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Doctor of Management

Supervisor:
PhD Virgínia Trigo, Professor,
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# Abstract

After the implementation of the medical reform, private hospitals are rapidly developing in China. As late comers they face many challenges including fierce competition from other private hospitals and from public ones. This study proposes to improve their competitiveness by cultivating the work engagement level of medical teams. Based on the literature review on Social Exchange Theory, it is advanced that Leader-member Exchange (LMX) and Team-member Exchange (TMX) can positively influence work engagement while self-efficacy is the mechanism for the above relationships based on Social Cognition Theory. In addition, by reviewing related studies on interactional justice differentiation, this research takes it as a moderator to explore this effect on the above direct and indirect relations. On the basis of the literature review, theoretical analysis and logical deduction, eleven hypotheses are proposed.

This study designs a questionnaire based on mature scales and conducts a survey in the case hospital through two stages of data collection, after which 370 valid questionnaires were received. Methods such as factor analysis, hierarchical regression analysis and moderated mediating model analysis are used to test the hypotheses. The results of data analysis partially support the research model.

**Keywords:** Leader-member Exchange; Team-member Exchange; Self-efficacy; Interactional justice differentiation; Work engagement

**JEL:** L; M1

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# Resumo

Com a implementação da reforma do sistema de saúde na China tem-se assistido a um rápido crescimento do número de hospitais privados que, no entanto, se veem confrontados com inúmeras dificuldades entre as quais a concorrência de outros hospitais privados e públicos. No sentido de ajudar a melhorar a competitividade destas unidades de saúde, esta tese procura estudar o nível de compromisso com o trabalho das equipas médicas. Através da revisão da literatura sobre a teoria das trocas sociais propõe-se que a troca membro-líder e a troca membro-grupo podem influenciar positivamente o compromisso com o trabalho entendendo-se a auto eficácia como um mecanismo mediador. O estudo considera ainda a diferenciação da justiça interativa como uma variável moderadora que permite explorar os efeitos diretos e indiretos no modelo proposto. Da revisão da literatura e da subsequente análise teórica extraíram-se onze hipóteses que refletem as relações e efeitos enunciados.

A recolha de dados foi feita a partir de um questionário utilizando escalas já anteriormente validadas o qual foi administrado em duas fases no hospital privado objeto do estudo tendo-se obtido 370 respostas válidas. Análise fatorial e regressão hierárquica foram os métodos utilizados para testar as hipóteses. Os resultados obtidos suportam parcialmente o modelo teórico proposto.

**Palavras-chave:** Troca de membro-líder; Troca de membro-grupo; Auto eficácia; Diferenciação da justiça interativa; Compromisso com o trabalho

**JEL:** L; M1

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# 摘 要

医疗改革实施后，民营医院在中国发展迅速。作为后来者，民营医院面临着许多挑战，包括来自其他私立医院和公立医院的激烈竞争。本研究提出通过提升民营医院医护人员的工作投入水平来提升医院的竞争优势。通过对社会交换理论的文献梳理，本文提出领导成员交换(LMX)和团队成员交换(TMX)会对工作投入产生影响，并根据社会认知理论将自我效能感作为上述关系的作用机制。此外，通过对互动公平差异相关研究和文献的梳理，本文还将其作为调节变量来探讨其对上述直接和间接关系的边界调节作用。在文献回顾、理论分析和逻辑推演的基础上，本文提出了11个假设。

本研究基于国际成熟量表设计问卷，分为两个阶段在现场集中向医院医护团队发放纸质问卷，共回收370份有效问卷，综合运用因子分析、层次回归分析以及有调节的中介模型分析等方法对假设进行了检验。研究结果部分支持了论文所提出的理论模型。

**关键词：**领导成员交换；团队成员交换；自我效能感；互动公平差异；工作投入

**JEL:** L；M1

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The whole process of this study from topic selection, proposal research to writing, modification and finalization was completed under the careful guidance of my supervisor Professor Virgínia. Thanks to your guidance and care in the process of my completion of this thesis, I benefited a lot.

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Finally, thank you very much for taking time out of your busy schedule to review the thesis.

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# Chapter 1: Introduction

This chapter introduces the research background and problem and puts forward research questions. Based on these, it further elaborates on the research purpose, research approach, and the framework of the study.

## 1.1 Research background

Since the new round of pharmaceutical and healthcare structural reform has been deepened in 2009, the Chinese government has paid much attention to the development of private hospitals and has released a series of policies, gradually scaling up the support for their development and bringing in new opportunities for the sector.

In April 2009, the State Council released the Opinions of the CPC Central Committee and State Council on Deepening the Reform of the Health-care System (No.6, [2009] of the CPC Central Committee) (2009), which clearly stated that we shall adhere to the principle of taking non-profit medical institutions as the mainstay and for-profit medical institutions as the supplement and achieving common development with public medical institutions taking the lead in running medical services. Moreover, in the Opinions, the State Council noted that we shall encourage and lead private capital to participate in the development of medical and healthcare industry.

In May 2010, the State Council released Several Opinions of the State Council on Encouraging and Guiding the Healthy Development of Private Investment (No.13 [2010] (State Council, 2010), in which it has been explicitly proposed that, as we firmly consolidate and develop public economy, we should consistently encourage, support and guide the development of non-public sectors of the economy, and further encourage and guide private investment. Furthermore, the State Council also pointed out that we shall take the medical and healthcare industry as one of the fields for further expansion of private investment, actively boost reforms in social undertakings such as medicine, education and others, and encourage the participation of private investment into the medical industry.

In December 2010, the General Office of the State Council specially forwarded the Opinions on Further Encouraging and Guiding Social Capitals in the Establishment of Medical Institutions (No.58 of the (General Office of the State Council, 2010) released by the National

Development and Reform Commission and other institutions, according to which private investment should be provided with more favorable conditions in market access management, working environment, and sustainable development in establishing medical institutions.

Although the government has issued favorable policies to support the development of private hospitals, these hospitals still face great challenges considering the reality of policy implementation.

On the one hand, in terms of quantity, private hospitals in China have sprung up owing to the advantages brought by policies. The number of private hospitals has increased dramatically from 11,313 in 2013 to 18,759 in 2017 with a growth rate of 66% (AskCI, 2018, June 25), greatly intensifying the competition with their counterparts. On the other hand, in terms of quality, compared with public hospitals, private hospitals are far behind regarding the number of medical teams, daily visits and beds. In fact, China's private hospitals are of high quantity but of low quality on the whole (Zhang et al., 2017). In this context, how to strengthen the competitiveness of a private hospital so that it can stand out not only in the competition with other private hospitals but also with public hospitals has become a critical problem in China.

It is true that medical teams are the core resource of a medical institution. What people care about in a hospital is the value that a medical team creates for the hospital when they engage in the work. Therefore, the question of how to strengthen the competitiveness of private hospitals is transformed into the question of how to improve the work engagement of their medical team. In the current society, although medical teams already work at a tense and compact pace, they still face sensitive doctor-patient relationships and, as a response, doctors and nurses gradually become numb and passive, and find it difficult to be happy and energetic at work. For medical teams in private hospitals, there is no big difference in work itself compared with public hospitals. Requirements for them are the same in terms of working hours, physical and emotional work. However, the resources that private hospitals can offer to their medical teams, such as professional titles, staffing and training, are far less attractive than those of public hospitals. Therefore, the condition of having the same requirements but less resources makes it even more difficult to improve the work engagement of medical teams in private hospitals.

In this context, it is very important and urgent to carry out the research on how to improve the work engagement of medical teams in private hospitals.

## 1.2 Research problem

On the one hand, private hospitals are legitimated because of national policy and support, and more privileges have been provided for their work environment and sustainable development. However, on the other hand, with the marketization of medical services and the deepening of reforms of the administrative systems of hospitals, the competition in the medical market has increasingly intensified. Apart from competing for hardware including environment, techniques and equipment, hospitals are already facing a fiercer competition in intangible infrastructure, which is the competition for medical talents. The development of hospitals depends on the daily work of every individual in the medical team and the team's vital interests are closely connected to their development. Therefore, hospitals and medical teams are intertwined and can influence each other.

For one thing, because of the marketization of medical services, the development of private hospitals highly depends on the quality of the daily work of every medical team member, which directly influences their social image and long-term development. At present, the pure biomedical pattern is far from enough to satisfy the demands of modern medicine and has indeed been transformed into a bio-psychosocial one (Zhang, 2017) . Therefore, when treating patients, doctors should not only rely on their professional knowledge in medicine, but also lay emphasis on resolving the conflicts between ethics and laws, narrowing the disparities in scientific evidence and patients' willingness, bridging the gap between medical treatment effect and patients' psychology, and reducing the differences between medicine and social perceptions. Only when every doctor realizes these transformations, actively engage in their work, and provide patients with meticulous care in every aspect, can private hospitals stand out from the fierce competition with their unique advantages in medical services.

For another thing, the marketization of medical services closely links the vital interests of medical workers in private hospitals with economic incomes. As the new round of medical reform has progressed, medical services have completely entered the stage of marketization and the aim of running a hospital has been fundamentally changed, with profits being the priority. Although hospitals always bear the noble cause of saving people' s lives, medical and healthcare services now have become profit-driven business activities.

In addition, the income of medical workers is related to the revenues of the hospital and has become an important feature of the marketization of private hospitals. Owing to this, an inevitable trend for doctors is to prescribe excessive and expensive medication and to conduct excessive checks to increase the revenues for both hospitals and themselves. However, over-

treatment will definitely raise tensions between doctors and patients, damage the reputation and social image of the hospital, influence its development, which will ultimately be detrimental to the career development of the medical staff.

Given all the above, the quality of doctors' work is even more important in light of the trends of marketization in medical services, which directly decides whether a private hospital can survive in the fierce market competition and secure further development. On the other hand, because of the profit-seeking tendency in the marketization of medical services, there are misconducts in the actual work of doctors, thus hindering medical teams from providing high-quality medical services. How to improve the work quality of medical staff has become a severe challenge faced by all private hospitals.

## 1.3 Research questions

Based on the research background and the problem in the previous two parts, this study mainly focuses on finding answers for the following two questions: (1) since the quality of doctors' work is so important, which factors will influence the work engagement level of medical staff? (2) which measures should private hospitals take to improve the work engagement level of their medical team?

As for the first question, the managerial level of hospitals can conduct analysis and research from four aspects: external environment, the work itself, work environment and medical staff. It is impossible for private hospitals to surpass the public ones either in external environment or in work itself as they naturally lag behind in these two aspects. Although medical staff are engaged in the same work and need to shoulder similar high requirements in physical strength, emotion, knowledge, and time, public hospitals enjoy higher social reputation and trust and they provide more attractive welfare, such as professional titles. This leads to great differences in attracting and motivating medical staff between public and private hospitals.

As they have no advantages in these two aspects, private hospitals can only make breakthroughs in the work environment so as to change medical staff's self-cognition and enhance their confidence. Only in this way can private hospitals improve work engagement, thus better facilitating their own development.

In terms of work environment, besides tangible infrastructures, intangible infrastructures exert greater influence on employees. One of the most important intangible infrastructures is interpersonal relationships. In their daily work, apart from patients, medical staff most frequently face their colleagues and superiors. The relationship between medical staff and their

superiors can be described by Leader-member Exchange (LMX) relationships. Previous research from the perspectives of social exchange mechanism, social cognitive mechanism, intrinsic motivation mechanism and other aspects have demonstrated that high-quality LMX is positively related to subordinates' in-role behaviors, such as organizational commitment, job satisfaction and work performance, as well as extra-role behaviors, such as organizational citizenship behaviors (Dulebohn et al., 2012; Gottfredson & Aguinis, 2017; Martin et al., 2016; Ng, 2017; Volmer et al., 2012; Yang et al., 2015). A high-quality relationship with colleagues can be described by Team-Member Exchange (TMX), and this kind of relationship can improve employees' job satisfaction, performance, commitment, and organizational citizenship behaviors, and reduce employees' pressure and turnover intention (Chen, 2018; Farh et al., 2016; Farmer et al., 2015; Rutishauser & Sender, 2019; Shih & Wijaya, 2017).

Moreover, medical staff's own characteristics will also affect their work status. Besides demographic variables, with the emergence of positive psychology, researchers pay more attention to the influence of employees' psychological health status on their work. Currently, research on positive psychology has focused on human's positive emotions and experiences, positive personalities and psychological process, surveying human's inherent positive potentials and behavioral motives from an appreciative and open perspective. In the research on positive psychology, progress has been made in self-efficacy (Bandura, 1997).

Overall, compared with public hospitals, private ones are at a disadvantage if they inspire medical staff from the perspective of external environment and work itself. Therefore, the managerial level of private hospitals should put emphasis on the work environment and medical staff's psychology to promote the quality of their medical team. In terms of work environment, this study chooses vertical social exchange relationship-Leader-member Exchange (LMX), horizontal social exchange relationship-Team-member Exchange (TMX) and Interactional Justice Differentiation (IJD) as variables, while for the phycology of the medical team, the study takes self-efficacy as the variable.

Based on the discussion above, the present study puts forward the following specific research questions:

(1) What are the relationships between social exchange relationship and work engagement? Will the quality of vertical social exchange relationship LMX influence the level of medical staff's work engagement? Can the quality of horizontal social exchange relationship TMX improve a doctor's or a nurses' work engagement?

(2) If both LMX and TMX can improve medical staff's work engagement, then what is the mechanism for these two paths? In other words, how can LMX and TMX improve the level of

work engagement and through what theory can we explain them?

(3) Is there a conditional boundary for the function of LMX and TMX on work engagement? Can the strength of LMX and TMX on work engagement be adjusted under different contexts and conditions?

The purpose of this thesis is to find out the answers for these three questions. We aim at exploring the main effects of LMX and TMX on work engagement and at understanding the function mechanism of the main effects and the conditional boundaries of the two kinds of main effects.

## 1.4 Research purpose

This research bears the following purposes:

Firstly, by analyzing the factors affecting the work state of the medical team of one private hospital-herein designated S hospital and by combining the analysis of academic theories and literatures with the actual situation, the purpose is to understand whether the managerial level of private hospitals can effectively inspire medical staff to activate their work passion, increase their sense of satisfaction, and promote their organizational commitment. In this way, medical staff can build a good doctor-patient relationship in the process of providing medical services and win a good social reputation, helping private hospitals to win the fierce competition.

Secondly, this study aims to verify the theoretical model of the relationships among such variables as LMX, TMX, self-efficacy, Interactional Justice Differentiation, and work engagement, and to test the direct effect, mediation effect and moderation effect among these constructs, to rationalize the analysis on how to improve the work engagement of medical teams in private hospitals.

Thirdly, through the exploration of possible explanations to talent management problems in private hospitals represented by S Hospital, this study aims to provide references for talent management and development in other similar units in China.

Fourthly, through the analysis and research of real cases as well as through the connection between theory and practice, this study aims to provide practical enlightenment to the development and extension of academic theories and to enrich the theoretical framework of human resource management, especially in the field of work engagement.

## 1.5 Research approach

As it will be further detailed in Chapter 3, the following research methods are used.

Firstly, literature review, which refers to the collection, screening, sorting and analysis of relevant professional books, papers, journals, government publications and other relevant literature and materials in China and abroad, enables the status, especially the limitations and improvement directions of the five variables of LMX, TMX, self-efficacy, interactional justice differentiation and work engagement to be understood. According to the literature analysis of work engagement, the two social exchange relationships (LMX and TMX) are taken as the antecedent variables of work engagement, and the influence of social exchange relationships on work engagement level is taken as the main axis to carry out the research. Then, based on social cognition theory, this study proposes self-efficacy as a mediator in the LMX-work engagement relationship. The interactional justice differentiation is included in the research to clarify the contingency relationship. At last, based on a systematic arrangement, summary and analysis of the literature related to the five variables of LMX, TMX, self-efficacy, interactional justice differentiation and work engagement, a theoretical foundation is established for subsequent analysis.

Secondly, based on social exchange and social cognition theory, this research uses literature deduction to analyze the possible direct effect mechanism of the five variables including LMX, TMX, self-efficacy, Interactional Justice Differentiation and work engagement from a theoretical perspective, and accordingly puts forward the research framework and theoretical model.

Thirdly, for empirical research a questionnaire was designed to measure the five variables such as LMX, TMX, self-efficacy, Interactional Justice Differentiation and work engagement adopting mature scales that have been verified and widely used in order to ensure the reliability and validity of the variable measurement. Meanwhile, it collects data of related variables at two stages through offline paper questionnaires and determines the final valid questionnaires and data according to exact criteria, thus laying a foundation for hypotheses testing of the theoretical model.

Fourthly, this study set up a research model based on the literature review and theoretical deduction and verifies the model through hypotheses testing. Statistical analysis is to analyze and comprehensively process questionnaire data by using statistical principles. So as to better understand the internal relationship between data, reveal the internal quantitative law between things. The main statistical analysis method used in this thesis is to use SPSS statistical software

for descriptive statistics, factor analysis, reliability, and validity test of the scale, mean value analysis and regression analysis of the pre-test data. In this thesis, SPSS software is used for correlation analysis and regression analysis of the formal data collected. The specific methods for data analysis include factor analysis, common method bias analysis, correlation analysis, hierarchical regression analysis and moderated mediation effect analysis, aiming to test the research hypotheses and the model.

## 1.6 Research framework

The framework of this research is as represented in Figure 1.1:

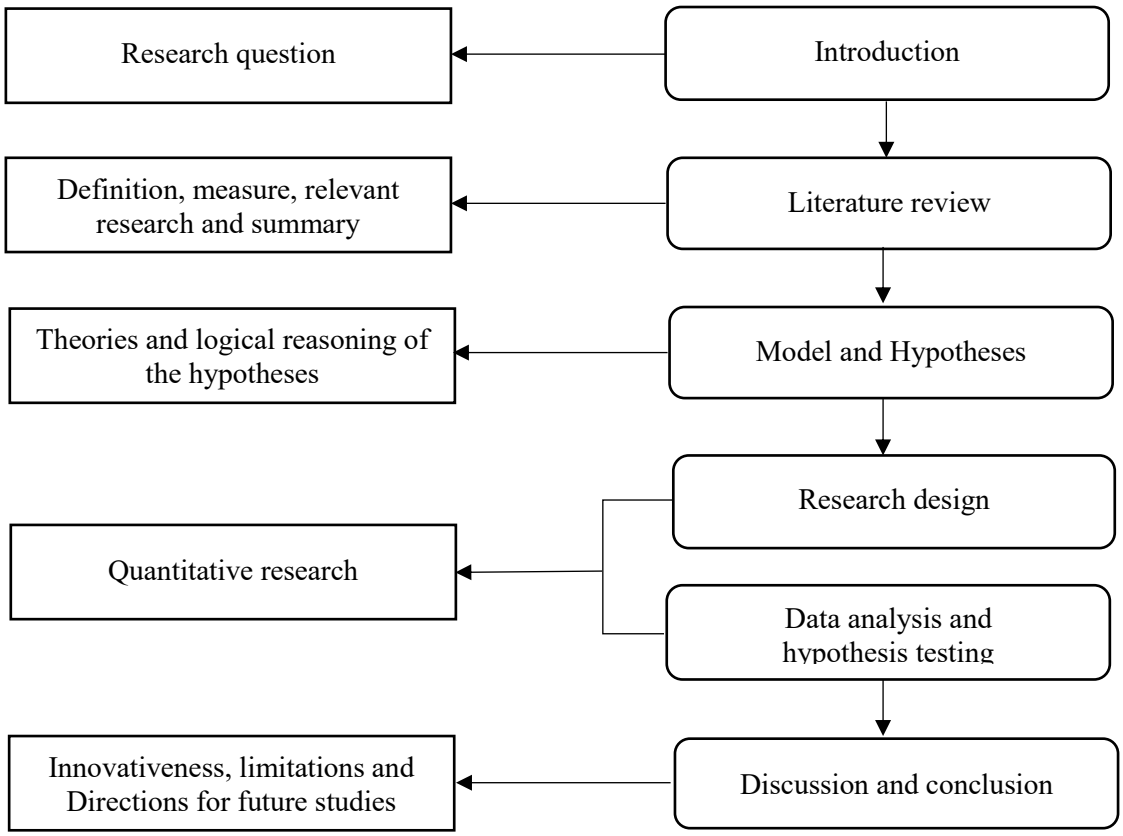


Figure 1.1 Thesis framework

The main chapters and contents of this study are as follows:

Chapter one is the introduction. Based on the research background, the chapter proposes the research questions, defines the research purpose and methods, and briefly introduces the research content and framework.

Chapter two is literature review. The chapter collects and sorts out literature related to the five variables LMX, TMX, self-efficacy, Interactional Justice Differentiation, and work engagement. Based on previous studies, it describes the research status, contributions to the model as well as the limitations of existing studies. Based on literature review, the chapter

makes a deduction of the research questions and puts forward the hypotheses and the overall research model.

Chapter three presents the research design. This chapter mainly introduces the research strategy, the sample and respondents, principles and processes of questionnaire design, procedures of data collection, distribution of the sample, measurement tools for all the five variables and overview of data analysis methods.

Chapter four covers hypotheses testing and data analysis. Conclusions are presented in Chapter five as well as relevant management implications and the shortcomings of the study. Suggestions are given for future research directions in related fields.

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# Chapter 2: Literature Review

Starting with the literature review on work engagement, this chapter reviews the definition, measurement methods, and related research on LMX, TMX, self-efficacy, and interactional justice differentiation. While exploring the internal relationships among variables, we hope to lay the foundations for the deduction of subsequent research models.

## 2.1 Work engagement

### 2.1.1 Definition of work engagement

Research on work engagement develops from the rise of positive psychology. As Myers (2000) noted, research questions of traditional psychological studies were mostly centered on human beings' morbidity and negative emotions. This situation changed in the 1950s and 1960s as some psychologists began to investigate human beings' positive emotions, which gave rise to positive psychology. Under such a backdrop, work engagement, as an important positive psychological state of employees, became a focus of organizational behavior studies. However, although there are many studies on work engagement, their interpretations differ from one another.

Lodahl and Kejner (1965) were the first scholars to put forward the concept of work engagement and pointed out that it is characterized by two aspects: one is that its formation is based on the fact that individuals recognize their work or regard their work as a way of showing self-image; the other is that work engagement is connected with self-esteem and is affected by work performance.

According to Kanungo (1982), work engagement indicates that employees consider their work as an integral part of life and those with high work engagement strongly acknowledge their work and even ponder work-related matters when they are not at work.

Kahn was the first scholar to systematically study work engagement. From the perspective of role theory, he coined the term "work engagement" that was defined as the integration of employees with their work roles. Work engagement describes how people can "use varying degrees of their selves, physically, cognitively, and emotionally in work role performances" (Kahn, 1990, p. 692).

Studying from the existing research results of work burnout, some scholars define work engagement by analyzing the differences and relations between work burnout and work engagement (Maslach et al., 2001). In their opinion, the research on work engagement is the supplement and expansion of the research on work burnout, and both work engagement and work burnout can be regarded as two poles of a three-dimensional continuum with a totally negative correlation, which are two extreme manifestations of the working state. These scholars also stated that work burnout scales can be used to reversely measure work engagement.

Schaufeli and Bakker (2004) further explored the research ideas of Maslach and other scholars and expressed dissenting opinions. They consider that work burnout scales cannot be used to reversely measure work engagement, and the correlation between work engagement and work burnout is not totally but moderately negative. The definition of work engagement should be based on two dimensions of work satisfaction, which are activation and identification, and work engagement is individuals' positive and relatively stable state of cognition and emotion (Schaufeli et al., 2002). They also divided the content and structure of work engagement into three dimensions: absorption, vigor and dedication. Absorption refers to the fact that individuals are so engrossed in their work that they feel time passes quickly and cannot detach themselves from it. Vigor indicates that employees are energetic and mentally resilient while working, and willing to work hard and persevere in spite of difficulties. Dedication is that employees concentrate on work and enjoy the significance, enthusiasm, inspiration, pride and challenges brought by it. Such division has been widely applied and supported by many scholars (Peng et al., 2017; Van Wingerden et al., 2017; Xu et al., 2015).

Compared with the views of Maslach et al. (2001), the division into three dimensions by Schaufeli et al. (2002) shows that vigor and dedication are the opposites of exhaustion and cynicism respectively, but there is no adversarial relationship between absorption and reduced professional efficacy. The Utrecht Work Engagement Scale, developed by Schaufeli et al. (2002) on the basis of Kahn's definition of work engagement, is considered to be the most popular and widely-accepted standard (Saks & Gruman, 2014). Zhang and Gan (2005) also studied the validity and reliability of the Chinese-version Utrecht Scale applied to a community of secondary school teachers and testified the three-dimensional model of work engagement, proving that the internal consistency in its all sub-scales was good in what concerns reliability.

In addition, different scholars came up with their own definitions of work engagement. For example, (Britt et al., 2001) propose that perceived influence of performance, commitment and sense of responsibility are the three dimensions of work engagement. They define work engagement as a situation in which the subjective perception of individuals is greatly influenced

by work performance that will trigger a strong desire for commitment and a sense of responsibility for work. This definition stresses individual psychological motivations, but it deviates from the perspective of engagement. (Tims et al., 2011) suggest that work engagement represents employees' emotions and cognition of their work and the organizations they belong to. Chinese scholars got off to a late start in the study of work engagement and most of them draw from the research results of other scholars at home and abroad. Liu (1999), according to available records, is the first Chinese scholar to have studied work engagement and concurs that it has a positive influence on work performance.

Overall, although scholars have early begun to explore the definition of work engagement, there has not been any recognized definition, content and structure. In this regard, more efforts should be made to integrate various perspectives to further explore this notion. Currently, most foreign and domestic scholars accept the three-dimensional model proposed by Schaufeli et al. (2002), which lays a good foundation for consensus in the research in this domain. This study will also use the three-dimensional model advanced by Schaufeli et al. (2002) and their definition of work engagement. Work engagement is here considered a dependent variable and will be divided into three dimensions.

### 2.1.2 Measurement of work engagement

So far, different scales have been developed to measure work engagement, which are summarized as follows:

The Maslach Burnout Inventory (MBI) Scale (Maslach et al., 1997): Based on the definition proposed by Maslach, work engagement is the opposite of work burnout. In practical operation, work burnout scales can be used to reversely measure work engagement.

The Utrecht Work Engagement Scale (UWES) (Schaufeli & Bakker, 2003) is recognized as the most reliable and valid scale for work engagement measurement. Based on the authors' three-dimensional theory there are two versions of UWES, i.e., a full version with 17 items and a simplified version with 9 items, the latter being the most used in measuring work engagement. Three questions have been designed respectively for each of the three dimensions so that scholars can analyze them both as a whole and as a part.

