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Dentists' Work Stress and Doctor-Patient Relationship: A Moderated Mediation Model of Emotional Labour, Emotional Intelligence and Empathy

WEN Ping

Doctor of Management

Supervisor:

PhD MA Shaozhuang, Associate Professor with Habilitation
ISCTE University Institute of Lisbon

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Abstract

Dentist is a profession characterised by much work stress and emotional labour, and Chinese dentists are faced with medical disputes and deteriorating doctor-patient relationships (DPRs). Guided by Job Demands-Resources (JD-R) Model and Conservation of Resources (COR) Theory, this study aims to analyse the impact of work stress on DPR among dentists and the roles of emotional labour, emotional intelligence and empathy in the effect of work stress on DPR.

Using a sample of 239 collected with self-reported questionnaire survey from dentists in seven hospitals in Shenzhen, China, the hypothesised model is tested with the method of PROCESS macro.

The study reveals the following results: 1) surface acting and deep acting fully mediate the relationship between work stress and DPR; 2) emotional intelligence attenuates the relationship between work stress and surface acting such that work stress is less positively related to surface acting among dentists with high emotional intelligence than those with low emotional intelligence; 3) empathy attenuates the relationship between surface acting/deep acting and DPR such that the effect of surface acting/deep acting on DPR decreases as empathy increases within a certain range; 4) surface acting fully mediates the relationships between each of the four aspects of work stress (work, patient, competency and colleague) and DPR, and this mediating effect is moderated by empathy; deep acting only fully mediates the relationship between patients-related work stress and DPR, and such mediating effect is moderated by emotional intelligence and empathy.

Keywords: dentists, work stress; doctor-patient relationship in China; emotional labour; emotional intelligence; empathy.

JEL: M54; M12

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Resumo

Ser dentista é uma profissão caracterizada por muito estresse no trabalho e trabalho emocional, os dentistas chineses também enfrentam disputas médicas e deterioração das relações médico-paciente (DPR). Guiado pelo Modelo de Exigências-Recursos do Trabalho (JD-R) e pela Teoria da Conservação de Recursos (COR), este estudo tem como objetivo analisar o impacto do estresse no trabalho nas DPR entre dentistas e o papel que o trabalho emocional (atuação superficial, e profunda), a inteligência emocional e a empatia desempenham no efeito que o estresse no trabalho tem na deterioração das DPR.

Utilizando uma amostra de 239 questionários respondidos por dentistas em sete hospitais em Shenzhen, China, o modelo hipotético foi testado através da macro PROCESS.

O estudo revelou que: 1) a atuação superficial e profunda medeiam totalmente a relação entre o estresse no trabalho e a DPR; 2) a inteligência emocional atenua a relação entre o estresse no trabalho e a atuação superficial, de modo que o estresse no trabalho está menos positivamente relacionado com a atuação superficial entre dentistas com alta inteligência emocional; 3) a empatia atenua a relação entre a atuação/profunda e a DPR, de modo que o efeito da atuação superficial/ação profunda na DPR diminui à medida que a empatia aumenta dentro de uma certa faixa; 4) a atuação superficial medeia totalmente a relação entre os quatro aspectos do estresse de trabalho (trabalho, paciente, competência e colegas) e a DPR, sendo esse efeito mediador moderado pela empatia; a atuação profunda apenas medeia totalmente a relação entre estresse de trabalho do paciente e a relação médico-paciente sendo este efeito indireto moderado pela inteligência emocional e pela empatia.

Palavras-chave: dentistas, estresse no trabalho; relação médico-paciente na China; trabalho emocional; inteligência emocional; empatia.

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摘要

口腔医生是一种工作压力大、情绪劳动高的职业，且中国口腔医生更面临医患纠纷和恶化的医生医患关系。基于工作需求资源模型（JD-R Model）和资源保护理论（COR Theory），本研究旨在分析口腔医生的工作压力对医患关系的影响以及情绪劳动、情绪智力及共情能力在工作压力与医患关系中所起的中介和调节作用。

