen, N., Huotari, M. L., Niemela, R., et al. (2012). Information Behavior in Stages of Exercise Behavior Change. *Journal of the American Society for Information Science and Technology*, 63(9), 1804-1819.
- Huang, H. Y., Lin, Y. S., Chuang, Y. C., et al. (2015). Application of the Transtheoretical Model to Exercise Behavior and Physical Activity in Patients after Open Heart Surgery. *Acta Cardiologica Sinica*, 31(3), 202-208.
- Hu, Z. H. (2021). "Research on the application of cross-theory model in football teaching in middle school." Jilin Institute of Physical Education, Master's Thesis.
- Kaplan, S. E., Citlik Saritas, S. (2021). The Effect of the Trans-theoretical Model Based Walking Exercise Training and Follow-Up on Improving Exercise Behavior and Metabolic Control in Patients with Type 2 Diabetes. *Clinical Nursing Research*, 30(3), 273-284.

- Liao, S. Z., Li, R. P. (2019). Research on health education for outpatient hypertensive patients based on the cross-theory model. *Chinese and Foreign Medical Research*, 17(22), 175-177.
- Li, D., Shi, Y., Jiang, J. X., et al. (2019). Application of the transtheoretical model in patients after PCI. *Chinese Journal of Modern Nursing*, 2019(09), 1117-1120.
- Li, J. Z., Lu, F. P., & Wang, J. H. (2021). Survey and analysis of the current situation of physical exercise among college students in Guangdong Province. *Contemporary Sports Science and Technology*, 11(35), 110-113.
- Liu, X. Y., Mao, J., & Chen, Z. J. (2022). The impact of cognitive-behavioral intervention based on the transtheoretical model on the physical exercise behavior of college students. *Sports Vision*, September 2022, P13-16.
- Ma, C. (2017). Survey research on college students' participation in physical exercise under the cross-theory model. *Sports*, 2017(21), 43-44.
- Ma, C., Wang, B. S., Li, J. Z. (2008). Application of the cross-theory model—An intervention study on exercise behavior of college students. *Chinese Journal of Sports Medicine*, 2008(02), 235-237.
- Mechanick, Jeffrey I., Youdim, Adrienne, Jones, Daniel B., et al. (2013). Clinical practice guidelines for the perioperative nutritional, metabolic, and nonsurgical support of the bariatric surgery patient--2013 update: cosponsored by American Association of Clinical Endocrinologists, the Obesity Society, and American Society for Metabolic & Bariatric Surgery. *Endocrine Practice*, 19(2), 159-191.
- Medeiros, R. M., Alves, E. S., Lemos, V. A., et al. (2016). Assessment of Body Composition and Sport Performance of Brazilian Paralympic Swim Team Athletes. *Journal of Sport Rehabilitation*, 25(4), 364-370.
- Müller, M. J., Bosy-Westphal, A., Kutzner, D., Heller, M. (2002). Metabolically active components of fat-free mass and resting energy expenditure in humans: recent lessons from imaging technologies. *Obesity Reviews*, 3(2), 113-122.
- Müller, M. J., Bosy-Westphal, A., Kutzner, D., Heller, M. (2002). Metabolically active components of fat-free mass and resting energy expenditure in humans: recent lessons from imaging technologies. *Obesity Reviews*, 3(2), 113-122.
- Noora Hirvonen, Maya-Leena Huotari, Raimo Niemela et al. (2012). Information Behavior in Stages of Exercise Behavior Change. *Journal of the American Society for Information Science and Technology*, 2012, 63(9):1804-1819.
- O'Connor, M. J. (1994). Exercise promotion in physical education: Application of the transtheoretical model. *Journal of Teaching in Physical Education*, 14, 2-12.
- Prochaska, J. O., & Norcross, J. C. (1994). *Systems of psychotherapy: A transtheoretical analysis* (3rd ed.). California: Brook/Cole.
- Prochaska, J. O., Velicer, W. F., Rossi, J. S., et al. (1994). Stages of change and decisional balance for 12 problem behaviors. *Health Psychology*, 13(1), 39-46.
- Quan, W. F. (2023). What did the Chengdu Universiade bring? *Pioneer*, 2023(07), P14-18.
- Rodgers, W. M., Courneya, K. S., & Bayduza, A. L. (2001). Examination of the transtheoretical model and exercise in 3 populations. *American Journal of Health Behavior*, 25(1), 33-41.
- Schumann, A., John, U., Rumpf, H. J. (2006). Changes in the "stages of change" as outcome measures of a smoking cessation intervention: a randomized controlled trial. *Preventive Medicine*, 43(2), 101-106.
- Shan, S. C. (2020). Investigation and analysis of the current situation of college students' participation in physical exercise in Jilin Province. *Sports Science Literature Bulletin*,

28(10), 23+26.

- Sun, F. C., Zhang, X., Liu, X. L., Wang, L. J. (2008). Study on the guidance of behavior change cross-theory model on extracurricular physical exercise of college students. *Journal of Nanjing Institute of Physical Education (Social Science Edition)*, 2008(04), 86-89.
- Tong, L., Jiao, Y. Q., Jiang, Y. R., et al. (2014). Study on the effect of the transtheoretical model on the rehabilitation behavior management of breast cancer patients. *Hebei Medical Journal*, 20(06), 895-897.
- Wang, B. Y., He, X. J., Li, W. W. (2021). Application of rehabilitation program based on the transtheoretical model in postoperative rehabilitation of elderly hip replacement patients. *Chinese Journal of Rehabilitation*, 36(02), 98-101.
- Wang, L. P. (2019). Effect evaluation of intervention on sedentary behavior of primary and secondary school students using the cross-theory model. *Contemporary Sports Science and Technology*, 9(04), 237-238.
- Wang, S., Yang, D., Liu, Y. L., et al. (2019). Influence of rehabilitation exercise based on the transtheoretical model on compliance, quality of life, and psychological health of advanced lung cancer chemotherapy patients. *Journal of Preventive Medicine of Chinese People's Liberation Army*, 37(12), 31-32.
- Wang, W. C. (2018). Testing the "National Student Physical Fitness Standards": the current situation, difficulties, and recommendations for college students. *Sports Science and Technology Literature Bulletin*, 26(9), 43-44+98.
- Yang, B., Yang, L., & Liu, Y. (2022). Application of CBT in facilitating the formation of mass sports behavior—Based on the transtheoretical model. *Sports Science and Technology Literature Bulletin*, 30(6), 100-103.
- Yang, L. F., et al. (2022). Investigation on the physical exercise status of medical students in a medical school. *Contemporary Sports Science and Technology*, 12(13), 177-182.
- Zhao, Y. X. (2019). Study on the investigation and research of the physical health status of Chinese college students during physical exercise. *Journal of Shandong Agricultural Engineering College*, 36(12), 133-134.