The Gallup Workplace Audit (GWA) scale (Zang & Li, 2015) was developed by Gallup Inc, an acknowledged leading research institute in the domain of work engagement. The GWA Scale, has become one of the reference scales in many research instances.

Most Chinese scales of work engagement are translated from foreign versions , including the Chinese-version of the UWES scale with 15 items and with 9 items respectively, both of

which have been translated by Zhang & Gan (2005), while the Chinese-version of the UWES scale with 16 items was revised by Tang et al (2015).

For the sake of simplicity and to improve measurement, the questionnaire used in this study to measure work engagement is the simplified version of the UWES Scale with 9 items developed by Schaufeli and Bakker (2003).

### 2.1.3 Research on work engagement

Although scholars both in China and abroad have not reached a consensus on the definition of work engagement, they have agreed on its antecedent influencing variables. According to the results of empirical research, the factors that influence work engagement of employees include three categories: employees' personal characteristics, work features and external environment as follows:

Personal characteristics mainly include factors such as demographic variables, characters, personality and behavioral habits. Since the proposition of the definition of work engagement, Kahn (1990) has noticed that psychological states such as individual psychological meaningfulness, psychological safety and psychological availability would affect work engagement. Scholars later followed this research direction and found that employees' positive emotion (Van Wingerden et al., 2017), core self-evaluation (L. L. Zhang et al., 2013), self-efficacy (Ouweneel et al., 2013), identity (Britt & Bliese, 2003), proactive personality and level of emotion quotient (Akhtar et al., 2015) could all have a significant influence on employees' work engagement. Besides, demographic variables such as gender (Sheng, 2006) and age (Kim & Kang, 2017) also affect work engagement.

Work features include factors such as work requirements and work resources, as well as work categories, work roles, typical tasks and career development opportunities described in the work demand-resource model (Bakker & Demerouti, 2007). Mauno et al. (2007) revealed that different jobs have different requirements and resources, and enterprises also differ in organizational factors, all of which exert their own influence on employees' work engagement. May et al. (2004) pointed out that work factors such as job enrichment, job-role matching, work resource availability, encouragement from colleagues and support from supervisors can positively affect work engagement. Additionally, organizational support (Sun et al., 2015) and leadership styles (De Clercq et al., 2014; Naeem et al., 2020; Qin et al., 2018; Rahmadani et al., 2020; Upadyaya et al., 2016) are also antecedent variables influencing work engagement.

In recent years, scholars have paid attention to the interaction between individual and the three objects of leader, work and organization, which had long been ignored before. They start

to investigate work engagement from the perspective of binary matching. Empirical studies show that person-job fit (Chen et al., 2014; De Beer et al., 2016), individual-organizational value fit (Tan, 2012), and leader-subordinate extravert personality fit (Chen et al., 2016) have good predictive effects on work engagement, while workplace bullying has a markedly negative influence (Ståle et al., 2016).

External environment mainly includes the external and internal environments of the organization. The former pays more attention to the effect of family factors on employees' work engagement. The research conducted by Bakker et al. (2005) reveals that employees' work engagement is influenced by family factors. If a couple are both office workers, there is a mutual transmission effect on their work engagement and work burnout. Another research on employees who are unmarried or without children shows that they have lower work engagement than those who are married or with children (Smith & Dumas, 2007).

In addition to the research on the antecedent variables of work engagement, scholars also discovered that high work engagement can produce a series of positive effects (Halbesleben, 2010; Harter et al., 2002; Kataria et al., 2013; Xanthopoulou et al., 2012). According to relevant literature in recent years, the research results regarding the outcome variables of work engagement can be divided into two aspects: one is the influence on employees such as work emotion and organizational commitment (Xanthopoulou et al., 2012), employees' psychological capital (De Waal & Pienaar, 2013), and employees' positive emotions in life (Culbertson et al., 2012). Work engagement also has a positive influence on work behavior (Demerouti et al., 2015; Sonnentag, 2003) and employees' organizational citizenship behavior (Kataria et al., 2013). Other researchers discovered that work engagement can raise employees' work performance (Bakker & Demerouti, 2008; Buil et al., 2019), bolster their job-related happiness and reduce turnover intention (Alarcon et al., 2011; Timms et al., 2015). In the long run, work engagement is conducive to improving employees' abilities (Airila et al., 2012). And finally work engagement has influence on organizations such as on organizational performance (Harter et al., 2002).

With regard to organizational influence, Harter et al. (2002) stated that work engagement has a direct influence on organizational performance and other variables. In turn, Gutermann et al. (2017) revealed that organizational engagement predicts organizational-level performance indicators. Saks (2006, 2019) revisited the model of antecedents and consequences of employee engagement and pointed out that engagement will increase employees' organizational commitment and decrease their intention to quit.

### 2.1.4 Summary of research on work engagement

As mentioned in this section, research on work engagement stems from the research on positive psychology, which pays attention to the influence of good psychological states of employees on organization and employees from a positive perspective. Considering previous research results of work burnout and its phenomena commonly seen in the workplace, researchers turn their direction to a new perspective, explore different antecedent variables and intermediary paths that affect employees' work engagement, and probe into the major advantages for organizations and positive influences on employees when employees' work engagement is improved. Scholars have given their own definitions of work engagement and divided its content and structure from different dimensions and emphasis, and thus they are applicable to various research demands. For example, it can be applied to a specific profession in practice. Based on the special nature of jobs, different approaches can be studied to increase work engagement of employees in different professions. According to the research demands, proper content and structure can be chosen from the dimensional classifications of previous studies, and emphasis shall be placed on comparing the differences of each dimension.

## 2.2 Leader-member exchange

### 2.2.1 Definition of LMX

Leader-member Exchange (LMX), also named as Leader-subordinate Exchange, is an important part of leadership theory. Research on traditional leadership theory in the early stage was mainly focused on leadership traits, leadership behavior and contextual factors, thus forming the Trait Leadership Theory, Behavior Leadership Theory and Situational Leadership Theory. These theories share a common hypothesis, i.e., the relationship between leaders and different subordinates is homogeneous, which means there exists no difference (Graen et al., 1982). However, Graen and other scholars challenged and questioned this hypothesis. They proposed that there should be a different exchange relationship between leaders and different subordinates, in which affinity varies, so studies shall focus on such kind of mutual relationship (Graen et al., 1972). Graen and Uhl-Bien (1995) further elucidated in their research that as leaders have limited time, energy and resources to carry out management, they will adopt diversified management methods for different subordinates, thus establishing relationships of varying affinity.

Later, the research on the connotation of LMX has mainly undergone several stages: the

research was initially focused on one-way and top-down relationship. Dienesch and Liden (1986) pointed out that due to limited resources and time, the leader will draw a line of demarcation between “members of the in-group” and “members of the out-group”; from the perspective of interaction between the leader and subordinates, both of them accept their respective roles in their work. There appears to be a two-way interaction, but this interaction is more of a working relationship or a labor contract relationship (Graen & Uhl-Bien, 1995). Then the interaction has been extended from workplace to personal life. This interaction starts to break through the limit of work contracts and gradually extends to personal contact. The leader not only builds a relationship with certain individuals, but also expands this interaction to the whole team and organization (Liden et al., 1997). Later, this interaction extends to a larger team and the quality of LMX is no longer determined by one-to-one interaction, but based on the social exchange and reciprocity between the leader and a certain group (Liden & Maslyn, 1998).

The Social Exchange Theory is the most fundamental theory in LMX, in which the interaction between leader and team members is a social exchange relationship (Deluga, 2011). In the Exchange Theory (Homans, 1958), economic exchange and social exchange are formed in the process of social interaction. Economic exchange means that interaction is driven by interests, and people interact for their benefit, while social exchange has a deeper connotation, in which people interact with trust on the basis of economic exchange. Liden and Graen (1980) held that according to the nature of the exchange relationship, there are two types of exchange between leaders and subordinates: one is the formal relationship between leaders and subordinates in an organization, which is the economic exchange only based on interests; the other is social exchange, in which leaders and subordinates establish a mutual-trust relationship for various reasons and there exists emotional exchange beyond formal relationship.

The academic community has not yet reached a consensus on the notion of LMX. Liden et al. (1997) defined it as the quality of the exchange relationship built between subordinates and their leaders, which is primarily determined by many aspects between leaders and subordinates such as material resources exchange, effort, quantity of information and life support. Yu and Liang (2002) believe that the nature of LMX is the relationship beyond the formal one between leaders and subordinates. They also judge whether there is a high-quality exchange relationship between leaders and subordinates depends on the marginal benefits derived from this exchange relationship and the marginal cost of maintaining this relationship. Graen and Ulh-Bien (1995) argued that LMX refers to the reciprocal relationship between leaders and members at psychological and human level, which emphasizes mutual trust and respect. This definition later became widely recognized and spread. It is also adopted in this study.

### 2.2.2 Measurement of LMX

In terms of dimensions and measurements of LMX, scholars have put forward various viewpoints as there is no agreement on the definition. At present, opinions can be summarized into two categories: one is that LMX is a single-dimensional construct, and the other is that it is a multidimensional construct.

Single-dimensional construct and its measurement: Graen and Uhl-Bien (1995) suggested in their research that single-dimensional LMX confines the exchange relationship to work, which reflects the overall working relationship between the leader and members. According to single-dimensional LMX, scholars have compiled various scales. For example, Graen et al. (1972) and Graen and Cashman (1975) measured the exchange quality ranging from low to high; according to a mutual trust relationship, Scandura et al. (1986) measured LMX relationship with seven items; Graen and Uhl-Bien (1995) also used seven items to measure the LMX relationship from low quality to high quality.

Multidimensional construct and its measurements: Unlike the supporters of the single-dimensional construct, quite a few scholars point out in their research that LMX is multidimensional, and the exchange between leaders and employees should not be limited only to work, but also extended to life and spiritual level. The most representative viewpoint is drawn from Dienesch and Liden (1986), who hold that LMX contains such three dimensions as liking, contribution and loyalty. Later, Liden and Maslyn (1998) propose the fourth dimension "professional respect" that differs from the three above-mentioned dimensions, and develop the four-dimensional measurement scale LMX-MDM. Wang et al. (2004) tested this scale in China and increased the number of items from 12 to 16. Results show that the extended scale has good reliability and validity, and it is especially in line with the research on LMX conducted in the context of Chinese culture, and thus has been widely promoted by Chinese scholars.

The single-dimensional measurement is still the most widely used method. Among them, the LMX-7 scale with 7 items compiled by Graen and Uhl-Bien (1995) is universally adopted, and its value α reaches above 0.8, which can give a good prediction of structural variables. Later most studies are based on this scale to measure the quality of LMX, either adopting it directly or utilizing it with slight modifications. This study also uses the LMX-7 scale developed by Graen and Uhl-Bien (1995).

### 2.2.3 Research on LMX

There are many studies on the antecedent variables of LMX and the research results can be roughly divided into four categories: employee characteristics, leadership characteristics, interaction variables between leaders and employees, and contextual variables.

In terms of employee characteristics, researchers believe that employees' self-assessment capability (Snyder & Bruning, 1985), affect and ability (Day & Crain, 1992), extroverted personality (Phillips & Bedeian, 1994) and proactive personality (Wijaya, 2019; Z. Zhang et al., 2013) can affect LMX, and that the leader's perception of employee competence is also one of the antecedent variables of LMX (Dockery & Steiner, 1990).

In respect to leadership characteristics, studies found that abusive supervision (Yu et al., 2014) will affect the quality of LMX, and specific leadership styles, such as transformational leadership (Boer et al., 2016; Krishnan, 2004), ethical leadership (Xiao & Zhao, 2017), inclusive leadership (Javed et al., 2018), authentic leadership (Qin et al., 2016), and humble leadership (Yu & Wang, 2017), are the antecedent variables of LMX.

As for the interaction variable between leaders and employees, most researchers examine the influence of their similarities on the quality of LMX. The findings suggest that competence similarity (Snyder & Bruning, 1985), perceived similarity (Engle & Lord, 1997; Liden et al., 1993; Phillips & Bedeian, 1994), similarities in positive emotions (Bauer & Green, 1996) and proactive personality (Z. Zhang et al., 2013) can all exert influences on LMX.

With regard to contextual variables, the scope of the leader's control (Green et al., 1983), organizational size, as well as cohesion and organizational climate of the working group (Cogliser & Schriesheim, 2000), all affect the quality of LMX.

Scholars have done considerable research on the outcome variables of LMX, and the results prove that LMX primarily affects subordinates' working attitude and working behavior. Specifically, research indicates that the quality of LMX has a positive influence upon employees' job performance and assessment (Deng et al., 2017; Gerstner & Day, 1997; Scandura & Graen, 1984), career process (Wakabayashi, 1988), frequency of communication (Dockery & Steiner, 1990), organizational citizenship behavior (Chen & Jin, 2014; Wayne & Green, 1993), voice behavior (Wang, 2017; Zou & Yang, 2013), organizational support behavior (Wu & Zhang, 2017), innovation behavior (Qu et al., 2013), job satisfaction (Harris et al., 2010), organizational commitment (Sparrowe & Liden, 1997), passion and work innovation (L. Atwater & A. Carmeli, 2009), self-efficacy (Wang & Qian, 2017), perceived organizational support (Erdogan & Enders, 2007) and work-family balance (Lin et al., 2016).

In addition, high-quality LMX also inhibits employees' negative attitude and behavior. Empirical studies demonstrate that LMX has a significant inhibitory effect on employee job burnout (Lee, 2011), spread and transmission of emotional exhaustion (Lu & Sun, 2016), and turnover intention (Huang et al., 2014).

### 2.2.4 Summary of research on LMX

As reviewed above, researchers have never stopped studying LMX since it was put forth. A host of studies and analyses of reasons for different levels of LMX relationship, such as employee characteristics, leadership factors, contextual factors, and the influence caused by different exchange on employees and the organization. It can be seen from the literature review that a thesis can hardly cover all the factors related to LMX. Therefore, the discussion of LMX must be carried out in conjunction with specific research purposes and different research variables. At the same time, in the discussion of the vertical LMX relationship in an organization, another horizontal relationship shall be considered by combining the two ubiquitous relationships so that the research can be more meaningful.

## 2.3 Team-member exchange

### 2.3.1 Definition of TMX

Initial investigation into TMX started with studies on LMX. Seers (1989) first put forward that there widely exists a kind of horizontal relationship among colleagues in addition to the vertical relationship between superiors and subordinates, and the former may even be more convincing than the latter in predicting the results of team work. In other words, the horizontal relationship can also have an influence on individual attitude and behavior. Therefore, Seers expands the exchange relationship and supplements the member-member relationship based on the original leader-subordinate exchange relationship. On this basis, Seers proposes the concept of TMX, which is individual member's perception of his or her overall exchange relationship with other members in the team. He considers that TMX is a kind of social exchange relationship in the workplace and is distinct from LMX. However, both can make cogent predictions in individual performance and job satisfactions in the organization.

Seers et al. (1995) further defined TMX in later studies and elucidated the process of giving and obtaining that form the reciprocal relationship. Giving includes not only the initiative to assist others, but also the exchange of ideas and feedback; while obtaining mainly refers to

accepting others' help in information, support and recognition. The reciprocal relationship should encompass two aspects, i.e., not only the cooperation and information exchange in work, but also the emotional identity and willingness to cooperate. In this regard, Seers et al. believe that TMX is a reciprocal relationship formed by team members expressing their opinions, receiving feedback, assisting colleagues, accepting views and obtaining help from colleagues. Some scholars have also proposed that TMX can measure the overall quality of exchange among members. Low-quality TMX is merely the exchange conducted to finish tasks; on the contrary, high-quality TMX includes the exchange conducted to complete tasks and the exchange of emotions and respects among team members (Farh et al., 2016; Li & Ling, 2011).

Besides Seers (1989), other scholars also propose different definitions of TMX in accordance with the needs of their research. For example, Tse et al. (2008) conducted a qualitative analysis of TMX based on its content and they held that TMX can be divided into task-oriented and relationship-oriented exchange. However, the current definition of TMX is mainly adopted from the one proposed by Seers (1989). This study also uses this definition that TMX refers to individual's overall exchange relationship with other colleagues in a team, which can be perceived.

### 2.3.2 Measurement of TMX

Seers was the first to carry out research on TMX and developed the TMX measurement scale (Seers, 1989) with 18 measurement items. The measurement is divided into three aspects:

(1) exchange, that is the exchange relationship formed by the interaction between individuals and their colleagues in the workplace. There are 10 measurement items in this respect, a relevant example of which is "colleagues recognize my potential"

(2) frequency of meeting, that is the frequency and effectiveness of meetings held by the team to finish tasks or achieve goals. This aspect contains 4 measurement items, an instance of which is "meetings help better convey my thoughts"

(3) cohesion, that is the degree of trust among team members and the overall centripetal force. This respect contains 4 measurement items, an example of which is "team members trust each other".

In a word, the measurement scale can be summarized as the sharing and feedback of information or opinions among team members at work, the recognition of each team member's role and their willingness to help each other. Later, Seers et al. (1995) modified and streamlined the previous scale by deleting the items related to "frequency of meeting" and "cohesion", and only retaining those in "exchange". However, they refined the content of "exchange" and

subdivide it into team contributions and team rewards, with 5 items for each and 10 items in total. As the scale has been widely used (Farmer et al., 2015), the questionnaire selected to measure the variables of TMX in this study is also a simplified version with 10 items developed by Seers et al. (1995).

### 2.3.3 Research on TMX

There are many studies on the antecedent variables of TMX. At the group level, there are two main antecedent variables of TMX, which are the similarity degree of team structure characteristics and that of team members. Some scholars suppose that team size can affect TMX (Gajendran & Joshi, 2012; Ismail et al., 2012). Alge et al. (2003) studied the impact of the nature of four teams on TMX, i.e., future teams, past teams, long-term teams, and temporary teams. Ko (2005) pointed out that transformational leadership and collectivism can boost high-quality exchange among team members. Zou et al. (2015) stated that service-oriented leadership can promote high-quality TMX characterized by mutual trust, help and love. Gao et al. (2016) suggested in their research that cognitive heterogeneity, emotional reflexivity, and relationship benefits can affect the quality of TMX. Xue et al. (2016) indicated that the learning goal orientation of a team can make a significantly positive prediction of TMX.

At the individual level, the antecedent variables of TMX include friendship (Tse et al., 2008), workplace friendship (Sias et al., 2012), emotional intelligence (Mayer et al., 2012; Schmidt, 2006), fairness perception (Guh et al., 2013; Murphy et al., 2003), team orientation (i.e. individual's willingness to be a team member and to work in a team) (Mohammed & Angell, 2004) and similarities among team members.

As a reflection of the reciprocal relationship between team members and their teams, TMX has an influence on the working atmosphere and working outcomes of both team members and the team. Scholars have also investigated the outcome variables of TMX from this viewpoint. At the group level, the outcome variables of TMX mainly include team members' cohesion (Seers et al., 1995), relationship conflict (Lin & Kwantes, 2014), team performance (Jordan et al., 2002; Liao et al., 2010), the overall level of team commitment (Witt et al., 1999) and the team's consensus climate (Ford & Seers, 2006).

At the individual level, the quality of TMX affects individuals' attitude and behavior. The outcome variables mainly include individual job satisfaction, individual's satisfaction with colleagues (Seers, 1989), individual performance (Farh et al., 2016), organizational citizenship behavior (Cogliser et al., 2013; Love & Forret, 2008), the willingness to share knowledge (Hu et al., 2012; Li & Sun, 2015; Liu et al., 2011), voice behavior, organizational commitment

(Liden et al., 2000), turnover intention (Major et al., 1995), positive emotional response (Tse & Dasborough, 2008), self-efficacy (Liao et al., 2010), psychological empowerment (Schermuly & Meyer, 2016), self-efficiency cognition (Denti & Hemlin, 2016), creative thinking (Farh et al., 2016) and work input (Liao et al., 2013). A meta-analytical study conducted by Banks et al. (2014) shows that TMX has a significantly positive correlation with individual performance, job satisfaction, organizational commitment, organizational citizenship behavior, and employee innovation behavior, and it also has a significantly negative correlation with employees' turnover intention.

### 2.3.4 Summary of research on TMX

The concept of TMX has been used for nearly 30 years since its proposal by Seers (Seers, 1989) in 1989. During this period, many scholars have carried out substantial research ranging from the exploration, summary, and evolution of the notion of TMX, thus contributing to the development of scales to some corresponding empirical studies. TMX gradually becomes a mature concept with extensive research results. However, it can be learned from the literature review that future research on TMX should distinguish between its definition and connotation so as to differentiate it from other variables such as workplace friendship. In addition, research on TMX should not be confined to its own field but be combined with research results in other fields such as LMX to explore the impact of the two relationships on employees. TMX research should decide which relationship has a greater impact on the outcome variables according to different research topics. In-depth studies integrated with practical work can also be conducted to explain the specific outcome variables of TMX through different paths, analyze the differences of various paths and find the way that brings TMX into full play in a specific context.

## 2.4 Self-efficacy

### 2.4.1 Definition of self-efficacy

Self-efficacy, which may be classified into perceived self-efficacy, self-efficacy beliefs, and self-efficacy expectancy, refers to the judgments and beliefs individuals have on whether they have the ability to complete an activity at a certain level, or individuals' self-assessments and feelings. It also represents various feelings including the senses of competence, self-confidence, self-care, and self-esteem when individuals are facing certain tasks (Bandura, 1986).

Initially, self-efficacy was regarded as a domain-specific concept, and it emphasized

established behavior. However, with the development of self-efficacy theory, many researchers believe that self-efficacy can be both general and specific, so they propose specific self-efficacy and general self-efficacy.

For example, scholars such as Schwarzer define general self-efficacy as an overall degree of confidence manifested in individuals who are faced with requirements of different situations or in a new environment (Schwarzer et al., 1997). Judge and Bono (2001) view general self-efficacy as the judgments or assessments of individuals about whether they can reach the target of certain behavior or effectively deal with various situations. Gist (1989) regards general self-efficacy as a unique and stable perception of individuals, indicating their expectation of whether they have the ability to fulfill their job requirements in different situations. Sherer et al. (1982) note that general self-efficacy is a general belief formed by the influence of past success or failure and the contributing factors of these experiences. Bandura divides self-efficacy into three types in his later research: general self-efficacy, domain-linked self-efficacy, and task-specific self-efficacy. He assumes that self-efficacy is both specific and general (Bandura, 1997).

Although there is controversy on whether self-efficacy is general or specific, both emphasize “perceived ability” or “people’s subjective judgments of their capabilities”, which is the core of self-efficacy. This study adopts the classic definition proposed by Bandura (1986) that self-efficacy is people’s belief on their abilities to finish specific tasks.

### 2.4.2 Measurement of self-efficacy

The measurements of self-efficacy in the early stage were primarily focused on the intensity of three dimensions proposed by Bandura (1978): magnitude, strength, and generality. Most scholars focus on the measurement of strength when they measure self-efficacy, which is to measure the degree of people’s confidence in reaching specific targets.

Since there is controversy over whether the definition of self-efficacy is general or specific in the academia, opinions vary on its measurement. Scholars represented by Bandura hold that the distinctiveness and completeness of the field of research should be considered in the measurement of self-efficacy (Bandura, 1978). However, some researchers have explored general self-efficacy and found that it does not vary by field, which led to the development of a measurement scale for this particular concept.

Coppel (1980) compiled a single-dimensional self-efficacy scale with 22 items; Sherer et al. (1982) developed a two-dimensional self-efficacy scale, including general self-efficacy with 17 items and social self-efficacy with 6 items. Jerusalem and Schwarzer (1992) compiled a single-dimensional General Self-Efficacy Scale (GSES) with 20 measurement items which are

later reduced to 10 items. The GSES is a most widely applied scale and has been translated into no less than 25 languages by scholars for research in their respective countries.

The Chinese version of GSES was initially applied to studying the freshmen in Hong Kong in 1995 by Zhang and Schwarzer (1995). The result revealed that this version is reliable and valid. Chen et al. (2001) developed a single-dimensional new General Self-Efficacy Scale (NGSES) with 8 measurement items. This scale is highly reliable and can predict specific self-efficacy of various tasks in different situations. Besides, it has been validated in the Chinese context, with good reliability and validity. Therefore, this study applies the NGSES compiled by Chen et al. (2001) to measure self-efficacy.

### 2.4.3 Research on self-efficacy

The antecedent variables of self-efficacy can be divided into individual factors, leadership factors and situational factors. Bandura (1986) holds that the formation and development of individuals' self-efficacy are influenced by four factors, which come from personal mastery, vicarious experience, verbal persuasion, and physiological and affective states. Lent et al. (2017) have verified that career exploration goals and career decidedness are also the sources of self-efficacy. Dimotakis et al. (2017) assume that positive feedback can also affect the formation of self-efficacy.

Empirical studies signify that positive leadership can promote self-efficacy, such as transformational leadership (Liu et al., 2010; Pillai & Williams, 2004), ethical leadership (F. O. Walumbwa et al., 2011a; Wang et al., 2015), charismatic leadership (Shea & Howell, 1999), inclusive leadership (Fang, 2014), paternalistic leadership (Tian & Huang, 2014), as well as empowering leadership (Song & Liu, 2014).

In addition to leadership, some studies promoted that interpersonal communication in an organization can have a positive influence on self-efficacy of members. For example, Xin (2013) conducted a research with college students as subjects, and proved that peer support in a circumstance can significantly influence the self-efficacy of students.

Self-efficacy also has a significant impact on employees' attitudes and behaviors. Bandura (1986) believes that it can affect people's thinking modes and emotional reactions in various situations. The above conclusions have been supported by many empirical studies (Pajares, 1996; Stajkovic & Luthans, 1998; Van Den Heuvel et al., 2015; F. O. Walumbwa et al., 2011a). Specifically, scholars suggest that self-efficacy can affect employees' improvisation (Ding & Chen, 2017). It can also change the thinking mode and emotional response of employees, then enhance their ability to cope with the needs of work and family, and ultimately to achieve the

balance and meliorate their work engagement (Chan et al., 2017). In addition, self-efficacy is usually perceived as an important internal psychological mechanism to explain the occurrence and change of behavior.

For example, Wang and Wu (2017) denote in their research that self-efficacy can intervene in the activation of individuals' stereotypes and their subsequent behavior. Kim and Beehr (2017) found that self-efficacy meditates the different effects of empowering leadership on employees' deviant behavior in the workplace and their role performance.