本研究通过自填式问卷调查从中国深圳七家医院收集到239份样本，使用Process宏对研究假设模型进行验证分析。

分析结果显示：（1）浅层扮演和深层扮演在工作压力对医患关系的影响中起到了完全中介作用；（2）情绪智力的调节作用在工作压力对浅层扮演的影响中有微弱的显著性，即工作压力对浅层扮演的正向影响在情绪智力高的医生中比情绪智力低的医生中更小；（3）浅层扮演/深层扮演对医患关系的作用受到共情能力的调节，在一定范围内浅层扮演/深层扮演对医患关系的影响随共情能力升高而降低；（4）浅层扮演在工作压力4个维度（工作、患者、技能和同事）对医患关系的影响中起到了完全中介作用，并且这种中介作用受到共情能力的调节；深层扮演仅在患者方面的工作压力对医患关系的影响中起到了完全中介作用，并且这种中介作用受到情绪智力和共情能力的调节。

关键词：口腔医生；工作压力；中国医患关系；情绪劳动；情绪智力；共情能力

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A few years ago, my position was shifted from a clinician to a hospital manager responsible for healthcare research. To better fulfil my duties, I applied for the Doctor of Management in Healthcare Program jointly held by Southern Medical University (SMU) and ISCTE-University Institute of Lisbon (ISCTE-IUL), in Portugal. The past few years of DoM journey has been very rewarding! I am very grateful to my teachers, peers and friends who have supported me along this journey!

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List of Abbreviations

Boot LLCI	Lower level of confidence interval by Bootstrapping
Boot ULCI	Upper level of confidence interval by Bootstrapping
CFI	Confirmatory factor analysis
COR	Conservation of resource theory
DPR-C	Doctor-Patient Relationship in China
DDPRQ-10	Difficult Doctor-Patient Relationship Questionnaire-10
DEWSS	Dentists' Experienced Work Stress Scale
DPR	Doctor-patient relationship
EFA	Exploratory factor analysis
ELS	Emotional Labour Scale (ELS)
ELSS	Emotional Labour Strategy Scale (ELSS)
EQ-I	Emotional Quotient Inventory
IRI	Interpersonal Reactivity Index
IRI-C	Interpersonal Reactivity Index-China
JCQ	Job Content Questionnaire
JSE	Jefferson Scale of Empathy
LSD	least significant difference
M-1SD	Mean - 1 standard deviation
M+1SD	Mean + 1 standard deviation
NSS	Nursing Stress Scale
OSI	Occupational Stress Indicator
OSI-R	Occupational Stress Inventory-Revised
PDRQ-9	Patient-Doctor Relationship Questionnaire-9
PSS	Perceived Stress Scale
WEIS	Wong's Emotional Intelligence Scale
WHO	World Health Organization
WLEIS	Wong and Law Emotional Intelligence Scale

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Chapter 1: Introduction

With China's rapid socio-economic development, Chinese people's material living standards and health awareness have been continuously improving, hence their significantly greater demand for high-quality oral health services. However, the current oral health services fall short of people's increasing oral health needs. At present, a serious shortage of dental practitioners, work overload, mounting work stress, frequent medical disputes and strained dentist-patient relationships have become pressing issues in need of urgent solutions in China. In this context, exploring the potential factors for improving doctor-patient relationship (DPR) bears great significance for building harmonious DPRs and achieving the goals set by China's Oral Health Action Plan (2019-2025) (China's National Health Commission, 2019, March 5).

1.1 Research background

China's Oral Health Action Plan (2019-2025) issued by China's National Health Commission (2019, March 5) clearly stated that efforts should be made to improve China's oral health services in an all-round manner and contribute to the "Healthy China" initiative with the fundamental purpose of improving the oral health of Chinese citizens and facilitated by an improved national oral health service system. As an integral part of overall health, oral health has drawn increasing attention from the society. To improve the quality of oral health services and people's oral health, dentists play a key role in the oral health service system.

According to the Job Demands-Resources (JD-R) model, excessive job demands and prolonged working hours will lead to rapid depletion of employee's emotional resources, causing them to suffer burnout (Bakker & Demerouti, 2007; Demerouti et al., 2001). International studies have shown that dentistry is a very stressful specialty (Antanavičienė et al., 2020; Mujić Jahić et al., 2019; Pan, Li, et al., 2015; K. W. Song & Kim, 2019). Gorter et al. (1999) developed a scale to assess the level of work stress among dentists from seven aspects including Work Pressure, Financial Aspects, Patient Contacts, Work Contents, Career Aspects, Team Aspects, and Professional and Private Life, which has gained widespread attention and recognition from researchers. Currently, the dentists in China are faced with work stress from multiple sources as detailed below.

First, China is faced with a shortage of dental professionals, and dentists in China struggle

with a heavy workload. At present, the number of dental specialists is far from meeting people's increasing needs for quality oral care. Statistics show that the ratio of dentists to population was approximately 1:2,000 in most industrialized countries (Petersen et al., 2005). The reasonable dentists-to-population ratio set by the World Health Organization (WHO) is 1:5,000, while this ratio in China was only 1:11,000, far below the level of industrialized countries and the WHO standard (Qiang & Tian, 2012). Moreover, due to an unbalanced population, geographic and economic distribution in China, human resources for oral health care were also unfairly allocated (Tan et al., 2019). Although the number of dentists in China increased at a rate of 10,000 per year since the end of the 20th century (L. Y. Zhao et al., 2010), it still fell short of people's growing needs for oral health care services. Faced with an increasing number of dental outpatients and emergency patients, dentists need to endure a heavy workload and therefore are prone to burnout or even physical and mental health disorders (Antanavičienė et al., 2020; Pan, Li, et al., 2015; Y. Zhang et al., 2018). Besides, human resources for oral health care in China is unreasonably distributed. S. H. Huang et al. (2004) analysed the composition of personnel in dental departments in Guangdong Province and found that the proportion of dentists exceeded 60%, while that of nurses was only 16%, showing an unreasonable distribution of dentists, nurses and dental technicians. In particular, a serious shortage of dental technicians and nurses made it difficult to meet patients' actual oral health care needs. Since some of the work that should be done by auxiliary healthcare workers have to be done by dentists, dentists have to be responsible for the whole process of oral healthcare services, resulting in low work efficiency and a waste of time, further increasing their workload. Unlike doctors in other clinical departments, dentists are required to work alone most of the time. Therefore, peer support and sharing are important for dentistry development (Choy & Wong, 2017).

Second, dentists need to meet high technical operation requirements and face high medical risks. Due to its particularity, oral clinical treatment calls for precise and accurate technical operations while exposing dentists to occupational hazards (Fan, 2012). Due to the insufficient instruments and equipment used for oral clinical treatment, especially the automated treatment equipment, the oral treatment needs to be proceeded mainly based on the manual and precise operation of dentists. During the treatment process, dentists need to communicate and cooperate with patients, accurately identify the treatment sites, and provide treatment with precise manipulation and strength. Because of this, dentists are required to maintain the same posture for a long time, which will greatly increase the incidence of occupational diseases. The common occupational diseases for dentists include occupational musculoskeletal diseases, cervical spondylosis, lumbar spondylosis, shoulder periarthritis and tenosynovitis (Y. Xu, 2017).

Additionally, different medical devices and materials need to be used during the treatment of oral diseases. These devices and materials may contain gaseous mercury and other harmful chemicals. Dentists may easily get poisoned after inhaling those chemicals and subsequently suffer from depression, irritability, insomnia and other health disorders (Möller & Spangenberg, 1996). Dentists may also be prone to physical damage (by sharp instruments, high decibel noise of instruments, ionizing radiation and other factors), iatrogenic infections (including hepatitis B and human immunodeficiency virus), and chemical lesion (by disinfectants, filling materials, drugs, and other hazardous chemicals) (Fan, 2012). In this sense, dentists are exposed to many occupational hazards. Due to insufficient occupational protection and high medical risks, they need to bear work overload and stay highly vigilant for a long time, which consumes a lot of their resources and energy and exposes them to huge stress and high risks.

Third, patient contacts cause huge stress to dentists. During the diagnosis and treatment of oral diseases, dentists need to maintain close contact with patients. Because of this, both parties are susceptible to each other's emotions. Due to the long-time of each single visit and the need for many follow-up visits, the whole treatment process will consume a great deal of patients' time, energy and money. If the treatment effect is not satisfactory or is far below the expectations, patients are prone to venting their negative emotions on dentists, which will cause psychological pressure among dentists. Besides, the oral cavity is highly sensitive. During the treatment of oral diseases, the instruments used by dentists will produce dental drilling noise, or even inflict severe pain on patients, which will increase the anxiety and nervousness of patient and cause them to experience fear and psychological repulsion or even dental phobia (W. Zhang, 2019). Due to the unpleasant experience brought about by oral disease treatment, many patients only go to see a dentist when they have no other choice and cannot bear the pain. In such cases, patients hardly show strong cooperation and compliance during the diagnosis and treatment process, therefore increasing treatment difficulty. Meanwhile, patients are even inclined to doubt the proficiency of their dentists when they suffer from unbearable pain, while dentists tend to feel stressed because of their fear of medical errors or disputes (Wang & Guan, 2018). A survey on occupational stress and burnout among Hong Kong dentists identified patient-related factors (including the possibility of making mistakes, patient having a medical emergency in the surgery, treating extremely nervous patients, coping with uncooperative patients and high patient expectations) to be major occupational stressors for Hong Kong dentists (Choy & Wong, 2017).