### 2.4.4 Summary of research on self-efficacy

As one of the significant factors of individual cognition, self-efficacy has a huge impact on people's motivations and behavior. From this perspective and from the literature above, self-efficacy can affect individual behavior, psychology, and emotion. However, there are some unsolved problems in the research on self-efficacy, such as the dispute over whether it is specific or general and its measurement dimensions. When self-efficacy is studied as an important intermediary path, research on the antecedent variables of this path is primarily focused on the characteristics or features of individuals, without considering the interaction between individuals and the environment. In the future, on the basis of unified and clear definition and measurement dimensions, research on self-efficacy should heed the intermediary path from multiple perspectives, so as to better enrich the research results in this field.

## 2.5 Interactional Justice Differentiation

### 2.5.1 Definition of interactional justice differentiation

The study of interactional justice begins with the study of organizational justice, which is directly related to the workplace. Organizational justice focuses on whether employees in an organization feel treated fairly in their work. The concept originates from social exchange theory (Rex & Homans, 1962) and justice theory (Adams, 1965). The research has gone through the development stages of single-factor theory, two-factor theory, three-factor theory and four-factor theory as detailed below.

One factor theory (outcome fairness): The early research stage of organizational justice is influenced by the justice theory according to which the individual perception of justice put forward by Adams (1965) is the result of the comparison of input-output ratios. Sometimes the comparison concerns individuals compared with others; others it concerns the comparison of

different individual periods. If the ratio is the same, the individual will get a sense of justice.

Two-factor theory (outcome justice and procedural justice): Thibaut and Walker (1975) studied procedural justice for the first time. According to them procedural justice means that justice must be guaranteed during the allocation of resources focusing more on the means used in decision-making and subsequent procedural justice. Therefore, organizational justice in this stage includes distributive justice and procedural justice.

Three-factors theory (distributive justice, procedural justice and interactional justice): Bies and Moag (1986) believe that procedures are formulated and implemented by the managers in the organization and that managers' behavior of will affect the perception of justice among the members of the organization. Interactional fairness includes two aspects: firstly, when the manager is making decisions, whether he/she communicates with the employees in a sincere mode, whether he/she shows concern and respect for them, and whether he/she considers their feelings; secondly, whether the manager gives a clear and reasonable explanation for the decision of the allocation structure of employees. Currently, the concept of organizational justice changes from two dimensions to three and includes distributive justice, procedural justice, and interactional justice.

Four-factors theory (distributive justice, procedural justice, interpersonal justice, information justice): Greenberg (1993) further subdivides interactional justice into interpersonal justice and information justice. Information justice refers to whether the superior has passed on the information that should be given to the employee and provided the necessary explanations. However, the four-factor theory is actually a split from the three-factor theory and its content does not add much to the former.

The concept of interactional justice was first proposed by Bies and Moag (1986). It refers to the quality of interpersonal treatment received by employees during the implementation of organizational procedures and to the influence of the attitudes and ways of the performers towards employees and their perception of fairness. Bies and Moag (1986) think that when individuals develop a sense of interactional justice, the superior leader should take on four norms, which are respect, propriety, justification, and truthfulness respectively. Later, Greenberg (1993) divided interactional justice into interpersonal justice and information justice. Interpersonal justice refers to the observance of norms of respect and propriety, while information justice refers to the observance of norms of justification and truthfulness. On the one hand, high interactional justice reflects that the leader gives full respect and courtesy to the subordinates rather than rough treatment when formulating and implementing company policies. On the other hand, it also shows that leaders disclose and convey sufficient information to

subordinates when making decisions.

Colquitt (2001) followed the division of Greenberg (1993) and gave his own definition of interpersonal justice and information justice. In his opinion, the former relates to whether superior leaders treat subordinates alike and consider the dignity of members when making decisions, implementing procedures, and assigning results. The latter is whether the information members get about the program, whether its results can explain why the program works this way and whether they are dispatched this way.

Ando and Matsuda (2010) believe that interactional justice means that if an individual in an organization is treated fairly in the process of the organization's execution procedures, he will have a high enthusiasm for the superior/supervisor and the organization.

Liu et al. (2003) gives a different classification of interactional justice. The author thinks that interactional justice can be divided into information justice and leadership justice. Leadership justice is not limited to the meaning of human justice; it includes whether the leader of the group shows respect, and gives a fair evaluation to members, moral support, acceptance, and encouragement.

On the basis of domestic and foreign research on interactional justice, Zhu and Long (2012) believe that it reflects the cognition degree of organization members on the quality of information and attitude in interpersonal communication.

Based on the research of domestic and foreign scholars on the concept of interactional justice, it can be found that there is no unified conclusion on the concept of interactional justice at home and abroad. However, most agree on the definitions of Bies and Moag (1986), which will be used in this study.

### 2.5.2 Measurement of interactional justice

For the measurement of interactional justice, the three-factor model of organizational justice is widely adopted. The interactional justice scale developed by Moorman (1991) is considered to be a comprehensive scale with high utilization rate. The scale includes questions related to sincerity and explanation, as well as questions such as “Will the leader consider your opinion” and “can the leader suppress personal prejudice”. It comprehensively measures the interpersonal relationship among members in the organization. There are altogether 6 questions with good reliability and validity. Then, Niehoff and Moorman (1993) further improved the interactional justice scale with a reliability coefficient of 0.92. The new scale contains 9 items, which are mainly concerned with whether the leaders take employees' ideas into consideration when making decisions and whether they give sufficient explanations. The scale used in this

study to measure interactional justice is that of Niehoff and Moorman (1993).

In addition to the scale using the three-factor model of organizational justice, Colquitt (2001) also developed a four-dimensional scale of organizational justice based on the four-factor model of organizational justice. Among them, interpersonal justice and information justice replace the interactional justice dimension in the three-dimension scale. There are 4 measurement items in interpersonal justice and 5 measurement items in information justice. The scale has good reliability and validity. Based on the four-factor theory proposed by Greenberg (1993), Folger and Konovsky (1989) developed a set of scale to measure information justice, involving questions such as “The leader will explain to me the reason for evaluation”, “The leader will discuss my performance with me”.

### 2.5.3 Research on interactional justice

Zhu and Long (2012) point out that the ante-dependent variables of interactional justice can be divided into superior factors, subordinate factors and similarity between superiors and subordinates. The superior factors include the personality characteristics and behavioral variables.

Bies and Moag (1986) believe that interpersonal justice and information justice can strongly predict the attitude and behavior of members who will increase their investment and produce higher work performance in the organization after they experience interpersonal justice and information justice. Masterson et al. (2000) proposed that interactional justice would affect the attitude of individuals towards authority. If the supervisor treats the members in a fair way, they will retribute with higher work performance. Moorman (1991) found that employees with higher interactional justice were more likely to have organizational citizenship behavior, showing more organizational obedience, altruism, politeness and sportsmanship. Williams et al. (2002) pointed out that organizational citizenship behavior was significantly correlated with the three dimensions of organizational justice, but only interactional justice reached a significant level in predicting organizational citizenship behavior.

In turn, Barling and Phillips (1993) found that employees with lower interactional justice were more likely to withdraw from work, whereas employees with higher interactional justice were less likely. According to Tekleab and Taylor (2005) research the higher employees' perception of interactional justice in the organization, the higher their happiness, and thus the lower their demission rate. Wang et al. (2014) found that employees with a higher perception of interactional justice were more likely to provide helpful behaviors. According to research conducted by Ren and Li (2016) employees with higher interactional justice were less likely to

have counterproductive work behaviors. In turn, a study conducted by Liu and Zhou (2015) found that employees with a higher perception of interactional justice were more likely to give advice to their leaders. More recently, Zheng and Liu (2016) found that the higher the interaction fairness in an organization, the higher the psychological empowerment of employees, which significantly improved their happiness.

### 2.5.4 Summary of research on interactional justice

As discussed above, scholars often consider interactional justice under the framework of organizational justice and study it as a whole variable. Scholars pay less attention to its unique role of emphasizing more on the justice perceived by others in interpersonal communication. In fact, the justice and harmony of interpersonal interactions not only affect people's mood, but it will also affect cognitive attributions, which cause different interpretations of the same phenomenon. This interpretation will affect the subsequent behavior and performance. Therefore, scholars should pay more attention to the uniqueness of interactional justice and take it as a separate variable in combination with research purpose and content. Although interactional justice concerns the perception of people, each person perception of interactive justice is different even in the same team because of the influence of various factors. So, the team atmosphere within the interactional justice has also differences, the perception of which will eventually affect the team’s attitude and behavior. Therefore, research could consider the influence of the differences of interactional justice at the team level on people's behavior.

## 2.6 Related theories

This study considers two major theories related to the research, namely social exchange theory and social cognitive theory, as follows.

### 2.6.1 Social exchange theory

The Social Exchange Theory, having its origin and prevalence in Western societies in the 1960s, gradually spreads far and wide across the globe in various fields of applications, including economics, sociology, anthropology, psychology, and management. Social exchange theory is a sociological theory that arose in the United States in the 1960s and spread widely around the world. It is also known as a behaviorist theory of social psychology because of its emphasis on the psychological aspects of human behavior. The fundamental concept of the theory concerns

human interactions as a rewards-driven behavior, essentially a kind of exchange behavior. Homans and Blau (Blau, 1964; Homans, 1958) are two representatives of the theory. Homans's research on social exchange is called Behavioristic Exchange Theory, which puts much emphasis on the individual behavior of social exchange in the microstructure, while Blau's research on social exchange is called Structuralist Exchange Theory, which moves beyond the micro level to the macrostructure, dealing with social exchange in a more complex social context.

(1) Homans's Behavioristic Exchange Theory (Homans, 1958; Rex & Homans, 1962). Homans focused on the interaction between people, that is, individuals exchange with other people in order to obtain certain benefits. Homans defined social exchange as the exchange of tangible or intangible, remunerated or paid actions between at least two people. Homans drew on the principle of behaviorism. It states that organisms tend to continue to satisfy it by taking the actions that have previously satisfied that need when they have a need. In human society, the satisfaction of needs is generally met by others, which involves the problem of why others want to meet needs. Therefore, the necessity of exchange is created. By exchanging, people getting each other are satisfied. People needs to have certain rational consideration before selecting exchange behavior. This relates to the problem of profit maximization in the motive of human behavior in utilitarianism. But Homans changed his assumption of the economically rational man. People don't always try to maximize profits in their behavior patterns. It's about trying to get the benefit of the relationship and not letting go. For example, interpersonal communication is not only the exchange of money, but also such things as praise, self-esteem, love and affection. His Social Exchange Theory includes the following 6 propositions.

Success Proposition—the more often a particular action of a person is awarded, the more likely the person is to perform that action. Stimulus Proposition—if in the past the occurrence of a particular stimulus, or set of stimuli has been the occasion on which a person's action has been awarded, then the more similar the present stimuli are to the past ones, the more likely the person is to perform the action, or a similar action, now. Value Proposition—the more valuable to a person is the result of his action, the more likely he is to perform the action. Deprivation/Satiation Proposition—the more often in the recent past a person has received a particular reward, the less valuable any further unit of that reward becomes for him (the principle of diminishing marginal utility). Aggression/Approval Proposition—when a person's action does not receive the reward he expected, or receives punishment he did not expect, he will be angry and become more likely to perform aggressive behavior; conversely, when he receives the expected reward, particularly the one more than expected, he will feel very happy

and becomes more likely to appreciate others. Rationality Proposition—in choosing between alternative actions, individuals will choose behaviors in which the total value of the result increases as the possibility of profit increases.

(2) Blau's Structuralist Exchange Theory (Blau, 1964): Blau defined social exchanges as voluntary actions of individuals that are motivated by the returns they are expected to bring and typically do in fact bring from others. He proposed the connotation of the exchange principles, summarized as five principles: Rationality Principle—the more profit people expect from one another in participating in an activity, the more likely they are to engage in it; Reciprocity Principle—the more people have exchanged rewards with one another, the more the reciprocal obligations that emerge and guide exchanges among these people, and the more the reciprocal obligations of an exchange relationship are violated, the more disposed deprived parties are to sanction negatively those violating the norm of reciprocity; Justice Principle—the more exchange relations have been established, the more likely they are to be governed by norms of fair exchange, and the less norms of fairness are realized in an exchange, the more disposed deprived parties are to sanction negatively those violating the norms; Marginal Utility Principle—the more expected rewards have been forthcoming from a particular activity, the less valuable the activity is and the less likely its performance is; Imbalance Principle—the more stabilized and balanced one set of exchange relations is among social units, the more likely are other exchange relations to become imbalanced and unstable.

Moreover, Blau summarized the basic exchange process into four steps, which contains social attraction - competition for power - differentiation - strains towards integration/ opposition. Blau's Social Exchange Theory was mainly explained from the perspective of social structure. In his research, he not only distinguished between economic exchange and social exchange, intrinsic reward and extrinsic reward, and micro exchange and macro exchange, but also introduced concepts including power, justice, inequality, norms and institutions, allowing exchange theory to explain social phenomena to a greater extent while also being more practical.

### 2.6.2 Social cognitive theory

The Social Cognitive Theory (Bandura, 1986) was introduced by the American psychologist Albert Bandura in 1986 on the basis of his Social Learning Theory proposed in 1977, and was rapidly developed in the 1990s. Social cognitive theory is one of the important theories in social psychology. It is a theory used to explain the process of social learning. Social cognitive theorists describe individuals as people who actively deal with events and develop expectations about reinforcement.

In essence, the Social Cognitive Theory is a social learning theory which focuses on cognitive factors including self-concept, consciousness, and expectations, with Triadic Reciprocal Determinism at its core, i.e., the interaction among behaviors, personal traits, and environment. The Social Cognitive Theory emphasizes the key regulating effect the cognitive process of individuals has on study and behaviors since individuals are agents of behaviors and they have subjective initiatives. Therefore, behaviors of individuals can only be explained through the interaction among environment, behavior, and individuals (Bandura, 1986).

Apart from the Triadic Reciprocal Determinism, the Social Cognitive Theory also includes the learning theory and the motivation theory. The learning theory mainly elaborates the forming process of individual behaviors, including observational learning and enactive learning while the motivation theory expounds the control and regulation of individual behaviors. The motivations of individuals controlling and regulating their behaviors include incentive motivation, alternative motivation, and self-regulating mechanism (Bandura, 1986). Based on this previous research, this study will focus on the introduction of the Triadic Reciprocal Determinism and the self-regulating mechanism of the motivation theory.

(1) Triadic Reciprocal Determinism: After thoroughly analyzing and studying the interaction among individual cognition, individual behavior, and the environment, Bandura (1986) proposed the Triadic Reciprocal Determinism in 1986. He stated that behaviors, personal traits such as individual cognition, and environment, all serve as determinants and interact with each other. The three factors are interacted in a cause-and-effect relationship, and every two factors are in bilateral relations of being influenced and influencing. The model is shown in detail as the following Figure 2.1.

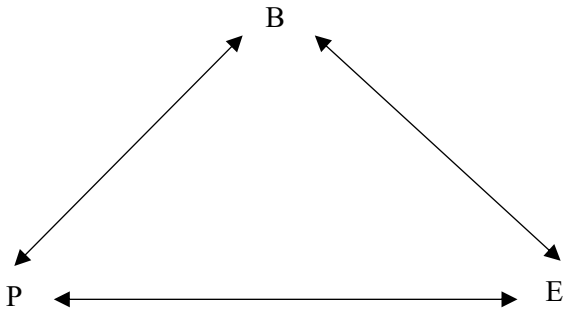


Figure 2.1 Triadic reciprocal determinism

Source: Bandura (1986)

In Figure 2.1, P stands for personal traits, B for behaviors, E for environment while the arrowheads represent the effect directions in the cause-and-effect relationship. According to the Triadic Reciprocal Determinism, personal traits of individuals including expectations, beliefs, targets, intentions, and emotions would influence their behaviors while the internal feedback

and the external outcome of their behaviors will in return change personal traits to some extent. Moreover, as the realistic condition of behaviors, environment decides the directions and intensity of such behaviors, whereas individuals can also constantly influence the environment through their behaviors, so that the environment can adapt to the requirements of individuals. In other words, individuals can decide environment while environment shapes individuals. The relative reciprocal effect among these three factors and the interaction mode among them would appear in different forms with various scenarios, individuals, and activities (Gao, 2000, p. 40). However, these three factors are generally in a high degree of mutual interdependence. The Triadic Reciprocal Determinism not only constructs the fundamental framework of social cognitive theory but also provides a brand-new perspective for psychology to study individuals (Gao, 2000, p. 45).

(2) The self-generated motivation of the Motivation Theory: Self-generated motivation is also named as the self-regulating mechanism, which refers to the self-assessment or self-reaction of observers to the demonstration behaviors and results of the behaviors (Gao, 2000, p. 148).

The Social Cognitive Theory believes that individuals have self-regulating mechanisms. The mechanism is considered as the set of factors of individuals in the Triadic Reciprocal Determinism in a broad sense and a self-feedback mechanism including self-setting goals of behaviors, self-observing actual behaviors, self-grading, and self-reaction based on the aforementioned procedures in a narrow sense. As a feedback system, the motivations of individuals performing certain behaviors neither rely on neither the behavior standards individuals set for themselves nor self-observation. Instead, the motivations are determined by the self-assessment and self-reaction to the gap between the standards and the observation.

Bandura (1986) believes that the self-feedback system would facilitate individuals to reflect and evaluate their own experience or thoughts, so as to adjust the thoughts and behaviors of themselves, which can be considered as the most distinctive characteristic of human beings. The future behaviors of individuals are greatly influenced by the beliefs individuals hold for their own abilities and the results of their efforts, i.e., self-efficacy and outcome expectation. These two beliefs together form the motivation effect of individual behaviors. Therefore, in Social Cognitive Theory, the beliefs of individuals are key factors to their behaviors and motivations.

## 2.7 Theoretical model

Based on the above literature, the following theoretical model is shown below. The relationships portrayed will be further enriched to generate the final research model as per Figure 2.2:

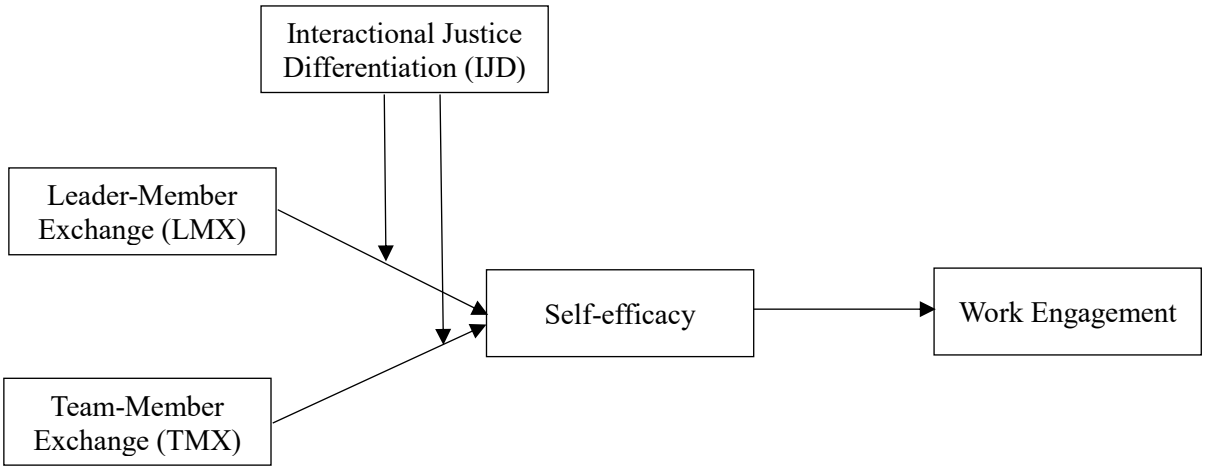


Figure 2.2 Theoretical framework

Starting with the subject of private hospitals and combining with the development opportunities and restrictions they face as a special kind of medical institutions in China, this study seeks to understand how to enhance the competitiveness of a private hospital by improving the work engagement of its medical staff. Work engagement is selected as the major variable to evaluate the quality in the routine work of medical staff in private hospitals, since according to previous studies, it has been found that it not only affects staff's intra-role behaviors and attitudes such as work satisfaction and work performance, but also influences the extra-role behaviors including proposals and initiative innovation. Moreover, work engagement is the most comprehensive measurement to describe the work state of high quality. As Ashforth and Humphrey (1995, p. 110) stated, work engagement requires staff's investment of "hands, head and heart". Engaged employees are described as being psychologically present, fully there, attentive, feeling, connected, integrated and focused in their role performances (Kahn, 1992). For all those reasons, this study takes work engagement as the dependent variable, explores its antecedent variables related to the medical staff in private hospitals and its mechanism of action, and takes into account the regulatory context that affects the mechanism of action.

## 2.8 Research hypotheses

In this chapter, the specific hypotheses are put forward. There are in total 11 hypotheses in the study. We demonstrate the reasonableness of the hypothesis in detail.

### 2.8.1 Main effect of social exchange relationship on work engagement

#### 2.8.1.1 LMX and work engagement

The quality of the exchange between leader and member has an important impact on the level of employees' engagement in their work roles. Social exchange theory can be used to interpret the behavior that determines the change of work participation based on the quality of exchange (Andrew & Sofian, 2012; Saks, 2006). Employees determine whether they are obliged to respond and repay the organization with kindness and high job commitment based on their own economic and socio-economic resources (Cropanzano, 2005). High quality LMX relationships can effectively affect the work of subordinates by interfering with their work engagement (Walumbwa et al., 2011b).

A study conducted by Hassan and Jubari (2010) on 218 employees of that Middle East Airlines showed that LMX was positively correlated with work engagement. Similarly, Atwater and Carmeli (2009) conducted a study on 193 employees in various occupations in Israel, showing that high-quality leadership exchange relationship has a positive impact on employees' work vitality, which in turn leads to employees' innovative work engagement level. Swati and Archana (2013) studied the impact of LMX on work engagement and role performance, and showed that high-quality LMX relationships can significantly improve employees' work engagement and role performance, and work engagement plays a mediating role in the positive correlation between LMX and role performance.

Based on the perspective of social exchange, a leader in the organization, limited by time and resources, will establish different quality exchange relationships with subordinates. Supported by the above literature review, this study considers that high-quality LMX contributes to improving the work engagement of subordinates, mainly because employees with high-quality LMX are supposed to be members of the in-group. For one thing, they can earn more respect, trust, loyalty, appreciation and affection from their leaders, or other positive emotions that can help.

In addition, they can focus more on the work itself and engage themselves most instead of being distracted to dealing with interpersonal relationships or other business. Moreover, according to the core principle of social exchange – reciprocity principle – owing to the strong loyalty expressed by the leader, medical workers with high LMX, in return, are willing to show a corresponding or even a higher level of loyalty to the leader, resulting in a higher degree of identification. As a result, they are more likely to pay back their leaders through hard work and safeguard the interests of the organization, which gradually transforms into an in-role

responsibility, a sense of ownership and ultimately the recognition and pride of their work.

For another thing, concerning the tangible material, employees with high-quality LMX are more likely to receive resources, information, decision participation opportunities, guidance and other preferential tangible materials from their leaders, which allow them to take the floor more, be more flexible at work, and receive more professional training and improvement so that they can be able to understand and control their work at a higher level, overcome difficulties more easily at work and accumulate more successful experiences. Thus, more vigor comes rolling in the routine work, and employees would like to concentrate on their work and take on more responsibilities and obligations.

In general, seeing from the Reciprocity Principle of social exchange, employees with high-quality LMX receive more positive emotional and material support from their leaders. Considering reciprocity, employees will generate internal motivation for work, burst their energy and maintain an enthusiasm for work without feeling tired. In addition, they are more likely to be enlightened from their work experience and be proud of what they have done, thus improving their work engagement. In conclusion, this study proposes the hypothesis as follows:

*H1a: LMX has a positive effect on the level of work engagement, that is, the higher the quality of LMX, th*e h*igher the level of individuals' work engagement will be.*

#### 2.8.1.2 TMX and Work Engagement

As Seers (1989) stated, TMX plays a crucial role in the formation of employees' roles. In turn work relationship plays a key role in the formation and maintenance of employees' work engagement. People need to keep in touch with others in work to maintain engagement (Kahn, 1990, 1992). First of all, scholars believe that high quality TMX reflects the honesty and support with each other between team members, encourages employees to establish close psychological connection with colleagues and effective working relationships (Seers, 1989).

Secondly, high-quality TMX indicates that members are more willing to share task-related resources with each other, exchange professional knowledge related to work, better communicate and feedback, and jointly solve work problems (Seers, 1989), which ultimately promotes the intrinsic motivation and emotion of employees to increase work involvement (Markos & Sandhya, 2010). Therefore, high-quality TMX can promote communication, strengthen the exchange of information and resources, improve work ability, and help to shape good employee relations, thus improving the level of individual work input.

A high-quality TMX concerns not only task-oriented exchanges such as idea sharing, knowledge and information exchanges, but also relationship-oriented exchanges, including

assistance, concern, support, shared values, friendship, and encouragement.

That is to say, there are more frequent interactions and exchanges between an individual with high TMX and other team members. During this process, they can know better about each other's working habits in order to anticipate others' responses to particular tasks in cooperation, which can therefore become more intimate since tacit cooperation with colleagues is the key to medical work. They are more inclined to exchange information and resources and more willing to share working skills and technique to others involved. In this way, individual members in a team are able to adopt different skills through exchanges, change their mindset and their monotonous work style, and gradually improve their work abilities with a greater sense of competence.

Moreover, employees with high TMX are more likely to earn trust, encouragement and assistance from colleagues. Those positive attitudes from colleagues, including feedback, acceptance, inspiration and trust, can develop employees' interest in teamwork, enhance their internal motivation of accomplishment and ignite their work enthusiasm, so that people attach more meaning and value to their work, and are more responsible and ambitious to challenge themselves when encountering problems or difficulties. At last, the individual with high TMX is more willing to offer feedback, support and assistance and share ideas to team members. The more contributions the individual makes for the team or other members, the more he/she can perceive their self-influence upon others and the organization. This kind of influence will eventually transform into his/her identification and responsibility for the team.