Fourth, medical disputes occur frequently, leading to strained DPRs. In recent years, "medical disputes" have become a topic of keen interest discussed and concerned by the public.

According to statistics, about 100 medical disputes with compensation claims occurred in China's Grade-A tertiary hospitals every year, of which about 30 cases ended up in court. The compensation fees for medical disputes reached about one million yuan every year; while China's secondary hospitals experienced about 20 medical disputes with compensation claims every year, five of which ended up in court. Additionally, 73.3% of the hospitals in China experienced incidents in which healthcare workers were beaten, scolded or threatened by patients and their family members (Y. H. Lu, 2017). Due to the particular nature of dentists' practices, a dentist may need to frequently interact and communicate with one or more patients for a long time, which may give rise to medical conflicts (G. Wang & Guan, 2018). The disputes between dentists and patients during the process of oral treatment was on the rise (Ye, 2014). In 2016, Director CHEN Zhongwei of the Dental Department of Guangdong Provincial People's Hospital was secretly followed and brutally murdered by a patient he treated more than 20 years ago, which caused quite a stir among dentists and in the healthcare community. The patient subjectively felt his teeth getting discoloured, claimed for compensation even when the doctor had no fault, and stabbed the doctor with a knife after his demand for compensation was rejected. This violent incident against the dentist reminds us that no matter how perfect the oral diagnosis and treatment facilities of a healthcare facility are, or no matter how rich the expertise and work experience of the dentists are, disputes between dentists and patients may still arise from the interactions between the two parties, and the problem of DPR remains very acute and serious due to the particularity of oral diagnosis and treatment as well as the subjective feelings of patients.

The above-mentioned job characteristics of dentists show that dentists need to not only use expertise and skills to help patients recover from oral diseases, but also perform emotional labour in the treatment process. Emotional labour is essentially the process of communication between doctors and patients, during which, face-to-face verbal communication is required to pacify patients and establish mutual trust between doctors and patients. Firstly, the oral treatment usually costs patients a lot of time and involves many times of follow-up visits, and patients are generally nervous and anxious before surgeries (F. Liu, 2001); secondly, during the oral treatment, the high-decibel noise generated by the equipment and instruments in a high-speed operation can cause adverse stimulation to the human body and aggravate the irritability and nervousness of patients; besides, as the oral cavity is a very sensitive organ, intraoral operations, especially the use of high-speed air-turbine dental handpieces to drill teeth, will produce vibration, and the incision of the mucosa during extraoral tooth extraction will stimulate the sensitive tooth nerve of patients, resulting in varying degrees of pain (Wang &

Guan, 2018). Dentists need to deal with many sceptical and anxious patients every day, making emotional labour inevitable for them. Emotional comfort can increase patients' cooperation with treatment (R. Zhou, 2017) and increase their trust in dentists, which will facilitate dentist-patient communication. Emotional intelligence and empathy, as dentists' personal emotional resources, will also be naturally utilized during the whole process of dental treatment.