Whether it is the knowledge of the working habits of the department members brought by the high TMX, the improvement of self-skills skills and working abilities, the internal motivation and enthusiasm for work, and the perception of self-influence and responsibility for the department, it can inspire workers with more passion, concentration, recognition, and love for work. In conclusion, this study puts forward the following hypothesis:

*H1b: TMX has a positive effect on the level of work engagement, that is, the higher the quality of TMX, the higher the level of individuals' work engagement will be.*

### 2.8.2 The mediating role of self-efficacy

In view of the individual motivation mechanism described in the Social Cognitive Theory, even if, for example, a medical staff in a private hospital knows the facts that he himself enjoys preferential resources and emotional input from the leader, it is his psychological strength that he still relies on to achieve such desire for working hard and paying back his leader and colleagues based on the Reciprocity Principle. Only when the medical staff maintain a strong

belief in their capability of devoting overwhelmingly to work, can they empower themselves mentally and turn it into action. On this basis, this study proposes that self-efficacy plays a mediator role in the relation between Social Exchange Relationship—Work Engagement as it will later be explained and hypothesized.

#### 2.8.2.1 LMX and self-efficacy

According to the research on self-efficacy of the Social Cognitive Theory, there are four primary sources of information on which individuals base their beliefs about self-efficacy: social persuasion, vicarious experience, mastery experience, and physiological state (Capa-Aydin et al., 2018). In this study, the explanation of the relationship between LMX and self-efficacy focuses on the social persuasion, mastery experience and physiological state, whereas the explanation of the relationship between TMX and self-efficacy puts much emphasis on the vicarious experience, mastery experience and physiological state.

Social persuasion: if significant others express their faith rather than doubt in one's capabilities, it is easier to work harder and sustain a sense of efficacy. For the medical staff in private hospitals, the significant others must be their immediate supervisors, who are more knowledgeable and authoritative in the professional field and have the power to provide direct assessment on the subordinate's work performance. Therefore, the opinions of the supervisor on an employee's work performance and ability highly determine how the employee thinks of his own working competence. Whether it is the direct trust expressed verbally by the leader, or the indirect trust conveyed through work guidance and opportunity recommendation, it can play a role in social persuasion and make employees sense more self-efficacy.

Mastery experience refers to the individual's accomplishments in the past. Enactive mastery experiences are authentic evidence of whether one can muster whatever it takes to succeed. Successes build a robust belief in one's personal efficacy. In high-quality LMX, since the individual can receive material assistance from the leader, such as resources, information and power that are helpful in work accomplishment. He/she may encounter less obstacles when completing tasks. It is relatively easier to succeed. By learning from successful efforts, the individual establishes a personal belief in self-ability, thus improving self-efficacy.

Physiological state: when judging his/her ability, the individual relies in part on information from both his/her physiological and emotional states. Strong mood swings, tension, anxiety and other negative emotions can easily cause a tendency to self-doubt. The individual may contradict unfamiliar environment from the heart, fear challenging tasks, and have negative judgments of one's ability. In a high-quality LMX where subordinates receive more often the

positive emotions from the leader, such as trust, respect, they can reduce to the largest extent their sense of uncertainty about the work task and insecurity about the working environment. Rather, they absorb good emotions in a more supportive external environment, through which their self-efficacy gets improved.

In conclusion, it is proposed that LMX can improve self-efficacy in general and of medical staff in private hospitals in particular through social persuasion, accumulation of mastery experience, and positive physiological state. This study therefore puts forward the hypothesis as follows:

*H2a: LMX has a positive effect on the level of self-efficacy, that is, the higher the quality of LMX, the higher the level of individuals' self-efficacy will be.*

#### 2.8.2.2 TMX and self-efficacy

This study articulates the impact of TMX on self-efficacy from three aspects among the four sources of self-efficacy, namely the vicarious experience, mastery experience and physiological state.

Vicarious experience—when individuals see that people similar to oneself in terms of age, physical characteristics, education level, social status and other aspects succeed in a task, they will subconsciously think that they can also accomplish such tasks. In a team, due to the similarity of individual characteristics and the tasks they face, individuals tend to choose colleagues in their own team as their role models and will adjust the evaluation of self-ability by observing the success or failure of the role models. Under the circumstances, if there is a high-quality TMX between a medical worker and his colleagues in the same department, the individuals see first-hand their colleagues' behaviors, and carry out full communication and interaction to follow up the progress, so that the individual can exploit his learning experience and useful lessons in the future similar tasks, maximize the value of the role models, and thereby build confidence in self-ability.

Mastery experience: employees with high-quality TMX can have open exchanges of information, resources and skills with their teammates, master the skills and abilities required to complete similar tasks, understand the latest task information, avoid the risk of information shortage, receive help and support from colleagues, or even get an opportunity to work with colleagues to get things done. Then with the task being relatively easier, twice as much can be accomplished with half the effort. The steady accumulation of those successful experiences contributes to developing self-efficacy.

Physiological state. In a high-quality TMX, recognition, encouragement, support and trust

among colleagues will create a safe and open work environment where positive emotions are provoked including happiness and a sense of belonging, while negative emotions, caused by negative emotions like jealousy and isolation among colleagues, are reduced. As a result, individuals develop greater confidence in their self-ability.

To sum up, TMX can improve self-efficacy of medical staff in private hospitals through vicarious experience, accumulation of mastery experience, and positive physiological state. This study therefore puts forward the hypothesis as follows:

*H2b: TMX has a positive effect on the level of self-efficacy, that is, the higher the quality of TMX, the higher the level of individuals' self-efficacy will be.*

#### 2.8.2.3 Self-efficacy and work engagement

The research on self-efficacy in the Social Cognitive Theory not only explores its four primary sources, but also considers self-efficacy as the pivotal psychological mechanism of human agency (Bandura, 1999). As Bandura stated, "Unless people believe they can produce desired results and forestall detrimental ones by their actions, they have little incentive to act or to persevere in the face of difficulties. Whatever other factors may operate as guides and motivators, they are rooted in the core belief that one has the power to produce effects by one's action" (Bandura, 1999, p. 128).

According to Cole et al. (2012), an employee's work engagement comes from his/her inner belief, i.e. the recognition of their own work, the degree of concentration, and his/her understanding of the importance and value of work to self.

To be specific, firstly, self-efficacy affects people's choice of behavior. The individual with high self-efficacy tends to choose the task with more challenges and aim higher. Secondly, self-efficacy will influence the effort and persistence that people exert on a task. Thirdly, self-efficacy has an effect on self-resilience in front of difficulty. The individual with high self-efficacy, when facing obstacles and blows, is able to recover more quickly. Lastly, self-efficacy also makes people have an emotional experience of anxiety or confidence with the task at hand.

Since individuals with high self-efficacy believe that they have the ability to complete the task, they will have easier expectations for successful outcomes, thus leading to positive emotional experience which transforms into psychological resources required at work. As a result, individuals are gradually equipped with more resources to accomplish the work.

To be concluded, the hypothesis is proposed as follows:

*H3: Self-efficacy has a positive effect on work engagement, that is, the higher the level of self-efficacy is, the higher the level of individuals' work engagement will be.*

Many studies in the past have found the mediating role of self-efficacy between social exchange behavior and job performance. Ye et al. (2007) found that self-efficacy plays an intermediary role between charismatic leadership and organizational citizenship behavior. Meng et.al. (2011) showed that self-efficacy plays a partial mediating role in the relationship between transformational leadership and job performance and job satisfaction. Tian (2012) showed that the sense of innovative self-efficacy mediated the relationship between authentic leadership and individual innovation performance.

Scholars have found that the behavior of superiors and the expectation of employees can effectively predict the creative self-efficacy of employees, and the creative self-efficacy can eventually lead employees to show a high level of creativity (Tierney & Farmer, 2014). Empowered leaders can provide greater decision-making autonomy, express confidence in employees' abilities and other ways to improve their role breadth and self-efficacy, so as to promote employees to show forward-looking behaviors.

Cropanzano (2005) pointed out that the employee will be based on the quality of the exchange with colleagues to adjust their attitude and behavior, further. Xiao's (2019) study of knowledge workers found that knowledge staff observation, assessment and forward-looking behavior have increased, so as to promote their own proactive behavior. Xu et al. (2012) confirmed that LMX has a positive effect on creative self-efficacy, and that creative self-efficacy plays a part of mediating role between LMX and employees' creativity.

Based on the above discussion, the high-quality vertical and horizontal social exchange relationships emphasize that in the individual's interaction with leaders and colleagues, from whom the individual receives positive emotional and material rewards, the person will be motivated to repay the leader and the team based on the Reciprocity Principle of Social Exchange Theory. Based on the Social Cognitive Theory, the process of cognition is an important factor in the motivation of individual behaviors. Self-efficacy, as a kind of influential resource of psychological cognition, can influence the process by which an individual completes a task from various aspects, including choice of task, effort, persistence, and emotional state. The individual with high self-efficacy will invest more resources in work. Therefore, this study presents the following hypothesis:

*H4a: Self-efficacy plays a mediating role in the positive relationship between LMX and work engagement.*

*H4b: Self-efficacy plays a mediating role in the positive relationship between TMX and work engagement.*

### 2.8.3 The moderating role of interactional justice differentiation

#### 2.8.3.1 Moderation of IJD on LMX—self-efficacy

According to the above discussion, LMX has a positive impact on individuals' self-efficacy. Individuals with high quality LMX also have a higher sense of self-efficacy. But could this positive relationship be influenced by other factors? Under what conditions is this positive relationship stronger? Under what conditions will this positive relationship be weakened?

According to social cognitive theory of ternary interaction, the external environment affects the individual cognition on the function of individual behavior. Interactional justice reflected in the implementation of decisions, leading to a sincere attitude to communicate with employees. The leader expresses genuine concern for employees, shows respect for employees, considers all aspects of employees' feelings, and shows respect for the subordinates. All of these create a supportive work environment.

At present, no direct studies could be found on the regulating role of interactional justice differentiation between LMX and self-efficacy, but relational assumptions can be derived from relevant studies. As mentioned above, from the perspective of social comparisons based on social cognition theory, employees will compare themselves with others (Bandura, 1997; Gist & Mitchell, 1992) while this social comparison is an almost inevitable element in social interaction (Brickman & Bulman, 1977), the comparison results in the perception of fairness or unfairness.

The research on organizational equity originates from Adam's (1965) equity theory, which has identified three types of equity: distributive equity, procedural equity and interactive equity. From the point of view of (Bies & Moag, 1986), interactional justice refers to individuals' concern about "the quality of interpersonal treatment they received during the formulation of organizational procedures". Different from distributive justice and procedural justice, interactive justice covers the whole scope of daily social interaction (Mikula et al., 2010) and is conceptualized as a kind of encounter based perception (Bies, 2005). Therefore, interactional justice seems more suitable for relationship research.

Interactional Justice Differentiation (IJD) refers to the difference in the degree of dignity, respect and honesty with which leaders treat employees. If the leader takes the initiative to communicate with employees, gives them work appreciation and expresses emotional care, employees will feel that they are taken care of and paid attention to by the leader (Zhou, 2003), so they will be more confident to handle their work well.

Bies and Moag (1986) believe that interpersonal fairness and information fairness with

interactional justice could strongly predict the attitude and behavior of members. When members feel interpersonal fairness and information fairness, they will increase their investment in the organization and produce higher work performance. Masterson et al. (2000) proposed that interactional justice would affect the individual's attitude towards authority, namely, towards the immediate leader. If the supervisor treats the member in a fair way, the member will be rewarded with higher work performance, thus improving the member's work performance.

Just as the rationality principle says (Meeker, 1971), employees will only engage in positive interactions when they believe that the trust and respect of leaders are real and that their trust will not be betrayed in the future. However, after witnessing other teammates being treated unfairly, team members are highly uncertain about how they will be treated in the future. In this case, employees will doubt the encouragement of leaders and despise the role of social persuasion.

At the same time, they are unsure whether the resources and support given by the leader will be withdrawn and will experience negative emotions. Moreover, due to different social classes, employees often have nervous psychology when communicating with leaders. This can reduce their sense of self-efficacy. In this way, the link between LMX quality and self-efficacy is weakened. Therefore, the following hypothesis is proposed in this study:

*H5a: IJD plays a negative moderating role in the positive relationship between LMX and self-efficacy, that is, the higher the level of IJD, the weaker the positive effect of LMX on self-efficacy will be.*

#### 2.8.3.2 Moderation of IJD on TMX—self-efficacy

At present, to our best knowledge there are no articles that have directly studied the moderating effect of interactional justice difference between TMX and self-efficacy. As mentioned above, in high-quality TMX relationships, individuals are more likely to have intimate feelings towards colleagues in their own team. Individuals tend to treat colleagues with the eyes of appreciation and learning and are good at finding bright spots from colleagues. Employees are also more likely to have a psychological sense of identity and affinity with their colleagues, believing that they are similar to their colleagues. Moreover, as with the similarity of teamwork tasks and requirements, high TMX individuals are more willing to share their own learning such as skills, experience or lessons with others.

As mentioned above, similarity is the prerequisite for choosing a social model to learn and acquire alternative experiences from. When the level of interactional justice differentiation is

high, employees tend to attribute the success of teammates to the leader's preference for resources. Once there is a sense of injustice, employees will be less willing to choose teammates to learn as social models, and despite their higher TMX level with teammates, the role of alternative experiences will also be reduced. The perception of injustice can lead to negative emotions such as anger and jealousy, leading to emotional experiences of disgust. As a result, the association between TMX quality and self-efficacy may weaken.

In conclusion, the difference in interactional justice conveys differentiated information of communication and respect between leaders and employees to individuals. When the difference in interactional justice perceived by employees is large, individuals will generate negative emotions in their interaction with colleagues. This will negatively affect the positive relationship between TMX and self-efficacy. Therefore, the following hypothesis is proposed:

*H5b: IJD plays a negative moderating role in the positive relationship between TMX and self-efficacy, that is, the higher the level of IJDs, the weaker the positive effect of TMX on self-efficacy will be.*

By combining social cognitive theory and social exchange theory, this study puts forward an individual powerful psychological cognitive factors—self-efficacy. Self-efficacy would mediate the relationship between high-quality LMX TMX and work involvement since even for mutual benefit, as insiders, individuals enjoy the attention and resources from the top management.

As well as in high TMX relationship they get emotional support and the actual help from their colleagues. The will is keen to balance giving and receiving of both sides, so they will work hard, as a reward to the leader and the team through the high level of work involvement. However, if the individual lacks the confidence and faith rooted in his/her heart to devote himself/herself to the work, the intention of reward will be difficult to be put into action. Only when individuals think they have the resources and ability to devote themselves to the work, can the principle of reciprocity be implemented.

Then, this study proposes that in the two chains of LMX-self-efficacy and TMX-self-efficacy, the interactional justice differentiation plays a moderating role. Combined with the previous discussion on mediating effect, this study speculates that interactional justice differentiation will not only moderate the direct chain of social exchange relationship - self-efficacy - but also moderate the indirect chain of social exchange relationship - self-efficacy - work engagement. Therefore, the following hypotheses are proposed in this study:

*H6a: IJD plays a negative moderating role in the indirect effect of LMX—Self-efficacy—Work Engagement, that is, the higher the level of IJD, the weaker the positive effect of LMX on*

*work engagement through self-efficacy will be.*

*H6b: IJD plays a negative moderating role in the indirect effect of TMX—Self-efficacy—Work Engagement, that is, the higher the level of IJD, the weaker the positive effect of TMX on work engagement through self-efficacy will be.*

Table 2.1 Research hypotheses

| Effect | Hypotheses |
|---|---|
| Main Effect | H1a: LMX has a positive effect on the level of work engagement, that is, the higher the quality of LMX is, the higher the level of individuals' work engagement will be.<br>H1b: TMX has a positive effect on the level of work engagement, that is, the higher the quality of TMX is, the higher the level of individuals' work engagement will be. |
| Mediation | H2a: LMX has a positive effect on the level of self-efficacy, that is, the higher the quality of LMX is, the higher the level of individuals' self-efficacy will be.<br>H2b: TMX has a positive effect on the level of self-efficacy, that is, the higher the quality of TMX is, the higher the level of individuals' self-efficacy will be.<br>H3: Self-efficacy has a positive effect on work engagement, that is, the higher the level of self-efficacy is, the higher the level of individuals' work engagement will be.<br>H4a: Self-efficacy plays a mediating role in the positive relationship between LMX and work engagement.<br>H4b: Self-efficacy plays a mediating role in the positive relationship between TMX and work engagement. |
| Moderation | H5a: IJD plays a negative moderating role in the positive relationship between LMX and self-efficacy, that is, the higher the level of IJD is, the weaker the positive effect of LMX on self-efficacy will be.<br>H5b: IJD plays a negative moderating role in the positive relationship between TMX and self-efficacy, that is, the higher the level of IJD is, the weaker the positive effect of TMX on self-efficacy will be.<br>H6a: IJD plays a negative moderating role in the indirect effect of LMX—Self-efficacy—Work Engagement, that is, the higher the level of IJD is, the weaker the positive effect of LMX on work engagement through self-efficacy will be.<br>H6b: IJD plays a negative moderating role in the indirect effect of TMX—Self-efficacy—Work Engagement, that is, the higher the level of IJD is, the weaker the positive effect of TMX on work engagement through self-efficacy will be. |

As shown in Table 2.1, we can see that there are totally 11 hypotheses in the study including two hypotheses about the main effect of social exchange relationship on work engagement, five hypotheses about the mediation effect of self-efficacy, two hypotheses about the moderation effect of interactional justice differentiation on the social exchange relationship – self-efficacy and two hypotheses about the moderated mediation. The following chapters are about the research design and data analysis to test these hypotheses. The hypothetical model is shown in Figure 2.3.

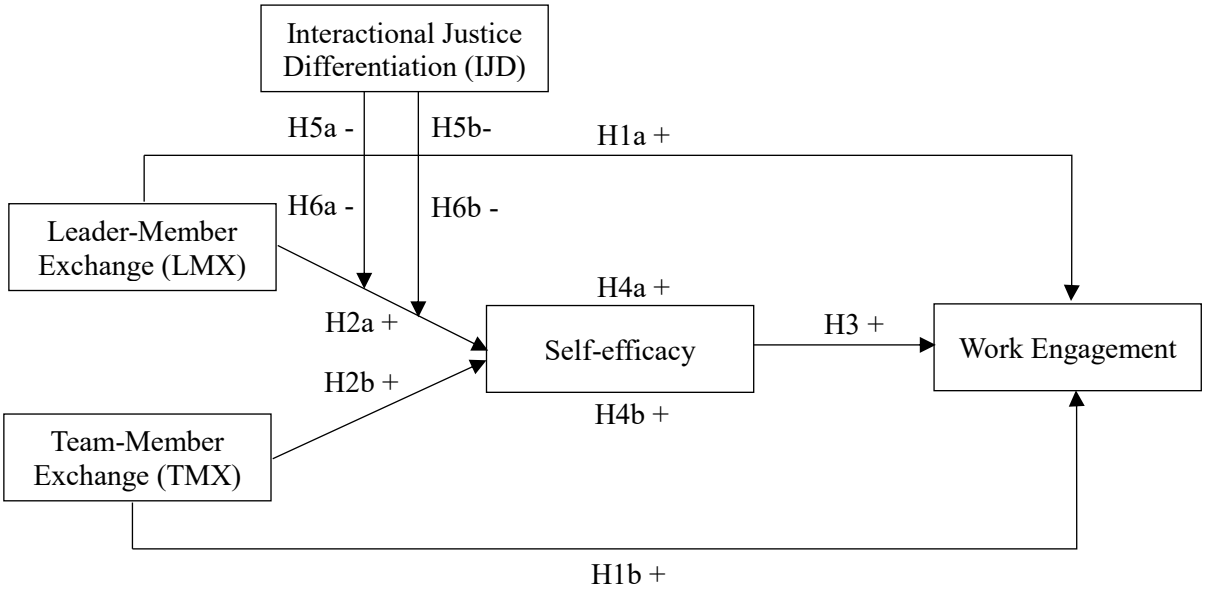


Figure 2.3 Hypotheses model

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# Chapter 3: Research Design

## 3.1 Sample

The macro background of this thesis is the medical reform in China. Within it, we focus on the question how a private hospital can gain continuous competitiveness while facing the fierce competition from other private and even public hospitals. As we have introduced in chapter one, with the encouragement and help of the government, the number of Chinese private hospitals has increased sharply overnight. However, compared with public hospitals that have a long history in China, private ones have inherent disadvantages, either from the perspective of market and patient confidence, or from the perspective of facilities and capital. These disadvantages lead to a problem whereby it is difficult for Chinese private hospitals to keep and motivate high-quality medical staff, which will put them in a poorer position. This is a vicious circle and pushes Chinese private hospitals to make a change. This thesis puts forward the idea that private hospitals can improve medical staff's daily work quality, that is, work engagement, as a way to increase their competitiveness and that the soft work environment, that is, social exchange relationships with direct supervisors and other colleagues in the same medical team is the main antecedent to improve doctors' and nurses' work engagement. These two main effects function with the mediating role of self-efficacy and are moderated by interactional justice differentiation. To test the research model, we choose a quantitative method through a survey conducted in a typical private hospital in an inland city in China.

The case hospital in this study is designated S Hospital for identity protection as required. S Hospital is affiliated to X Medical University which was established in 1936. Now it has developed into a group medical institution including the hospital headquarters, urban outpatient department and two branches. It is a Grade III Level B hospital with a large scale in northern Jiangsu province. In the competitiveness ranking of Chinese hospitals released by Hong Kong Alliby Hospital Management Research Center, it ranks 45th among the top 100 county-level hospitals in China and 13th among the top 100 non-public hospitals in China.

From January to July 2021, the total revenue of the hospital reached 418 million yuan (grossly equivalent to 59 million euro), including outpatient and emergency revenue of 105 million yuan and hospitalization revenue of 309 million yuan.

From January to July of 2021, the number of outpatient emergency visits was 282,600, including 252,400 outpatient visits, 28,600 expert outpatient visits and 223,800 general outpatient visits.

Figure 3.1 The hospital image

The hospital is a national health management base at county level and the first county hospital that got the approval of ISO15189 standards in Jiangsu Province. The hospital is a unit of five international colleges of endoscopic evaluation including digestive endoscopy, arthroscopy, respiratory endoscopy, gynecology endoscopy and anesthesia endoscopy. It is one of the first county-level medical institutions with the qualification of “test-tube baby” technology and one of the only two county-level Wu Jieping urology centers in China. S hospital has set up nine expert studios, including professor Zhang Yangde's workstation, academician of The Ukrainian National Academy of Medical Sciences, Professor Guo Hui's (team) studio and the Neurosurgery Department of Shanghai Deji Hospital. With the development of the society, science and technology, the hospital has opened an Internet hospital to provide online consultation, online diagnosis and treatment, prescription renewal and other services.

S hospital has 1317 employees, including 1136 health technicians, 160 staff with senior professional title, 337 staff with intermediate professional title, 107 doctors and masters, four master supervisors, 10 lecturers of X Medical University, one young and middle-aged expert with outstanding contributions in Jiangsu Province, and seven recipients of “333” high-level talents training in Jiangsu Province. In addition, 16 employees have been honored “one

thousand top talents" training subjects in the city where S hospital is located.

The hospital has a building area of 155,000 square meters and it is designed according to the standards of a class III hospital and an affiliated hospital of a medical university. It has 26 wards, 32 clinical departments, 10 medical technology departments, and 1600 beds. The Department of Neurology is the key clinical specialty of Jiangsu Province while the four departments of General surgery, Orthopedics, Neurology and Laboratory are the key disciplines and key specialties of S city. Twelve departments, including respiratory medicine, cardiology, obstetrics and gynecology, gastroenterology, anesthesiology, ultrasound, radiology, critical care medicine, pediatrics and oncology are the key clinical specialty construction units in S City. Two departments – neurosurgery and infection – are the key clinical specialty construction units in S City. It has five diagnosis and treatment centers, including chest pain center, stroke center, trauma emergency center, maternal and newborn critical care center, and reproductive medicine center.

The hospital always takes development as the top priority and carries forward the spirit of "combining morality and skill and serving the people for public benefit". It adheres to the mission of "being committed to improving people's healthy lifestyle and being the guardian of people's health" and is striving to build a standardized, scientific, and professional comprehensive modern hospital group integrating medical treatment, teaching, research, rehabilitation, first aid and health care, and to become a hospital with employees' happiness, people's satisfaction, peer recognition and government trust.

The hospital holds many activities, such as the Dragon Boat Festival cooking contest, Mid-Autumn Festival singing competition, National Day flag-raising ceremony, Lantern Festival flash show and other themed activities. These activities are intended for every employee to become a participant in the construction of a "home" culture. Organizing and carrying out sports activities such as league building activities, "Olympic Champion calls you to sport" themed activities, old photos, and old stories exhibition on the 15th anniversary of medical reform, cultural festivals, and special forum on the cultural development of the hospital, annual work appreciation meeting and other cultural and sports activities to give workers a stage to show their talents and enhance their sense of honor.

As the only designated medical institution for the treatment of infectious diseases and COVID-19 in the county, the hospital quickly deployed its staff when COVID-19 hit, established a leading group for epidemic prevention and control as well as a temporary branch for epidemic prevention and control. It also took the lead in conducting nucleic acid testing in county-level hospitals.

A vast number of leading cadres took the lead in setting an example and stepped forward to sign the petition of "Go all out, regardless of life or death, regardless of the reward". In the first half of 2021, a total of 15,716 patients were treated in the fever outpatient department of the Department of Infection and 16 isolated patients were treated in the isolation ward. By then, the hospital had completed novel coronavirus nucleic acid testing of 69,755 tested specimens, effectively ensuring the health and safety of over 2 million people in S city.


Figure 3.2 Doctors support COVID-19 prevention and control

On July 29, 2021, the hospital dispatched 30 medical personnel to Nanjing (some pictured in Figure 3.2), to form a temporary branch, and successfully completed the nucleic acid sampling task of 204,468 people. In December 2020, the hospital was awarded the honorary title of "Advanced Collective against COVID-19 in the province", which is the only non-public medical institution in the province to be awarded such distinction.

Currently S Hospital is a very powerful hospital. It has won many honors, such as the "2020 Model Hospital for Improving Medical Services" awarded by the Medical Administration Bureau of the National Health Commission, the "2020 Advanced Unit for Medical Security System" awarded by the county level, the "Advanced Unit for Maternal and Child Safety" awarded by the city level, "Caring Enterprise" awarded by the city level, and "Advanced Unit for Fighting COVID-19" awarded by the provincial level, and county-level "2019 Advanced Unit of Medical Security System". It has passed the national Connectivity Standardized Maturity Level 4 grade A assessment. In addition, the Department of Laboratory Quality

Assessment has been awarded 29 professional certificates covering 146 items in total. Fever clinic was confirmed as the first batch of demonstration fever clinics in Jiangsu province, which was the only one in S city among 47 demonstration fever clinics in Jiangsu Province.

S Hospital is the most influential private hospital in S City and is part of the first batch of hospitals to be restructured in the city under the background of Chinese medical reform. After 16 years of privatized operation, its professional operation has expanded rapidly, and five major professional centers have been established successively. At present, S Hospital has developed into the only non-public hospital in the top 100 county-level hospitals in China, ranking 45th among the top 100 non-public hospitals in China. However, as China vigorously implements new medical reforms that encourage private hospitals with private capital, more private hospitals have sprung up in S City, which has created huge competitive pressure on S Hospital.

At the same time, leveraging on national policies and resources granted to public hospitals, the municipal government where S Hospital is located, has funded, and constructed the first people's hospital with a total investment of 2.1 billion yuan and 2,000 medical staff, covering an area of 300 Mu (about 200,000 m2), which was officially opened in July 2016 (Suqian First Hospital). Therefore, S Hospital faces not only fierce competition from many local private hospitals, but also a huge challenge posed by this local public hospital. In this context, how to improve the work engagement of medical staff in private hospitals, of which S Hospital is an exemplary case, so as to enhance their competitive advantage, is an urgent issue and the main question researched in this thesis. To answer this question, doctors and nurses in S Hospital have been selected as the respondents.

## 3.2 Method and questionnaire design

This thesis adopts the method of combining theoretical with empirical research using quantitative methods. Besides of making a comprehensive use of literature analysis, it uses questionnaire survey, statistical analysis, and other methods.

Through theoretical research and thorough literature analysis, hypotheses have been derived and subsequently tested. Empirical research is mainly responsible for verifying research hypotheses and providing data support for the research conclusions.

The combination of literature review and quantitative research allows to demonstrate the specific mechanism of leadership member exchange on job engagement more comprehensively allowing us to have a better understanding of the research problem. In fact, in the real management research, most of the two are used simultaneously. Researchers use the literature

to assist them to define problems or find ways to deal with them and to formulate hypotheses or determine the variables to be included in the research when looking for ways to deal with problems. Literature is also used to interpret the results obtained through quantitative analysis. When considering a new research project, quantitative research is often preceded by appropriate literature review. In this study, literature review was adopted to propose research variables and hypotheses, and quantitative research was adopted to test the correctness of hypotheses by collecting questionnaires and conducting statistical analysis. Therefore, the object of literature review mainly involves the descriptive text data of various variables such as leader-member exchange, team-member exchange and work engagement, while the quantitative research is represented by the data collected from the questionnaires on the above-mentioned variables.

As mentioned above, we adopt the method of conducting a survey by handing out a questionnaire. As a scientific empirical research method for collecting information, the questionnaire method can not only help researchers understand and describe the attitudes and behaviors of certain groups, but also help researchers provide sample data support for inferences about the relationship between variables. In the past decades of development, numerous scholars in psychology, sociology and management have repeatedly demonstrated and developed a large number of research scales with high reliability and high validity. These scales are valuable tools for questionnaires and have played an important role in promoting the development of academia in various fields. Compared with other data collection methods, the questionnaire survey is widely welcomed by scholars because of its four advantages. First, questionnaire surveys give researchers a lot of space to design questionnaires according to their research questions and research purposes, so that researchers can obtain targeted first-hand data; secondly, scientific questionnaire design and investigation process can help researchers more quickly and effectively collect data; thirdly, the feasibility of questionnaire survey is higher, it interferes with the respondents to a lesser degree than other data collection methods, and it is easier to obtain the support of the surveyed organizations and personnel; finally, the method of questionnaire survey is more economical and the cost of collecting data is small.

In our theoretical model, the independent variables LMX and TMX, the mediator variable self-efficacy, the moderator variable interactional justice differentiation, and the dependent variable work engagement are all variables that measure personal feelings. The questionnaire covers several standard and relevant questions about the target variables for respondents to answer. These questions have been verified and tested in many other research, supporting their reliability and validity. Also, the questionnaire design adopts a Likert scale so that respondents could choose the closest answer according to their actual situation. Compared with the method

of interview, questionnaire survey can collect data from a larger sample. It also uses first-hand data which can reveal a more authentic and updated information about the respondents.

In order to maximize the advantages of the questionnaire survey method and effectively answer our research questions, researchers need to be extra cautious and strictly control every detail from questionnaire design to data collection to data analysis. Quantitatively provides a higher quality research paradigm. For the survey method, the questionnaire is the most important tool, so we paid much attention to its design. In designing the questionnaire, the basic factors considered in this thesis mainly include: the content of the question, the type of the question, the expression of the question, the order of the questionnaire and the layout of the questionnaire.

The content of the question refers to the specific aspects of the content, mainly considering the following aspects. At first, is this problem relevant? In the questionnaire design process, the most critical factor is the correlation factor, that is, the content of the questionnaire should be actually related to the research purpose, and each question can provide specific information related to the research topic and research variables. Secondly, is the problem sensitive and threatening, thus causing “Social-Desirability Bias”? In the questionnaire survey, if researchers ask sensitive questions or questions that people avoid, it is often difficult to get real and objective answers. Either the other party refuses to answer, or the other party gives normative answers in line with the mainstream values of the society. This leads to what is known as the “Social-Desirability Bias”. Therefore, this kind of problem should be avoided as far as possible or use other ways to obtain specific real information.

In the process of questionnaire design, the basic types of common questions mainly include open-ended, multiple choice (selecting one from multiple options) and dichotomous. The questionnaire in this thesis mainly adopts multiple choice method.

The questions expression in a questionnaire should be clear and understandable, and avoid ambiguity. Questionnaires usually use classical scales especially imported from abroad and many technical and translated words are often ambiguous. Therefore, it is necessary to clarify many technical terms and make the language understandable and accurate. In addition, respondents may not be familiar with management jargon. Thus, technical terms whose meaning can only be understood by trained people should be avoided as far as possible in the questionnaire design. Two-in-one problems should also be eliminated. A two-in-one problem is a situation where there are two subproblems in one problem, that is, there are actually two questions and only one answer. In the question design of the questionnaire, this kind of situation should be avoided absolutely, otherwise, the subject cannot answer the question properly.

Another element to consider in the questionnaire design is the difference in the frame of reference between the researcher and the respondent which can lead to "irrelevant" responses. Therefore, the overall research framework should be explained accordingly.

As for the design of the questionnaire, the main purpose is to obtain effective information. In the early stage of the questionnaire design, we carried out a series of preparatory activities, conducted interviews with the supervisors and subordinates of each department in S Hospital for many times, and selected five representative departments, using in-depth interviews and focus group interviews. A case study was done on it. We mainly summarize the current situation of employees' work engagement and the influencing factors that affect their work engagement, and focus on the relationship between subordinates, leaders and colleagues, and the personal psychological feelings and self-efficacy brought about by these relationships as well as interactional justice differentiation. In order to obtain a preliminary description of the more appropriate correlation with the relevant key variables in this paper. We have sorted out the first-hand interview data and case study data, and plan to focus on these data in the follow-up questionnaire design as the basis for questionnaire development.

What's more, the design of the key questions must ensure that the answers can be clearly understood. In this research the following principles have been considered: the questionnaire was preceded by a preface with a brief description of who is doing the research, for which purpose, how much time it would take to complete the questionnaire, and how the respondents are expected to cooperate. Respondents were ensured that anonymity would be preserved.

Based on the above considerations, the specific design of the questionnaire survey was conducted. Firstly, to ensure good content validity, when we chose the measurement tools of variables in this thesis, there are two principles that have been followed: one is that the scales selected are drawn from research published in internationally recognized journals in the fields of management and organizational behavior and the other is that the selected scales have passed the reliability and validity tests in that research. Secondly, as the scales we selected to measure LMX, TMX, interactional justice differentiation, self-efficacy, and work engagement according to the principles above are from research conducted in English, in order to fit the Chinese context, they were subject to the procedures of translation and back-translation to Chinese and English respectively. For this purpose, we first invited two professors in the management field to translate them independently; then we invited other two professors in the management field to translate the Chinese versions back to English independently. With the two English versions reverse translated, we compared them with the original English versions, and inconsistencies in the translation were discussed and corrected. After discussion and correction, we obtained a

preliminary questionnaire in the Chinese version. Before the questionnaire was finally confirmed and used, the preliminary Chinese version was sent by email to five postgraduates with a non-management professional background and five in-service nurses at S Hospital. The rhetoric, semantics and expression of the questionnaire were adjusted according to the feedback from the ten respondents. After that, the survey questionnaire for the research was finally determined.

Out of the consideration of enhancing the reliability and validity of the questionnaire, the thesis still adopts several supplementary measures. Because the measurement of the five variables involved in this thesis is all conducted in the form of employee self-report, but self-assessment may lead to common method variance this research adopts a combination of pre-control and post-test to weaken the potential adverse effects. Regarding the preliminary control, the questionnaires were collected anonymously, and the respondents were continuously told that the responses would be used only for research purposes in the management field, that the principle of “anonymity” and “confidentiality” would be followed and that there was no right or wrong answer for all questions, so as to encourage employees to truly give feedback on their own situation. Regarding the post-test, this research uses Harman single factor test to examine whether the common method variance is within the acceptable range, the result of which will be introduced in the next chapter.

## 3.3 Data collection

In our survey, paper questionnaires were distributed on-site to ensure that they were filled out by the target respondents. By communicating with the human resources department and the hospital office of S Hospital in advance, clearly express the research purpose and needs, and request the hospital's support and help. With the support of the hospital, the two-stage questionnaire survey was conducted in the hospital conference hall provided by S Hospital. By organizing medical staff in different departments to fill in paper questionnaires in batches according to the duty time, the two-stage survey can be carried out with high efficiency and high coverage are done. Before the first round of on-site survey questionnaires, we invited a well-known professor from the department of Human Resources of Nanjing University to give an interesting lecture on management practice issues that hospital managers and medical staff are usually concerned about. The conference hall of the hospital was full, attracting a large number of hospital managers and medical staff to come to study. After the lecture, we explained the purpose and significance of this survey to the medical staff. The questionnaire

survey starts from understanding the physical and mental health of medical staff to improve their well-being, so as to dispel the respondents' concerns about filling out the questionnaire and encourage them to answer truthfully according to their own circumstances. In addition, we explained to the respondents that this survey questionnaire is only for academic research and not for other purposes, and repeatedly emphasized the confidentiality of their personal information and questionnaire responses. Further, we provide guidance on how respondents should fill in the answers and other details. We organized the medical staff of the hospital to fill in the first wave of survey questionnaires after the lecture. This wave mainly collects the personal information of the respondents (including gender, age, education level, tenure in S hospital, marital status and other demographic characteristics), the independent variables LMX and TMX, and the moderator variable interactional justice differentiation. Due to the nature of the work and duty arrangement of medical staff, the first round of questionnaire survey was divided into two days. The respondents could fill in the questionnaire on-site in the conference hall according to their work breaks. We stayed in the conference hall all the time to answer the questions encountered by the respondents during the answering process. In order to ensure the validity and accuracy of the questionnaire collection, we collected the questionnaire on the spot and recorded the answers of the paper questionnaire in time to better preserve the research results and conduct data analysis.

One month later, we carried out the second wave of questionnaire survey, and decided to adopt the method of the first round of survey, allowing medical staff to fill in the questionnaire on-site in the conference hall according to their on-duty situation. Before the survey, we contacted the human resource management department of S Hospital and relevant persons in charge of the hospital office again, and entrusted them to explain the purpose and significance of the second round of questionnaire survey as well as the survey method and time in the WeChat work group. The second round of questionnaire survey mainly collected the data of mediating variable self-efficacy and dependent variable job engagement. The second round of questionnaires was also divided into two days. Since the first day was Monday, the work arrangements of medical staff were very full, and many departments reported that there were many surgeries to be carried out, so they couldn’t take time out to answer the questions. Therefore, there were not many people who came to the conference hall to answer the questionnaire on the first day. Most of them were hospital administrators and logisticians. For this reason, considering the situation that the medical staff could not come to the site to fill in the questionnaire due to being on duty, we communicated and negotiated with the person in charge of the hospital office in a timely manner, and entrusted him to inform the medical staff

in the WeChat work group that the questionnaires can be brought by each department according to the number of employees. Go back so that he can use the work break to complete the questionnaire. Consistent with the first round of questionnaire survey, we have been staying in the conference hall to pay attention to the completion of the questionnaire and the recovery of the questionnaire, and to answer the questions of the respondents. After collecting the questionnaire, we timely input the answers of the paper questionnaire.

504 questionnaires were distributed in each of the two waves. After the two-wave questionnaires were collected, we matched the two-stage questionnaires according to the respondent's work ID number or name and other identifiers, and sorted, screened and cleaned the data results. Through data sorting, the questionnaires that cannot be matched in the two stages, the questionnaires with missing personal information and key variables, the questionnaires with obvious answering rules, and the questionnaires with a high repetition rate of the choice answers are screened and excluded (for example, the same option is selected for the same page of questions). ), a total of 370 valid questionnaires were obtained, and the effective rate of questionnaire recovery was about 73.41%. Table 3.1 below shows the basic information of the sample regarding demographic characteristics.

Table 3.1 Sample distribution (N = 370)

| Variable | Group | Counts | Proportion (%) |
|---|---|---|---|
| Gender | Male | 44 | 11.9 |
| | Female | 326 | 88.1 |
| Age | 25 years old and below | 61 | 16.5 |
| | 26-35 years old | 208 | 56.2 |
| | 36-45 years old | 64 | 17.3 |
| | 46 years old and above | 37 | 10.0 |
| Education | Vocational secondary school and below | 17 | 4.6 |
| | Junior college | 155 | 41.9 |
| | Bachelor degree | 181 | 48.9 |
| | Master degree and above | 17 | 4.6 |
| Tenure in S hospital | Within 3 years | 61 | 16.5 |
| | 3-8 years | 155 | 41.9 |
| | 8-13 years | 102 | 27.5 |
| | 13 years and above | 52 | 14.1 |
| Marriage status | Divorced | 4 | 1.1 |
| | Unmarried | 98 | 26.5 |
| | Married | 268 | 72.4 |

According to table 3.1, we can see that among the 370 respondents, 326 are female and only 44 are male. This is because in S Hospital, there are many more nurses than doctors, and most of the nurses are female. As for age, over half of the respondents are between 26 and 35, accounting for 56.2% of the whole sample. From the perspective of the highest education background, 41.9% of them are graduated from junior colleges, and half of them (48.9%) have

a bachelor's degree diploma. For a professional hospital serving many medical fields, there is still the need for improvement in what concerns education background, especially when the medical team faces more complex diseases as it happens nowadays. Many doctors in public hospitals have a doctor or post-doctor degree, which consists in a large competitive advantage.

When considering doctors' and nurses' tenure in S Hospital, it can be seen that 41.9% have been working in the hospital for more than 3 but less than 8 years, and 27.5% have stayed in the hospital for more than 8 years but less than 13 years. In turn, 14.1% of the sample has been working for the hospital for more than 13 years. These figures all point to a certain degree of medical staff's loyalty to the hospital. However, how to continuously inspire and motivate these employees remains an important question. Finally, 72.4% of the respondents are married, showing that most of the medical staff in the surveyed hospital are in a mature and stable life stage.

## 3.4 Measurement

As introduced above, the tools we use to measure our variables are all from mature scales from international management journals and have experienced the processes of translation and back-translation.

### 3.4.1 Measurement of LMX quality

LMX quality is one of the independent variables of this research. This thesis used the LMX-7 scale developed by Graen and Uhl-Bien (1995) to measure the LMX quality of medical staff in the case hospital. The scale includes 7 items. Items include "I usually know how satisfied my leaders are with what I do ", "Regardless of how much formal authority my leader has built into his or her position, my leader may use his or her power to help me solve problems in my work", "Regardless of how much formal authority my leader has built into his or her position, he or she may be willing to help me at his or her expense". The specific items are shown in table 3.2 in both English and Chinese. The Likert 5-point scoring method is adopted ranging from 1 = strongly disagree to 5 = strongly agree.

Table 3.2 Measurement of LMX quality

| No. | Leader-member exchange (TMX) quality<br>Content |
|---|---|
| 1 | I usually know how satisfied my leaders are with what I do.<br>我常常很清楚我的直接领导对我的工作有多满意。 |
| 2 | My leader understands the problems and needs of my job. |

| No. | Leader-member exchange (TMX) quality<br>Content |
|---|---|
| | 我的直接领导很了解我在工作中遇到的问题和需求。 |
| 3 | My leader recognizes my potential.<br>我的直接领导很认同我的潜力。 |
| 4 | Regardless of how much formal authority my leader has built into his or her position, my leader may use his or her power to help me solve problems in my work.<br>不管我直接领导手中的职务权力是大是小，我认为他（她）会使用手中的权力来帮我解决工作中的问题。 |
| 5 | Regardless of how much formal authority my leader has built into his or her position, he or she may be willing to help me at his or her expense.<br>不管我直接领导手中的职务权力是大是小，我认为他（她）会愿意为了帮助我而做出自我牺牲。 |
| 6 | I have enough confidence in my leader that I am willing to defend his or her decision even if he or she is not present.<br>我对我的直接领导有足够的信心，以至于即使他（她）不在场，我也愿意捍卫和辩护他（她）的决定。 |
| 7 | I maintain an efficient working relationship with my leader.<br>我认为我和我的直接领导保持着高效的工作关系。 |

Source: Graen & Uhl-Bien (1995)

### 3.4.2 Measurement of TMX quality

TMX quality is the other independent variable of the thesis. The measurement of TMX is based on the scale developed by Seers et al. (1995). Their original scale has 10 items in total, divided into two aspects, namely respondents' contributions to the team and returns gained from the team. This is to say that Seers et al. measure an employee's social exchange relationship with other members in the same team from two aspects. They not only ask about what does an employee bring to his or her team, but also measure what they can receive from their team member. Therefore, we have totally 10 items to measure TMX quality, and they still belong to two perspectives. The specific items are shown in table 33. The Likert 5-point scoring method is used, ranging from 1 =very disagree to 5 = strongly agree.

Table 3.3 Measurement of TMX quality

| No. | Team-member exchange (TMX) quality<br>Content |
|---|---|
| 1 | I frequently make suggestions about work methods to colleagues in the team.<br>我频繁地向所在科室的同事推荐更好的工作方法。 |
| 2 | The colleagues in the team often tell me that I make their work easy or simple.<br>科室内的同事经常告诉我，我让他们的工作变得容易或简单。 |
| 3 | I often tell my colleagues in the team that they make my job easy or simple.<br>我经常告诉科室内的同事，他们使我的工作变得容易或简单。 |
| 4 | My colleagues in the team recognize my potential.<br>科室内的同事认可我的潜力。 |
| 5 | The colleagues in the team understand my problems and needs in work.<br>科室内的同事理解我工作中的问题与需求。 |

| No. | Team-member exchange (TMX) quality<br>Content |
|---|---|
| 6 | In order to help colleagues who are too busy in the team, I am flexible to switch job tasks with them.<br>为了帮助科室内忙不过来的同事，我会变通而灵活地与他们交换工作任务。 |
| 7 | When there is too much work to do, colleagues in the team will ask for my help.<br>当工作繁忙时，科室内的同事会主动请求我的帮助。 |
| 8 | When there is too much work to do, I will reach out to colleagues in the team.<br>当工作繁忙时，我会主动向科室内的同事伸出援手。 |
| 9 | I am willing to help colleagues in the teams to complete their tasks.<br>我愿意帮助科室内的同事完成他们分内的工作。 |
| 10 | The colleagues in the team are willing to help me complete my own work.<br>科室内的同事愿意帮助我完成我自己分内的工作。 |

Source: Seers et al. (1995)

### 3.4.3 Measurement of self-efficacy

Self-efficacy is the mediator variable in the conceptual model of the thesis. In this research, a new self-efficacy scale developed by Chen et al. (2001) is used to measure the self-efficacy of medical staff. There are 8 items. Items include “I firmly believe that I can accomplish Difficult Tasks”, “I am confident that I can perform many different tasks effectively”. The specific items are shown in table 3.4. The Likert 5-point scoring method is used, ranging from 1 = strongly disagree to 5 = strongly agree.

Table 3.4 Measurement of self-efficacy

| No. | Self-efficacy<br>Content |
|---|---|
| 1 | I can achieve most of the goals I set.<br>我将能实现我为自己设下的大多数目标。 |
| 2 | I firmly believe that I can accomplish difficult tasks.<br>当面对艰难的任务时，我坚信我能完成。 |
| 3 | Overall, I think I can get results that are important to me.<br>基本上，我能获得对我而言非常重要的结果。 |
| 4 | I believe most of my efforts will pay off.<br>我相信我的大多数努力都会取得成功。 |
| 5 | I can successfully overcome multiple challenges.<br>我将能战胜多个挑战。 |
| 6 | I am confident that I can perform many different tasks effectively.<br>我对自己能够有效执行多个不同的任务很有信心。 |
| 7 | I can perform most tasks better than others.<br>与其他人相比，我能较好地完成大多数任务。 |
| 8 | Even in the face of difficulties, I can perform well.<br>甚至是在面临困难的时候，我也能表现卓越。 |

Source: Chen et al. (2001)

### 3.4.4 Measurement of interactional justice differentiation

Interactional justice differentiation is the moderator variable in the model. First, each subject's own perceived justice of the interaction was measured; then, the interactional justice self-reported by each member in a team is divided into the mean value of interactional justice, which is regarded as the interactional justice differentiation of the whole team. In this research interactional justice was measured by the scale developed by Niehoff and Moorman (1993), with a total of 9 items. Examples include “When decisions are made about my job, the general manager treats me with kindness and consideration”, “When decisions are made about my job, the general manager treats me with respect and dignity”. The adjusted specific items are shown in table 3.5. Likert’s 5-point scoring method was used, ranging from 1 = strongly disagree to 5 = strongly agree.

Table 3.5 Measurement of Interactional justice

| | **Interactional justice** |
|---|---|
| **No.** | **Content** |
| 1 | When decisions are made about my job. the general manager treats me with kindness and consideration.<br>当要制定一项与我的工作有关的决策时，我的领导会表现出对我的友好与关心。 |
| 2 | When decisions are made about my job. the general manager treats me with respect and dignity.<br>当要制定一项与我的工作有关的决策时，我的领导会表现出对我的尊重。 |
| 3 | When decisions are made about my job, the general manager is sensitive to my personal needs.<br>当要制定一项与我的工作有关的决策时，我的领导会对我的个人需求表现得很敏感。 |
| 4 | When decisions are made about my job, the general manager deals with me in a truthful manner.<br>当要制定一项与我的工作有关的决策时，我的领导会以一种真诚的方式对待我。 |
| 5 | When decisions are made about my job, the general manager shows concern for my rights as an employee.<br>当要制定一项与我的工作有关的决策时，我的领导会表现出对我作为一名员工拥有的权利的关注。 |
| 6 | Concerning decisions made about my job. the general manager discusses the implications of the decisions with me.<br>当要制定一项与我的工作有关的决策时，我的领导会与我一起讨论这项决策涉及到的一些事情。 |
| 7 | The general manager offers adequate justification for decisions made about my job.<br>当要制定一项与我的工作有关的决策时，我的领导会给出恰当的理由。 |
| 8 | When making decisions about my job. the general manager offers explanations that make sense to me.<br>当要制定一项与我的工作有关的决策时，我的领导会给出我能理解的解释。 |
| 9 | My general manager explains very clearly any decision made about my job.<br>我的领导对任何与我的工作有关的决策的解释都很清楚。 |

Source: Zhou (2003)

### 3.4.5 Measurement of work engagement

Work engagement is the dependent variable in the model. In this research, we mainly set questions to measure medical staff's work engagement according to the 17-items scale developed by Schaufeli and Bakker (2003). We confirm a version of totally 17 items to measure work engagement of doctors and nurses in S Hospital, including six items for vigor, five for dedication and six for absorption. The specific items are shown in table 3.6 below. Likert's 5-point scoring method was used, ranging from 1 = strongly disagree to 5 = strongly agree.

Table 3.6 Measurement of work engagement

| No. | Work Engagement<br>Content |
|---|---|
| 1 | At my work, I feel bursting with energy.<br>工作时，我感到自己精力充沛。 |
| 2 | At my job I feel strong and vigorous.<br>工作时，我感到自己是强有力的。 |
| 3 | When I get up in the morning, I feel like going to work.<br>当我早上起床的时候，我想去工作。 |
| 4 | I can continue working for very long periods at a time.<br>我可以一次持续工作很长时间。 |
| 5 | At my job, I am very resilient, mentally.<br>即使在工作中感到疲惫，我也能很快地恢复过来。 |
| 6 | At my work I always persevere, even when things do not go well.<br>工作中，我总是坚持不懈，即使是进展不顺利的时候。 |
| 7 | I find the work that I do full of meaning and purpose.<br>我觉得我的工作充满意义且目标明确。 |
| 8 | I am enthusiastic about my job.<br>我对自己的工作充满热情。 |
| 9 | I am proud on the work that I do.<br>我为我所做的工作感到自豪。 |
| 10 | To me, my job is challenging.<br>对我而言，我的工作是具有挑战性的。 |
| 11 | Time flies when I am working.<br>当我工作时，我感觉时间过得飞快。 |
| 12 | When I am working, I forget everything else around me.<br>当我工作时，我忘记了身边的一切。 |
| 13 | I feel happy when I am working intensely.<br>当我处于紧张工作的状态时，我感到快乐。 |
| 14 | I am immersed in my work.<br>我沉浸在我的工作中。 |
| 15 | I get carried away when I am working.<br>我工作起来就会变得无法自拔、忘乎所以。 |
| 16 | It is difficult to detach myself from my job.<br>很难使我与我的工作分开。 |
| 17 | My job inspires me.<br>我的工作能够鼓舞我。 |

Source: Schaufeli & Bakker (2003)

### 3.4.6 Control variables

From the point of view of empirical research, the role of the control variables in the regression analysis is very important. In regression analysis, our main aim is to discuss the causal relationship between dependent and independent variables, but there are other factors that may interfere with the independent and dependent variables in a regression analysis model. When choosing control variables, we need to pay attention to the following issues: first, the selection of control variables should be determined around dependent variables; the selection should be determined conditionally or with evidence; finally, the more is not necessarily the better.