As a major population health challenge, oral diseases have drawn worldwide attention (Bernabe et al., 2020; Kassebaum et al., 2014; Kassebaum et al., 2017; Marcenes et al., 2013; Tonetti et al., 2018; L. Wu et al., 2022). The Global Burden of Disease (GBD) (1990-2017) study shows that there were 3.5 billion cases of oral conditions globally (Bernabe et al., 2020). Specifically, untreated caries in permanent teeth was the most prevalent condition evaluated by the GBD 2010 study, whereas severe periodontitis and untreated caries in deciduous teeth were the 6th and 10th most prevalent (Marcenes et al., 2013), all of which were characterised by a high incidence rate and a large number of patients. Moreover, oral diseases have imposed huge impact on society and economy. According to statistics, the worldwide productivity losses due to severe periodontitis totalled USD 53.99 billion every year, and the global economic burden of dental diseases amounted to USD 442 billion in 2010 (Listl et al., 2015; Tonetti et al., 2017). The oral health of Chinese people is also a cause for concern. According to the 2017 National Oral Health Epidemiological Survey, the number of 12-year-old children with dental caries in permanent teeth increased by 7.8% compared with that of a decade ago; and the prevalence of dental caries in deciduous teeth in five-year-old children grew by 5.8% to 70.9% compared with that of a decade ago. In addition, middle-aged people generally suffer from periodontal diseases. Among those aged 35-44 years old, 96.7% were diagnosed with dental calculus, and 87.4% with oral health problems such as gingival bleeding, up by 10.1% compared with that of a decade ago. In 2019, China's Oral Health Action Plan (2019-2025) issued by the China's National Health Commission (2019, March 5) specified that efforts should be made to continuously refine the national oral health service system, strengthen the cultivation of oral health professionals, and comprehensively improve the oral health of the Chinese people. As the direct provider of oral health services, dentists play an important role in improving the quality of oral health services and effectively maintaining the oral health of the people. Therefore, paying attention to the job demands and characteristics of Chinese dentists, analysing the work stressors and DPR among dentists, and exploring ways to improve the mutual communication and mutual trust between dentists and patients are of great significance to building harmonious DPRs and achieving the goals set by China's Oral Health Action Plan (2019-2025).

1.2 Research problem

The WHO declared workplace stress as a worldwide health epidemic of the 21st century (Pejčić et al., 2018). Each workplace has potential risk factors related to incidence of certain diseases. However, some professions are commonly perceived as more stressful, and dentistry is one of them (Muhic et al., 2016). Many work-related factors can lead to stress among dentists, such as heavy clinical work, a poor work environment, nervous and anxious patients, infliction of pain on the patient, long worktime and limited career promotion channels (Mujić Jahić et al., 2019). Dentists in China are faced with various stressors, such as work overload, frequent medical disputes and tense DPRs (Fan, 2012; Pan, Li, et al., 2015; Ye, 2014; Y. Zhang et al., 2018).

There have been many studies on work stress among dentists, and these studies mostly focus on such aspects as stressors, level of stress, stress assessment, negative influence and stress coping (Divaris et al., 2012; Marklund et al., 2020; Möller & Spangenberg, 1996; Myers & Myers, 2004; K. W. Song et al., 2017; K. W. Song & Kim, 2019). Gorter et al. (1999) developed the Dentists' Experienced Work Stress Scale (DEWSS) to assess the risks in 709 Dutch general dental practitioners and identified patient contacts and career perspective to be the top two stressors. Newton et al. (2006) explored the prevention and alleviation of stress amongst dental practitioners, covering a series of aspects such as experience of stress, coping mechanisms and behavioural change; K. W. Song et al. (2017) found in their study on the occupational stress among dentists in South Korea that occupational stress could lead to depression, anxiety, sleep problems and other disorders. Most of the studies conducted in China focus on the assessment of dentists' occupational and work stress (Y. Zhang et al., 2018), job characteristics (Pan, Li, et al., 2015), occupational hazards (Fan, 2012) and occupational well-being (R. Zhou, 2017). There is still a lack of theory-driven research on work stress among dentists in China.

Studies have shown that huge work stress will not only reduce doctors' work efficiency, but also lead to doctor-patient disputes in serious scenarios (A. Q. Wang et al., 2016). Due to the job characteristics of dentists, a dentist may need to interact and communicate with one or more patients on a face-to-face basis more frequently for a long time, during which medical conflicts are more prone to occur (Wang & Guan, 2018). Research suggests that doctor-patient disputes arising from oral diagnosis and treatment had been on the rise in recent years (Ye, 2014). However, there are relatively few studies on the relationship between dentists' work stress and DPR.

Hochschild (1983) argued that the work of service employees involves not only physical

and mental labour but also emotional labour and divided emotional labour into two categories, namely surface acting and deep acting, based on the degree of effort involved. Surface acting occurs when an individual displays the emotion required by an organization without changing how he/she actually feels to adapt to or cater to the needs of the organization; deep acting is a process where an individual changes his/her emotions to align with the needs of the organization, producing more natural and genuine emotional displays. In the process of providing healthcare services, healthcare workers need to know the conditions of patients all the time and establish good communication with patients, which makes it necessary for healthcare workers to display positive emotions and perform emotional labour.