To understand more clearly about the relations among the variables LMX, TMX, self-efficacy, interactional justice differentiation, and work engagement, this research controlled five variables regarding individual demographic characteristics that may affect the above variables, including gender (0 = Male, 1 = Female), age (1 = 25 years old and below, 2 = 26-35 years old, 3 = 36-45 years old, 4 = 46 years old and above), highest education background (1= Vocational secondary school and below, 2 = Junior college, 3 = Bachelor degree, 4 = Master degree and above), tenure in S Hospital (1 = Within 3 years, 2 = 3-8 years, 3 = 8-13 years, 4 = 13 years and above), and marital status (1 = Divorced, 2 = Unmarried, 3 = Married).

## 3.5 Overview of data analysis methods

For analyzing the data to verify the research hypotheses, SPSS and PROCESS macro programs were used as well as the following analysis methods.

(1) Descriptive statistical analysis: Descriptive statistics refers to the activities of characterizing data using tabulation and classification, graphs, and computational summary data. Descriptive statistical analysis is to carry out a statistical description of the relevant data of all variables of the survey population, mainly including frequency analysis, central tendency analysis, dispersion analysis, distribution and some basic statistical graphics of the data. In the preprocessing part of the data, outliers can be detected using frequency analysis. The central tendency analysis of the data is used to reflect the general level of the data, and the commonly used indicators are the mean, median and mode. The degree of dispersion analysis of data is mainly used to reflect the degree of difference between data, and the commonly used indicators are variance and standard deviation. Through the description of the independent variables LMX and TMX, the mediator variable self-efficacy, the moderator variable interactional justice differentiation, and the dependent variable work engagement in terms of mean value (average),

standard deviation, minimum value and maximum value, the basic characteristics of the data related to each variable are objectively reflected, and we can know about the basic level of medical staff's LMX, TMX, self-efficacy, interactional justice differentiation and work engagement overall.

(2) Test of common method variance and multicollinearity: Common method variance refers to the artificial covariation between predictor and criterion variables due to the same data sources or raters, the same measurement environment, item context, and item characteristics. Multicollinearity refers to the fact that the explanatory variables in the linear regression model are distorted or difficult to estimate accurately due to the existence of precise correlation or high correlation between the explanatory variables. For testing the common method variance, we mainly use Harman single factor analysis. It is suggested that the analysis results of the research will not be influenced by severe common method variance if the factor analysis finds out more than one factor with the eigenvalue larger than one, and the largest factor does not explain more than half of the total variance explained (Podsakoff & Organ, 1986). As for test of multicollinearity, we mainly check the VIF and tolerance value of regression equation. If the VIF is in the range from zero to ten, or the tolerance value is bigger than 0.1, then we can say the multicollinearity is not a severe problem influencing the result of analysis.

(3) Reliability and validity analysis: Reliability refers to the consistency of the results obtained when the same method is used to repeat the measurement on the same object. Reliability indicators are mostly expressed by correlation coefficients, which can be roughly divided into three categories: stability coefficients (consistency across time), equivalence coefficients (consistency across forms), and internal consistency coefficients (consistency across items). There are four main methods of reliability analysis: test-retest reliability method, replicate reliability method, split-half reliability method, and alpha reliability coefficient method. Validity analysis refers to the analysis of the scale expression to the accuracy of the measurement index. Simply put, it is the validity and accuracy of the questionnaire design, which is used to measure whether the item design is reasonable. Validity can be further divided into content validity, construct validity and criterion validity. Taking Cronbach's α coefficient ($\alpha > 0.7$) (Nunnally, 1978) as the standard, the internal consistency or stability of each scale item in the measurement of LMX, TMX, self-efficacy, interactional justice differentiation and work engagement variables are measured through reliability analysis. We check the data whether meet the requirements.

As for validity, we mainly examine two types of validity, that is content validity and structural validity. For content validity, this research uses mature scales to ensure that they pass

the test; for structural validity, factor analysis was used. To begin the factor analysis, we firstly examine whether the scales are suitable, that is, whether the KMO value meets the standard (> 0.6) and whether the Bartlett spherical test is up to standard ($p < 0.001$) (Kaiser & Rice, 1974). Then we perform confirmatory factor analysis. If all these requirements are satisfied, we can say that the validity of the scales is verified.

(4) Correlation analysis: Correlation analysis refers to the analysis of two or more variable elements with correlation, so as to measure the degree of correlation between two variable factors. There needs to be a certain relationship or probability between the elements of the correlation before the correlation analysis can be carried out. For empirical research, the premise of judging the causal relationship between two variables is that there is a significant correlation between the two variables. Correlation analysis can preliminarily explore the causal relationship between LMX and work involvement, TMX and work involvement, LMX and TMX and self-efficacy, self-efficacy, and work engagement. This research used the Pearson correlation coefficient matrix to determine the correlation between variables and establish a basis for subsequent hypothesis testing.

(5) Hierarchical regression analysis: Hierarchical regression is the comparison of two or more regression models. We can compare the two established models based on the difference in the amount of variation explained by the two models. The more variation a model explains, the better it fits the data. A model is a better model if, other things being equal, it explains more variation than the other. The difference between the amount of variation explained by the two models can be estimated and tested for statistical significance. Model comparisons can be used to evaluate individual predictors. The way to test whether a predictor is significant is to compare two models, where the first model excludes the predictor and the second model includes the variable. If the predictor explains significant additional variation, the second model explains significantly more variation than the first model. The hierarchical regression analysis is to generate a series of models. On the premise that the dependent variables are unchanged, the controlled variables are input as the initial model; then, new research variables are gradually added, which determines that the newly added research variables can only explain the unique variation produced by it. This is helpful to directly observe the contribution of each research variable to the dependent variable.

(6) Mediation analysis: Mediating variables can explain the deep mechanism behind a relationship and play an important role in research. The mediating variable is the link that connects the relationship between two variables. In theory, the mediating variable implies some kind of internal mechanism. The change of the independent variable X causes the change of the

mediator variable M, and the change of the mediator variable M causes the change of the dependent variable Y. Mediating variables can be divided into full mediation and partial mediation. If the independent variable is set as X, the dependent variable is Y, and the intermediate variable is M, the perfect mediation is the effect of X on Y through M. Without the effect of M, X would have no effect on Y.

The partial mediation is that the influence of X on Y is partly direct and partly through the action of M. For the test of mediation, the method of Baron and Kenny (1986), was adopted and finally verified with the method of SPSS Macro proposed by Preacher and Hayes (2004). Baron and Kenny proposed the sequential test of regression coefficients, that is, when (1) the independent variable significantly affects the dependent variable; (2) Any variable in the causal chain, after controlling its preceding variables (including independent variables), will significantly affect its subsequent variables.

(7) Analysis of first stage moderating effects and moderated mediation: The moderating effect is whether the influence of X on Y will be disturbed by the moderating variable W. The moderator variable affects the direction (positive or negative) and the strength of the relationship between the independent variable and the dependent variable. For testing the first stage moderating effect, the method proposed by Baron and Kenny (1986) was adopted, which mainly tests whether the coefficient of the interaction term between the independent variable and the moderator variable is significant. However, because the high correlation between the independent variable, the moderator, and the interaction term may cause collinearity problems, the independent variable and the moderator are firstly centralized when calculating the interaction term (Aiken et al., 1991). The mediated mediating effect considers both the mediating variable and the moderating effect, the core of which is the mediating effect, and the moderating effect is further discussed on the basis of the mediating effect. That is, whether the mediating effect is affected by the direction or strength of the moderator variable. For the testing of the moderated mediation, the PROCESS macro program was used.

# Chapter 4: Data Analysis and Hypothesis Testing

In this chapter, a descriptive analysis to introduce the basic information of all the five variables including LMX, TMX, Self-efficacy, Interactional Justice Differentiation and Work Engagement, is conducted. Then, the common method variance and multicollinearity are tested. Correlations between variables are also shown before the final test of hypotheses by using the method of multiple stepwise regression.

## 4.1 Descriptive analysis

The descriptive analysis mainly introduces the average, standard deviation, minimum and maximum values of the five variables. With regard to the two independent variables, we can see that the average of LMX quality is 3.51 (see table 4.1), while the average of TMX is 3.88, higher than LMX. From the comparison, in S hospital, medical teams think they have a generally better exchange relationship with colleagues rather than with direct supervisors. Also, the average of quality of TMX is the highest of the five variables and its minimum value reaches 2.10, which is also the highest, showing that the horizontal exchange relationship in S hospital is comparatively of quite high-quality, and members in each medical team are willing to help each other. As for self-efficacy, the mediator variable, the average is 3.87 and the standard deviation is 0.58. The numbers tell that doctors and nurses in S hospital have a high level of confidence regarding their abilities to complete the daily tasks. As for the moderator variable interactional justice, its average is 3.89, ranking the highest among the five variables. Its standard deviation is 0.60, which means that different doctors and nurses have a relatively different evaluation towards the quality of interactional justice differentiation. Finally, for the dependent variable work engagement, its average is 3.75, lower than other variables except LMX, which means that the daily work status of doctors and nurses still needs to be improved.

Table 4.1 Descriptive analysis (N = 370)

| Variable | Average | Standard deviation | Minimum | Maximum |
|---|---|---|---|---|
| LMX | 3.51 | 0.64 | 1.14 | 5.00 |
| TMX | 3.88 | 0.50 | 2.10 | 5.00 |
| Self-efficacy | 3.87 | 0.58 | 1.75 | 5.00 |
| Interactional Justice | 3.89 | 0.60 | 2.00 | 5.00 |
| Work Engagement | 3.75 | 0.62 | 1.24 | 5.00 |

## 4.2 Test of common method variance

In this research, the five variables LMX quality, TMX quality, interactional justice differentiation, self-efficacy and work engagement are all variables that ask for personal feelings, and thus a self-report questionnaire is the best way to collect data from these variables. In this research doctors and nurses were asked to fill out all the questions in the questionnaire, telling their relationship with their direct supervisor and colleagues in the same team, beliefs of their own ability to complete work tasks, interactional justice differentiation and daily work status regarding vigor, dedication, and absorption.

The same source of data is another important factor likely to bring common method variance problem, therefore the common method variance will be tested to ensure that the later analysis and results will not be influenced. Harman single factor analysis (Podsakoff & Organ, 1986) will be used to this effect. By using SPSS, all the items in the questionnaire are put together to conduct a factor analysis without rotation: if the result of factor analysis finds out that in more than one factor eigenvalues are greater than 1, and that the first factor explains less than 50% of the total variance, we can say that common method variance is not a severe problem. In this case, the 51 items are input together to run factor analysis without rotation. The result shows that there are 9 factors with eigenvalues greater than 1, and the first factor explains 31.70% of the variance, not reaching half of the total variance explained that is 68.15%. Based on this result, we may conclude that the common method variance will not influence the result of data analysis.

## 4.3 Test of multicollinearity

Before conducting regression analysis, it is important to ensure that there is no multicollinearity between variables. Otherwise, the results of the regression will be doubted because of the existence of alternative explanations. This research uses two indicators to judge whether there is collinearity: one is variance inflation factor (VIF), and the other is tolerance. The latter is the reciprocal of the former and the criterion is that VIF should have a value between 0 to 10 and the tolerance should be larger than 0.1. If the criteria are satisfied, we can say that there is no multicollinearity between variables.

With the help of SPSS, the regression was run by putting gender, age, education, tenure in S hospital, marriage status, LMX and TMX quality, interactional justice differentiation and self-efficacy into the independent variable box and letting the work engagement to be the dependent

variable. From table 4.2 below, we can see that there is no collinearity relationship between all the variables including control variables, independent variables, moderator, mediator, and work engagement, because in all cases the tolerance in the table is larger than 0.1, and none of the VIF is higher than 10. To be more specific, the VIF of the variables is all lower than 5, which tells a rather good result in the test of multicollinearity. With these results, the research may continue with the test of the hypotheses by mainly using the method of multiple stepwise regression.

Table 4.2 Test of multicollinearity

| Variable type | Variable name | Tolerance（>0.1） | VIF（0<VIF<10） |
|---|---|---|---|
| Control variables | Gender | 0.76 | 1.32 |
| | Age | 0.27 | 3.62 |
| | Education | 0.78 | 1.27 |
| | Tenure in S hospital | 0.31 | 3.28 |
| | Marriage status | 0.70 | 1.44 |
| Independent variables | LMX | 0.62 | 1.61 |
| | TMX | 0.53 | 1.89 |
| Moderator variable | Interactional Justice Differentiation | 0.79 | 1.27 |
| Mediator variable | Self-efficacy | 0.59 | 1.71 |

Note: the dependent variable is work engagement.

## 4.4 Reliability analysis

The reliability analysis of the measurement scales is performed by using SPSS and the analysis results are shown in Table 4.3 below. According to the results, the Cronbach's α coefficients for scale of LMX, TMX, self-efficacy, interactional justice differentiation and work engagement are 0.851, 0.895, 0.909, 0.937, and 0.946 respectively. All of them are higher than 0.7, indicating the good reliability of each scale designed and used in this thesis. In addition, the corrected item-total correlation (CITC) of each item of the five variables of LMX, TMX, self-efficacy, interactional justice differentiation and work engagement are between 0.540-0.680, 0.53-0.741, 0.653-0.771, 0.504-0.840, 0.611-0.768 all of which are greater than 0.5, indicating that the reliability of each scale is relatively high and there is no need to delete any of the items in the questionnaire.

Table 4.3 Reliability analysis

| Variable name | Item | CITC | Cronbach's α after the item is deleted | Cronbach's α |
|---|---|---|---|---|
| LMX | LMX1 | 0.540 | 0.840 | 0.851 |
| | LMX2 | 0.680 | 0.821 | |
| | LMX3 | 0.653 | 0.825 | |
| | LMX4 | 0.565 | 0.840 | |

| Variable name | Item | CITC | Cronbach's α after the item is deleted | Cronbach's α |
|---|---|---|---|---|
| TMX | LMX5 | 0.597 | 0.835 | 0.895 |
| | LMX6 | 0.624 | 0.829 | |
| | LMX7 | 0.670 | 0.824 | |
| | TMX1 | 0.596 | 0.888 | |
| | TMX2 | 0.684 | 0.882 | |
| | TMX3 | 0.658 | 0.884 | |
| | TMX4 | 0.741 | 0.878 | |
| | TMX5 | 0.730 | 0.879 | |
| | TMX6 | 0.530 | 0.893 | |
| | TMX7 | 0.654 | 0.884 | |
| | TMX8 | 0.632 | 0.886 | |
| | TMX9 | 0.647 | 0.885 | |
| | TMX10 | 0.583 | 0.888 | |
| Self-efficacy | SELF1 | 0.653 | 0.902 | 0.909 |
| | SELF2 | 0.701 | 0.898 | |
| | SELF3 | 0.656 | 0.902 | |
| | SELF4 | 0.703 | 0.898 | |
| | SELF5 | 0.765 | 0.892 | |
| | SELF6 | 0.771 | 0.892 | |
| | SELF7 | 0.692 | 0.899 | |
| | SELF8 | 0.713 | 0.897 | |
| Interactional Justice | IJ1 | 0.785 | 0.929 | 0.937 |
| | IJ2 | 0.840 | 0.926 | |
| | IJ3 | 0.504 | 0.949 | |
| | IJ4 | 0.819 | 0.927 | |
| | IJ5 | 0.810 | 0.927 | |
| | IJ6 | 0.791 | 0.929 | |
| | IJ7 | 0.801 | 0.928 | |
| | IJ8 | 0.802 | 0.928 | |
| | IJ9 | 0.799 | 0.928 | |
| Work Engagement | WKE1 | 0.658 | 0.943 | 0.946 |
| | WKE2 | 0.657 | 0.943 | |
| | WKE3 | 0.697 | 0.943 | |
| | WKE4 | 0.638 | 0.944 | |
| | WKE5 | 0.666 | 0.943 | |
| | WKE6 | 0.703 | 0.942 | |
| | WKE7 | 0.763 | 0.941 | |
| | WKE8 | 0.754 | 0.941 | |
| | WKE9 | 0.740 | 0.942 | |
| | WKE10 | 0.768 | 0.941 | |
| | WKE11 | 0.611 | 0.944 | |
| | WKE12 | 0.675 | 0.943 | |
| | WKE13 | 0.773 | 0.941 | |
| | WKE14 | 0.681 | 0.943 | |
| | WKE15 | 0.700 | 0.942 | |
| | WKE16 | 0.694 | 0.943 | |
| | WKE17 | 0.676 | 0.943 | |

Note: LMX = leader-member exchange; TMX = team-member exchange; IJ = interactional justice.

## 4.5 Validity analysis

For validity analysis of the questionnaire, the method was introduced in chapter four. There are two types of validity to be analyzed, that is, content validity and structure validity. The first mainly measures whether the items of the scale can correctly and completely express the meaning of the variable. Since the five scales for measuring LMX, TMX, interactional justice differentiation, self-efficacy and work engagement are all selected from research published in internationally recognized journals and have been used and spread by a large number of scholars, we suppose that there is no problem for the content validity of our scale and believe the items of the scales can reflect the real feeling of medical staff's perception regarding their social exchange relationship with direct supervisor and with colleagues in the same medical department, level of interactional justice differentiation received from direct supervisor, personal confidence to accomplish daily work tasks and daily work status in terms of vigor, dedication and absorption.

As for structure validity, it is normally used to evaluate whether the factor structure of the data is in accordance with the hypothesized theoretical structure. The method used for testing structure validity is usually factor analysis with the help of SPSS. In this thesis, we hypothesize that the independent variable LMX quality, and the mediator variable self-efficacy are one-factor variables. Another independent variable TMX quality is a two-factor variable with the dimensions named "give" and "take", that is what a doctor or nurse does for his or her team and what can he or she receive from his or her team, which is in line with the theoretical research conducted by former scholars.

The variable interactional justice is a two-factor variable. As for the dependent variable work engagement, we suppose it to be a three-factor variable, because the most popular theoretical model of work engagement is the three-dimension model put forward by Schaufeli et al. (2002). They measure an employee's work engagement for the aspects of vigor, dedication, and absorption. To sum up, our hypothesized model should be a 9-factor model. To test the structure validity of the questionnaire, that is to see whether the result of factor analysis of all the 51 items can find out exactly 9 factors, we use the method of factor analysis with rotation.

Before factor analysis, we firstly test whether the scale of LMX, TMX, interactional justice, self-efficacy and work engagement are suitable for conducting factor analysis. There are two standards to evaluate whether a scale can use the method of factor analysis to test the structure validity. One is to see if the KMO (Kaiser-Meyer-Olkin) value is higher than 0.6 and the other is to see whether the result of Bartlett's Test is statistically significant (Kaiser & Rice, 1974).

From Table 4.4 below, we can see that the KMO of the LMX, TMX, self-efficacy, interactional justice and work engagement scale is 0.855, 0.873, 0.927, 0.921, 0.933, respectively. They are all higher than 0.6 and all the five scales have passed the Bartlett's Test.

Table 4.4 KMO value and Bartlett's Test of each scale

| Variable | KMO | Chi-square | Bartlett's Test df | Sig. |
|---|---|---|---|---|
| LMX | 0.855 | 1009.851 | 0.21 | 0.000 |
| TMX | 0.873 | 2003.718 | 0.45 | 0.000 |
| Self-efficacy | 0.927 | 1606.321 | 0.28 | 0.000 |
| Interactional Justice | 0.921 | 2825.924 | 0.36 | 0.000 |
| Work Engagement | 0.933 | 4622.772 | 0.136 | 0.000 |

By comparing the fitting indexes of the four-factor model, three-factor model, two-factor model and single-factor model, this study found that the fitting indexes of the five-factor model were the best, which indicates that the discriminant validity among scales is good. The fitting indexes of each factor model are shown in Table 4.5.

Table 4.5 Result of confirmatory factor analysis

| Model | Factors | $\chi^2$ | df | $\chi^2$/df | RMSEA | CFI | IFI |
|---|---|---|---|---|---|---|---|
| five-factor | LMX, TMX, SELF, IJ, WKE | 3574.366 | 1214 | 2.944 | 0.073 | 0.819 | 0.820 |
| four-factor | LMX+TMX, SELF, IJ, WKE | 3979.790 | 1218 | 3.267 | 0.078 | 0.788 | 0.789 |
| three-factor | LMX+TMX+SELF, IJ, WKE | 4602.749 | 1221 | 3.770 | 0.087 | 0.740 | 0.742 |
| two-factor | LMX+TMX+SELF+IJ, WKE | 6937.155 | 1223 | 5.672 | 0.113 | 0.561 | 0.563 |
| single-factor | LMX+TMX+SELF+IJ+WKE | 8382.290 | 1224 | 6.848 | 0.126 | 0.451 | 0.453 |

Note: LMX = leader-member exchange; TMX = team-member exchange; IJ = interactional justice; SELF = self-efficacy; WKE = work engagement.

To sum up, for validity analysis, we mainly pay attention to two kinds of validity. The first one is content validity. Therefore, mature scales widely used and examined by former scholars have been used to assure the content validity of our questionnaire. Another one is structure validity that was tested through confirmatory factor analysis. The results show that the model with five factors, namely LMX, TMX, interactional justice, self-efficacy and work engagement has the best fitting index. Therefore, the questionnaire passed the test of structural validity.

## 4.6 Correlation analysis

Before conducting multiple stepwise regressions, one important thing is to ensure that there are correlation relationships between variables. Although correlation relationship cannot always lead to causal relationship, it is a necessity to explore the causal relationship between different variables. Thus, before testing the causal relationship between LMX, TMX, interactional justice differentiation, self-efficacy and work engagement, correlation analysis was conducted as shown in Table 4.6.

Table 4.6 Result of correlations

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | | | | | | | | | |
| 2 | 0.280** | 1 | | | | | | | | |
| 3 | 0.300** | 0.548** | 1 | | | | | | | |
| 4 | 0.389** | 0.443** | 0.605** | 1 | | | | | | |
| 5 | 0.576** | 0.395** | 0.285** | 0.310** | 1 | | | | | |
| 6 | -0.097 | -0.051 | -0.061 | -0.110* | -0.064 | 1 | | | | |
| 7 | 0.323** | 0.117* | 0.104* | 0.178* | 0.204** | -0.298** | 1 | | | |
| 8 | 0.009 | -0.030 | 0.034 | 0.057 | -0.002 | -0.393** | 0. 239** | 1 | | |
| 9 | 0.261** | 0.163** | 0.122* | 0.195** | 0.199** | -0.117* | 0.817** | 0.139** | 1 | |
| 10 | 0.236** | 0.057 | 0.053 | 0.145** | 0.186** | -0.169** | 0.499** | 0.290** | 0.462** | 1 |

Note: (1) *** means p <0.001; ** means p <0.01; * means p <0.05; (2) 1 = Work engagement; 2 = LMX; 3 = TMX; 4 = Interactional Justice Differentiation; 5 = Self-efficacy; 6 = Gender; 7 = Age; 8 = Highest educational background; 9 = Tenure in S hospital; 10 = Marital status; (3) Sample size N = 370.

Firstly, for the two kinds of social exchange relationships LMX ($r = 0.280$, $p < 0.01$) and TMX ($r = 0.300$, $p < 0.01$), they are both positively related to work engagement. This provides support to further explore the causal relationships between LMX and work engagement, and also between TMX and work engagement. Secondly, the vertical social exchange relationship LMX ($r = 0.395$, $p < 0.01$) and horizontal social exchange relationship TMX ($r = 0.285$, $p < 0.01$) are both positively related to self-efficacy. The correlations help to further prove the causal relationships between LMX and self-efficacy and also between TMX and self-efficacy. Thirdly, self-efficacy has a positive relationship with work engagement ($r = 0.576$, $p < 0.01$), laying the foundation for their causal relationship. Fourthly, interactional justice differentiation is positively related to LMX ($r = 0.443$, $p < 0.01$) and TMX ($r = 0.605$, $p < 0.01$), self-efficacy ($r = 0.310$, $p < 0.001$), and also work engagement ($r = 0.389$, $p < 0.01$).

Finally, in what concerns the control variable and self-efficacy, there are positive relationships between age and self-efficacy ($r = 0.178$, $p < 0.01$), tenure in S hospital and self-efficacy ($r = 0.195$, $p < 0.001$), and marriage status and self-efficacy ($r = 0.145$, $p < 0.01$). For the control variable and work engagement, there are positive relationships between age and work engagement ($r = 0.323$, $p < 0.01$), tenure in S hospital and work engagement ($r = 0.261$, $p < 0.01$), and marriage status and work engagement ($r = 0.236$, $p < 0.01$).

## 4.7 Hypothesis testing

This study will test the hypotheses about the main effect between two kinds of social exchange relationships and work engagement, the mediation effect of self-efficacy, the moderation effect of interactional justice differentiation on the relationship between two kinds of social exchange relationships and self-efficacy, and the moderated mediation effect of interactional justice differentiation on the indirect relationship between LMX, TMX and work engagement through self-efficacy. Stepwise regression is used as the testing method (Table 4.6). For the mediation effect the method recommended by Baron and Kenny (1986) is adopted. SPSS PROCESS (model 4) is also used to conduct a supplementary test. For the moderation effect in the first stage, the recommendation from Baron and Kenny (1986) is adopted and then SPSS PROCESS (model 1) is used to retest the result. For moderated mediation, the thesis mainly relies on SPSS PROCESS (model 7) to run the result.

### 4.7.1 Test of main effect

Hypotheses H1a and H1b refer to the relationship between social exchange relationship and work engagement. To be specific, H1a puts forward that vertical social exchange relationship LMX is positively related to work engagement. To test this hypothesis, we use SPSS to run a stepwise regression. Firstly, work engagement is input into the box of the dependent variable, and the control variables including gender, age, education background, tenure in S hospital and marital status are put into the box of the independent variable in the first page. This is model 1. Then, in the second page of the independent variable, LMX quality is put into the box. This is model 2. According to table 4.7 below, we can see that LMX has a significant positive influence on work engagement ($\beta = 0.246$, $p < 0.001$), revealing that a higher LMX quality will lead to higher work engagement. Also, $R^2$ change from model 1 to model 2 is 0.057, revealing that model 2 has been improved by adding LMX quality. Thus, H1a is supported.

Table 4.7 Regression analysis results of LMX and TMX on work engagement

| Variable | Model 1 | Model 2 | Model 3 |
|---|---|---|---|
| LMX | | 0.246*** | |
| TMX | | | 0.272*** |
| Gender | -0.032 | -0.013 | -0.018 |
| Age | 0.303*** | 0.320*** | 0.307*** |
| Education | -0.108 | -0.09 | -0.109* |
| Tenure in S hospital | -0.033 | -0.087 | -0.069 |
| Marital status | 0.125* | 0.128* | 0.128* |
| $R^2$ | 0.121 | 0.179 | 0.194 |
| Adjusted $R^2$ | 0.109 | 0.166 | 0.180 |
| F change | 10.013*** | 13.222*** | 14.539*** |

Note: *** means p <0.001; ** means p <0.01; * means p <0.05.