Firstly, dentists need to perform more emotional labour due to their job characteristics. An analysis of the psychology of the patients who underwent dental surgeries revealed that patients were generally nervous and anxious before surgeries. Specifically, most of the children were frightened and anxious; the elderly patients, with more complex psychological activities, were mainly sceptical; and emergency patients felt restless before surgeries as they were being tortured by pain (F. Liu, 2001).

Secondly, the operation of surgical instruments (such as dental drill handpieces, curettes and scalpels) during oral treatment will generate high-decibel noise, which will make patients highly nervous and irritable. Moreover, oral cavity is a very sensitive organ. Pain and stimulation to patients is unavoidable during dental surgeries, which will cause fear in patients. Therefore, when dealing with anxious and irritable patients every day, dentists need to perform more emotional labour by identifying the emotions of patients and timely comforting patients for many times to increase their degree of cooperation.

Emotional labour can help improve the work performance and effectiveness of healthcare workers, but it can also produce a negative impact on them. As an emotional effort, emotional labour can also potentially develop into a work stressor. Relevant research findings have shown that emotional labour is positively associated with work stress, and higher levels of emotional labour will lead to higher levels of work stress (Khalid et al., 2019). Although some studies have shown that the voluntary engagement of healthcare workers in emotional labour produces a significant effect on the improvement of DPR (Yuan et al., 2021), long-term emotional labour will not only impair the mental health of healthcare workers but also exert a negative impact on the improvement of work efficiency and the establishment of harmonious DPRs. A survey on the emotional labour of dentists suggested that the job characteristics of dentists significantly affect their degree of emotional exhaustion (Pan, Li, et al., 2015). However, studies on the status of dentists' emotional labour, the choice of dentists' emotional strategies and the relationship

between work stress and DPR are still limited in existing literature.

Emotional intelligence is the ability of an individual to accurately perceive their own emotions and the emotions of others and to regulate their own emotions and behaviours (Mayer et al., 1990). In the face of work stress, employees with high levels of emotional intelligence can accurately perceive the emotions of themselves and others, exercise strong adaptability, and adopt appropriate coping strategies (Furnham et al., 2002) to mitigate the adverse impact of work stress and facilitate positive outcomes of stress. Emotional intelligence is one of the influencing factors of emotional labour, and the two are significantly positively associated with each other. Workers with higher levels of emotional intelligence were found to be more likely to perceive the need to frequently display emotions as part of their work role and perform deep acting in response to these situational demands (Brotheridge, 2006). Studies have shown that healthcare workers with higher levels of emotional intelligence tend to experience more harmonious DPRs and higher levels of job satisfaction (Weng, 2008; Weng et al., 2011). Weng et al. (2011) suggested that doctors' emotional intelligence was significantly and positively associated with the patient's trust and DPR (Weng, 2008; Weng et al., 2011). Currently, there are few studies on the emotional intelligence of dentists. In their study on the emotional intelligence of dentists, Pan, Li, et al. (2015) found that emotional intelligence negatively regulates the relationship between job characteristics and reduced sense of personal achievement. In short, dentists with a relatively high level of emotional intelligence can regulate their emotions to adapt to the reduced sense of personal achievement caused by their job characteristics. By doing so, dentists can quickly recognise and perceive the changes in emotion among patients and themselves, establish a good DPR by understanding and adapting to the patients' emotions, and improve their sense of personal achievement by winning the cooperation and recognition of patients (Pan, Li, et al., 2015). In this sense, a study on how dentists' emotional intelligence impacts the relationship between emotional labour, work stress and DPR can fill the existing research gap.