H1b concerns the relationship between horizontal social exchange relationship TMX and work engagement. On the basis of model 1 mentioned above, TMX quality is input into the box of the independent variable in the second page. This is model 3. According to table 4.7 above, we can see that TMX is positively related to work engagement ($\beta = 0.272$, $p < 0.001$), revealing that a higher TMX quality will lead to higher work engagement. Also, $R^2$ change from model 1 to model 3 is 0.071, revealing that model 3 is more powerful in explaining work engagement after adding TMX quality. Thus, H1b is supported.

### 4.7.2 Test of mediation effect

The method developed by Baron and Kenny (1986) was adopted to analyze the mediation in this research. According to these authors, there are four steps to test the mediation effect. Step 1, the relationship between the independent variable and the dependent variable must be tested.

Step 2, the relationship between the independent variable and the mediator variable must be tested. Step 3, the relationship between the mediator variable and the dependent variable must be tested. Step 4, it is necessary to test whether the independent variable is still significant when the independent variable and the mediator variable are added at the same time. If it becomes insignificant, it indicates that the mediator variable has played a full mediation role; if it is still significant, but the effect is reduced, then the mediator variable has played a partial mediation role.

After step 1 about the test of the main effect between two kinds of social exchange relationship and work engagement has been completed (see model 2 and model 3 in table 4.7), we then proceed to step 2 to test the relationship between the independent variable and the mediator variable here.

H2a puts forward that LMX quality is positively related to self-efficacy. To test this hypothesis, we put self-efficacy in the box of the dependent variable, and then the control variables including gender, age, education background, tenure in S hospital and marital status are put into the box of the independent variable in the first page. This is model 4. Then, LMX quality is put into the box of independent variable in the second page. This is model 5. As shown in table 4.8, LMX quality is positively related to self-efficacy ($\beta = 0.423$, $p < 0.001$), revealing that doctors and nurses who have a high-quality social exchange relationship with their direct supervisors are more confident in their ability to accomplish daily work tasks. Also, we can see that the $R^2$ change from model 4 to model 5 is 0.172, revealing that model 5 is more powerful in explaining self-efficacy after adding LMX quality. Thus, H2a is supported.

Besides, H2b says that horizontal social exchange relationship TMX also has a positive influence on self-efficacy. To test this hypothesis, on the basis of model 4, TMX is added into the box of the independent variable in the second page. This is model 6. As shown in table 4.8, TMX quality is positively related to self-efficacy ($\beta = 0.588$, $p < 0.001$), revealing that the higher the quality of social exchange relationship with colleagues in the same medical team is, the higher the level of self-efficacy will be. We can also see that the change in $R^2$ from model 4 to model 6 is 0.342, revealing that model 6 is more powerful in explaining self-efficacy after adding TMX quality. Thus, H2b is supported.

Table 4.8 Regression analysis results of LMX and TMX on self-efficacy

| Variable | Model 4 | Model 5 | Model 6 |
|---|---|---|---|
| LMX | | 0.423*** | |
| TMX | | | 0.588*** |
| Gender | -0.091 | -0.060 | -0.061 |
| Age | -0.017 | 0.011 | -0.009 |

| Variable | Model 4 | Model 5 | Model 6 |
|---|---|---|---|
| Education | -0.017 | 0.014 | -0.018 |
| Tenure in S hospital | 0.171 | 0.078 | 0.093 |
| Marital status | 0.064 | 0.065 | 0.070 |
| $R^2$ | 0.049 | 0.221 | 0.388 |
| Adjusted $R^2$ | 0.036 | 0.208 | 0.378 |
| F change | 3.732*** | 17.192*** | 38.363*** |

Note: *** means p <0.001; ** means p <0.01; * means p <0.05.

Step 3 is to test the relationship between the mediator variable self-efficacy and dependent variable work engagement. H3 puts forward that self-efficacy has a positive influence on work engagement. On the basis of model 1, we then put self-efficacy into the box of the independent variable in the second page. This is model 7. As shown in table 4.9, self-efficacy is positively related to work engagement ($\beta = 0.362$, $p < 0.001$), indicating that doctors and nurses who are confident in their ability to finish daily tasks are more engaged in their daily work regarding to the aspects of vigor, dedication, and absorption. We can also see that the change in $R^2$ from model 1 to model 7 is 0.111, revealing that model 7 is more powerful in explaining work engagement after adding self-efficacy. Thus, H3 is supported.

Table 4.9 Regression analysis results of self-efficacy on work engagement

| Variable | Model 1 | Model 7 |
|---|---|---|
| Self-efficacy | | 0.362*** |
| Gender | -0.032 | 0.000 |
| Age | 0.303*** | 0.309*** |
| Education | -0.108 | -0.102* |
| Tenure in S hospital | -0.033 | -0.091 |
| Marital status | 0.125* | 0.103 |
| $R^2$ | 0.121 | 0.233 |
| Adjusted $R^2$ | 0.109 | 0.220 |
| F change | 10.013*** | 18.349*** |

Note: *** means p <0.001; ** means p <0.01; * means p <0.05.

Step 4 consists in placing the independent variable and the moderator variable together into the regression equation to check the significance of the mediator variable and the change in the independent variable. Hypothesis 4a puts forward that self-efficacy plays a mediating role in the relationship between LMX and work engagement. On the basis of model 1 and model 2, we added the mediator variable self-efficacy to the box of the independent variable in the third page. This is model 8. According to the table 4.10 below, when the independent variable LMX quality and mediator variable self-efficacy are included in the regression equation at the same time, the coefficient of the mediator is significant ($\beta = 0.290$, $p < 0.001$) and the coefficient of the independent variable LMX is still significant ($\beta = 0.123$, $p < 0.05$), but compared to that coefficient in model 2 ($\beta = 0.246$, $p < 0.001$), it is reduced, indicating that self-efficacy plays a partial mediating role in the relationship between LMX and work engagement. Also, from

model 2 to model 8, the change in $R^2$ is 0.074, which means that the model has been improved by adding self-efficacy to explaining work engagement. Thus, hypothesis H4a is partially supported.

Table 4.10 Test of mediation of self-efficacy

| Variable | Model 1 | Model 2 | Model 8 | Model 3 | Model 9 |
|---|---|---|---|---|---|
| Self-efficacy | | | 0.290*** | | 0.276*** |
| Gender | -0.032 | -0.013 | 0.004 | -0.018 | -0.001 |
| Age | 0.303*** | 0.320*** | 0.3316*** | 0.307*** | 0.309*** |
| Education | -0.108 | -0.09 | -0.094 | -0.109* | -0.104* |
| Tenure in S hospital | -0.033 | -0.087 | -0.110* | -0.069 | -0.095 |
| Marital status | 0.125* | 0.128* | 0.107* | 0.128* | 0.109* |
| LMX | | 0.246*** | 0.123* | | |
| TMX | | | | 0.272*** | $0.110^{+}$ |
| $R^2$ | 0.121 | 0.179 | 0.245 | 0.194 | 0.240 |
| Adjusted $R^2$ | 0.109 | 0.166 | 0.230 | 0.180 | 0.226 |
| F change | 10.013*** | 13.222*** | 16.760*** | 14.539*** | 16.364*** |

Note: *** means p <0.001; ** means p <0.01; * means p <0.05; $^{+}$为P<0.1.

Hypothesis 4b argues that self-efficacy plays a mediating role in the relationship between TMX and work engagement. To test this hypothesis, we put forward model 9 on the basis of models 1 and 3. In model 9, the dependent variable is still work engagement, but the independent variable TMX and the mediating variable self-efficacy are both included in the regression equation together. From table 4.10 above, we can see that the coefficient of the mediating variable self-efficacy is significant ($\beta = 0.276$, $p < 0.001$). Although the coefficient of the independent variable TMX is still significant, it has reduced from 0.272 to 0.110 compared with model 3, indicating that in the relationship between TMX and work engagement, self-efficacy plays a partial mediating role. Also, the change in $R^2$ is 0.043 from model 3 to model 9, indicating the improvement of the model in explaining work engagement. Therefore, hypothesis H4b is partially supported.

As mentioned above, besides using the method recommended by Baron and Kenny (1986), we also used the Bootstrap method with the help of SPSS PROCESS for testing. Specifically, in SPSS macro program PROCESS, we select model 4, set Bootstrap Samples = 5000 times, and construct a confidence interval for 95% bias correction. If the upper and lower limits of this interval do not include zero, the mediation is significant (Shrout & Bolger, 2002).

On the basis of adding controlled variables, using LMX and TMX as independent variables, self-efficacy as the mediator variable, and work engagement as the dependent variable, we can obtain the following results: the mediation of self-efficacy on the relationship between LMX and work engagement is significant (direct effect = 0.192, standard error = 0.050; indirect effect = 0.118, standard error = 0.026), the 95% confidence intervals for direct and indirect effects are

from 0.217 to 0.216 and from 0.073 to 0.179, respectively, not including zero, indicating that both direct and indirect effects exist, so hypothesis H4a is again partially supported, that is self-efficacy plays a partial mediating role in the chain from LMX to work engagement.

As for the mediating role of self-efficacy on the relationship between TMX and work engagement, it is also significant (direct effect = 0.135, standard error = 0.070; indirect effect = 0.199, SE = 0.044), with 95% confidence intervals from 0.010 to 0.273 and from 0.106 to 0.286 respectively. The confidence intervals do not contain zero, indicating that both direct and indirect effects exist, which partially supports the hypothesis H4b again. In other words, self-efficacy does play a partial mediating role in the relationship between TMX and work engagement.

### 4.7.3 Test of first-stage moderation effect

In this research we used the method proposed by Baron and Kenny (1986) to test the first stage moderating effect of interactional justice differentiation on the relationship between social exchange relationship and self-efficacy, which is a kind of stepwise regression. The specific procedure is as follows: after adding the controlled variables in the box of the independent variable in the first page, the independent variable in the second page and the moderator variable in the third page, we calculate the mean-centered values of the independent variable and the moderator variable and then use the product of these two values to create an interaction term, and this interaction term is put into the fourth page to predict the outcome variable. If the coefficient of the interaction term is significant, then we can say that the moderation effect exists. Otherwise, there is no moderation effect. In this thesis, the outcome variable for the first-stage moderation is self-efficacy.

Hypothesis H5a puts forward that in the relationship between LMX and self-efficacy, interactional justice differentiation plays a negative moderating role, that is, for those who receive higher level of interactional justice differentiation, their high-quality social exchange relationship with the direct supervisors can bring to lower level of personal self-efficacy. To test the hypothesis, we firstly put self-efficacy into the box of the independent variable, and then add the control variables gender, age, education background, tenure in S hospital, marital status, and independent variable LMX, moderator variable interactional justice differentiation, and interaction term LMX*IJD into the box of the independent variable in the first, second, third, and fourth page respectively, as per models 4, 5, 10 and 11 respectively. According to the table 4.11 below, we can see that the coefficient of the interaction term LMX*IJD is positive and significant ($\beta = 0.890$, $p < 0.001$), and the change in $R^2$ is 0.007 in model 11. Therefore,

hypothesis 5a is not supported.

Hypothesis H5b puts forward that interactional justice differentiation plays a negative moderating role in the relationship between TMX and self-efficacy. In other words, for those who receive higher level of interactional justice differentiation, their horizontal social exchange relationship with colleagues in the same medical team will bring to lower levels of personal self-efficacy. To test this hypothesis, on the basis of model 4 and model 6, we added the moderator variable interactional justice differentiation to the box of the independent variable in the third page, creating model 12, and finally put the interaction term TMX*IJD to the fourth page, building model 13. The dependent variable is still self-efficacy for model 4, 6, 12 and 13. As shown in table 4.11 below, we can see that the coefficient of the interaction term TMX*IJD is not significant ($\beta = 0.046$, $p > 0.05$). Therefore, hypothesis 5b is not supported.

Table 4.11 Test of first-stage moderation

| Variable | Model 4 | Model 5 | Model 10 | Model 11 | Model 6 | Model 12 | Model 13 |
|---|---|---|---|---|---|---|---|
| LMX | | 0.423*** | 0.372*** | -0.205 | | | |
| TMX | | | | | 0.588*** | 0.124** | 0.155 |
| IJD | | | 0.136** | -0.344 | | 0.560*** | 0.586* |
| LMX*IJD | | | | 0.890* | | | |
| TMX*IJD | | | | | | | -0.046 |
| Gender | -0.091 | -0.060 | -0.058 | -0.053* | -0.061 | -0.052** | -0.052 |
| Age | -0.017 | 0.011 | -0.004 | -0.009 | -0.009 | -0.027 | -0.027 |
| Education | -0.017 | 0.014 | 0.022 | -0.022 | -0.018 | 0.004 | 0.004 |
| Tenure | 0.171 | 0.078 | 0.079 | 0.075 | 0.093 | 0.089 | 0.089 |
| Marriage | 0.064 | 0.065 | 0.048 | 0.056 | 0.070 | 0.048 | 0.048 |
| $R^2$ | 0.049 | 0.221 | 0.236 | 0.245 | 0.388 | 0.407 | 0.407 |
| Adjusted $R^2$ | 0.036 | 0.208 | 0.221 | 0.228 | 0.378 | 0.395 | 0.394 |
| F change | 3.732*** | 17.192*** | 15.989** | 14.608*** | 38.363*** | 35.477*** | 30.959*** |

Note: *** means $p < 0.001$; ** means $p < 0.01$.

In order to describe the moderating effects of interactional justice differentiation in a clearer way, based on the method proposed by Aiken et al. (1991), the corresponding moderating effect diagram is also shown. It can be seen from Figure 4.1 that when the interactional justice differentiation level is low, the regression slope of LMX on self-efficacy is rather gentle. That is, for medical staff who perceive that the interactional justice differentiation level is low, the effect of the LMX quality on self-efficacy is small. However, under a high level of interactional justice differentiation, the slope of the relationship between LMX and self-efficacy is steeper. This indicates that the effect of the quality of LMX on the medical staff's self-efficacy is relatively larger. Hence the level of interactional justice differentiation positively moderates the relationship between LMX and self-efficacy, that is, hypothesis 5a, is not supported.

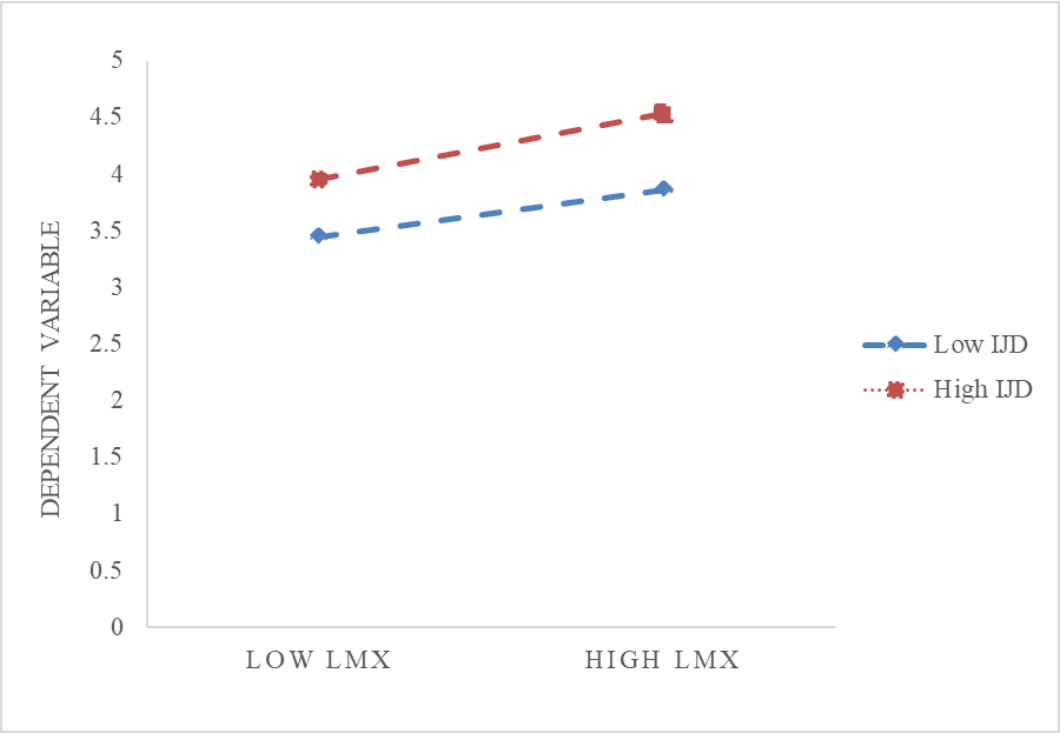


Figure 4.1 Moderating effect of IJD on the LMX- self-efficacy relationship

After testing with the method proposed by Baron and Kenny (1986), this study also used SPSS macro program to retest the above results. We choose model 1 in PROCESS tool, set the bootstrap to 5000 times and confidence intervals to 95%, and put the control variables, LMX, interactional justice differentiation and self-efficacy into the right box. The results obtained show that the interaction term between LMX and interactional justice differentiation has a significant positive effect on the mediator variable of self-efficacy (coefficient = 0.132, standard error = 0.066, $p<0.05$, 95% interval is from 0.0024 to 0.2620, not containing zero), indicating that the interactional justice differentiation has a significant positive moderating effect on the chain of LMX affecting self-efficacy, so H5a is again not supported.

In the same way, we test the moderating role of interactional justice differentiation in the relationship between TMX and self-efficacy again. The interaction term of TMX and interactional justice differentiation has a significant positive impact on self-efficacy (coefficient = -0.006, standard error = 0.073, $p>0.1$, 95% interval is from -0.1488 to 0.1368, containing zero), indicating that interactional justice differentiation has not a significant moderating effect on the chain of TMX affecting self-efficacy, so H5b is again not supported.

### 4.7.4 Test of moderated mediation effect

This research uses the PROCESS macro program SPSS and selects model 7 to test the moderated mediation, that is, to test the moderation of interactional justice differentiation on

the two indirect paths from LMX to work engagement through self-efficacy, and from TMX to work engagement through self-efficacy. If the result of the PROCESS macro program shows that the confidence interval of the moderated mediation does not contain zero, then we can say the moderated mediation exists and the hypothesis is supported. Otherwise, the hypothesis is not supported.

Hypothesis 6a put forwards that interactional justice differentiation plays a negative moderating role in the indirect relationship from LMX to work engagement through self-efficacy. That is, the higher the interactional justice differentiation is, the weaker role will LMX quality play in improving personal self-efficacy and finally leading to low level of work engagement. To test this hypothesis, after setting the number of Bootstrap times to 5000 and the confidence interval to 95%, the result shows (see Table 4.12) that the moderated mediation is significant (coefficient = 0.004, standard error = 0.028, the 95% confidence interval is from -0.012 to 0.100, containing zero). Thus, hypothesis H6a is not supported.

Table 4.12 Test of moderated mediation

| **Conditional indirect effect** | **IJD** | **Effect** | **Boot SE** | **Boot LLCI** | **Boot ULCI** |
|---|---|---|---|---|---|
| LMX-SELF-WKE | Low | 0.075 | 0.028 | 0.022 | 0.135 |
| | High | 0.124 | 0.031 | 0.073 | 0.191 |
| TMX-SELF-WKE | Low | 0.189 | 0.046 | 0.109 | 0.279 |
| | High | 0.187 | 0.044 | 0.107 | 0.283 |
| Moderated mediation | Index | | SE (Boot) | Boot LLCI | Boot ULCI |
| LMX-SELF-WKE | 0.040 | | 0.028 | -0.012 | 0.100 |
| TMX-SELF-WKE | -0.042 | | 0.025 | -0.050 | 0.047 |

Note: (1) *** means p <0.001; ** means p <0.01; * means p <0.05; (2) LMX = leader-member exchange; TMX = team-member exchange; SELF = self-efficacy; WKE = work engagement; IJD = interactional justice differentiation; (3) Low = -1 standard deviation from mean; High = +1 standard deviation from mean.

Hypothesis 6b suggests that interactional justice differentiation plays a negative moderating role in the indirect relationship from TMX to work engagement through self-efficacy. That is, for those who receive higher level of interactional justice differentiation, their relationship with other colleagues in the same medical team will have a weaker effect in improving personal self-efficacy which leads to a lower level of work engagement eventually.

To test this hypothesis, we choose model 7 in PROCESS program, and set the number of Bootstrap times to 5000 and the confidence interval to 95%. As shown in Table 4.12 above, the moderated mediation is significant (coefficient = -0.002, standard error = 0.025, the 95% confidence interval is from -0.050 to 0.047, containing zero). Thus, hypothesis 6b is not supported.

Based on the hypothesis of direct effect, mediating effect and moderating effect mentioned above, this chapter tests the hypothesis through data analysis according to the judgment

criterion of the establishment of moderated mediating effect. In this chapter, we examine the moderating effects of interactional justice differentiation on leader-member exchange (LMX) and team-member exchange (TMX) and work engagement, with self-efficacy as the mediator. Specific conclusions and relevant analysis will be introduced in the next chapter.

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# Chapter 5: Discussion and Conclusions

## 5.1 Research results

The previous chapter has presented the data processing and hypothesis testing. In this chapter the results of the hypotheses testing will be first summarized, as shown in the following Table 5.1.

Table 5.1 Results of hypotheses testing

| Effect | Hypothesis | Result |
|---|---|---|
| Main Effect | H1a: LMX has a positive effect on work engagement, that is, the higher the quality of LMX, the higher the level of individual work engagement. | Supported |
| | H1b: TMX has a positive effect on work engagement, that is, the higher the quality of TMX, the higher the level of individual work engagement. | Supported |
| Mediation | H2a: LMX has a positive effect on self-efficacy, that is, the higher the quality of LMX, the higher the level of individual self-efficacy. | Supported |
| | H2b: TMX has a positive effect on self-efficacy, that is, the higher the quality of TMX, the higher the level of individual self-efficacy. | Supported |
| | H3: Self-efficacy has a positive effect on work engagement, that is, the higher the level of self-efficacy, the higher the level of work engagement. | Supported |
| | H4a: Self-efficacy plays a mediating role in the positive relationship between LMX and work engagement. | Supported |
| | H4b: Self-efficacy plays a mediating role in the positive relationship between TMX and work engagement. | Supported |
| Moderation | H5a: IJD plays a negative moderating role in the positive relationship between LMX and self-efficacy, that is, the higher the level of IJD is, the weaker the positive effect of LMX on self-efficacy will be. | Rejected |
| | H5b: IJD plays a negative moderating role in the positive relationship between TMX and self-efficacy, that is, the higher the level of IJD is, the weaker the positive effect of TMX on self-efficacy will be. | Rejected |
| | H6a: IJD plays a negative moderating role in the indirect effect of LMX—Self-efficacy—Work Engagement, that is, the higher the level of IJD is, the weaker the positive effect of LMX on work engagement through self-efficacy will be. | Rejected |
| | H6b: IJD plays a negative moderating role in the indirect effect of TMX—Self-efficacy—Work Engagement, that is, the higher the level of IJD is, the weaker the positive effect of TMX on work engagement through self-efficacy will be. | Rejected |

It can be seen from Table 5.1 that the empirical analysis results of the data partially support the hypothesis about the main effect and the mediating effect, the moderating effect and the moderated mediating effect proposed in this thesis. Before analyzing the empirical findings, we present a graph of the aggregated empirical results. In general, LMX positively predicts the level of work engagement, that is, the higher the quality of LMX, the higher the level of

individual work engagement. TMX also had a positive effect on work engagement levels, i.e., the higher the TMX quality, the higher the individual's work engagement level was. LMX has a positive effect on self-efficacy, that is, the higher the quality of LMX, the higher the self-efficacy of the individual. TMX has a positive effect on self-efficacy, that is, the higher the quality of LMX, the higher the individual's self-efficacy resulting from it. Self-efficacy has a positive impact on an individual's work engagement, that is, the higher the individual's self-efficacy, the higher the level of work engagement. In addition, individual self-efficacy played a mediating role in the positive relationship between LMX and work engagement, and individual self-efficacy also played a mediating role in the positive relationship between TMX and work engagement, that is, high-quality LMX and TMX could Enhance the individual's sense of self-efficacy and thus improve their work engagement level.

As for the main effect, based on the status of private hospitals in China, this study aims to propose strengthening their competitiveness through the mechanism of promoting the work engagement level of their medical team. Employees are willing to invest more time and energy in their work. Companies become more competitive. Based on literature review on work engagement, the research analyzes two important subjects that, besides patients, medical staff most frequently face in daily work – direct superiors and team colleagues – and proposes that the quality of vertical and horizontal social exchange relationships in the hospital has positive effects on medical staff’s work engagement level, which is supported by the Social Exchange Theory.

On the basis of the main reciprocity principle in Social Exchange Theory, if a medical employee has a high-quality LMX relationship, as a member of the team, he will certainly get more emotional care and material help from his leader than other colleagues. These things are very important to the job. Therefore, in order to keep the balance of the high-quality exchange relationship, he will have a strong intention to repay the leader by putting more energy and concentration in the work. In addition, the approval from the leader drives him to recognize the value of his own work and to grow a sense of pride, thus increasing his work engagement level, which is also shown by the result of the empirical analysis showing that LMX has a positive effect on work engagement ($\beta = 0.246$, $p < 0.001$, see Model 2 in Table 5.2).

A high-quality TMX also drives the medical employee to repay his colleagues in a practical way – improving the individual work engagement level in order to add credits to the department performance – which is also in accordance with the result of empirical analysis showing that TMX has a positive effect on work engagement ($\beta = 0.272$, $p < 0.001$, see Model 3 in Table 5.2).