Empathy refers to the ability of an individual to accurately appraise and perceive the specific feelings and thoughts of others. The physician empathy, in patient-care situations, is defined as "a cognitive attribute that involves an ability to understand the patient's inner experience and perspective and a capability to communicate this understanding (Hojat et al., 2002, p. 1564)". Some scholars believe that empathy is a process of understanding a patient's inner thoughts and opinions, and then communicating this understanding to the patient. Empathy facilitates better clinical treatment outcomes and fosters a meaningful nurse-patient relationship (Nightingale et al., 1991a; Olson, 1995; Spiro et al., 1993). Some studies suggest

that emotional labour education can effectively improve the empathy of nurses, reduce burnout, and improve nurses' job satisfaction (L. Y. Li & Wu, 2020). The empathy of healthcare workers is a necessary pre-condition for the alleviation of anxiety and pain inflicted on patients by diseases and for the facilitation of harmonious DPRs (Astrow, 2015). Jones and Huggins (2014) studied the influence of empathy on the dentist-patient relationship. The results showed that empathy is positively associated with higher levels of patient satisfaction, negotiated treatment plans, treatment adherence, and lower dental anxiety. In terms of work stress and empathy, the study by Y. J. Yang et al. (2021) showed that the stress level among doctors is an important factor for the strained DPR, and empathy mediates the relationship between work stress and DPR. In this sense, doctors' empathy is an important guarantee for a harmonious DPR. A survey on the influencing factors of dental students' empathy indicated that depression and stress can significantly reduce empathy (Rajput et al., 2020). However, there have been very limited studies on the impact of dentists' empathy on emotional labour, work stress and DPR. Thus, in-depth research and exploration are needed.

According to the JD-R model, excessive job demands and prolonged working hours will quickly exhaust employees' resources. From the conservation of resources (COR) theory perspective, when loss of resources occurs, people will mobilise other resources to compensate the loss. Besides, timely replenishment of job resources can alleviate the depletion of energy caused by high job demands and motivate high work engagement and excellent performance (Bakker & Demerouti, 2007; Demerouti et al., 2001). According to the job characteristics of dentists, high work stress and emotional demands can be considered as the job demands of dentists. When work stress piles up, healthcare workers need to perform relatively much more emotional labour, which will lead to a certain degree of resource consumption. A sound DPR can be regarded as a kind of valuable job resources, while doctors' emotional intelligence and empathy can also be considered as effective personal resources. In this sense, it is relevant to conduct in-depth research on the impact of the aforesaid resources on job demands. At present, there is a lack of studies on the relationships among dentists' emotional labour, work stress and DPR. Moreover, studies on the relationship between dentists' emotional intelligence and empathy are also limited. In this context, this study includes both emotional intelligence and empathy as variables to explore the relationship between work stress and DPR.

1.3 Research purpose

This study endeavours to: (1) understand the status of work stress, DPR and emotional labour

among dentists; (2) explore the relationship between work stress and DPR among dentists; and (3) explore the roles of emotional intelligence and empathy in the relationship between work stress and DPR among dentists. It is expected that this study will help identify the potential favourable factors for work stress alleviation and DPR improvement from the perspective of dentists themselves, provide scientific suggestions for hospital managers to formulate management strategies, improve the quality of healthcare services, and facilitate the harmonious development of DPR.

1.3.1 Theoretical significance

This study will enrich the theory of emotional labour.

First, this study is an empirical study using emotional labour theory in the Chinese context. It can help widen the scope of application of the emotional labour theory. Besides, this study explores in depth work stress as an antecedent and DPR as an outcome of emotional labour.

Second, most of the existing studies focus on the outcomes of emotional labour, such as burnout, job satisfaction, occupational wellbeing, emotional exhaustion and turnover intention. Few studies have focused on the impact of emotional labour on DPR. Moreover, the factors affecting emotional labour are less analysed and discussed from the perspective of emotions;

Third, there are few studies on dentists' emotional labour, even less on the role of emotional labour in the relationship between work stress and DPR, so are the empirical studies on surface acting and deep acting.

To fill these research gaps, this study aims to explore the role of emotional labour in the relationship between work stress and DPR among dentists, and to identify the effects of emotional intelligence and empathy on this relationship.

1.3.2 Practical significance

China's Oral Health Action Plan (2019-2025) issued by the China's National Health Commission (2019, March 5) pointed out that efforts should be made to strengthen the cultivation of oral health professionals, improve the national oral health service system, and comprehensively improve the oral health of the Chinese people. As an important part of the oral health service system, dentists play an important role in improving the quality of oral health services, effectively maintaining the oral health of the people, and building harmonious DPRs.