Table 5.2 Results of empirical models

| Variable | Dependent variable: work engagement | | | | | | | Dependent variable: self-efficacy | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 7 | Model 8 | Model 9 | Model 4 | Model 5 | Model 10 | Model 11 | Model 6 | Model 12 | Model 13 |
| LMX | | 0.246*** | | | 0.123* | | | 0.423*** | 0.372*** | -0.205 | | | |
| TMX | | | 0.272*** | | | 0.110$^{+}$ | | | | | 0.588*** | 0.124** | 0.155 |
| Self-efficacy | | | | 0.362*** | 0.290*** | 0.276*** | | | | | | | |
| IJD | | | | | | | | | 0.136** | -0.344 | | 0.560*** | 0.586* |
| LMX*IJD | | | | | | | | | | 0.890* | | | |
| TMX*IJD | | | | | | | | | | | | | -0.046 |
| Gender | -0.032 | -0.013 | -0.018 | 0.000 | 0.004 | -0.001 | -0.091 | -0.060 | -0.058 | -0.053* | -0.061 | -0.052** | -0.052 |
| Age | 0.303*** | 0.320*** | 0.307*** | 0.309*** | 0.332*** | 0.309*** | -0.017 | 0.011 | -0.004 | -0.009 | -0.009 | -0.027 | -0.027 |
| Education | -0.108 | -0.09 | -0.109* | -0.102* | -0.094 | -0.104* | -0.017 | 0.014 | 0.022 | -0.022 | -0.018 | 0.004 | 0.004 |
| Tenure | -0.033 | -0.087 | -0.069 | -0.091 | -0.110* | -0.095 | 0.171 | 0.078 | 0.079 | 0.075 | 0.093 | 0.089 | 0.089 |
| Marriage | 0.125* | 0.128* | 0.128* | 0.103 | 0.107* | 0.109* | 0.064 | 0.065 | 0.048 | 0.056 | 0.070 | 0.048 | 0.048 |
| $R^2$ | 0.121 | 0.179 | 0.194 | 0.233 | 0.245 | 0.240 | 0.049 | 0.221 | 0.236 | 0.245 | 0.388 | 0.407 | 0.407 |
| Adjusted $R^2$ | 0.109 | 0.166 | 0.180 | 0.220 | 0.230 | 0.226 | 0.036 | 0.208 | 0.221 | 0.228 | 0.378 | 0.395 | 0.394 |
| F change | 10.013*** | 13.222*** | 14.539*** | 18.349*** | 16.760*** | 16.364*** | 3.732*** | 17.192*** | 15.989** | 14.608*** | 38.363*** | 35.477*** | 30.959*** |

Note: (1) *** means p <0.001; ** means p <0.01; * means p <0.05; $^{+}$ means p <0.1. (2) LMX = leader-member exchange; TMX = team-member exchange; IJD = interactional justice differentiation.

Therefore, our hypothesis H1a saying that LMX has a positive effect on work engagement and H1b saying that TMX has a positive effect on work engagement are both verified and supported.

For the mediation effect of self-efficacy, this study puts forward the idea that self-efficacy can be taken as a functional mechanism in the chain from social exchange relationship to work engagement according to Social Cognition Theory which says that an individual behavior is driven by his or her will and belief. Even a high-quality LMX and TMX helps grow an employee's intention to repay leaders and colleagues by promoting the work engagement to improve work performance, whether this intention can be turned into action still depends on the confidence that individuals have in their ability to engage in work. Actually, work engagement requires an employee to invest his or her physical, emotional and cognitive resources to daily work. If the employee thinks he or she cannot gain a positive wanted result after investing all these resources, he or she will not dare to act. Thus, we firstly propose that both vertical social exchange relationship with direct supervisor and horizontal social exchange relationship with colleagues in the same medical team can improve a medical staff's self-efficacy.

On the grounds of four sources of self-efficacy according to Social Cognition Theory, which are social persuasion, vicarious experience, mastery experience, and physiological state (Capa-Aydin et al., 2018), this study suggests that LMX mechanism is to improve medical staff's self-efficacy mainly by making social persuasion, accumulating mastery experiences, and presenting more positive physiological and affective states, while TMX mechanism mainly concerns the setting of a role model image for gaining vicarious experience, accumulating successful experiences, and presenting more positive physical and mental states. Both of these two chains are supported by the results of empirical research in this study (for the chain from LMX to self-efficacy, $\beta=0.423$, $p<0.001$, see Model 5 in Table 5.2； for the chain from TMX to self-efficacy, $\beta=0.588$, $p<0.001$, see Model 6 in Table 5.2). Thus, our hypotheses H2a and H2b are both supported.

Besides discussing the chain from social exchange relationship to self-efficacy, we also examine the chain from self-efficacy to work engagement. Our empirical result shows that, in the sample examined, self-efficacy can promote medical staff's work engagement level ($\beta=0.362$， $p<0.001$, see Model 7 in Table 5.2) through the human agency mentioned in Social Cognition Theory. So, hypothesis H3 is supported. Based on the examination of LMX's and TMX's effect on work engagement and self-efficacy, and self-efficacy's effect on work engagement, we then checked the mediating role of self-efficacy on the main effects from LMX

and from TMX to work engagement. It was found that when the independent variable LMX and mediator variable self-efficacy are put into the same model for regression to work engagement, both the coefficient for LMX and self-efficacy are significant (see Model 8 in Table 5.2), but LMX's coefficient decreases from 0.246 in Model 2 to 0.123 in Model 8 (see Table 5.2), indicating that self-efficacy only plays a partial mediating role in the relationship from LMX to work engagement thus partially supporting our hypothesis H4a.

As for the mediating role of self-efficacy in the relationship from TMX to work engagement, we also entered the independent variable TMX and the mediator variable self-efficacy together in Model 9 at the same time for regression to work engagement. The empirical result is similar to that of the LMX-work engagement chain. The coefficient of self-efficacy is significantly positive ($\beta=0.276$, $p<0.001$, see Model 9 in Table 5-2), but the coefficient of TMX decreases though it is still significant (in Model 3, $\beta=0.272$, $p<0.001$, and in Model 9, $\beta=0.110$, $p<0.1$) (see Table 5.2), indicating the partial mediating role of self-efficacy in TMX-work engagement relationship and partially supporting our hypothesis H4b.

About the moderation effects of interactional justice differentiation (IJD), this study suggests that IJD weakens the effects of social exchange relationships on self-efficacy by bringing their different perceptions about communication and respect. It will cause the occurrence of negative emotions of employees and negatively moderate the influence of social exchange relationships on self-efficacy. If medical staffs gain higher level of interactional justice differentiation, the relationship of LMX-self-efficacy and TMX-self-efficacy will be weakened. We call the moderating role of interactional justice differentiation on the relationship from LMX to self-efficacy and the relationship from TMX to self-efficacy the first-stage moderation. Empirical results of first-stage moderation do not support either hypothesis 5a about the negative moderation of interactional justice differentiation on the chain from LMX to self-efficacy (coefficient for interaction item LMX*IJD is 0.890, $p<0.001$, see Model 11 in Table 5.2), or hypothesis 5b about the negative moderation of interactional justice differentiation on the chain from TMX to self-efficacy (coefficient for interaction item TMX*IJD is -0.046, $p>0.05$, see Model 13 in Table 5.2).

Besides the first-stage moderation, we also propose hypotheses about the moderated mediation based on the mediating role of self-efficacy and first-stage moderation of interactional justice differentiation combining Social Exchange Theory with Social Cognition Theory. The results of empirical research using PROCESS program of SPSS show that the moderated mediation does not exist in both indirect chains from LMX to work engagement through self-efficacy (from -0.012 to 0.100, containing zero, see Table 4.12) and from TMX to

work engagement through self-efficacy (from -0.050 to 0.047, containing zero, see Table 4.12). Therefore, our hypothesis 6a and 6b are not supported.

To conclude, in all hypotheses about the main effects from vertical and horizontal social exchange relationship to work engagement, the mediation effects of self-efficacy are verified and supported. However, the first-stage moderations of interactional justice differentiation on the relationship between LMX and self-efficacy and between TMX and self-efficacy, as well as the moderated mediation are not verified and supported. The discussion on these empirical results is given in the section below.

## 5.2 Discussion

The results of the hypothesized main effects will be discussed first. As we say in the previous content, in a hospital, the two types of people that a doctor or a nurse interacts with most frequently, besides patients, are his or her direct supervisor and colleagues in the same medical team. Since direct supervisor and colleagues are both important to medical staff in private hospitals, this study does not just pick one of them as the antecedent variable of work engagement but puts both LMX and TMX into our research model. By doing this, on the one hand, we look for the overall effects of work relationships on individual work engagement in work environment; on the other hand, this can be used for comparison and analysis on the influence of the two relationships, thus getting managerial implications.

According to the empirical results, TMX has a greater effect on work engagement as its regression coefficient is 0.272 ($p < 0.001$, see Model 3 in Table 5.2), which is higher than that of LMX of 0.246 ($p < 0.001$, see Model 2 in Table 5.2). Although medical staff frequently interact with both superiors and colleagues, in reality they spend much more time with colleagues than with superiors, and medical staff have more opportunities to cooperate with their colleagues since the characteristics of their work requires them to do so. This is because the medical industry emphasizes teamwork, and no one can finish a whole operation or surgery alone. So, every individual needs to communicate and cooperate with other medical personnel in the daily work. From being together for a large amount of time, medical staff's high-quality social exchange relationship with team colleagues will result in a more intense intention and desire to pay back to the team and thus in the willingness to improve job performance by improving daily work status, that is, work engagement. However, supervisors only give overall guidance to medical staff in a broad way. In supervisors' daily work life, they not only need to deal with their own work; they are busy with executive duties and academic research, which

makes them have less time to spend with their subordinates so, even for those who have high-quality social exchange relationship with them, their social persuasion and help for medical staff to accumulate successful experiences will play a less functional role in motivating subordinates to work hard with the purpose of paying back.

However, TMX can play a more important role in improving medical staff's self-efficacy rather than LMX. The coefficient of LMX on improving self-efficacy is 0.423 (see Model 5 in Table 5.2) and the coefficient of TMX on improving self-efficacy is 0.588 (see Model 6 in Table 5.2), much higher than that of LMX. This can also be combined with the work nature and practical work of medical staff in private hospitals for analysis. As for time consumption, medical staff in private hospitals spend more time with their colleagues, which better helps colleagues play a role model in improving individual self-efficacy. Due to the limitation of time and energy, it is difficult for supervisors to devote as much time and energy as colleagues to their subordinates, which naturally weakens the role of social persuasion in improving individual self-efficacy. From this perspective, the results of our sample show that medical staff's horizontal social exchange relationship with colleagues is more beneficial for increasing personal self-efficacy and work engagement compared with their vertical social exchange relationship with direct supervisor.

As for the mediating role of self-efficacy, the empirical results above have shown that self-efficacy acts as a partial mediator. In other words, in the hospital studied, LMX and TMX not only have effects on work engagement through self-efficacy, but also influence work engagement on their own even without self-efficacy as a mediator. This indirectly shows the importance of the quality of social exchange relationships to the level of work engagement of medical teams in private hospitals according to the sample examined. If a medical worker can work with high-quality LMX and TMX relationships, even if he or she does not have a high-level self-efficacy for now, he or she still can be more concentrated on his work with more energy, enthusiasm, and recognition since the two relationships motivate him or her. What is more, the partial mediating role of self-efficacy indicates that, in the relationship between LMX and work engagement and in the relationship between TMX and work engagement, self-efficacy may not be the suitable mechanism, that is, maybe there are other mechanisms that can fully mediate the two main effects mentioned before. We put forward the idea that self-efficacy is a mediator and a mechanism mainly based on social cognitive theory which regards self-efficacy as a critical factor motivating human agency. However, according to our empirical results, there may be other psychological factors that are more suitable than self-efficacy when it comes to function as a mechanism for the chain between social exchange relationship and

work engagement.

As for the moderating role of interactional justice differentiation on the chain of social exchange relationships on self-efficacy, we can see that interactional justice differentiation has a greater effect on the LMX - self-efficacy chain than on TMX - self-efficacy chain from the moderation effect diagram in the previous chapter. Based on the literature review (e.g., Zhou, 2003), it was assumed that the interactional justice differentiation plays a negative moderating role between LMX and self-efficacy. However, the empirical results support the opposite. The higher the interactional justice differentiation, the stronger the positive relationship between LMX and self-efficacy; the higher the level of interactional justice differentiation, the greater the difference between employees' perceived interactional justice and team interactional justice. When employees think that they are not understood and respected by leaders, the frequency and quality of exchanges with leaders are particularly important and can exert a more positive influence on the sense of self-efficacy. Imagine a person who feels that he or she is not being respected in the group. At this point, the better the relationship between leaders and members, the more courage and conviction employees will have to overcome difficulties, so as to gain due respect. When employees think that they are more understood and respected by the leaders in the team, having a high-quality leader-member exchange relationship can stimulate the belief of work, so as to maintain a good status.

In contrast, interactional justice differentiation has a very small effect on the relationship between TMX and self-efficacy. This thesis attempts to understand how this difference arises. According to the hypothesis put forward based, leaders in high-quality LMX relationships are more likely to encourage their own insiders, thus increasing the self-efficacy of staff. However, if individuals can receive more respect and communication in this process, then encouragement from superiors will have more practical guiding significance rather than empty verbal praise. In this case, social persuasion will have practical content and play a greater role in strengthening the process from LMX to self-efficacy. As for the process from TMX to self-efficacy, the logical deduction is that interactional justice differentiation will cause employees' prejudice to the success of other team members and affect the relationship between LMX and self-efficacy. In contrast, the interactional justice differentiation has a more direct effect on the path of LMX-self-efficacy. However, the process of influencing TMX- self-efficacy is more tortuous. Moreover, the interactional justice differentiation lies more in the vertical relationship, which is a special form of communication between superior and subordinate, so it can be understood to have little influence on the process of horizontal relationship acting on self-efficacy.

## 5.3 Managerial implications

According to the above discussion, this study proposes some implications to the management of personnel in private hospitals in China: In the medical service system, medical staff need to contact with a large number of patients every day and face endless work tasks. They not only need to deal with all kinds of daily affairs, but also need to face patients' negative emotions. Therefore, the working intensity of medical staff may make them lack enough time and energy to focus on their work. Firstly, management should attach importance to every worker's daily work status and manage to improve their work engagement level so that their enthusiasm and identification can grow and they are willing to devote more energy, passion, and concentration on it. The improvement of work engagement can promote the performance of the hospital and strengthen its competitiveness by enhancing every individual's performance.

Secondly, to improve the work engagement of medical staff in private hospitals in China, superiors in these hospitals should pay more attention to the daily communication with subordinates. By setting up a social exchange relationship with the main features of mutual trust and respect, they can win over the recognition from subordinates and help them grow the sense of identification and positive attitudes towards their job. Leaders should also give more encouragement to their subordinates in daily work, help them accumulate successful experiences by giving specific instructions and professional training, help them overcome the negative physiological and affective states by providing emotional support so that the medical staff can build up confidence about their ability and put the confidence into actual work, so that their work quality and engagement levels can be improved. Specifically, first, leadership should be committed to fairness. Adhere to the principle of position analysis and performance management system to ensure that subordinates can be treated fairly, instead of releasing vague information based on personal likes and dislikes, causing unnecessary suspicion and misunderstanding of subordinates. Second, pay attention to strengthening the construction of team atmosphere, promote target management measures, and improve the level of communication between the two parties. Effective communication can prompt leaders to understand the real thoughts and needs of their subordinates, and provide them with targeted support and help. The subordinates can also clarify the real purpose of the leader in a relaxed and harmonious atmosphere. Third, organizations can make full use of institutional management activities based on business training, performance feedback, career development, etc., to benefit more subordinates rather than just a few people who are closely related. Third, organizations can make full use of institutional management activities based on business

training, performance feedback, career development, etc., to benefit more subordinates rather than just a few people who are closely related.

Thirdly, leaders should realize that it is far from enough for them only to set up a good relationship with subordinates. They should also set up a friendly environment for mutual help within the medical team so that when cooperating with colleagues, everyone can support and get along well with each other at work. First, cultivate the mutual exchange awareness of team members and promote the formation of a high-level team member exchange atmosphere. The organizational structure of S hospital is becoming more and more flat, and the hospital pays more and more attention to the power of teamwork. In order to enable the team to achieve better innovation performance and team members to produce better innovations, it is necessary to focus on cultivating team members to “return the favor” consciousness. On the one hand, organizations can take the exchange behavior of team members as part of the corporate culture. When selecting, identifying and training personnel, focus on employees’ awareness and behavior that they are willing to interact with others, and when training and developing, they can encourage employees from the corporate culture level. Carry out resource exchange and emotional exchange of mutual help, so as to motivate employees to actively form a good exchange relationship with other team members. On the other hand, organizations can establish activities that can promote the interaction of team members in their daily work, such as holding regular experience exchange meetings, mentoring systems, festival team building activities, etc. to enhance sharing and communication among members, so that the team has love, A spiritual working atmosphere of trust and mutual respect. To reach this goal, moderate team activities should be organized to enhance the cohesion of the team and to build up confidence among colleagues. Besides, daily communication is necessary for the understanding of the relationships among subordinates and resolving misunderstandings as much as possible among those who have conflicts. Superiors should also realize that subordinates contact most with their colleagues, and the relationship with them has greater effects on individual self-efficacy and work engagement.

Self-efficacy refers to an individual's ability judgment, belief, or subject's self-control and feeling about whether he can complete a certain activity at a certain level. It is related to a person's personal ability level, but does not represent an individual's true ability level. Self-efficacy has a role in determining people's choice of behavioral tasks and their persistence and effort in the task. At the same time, it also affects people's thinking patterns and emotional reflection patterns in the process of performing tasks. Self-efficacy can be improved through social persuasion and positive feedback. Therefore, leaders can give subordinates recognition

and praise in a timely manner in their daily work, and give a certain degree of recognition and reward to their work efforts, thereby promoting the transformation of subordinates into self-efficacy. Self-efficacy is more likely to be influenced by role model success. This means that personal experience and secrets imparted by colleagues may increase self-efficacy more than formal training by professional trainers and renowned external consultants. Because coworkers are often perceived as more similar to the employee in terms of background, abilities, and career goals. So, observe how those admired colleagues do their work, feel their success, and instill in the trainees a philosophy that “if they can do it, so can I” to improve their ego efficacy. Managers should focus on building a learning team, and encourage team members to learn from each other and grow together, so as to improve individuals' self-efficacy of learning from role models.

Finally, hospital leaders at all levels should pay more attention to the quality of their interaction with subordinates in daily work. As a kind of justice, interactional justice is the perception of comparisons that employees make within the team. Good interactional justice can reflect the leader's sincere care for employees, sufficient respect, courtesy and trust. At the same time, good interactional justice also means that leaders give employees sufficient information and explanation when making decisions. After the members feel interactional justice, they will increase their investment in the organization, overcome difficulties with more information, and reward teams with higher work performance. Managers should be committed to jointly constructing a fair organizational atmosphere for the interaction between superiors and subordinates, and forming a good incentive environment. In the process of communication with subordinates, superiors should treat each other with sincerity, respect subordinates, create a good interaction between superiors and subordinates, enhance employees' trust in themselves, and thus increase their work engagement. The data analysis of this thesis shows that interactional justice differentiation plays a positive moderating role in the positive relationship between LMX and self-efficacy. This may be because interactional justice differentiation in the case hospital is within the right range and plays a positive incentive role. However, managers should also be aware about having too much justice differentiation in team interactions especially when leaders have excessive trust and respect for some members while ignoring or even doubting other members. Then, the team will inevitably create an extremely unfair atmosphere, and the relationship among team members will deteriorate, which may seriously affect work engagement, and the team may even break down.

## 5.4 Research contribution

This study has the following contributions:

Firstly, it explores factors that influence work engagement from special research subjects. So far, work engagement has been one of the research topics that has received considerable attention in the field of organizational behavior, and studies about antecedent variables and effects of work engagement have also made many achievements. However, previous studies seldom classify the objects of work engagement in discussion, and most of them are universal research. The innovation of this paper in this field is mainly based on combining the research theme of this paper and placing the research object on the medical staff of private hospitals, especially in the context of the normalization of the new crown epidemic, medical staff are faced with increasingly complex and endless work tasks, which need to be dealt with The patient's negative emotions, the dual challenges caused by work intensity and psychological stress may interfere with their mood, energy, etc., thereby affecting the level of work engagement. Combined with the particularity of medical staff in private hospitals, this paper analyzes, deduces and verifies the mechanism that affects their work engagement, so as to focus on the impact mechanism from two aspects of work environment support and medical staff's psychological state.

Secondly, it discusses the effects of LMX and TMX on work engagement from the perspective of social exchange theory focusing on two groups that medical staff in private hospitals face most frequently in daily work besides patients - direct superiors and colleagues within the department. In the discussion about the interaction between medical staff and leaders or colleagues, the quality of their social exchange relationships also has effects on the work engagement level of medical teams in the private hospital examined. This breaks the limitation of previous research focusing on single social exchange relationship and explores the effects of LMX and TMX on work engagement in a comprehensive way making comparisons between the influence of these two relationships, thus giving implications on management practice.

Thirdly, it introduces self-efficacy as a mediator and explores its effects on social exchange relationship, that is work engagement process based on social cognitive theory. Two important sources of self-efficacy are social persuasion and positive feedback, alternative learning and imitation. And LMX and TMX reflect the positive feedback and learning from the leaders brought by the exchange and interaction process between individuals and leaders and teams. On this basis, this study explores individual psychological mechanism and functions of mind in the influencing process of social exchange relationship on work engagement and thus it helps

improve the functional mechanism between social exchange relationships and work engagement.

Fourthly, it observes the boundary conditions of the functional mechanism. In the process of functional mechanism operation, will the process be affected by situational variables? By reviewing relevant literature (namely Zhou, 2003) and sorting out research ideas, this study takes interactional justice differentiation as a situational variable and as a symbol of trust and respect from superiors to subordinates. Findings showed that it exerts a moderation effect on social exchange relation - work engagement process, with or without self-efficacy. At last, it tests these hypotheses through empirical analysis.

## 5.5 Limitations

This study also has the following limitations:

Firstly, we may argue about the selection of the dependent variable: work engagement. Our research takes improving the competitiveness of private hospitals as the ultimate goal and focuses on intangible infrastructures, that is, medical teams, paying attention to the impact of their daily work status and work quality as a means to improve hospital performance and competitiveness. However, according to the research done by Zigarmi et al. (2009), the concept of work engagement always overlaps concepts of organizational commitment, job commitment, job involvement, no matter in academic or practitioner literature. It needs further discussion on how to distinguish these concepts and verify work engagement as the most suitable dependent variable. In addition, Macey and Schneider (2008) divided engagement into trait engagement, state engagement and behavioral engagement, which one is more suitable for this study is also a question that may be the object of further research.

Secondly, from the perspective of data collection, our data for empirical analysis is cross-sectional, which may have an inverse or bidirectional causality. In addition, the measured data of the variables in this study all come from self-reports of medical staff. Although the effect of common method bias has been controlled through the methods of pre-control and post-test, this problem may still exist.

Thirdly, from the perspective of our sample and respondents, considering the difficulty of collecting questionnaires, this research adopts convenience sampling method and collects questionnaire samples from the most influential private hospital in S city. In this case, it still requires further efforts for comparative analysis to test the generalization of the research conclusion and see whether it can be applied to other private hospitals, even public hospitals.

Fourthly, from the perspective of our method to conduct data analysis, due to the limitation of time, knowledge of research methods and techniques, this study still adopted more conservative data processing instead of, for example, structural equation model to explore the relationships among variables, and we still use the relatively outdated tools like SPSS. Therefore, there is still room for apply other data processing tools that may refine further the research conclusions. In addition, this study mainly adopted a questionnaire survey as the data collection tool. Factor analysis, correlation analysis and regression analysis were used on the collected data to verify the causal relationship among the constructs. However, this is not sufficient to explain the theoretical and practical significance behind the statistical relationship of each variable. Therefore, the conclusions of this study remain at the level of theoretical inference based on the results of statistical analysis and further quantitative or qualitative studies may bring more enlightenment. Further case studies could also be conducted to enrich the discussion especially in answering questions such as why and how.

At last, from the perspective of our selection of the moderator, our empirical result shows that for moderation effect of interactional justice differentiation has a relatively weaker moderation effect on the first stage and the whole indirect process of TMX - self-efficacy - work engagement chain than that of LMX. Therefore, IJD may not be an effective moderation variable for the TMX chain, and more detailed literature review and hypotheses deduction on this chain should be given. Moreover, IJD plays a positive moderating role in the first stage of LMX-self-efficacy - work engagement chain. Contrary to the hypothesis, it is an interesting topic worthy of further research.

## 5.6 Suggestions for future studies

Based on the discussion, conclusions, and limitations of this research, some suggestions for future studies in related fields are given as follows:

Firstly, for work engagement, researchers should be clear about the similarities and differences between the concept of work engagement and others like job involvement and find out the most suitable research variables that are in accordance with the research content by reviewing related literature. Future studies can further explore effects of work engagement on both individual aspects like individual performance and organizational aspects like organization performance so that a more comprehensive research model of antecedent variables, mediation mechanisms and effect variables about work engagement can be set up and researched.

Secondly, in the measurement of LMX, TMX and interactional justice differentiation,

common method bias from single self-reports can be avoided by collecting data from both superiors and subordinates, or individuals and colleagues, and matching the data. Besides, since the two variables self-efficacy and work engagement change as individual status changes, experience sampling method in multiple periods can be adopted in future studies to have a more reliable measurement of the two variables. Data may also be collected in a longitudinal way to avoid shortcomings of cross-sectional studies. In addition, this thesis only uses the empirical research method of single-level questionnaire survey to explore the mechanism of the relationship between exchange and work engagement. However, the more profound meaning behind the causal relationship between variables needs to be improved through more case studies and other theoretical research methods.

Thirdly, the sample selection range can be expanded and improved to cover more areas and hospitals. In the future, targeted empirical investigations can be carried out on employees of different types of units and the hypotheses of this study may be tested in a wider sample to avoid the data homology error problem. In follow-up studies, time series sample data can be used based on the diversity of the subjects sampled to further verify the correctness of the results so as to improve its applicability in different types of organizations in different regions of the country. When studying the issue of strengthening the competitiveness of private hospitals, if such conditions as time and resources permit, a wider sample can be collected and analyzed to promote the general applicability of the research conclusions. Besides data from more private hospitals, data from public hospitals are also beneficial for comparative analysis on the two kinds of hospitals in order to explore a better way for their development.

Fourthly, based on the literature review on related research methods, researchers can choose more advanced methods for data analysis. Different software can be used for data analysis, and comparisons can be made to have more rigorous research conclusions.

At last, for the TMX - self-efficacy - work engagement process, variables related closer to horizontal relationships like team cohesion, in-group work conflicts and individual conflicts may be taken into consideration in the analysis to explore the boundary moderation effect of the overall atmosphere in a medical team. Even the whole medical team atmosphere may be taken as the moderation variable at the team level since the moderation effect of cross-level team atmosphere on this chain may be helpful for better discussion when combining individuals with teams. Although this study does not support this hypothesis, it also provides contextualized ideas for relevant research on the relationship between LMX and TMX and individual psychological cognition and job output.

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