Through exploring the impact of dentists' emotional labour on the relationship between work stress and DPR, this study will help hospital managers understand the status of dentists'

work stress and DPR as well as the main reasons behind, so that they can take effective and comprehensive measures from an organizational perspective to alleviate the work stress among healthcare workers, improve their understanding of the factors of emotion management, and facilitate doctor-patient communication. Besides, hospital managers can apply the knowledge of positive psychology and take targeted measures to foster healthcare workers' ability to manage and express their emotions. Furthermore, this study can also help government authorities understand the impact of work stress and DPR on dentists, so as to formulate effective management policies and take comprehensive measures to alleviate work stress among dentists, foster mutual trust between dentists and patients, strive to establish harmonious DPRs, and achieve the goals set by China's Oral Health Action Plan (2019-2025).

1.4 Research questions

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

1. What is the status of work stress and doctor-patient relationship among dentists, and how is it like among dentists with different sociodemographic characteristics in Shenzhen, China?
2. Will dentists' work stress affect doctor-patient relationship?
3. How does dentists' emotional labour (surface acting and deep acting) affect work stress and doctor-patient relationship?
4. Do dentists' emotional intelligence and empathy moderate the relationship between work stress and doctor-patient relationship?

1.5 Thesis structure

This thesis consists of the following five chapters.

Chapter 1: Introduction. This chapter introduces the research background, research problem, research purpose, research significance and research questions.

Chapter 2: Literature Review. This chapter reviews the theories, existing studies, and measurement methods related to work stress, DPR, emotional labour, emotional intelligence and empathy. Moreover, it describes the COR theory and JD-R model to lay a theoretical foundation for this study and proposes the research hypotheses and research model.

Chapter 3: Research Methods. This chapter elaborates on the methods and process of questionnaire design, data collection and statistical analysis. In this chapter, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were conducted on the collected sample

data to test the reliability and validity of the questionnaire. In addition, the independent samples t-test and one-way ANOVA were used to compare the overall means of the measurement variable scores among groups with different sociodemographic characteristics, and PROCESS macro was used to validate the moderated mediation model.

Chapter 4: Results and Hypotheses Testing. This chapter reports the results of descriptive statistics, the results of correlation analysis and one-way ANOVA analysis, and the PROCESS-macro-based hypothesis testing results of the theoretical model.

Chapter 5: Discussion and Conclusions. Results of this empirical study are analysed and discusses in comparison with the results of existing studies. Conclusions are drawn, theoretical and practical implications highlighted, limitations pointed out, and suggestions for future research put forward.

Chapter 2: Literature Review

This chapter reviews theories, existing studies and measurement methods related to work stress, DPR, emotional labour, emotional intelligence and empathy. It also describes the COR theory and the JD-R model to lay the theoretical foundation for this study, on which basis the research hypotheses and research model are put forward.

2.1 Work stress

2.1.1 Stress and Work Stress

Stress

The word “stress” comes from the Latin word “stringere”, meaning to draw tight or to tighten. In 1914, some sociologists began to focus on the study of stress. From the 1930s onwards, the study of stress expanded into the fields of psychology, management and sociology. Stress was described as “a state of psychological and mental tension experienced by an individual”. Early theories of stress were classified as follows (N. Cai, 2019): (1) stimulus theory: Lazarus and Launier (1978) argue that stress is an external stimulus to an individual, which results in a sense of tension and fear. The stimulus theory draws on the law of elasticity in physics to argue that there is a range in an individual’s tolerance for stress, and that once the relative balance between stress intensity and tolerance is broken, the individual will suffer a negative impact on his/her physical and mental health (Lazarus & Launier, 1978); (2) reaction theory: Quicke (1984) argues that stress is an individual’s ability to adapt to the demands of the environment. His view focuses on the response to stress and the treatment of symptoms. The reaction theory, from a biomedical perspective, defines stress as the psychological response of an individual to environmental stimuli, manifested as reactions such as tension and anxiety, with an emphasis on the consequences of stress; (3) stimulus-response theory: Marshall and Cooper (1976) contend that stress results from an interaction between external environmental stimuli and the individual’s response and is a dynamic process that occurs when the individual’s wishes are in conflict with the satisfaction provided by the organization (Marshall & Cooper, 1976). Similarly, McGrath (1971) holds that stress occurs when there is an imbalance between an individual’s needs and the level of competence he or she possesses.

The above theories of stress are all early theoretical findings. What they have in common is that their definitions of stress emphasise environmental stimuli, which are external variables. The differences lie in that the stimulus theory focuses on the source of stress; the response theory focuses on the individual's reaction; and the stimulus-response theory combines these two perspectives, emphasising that stress is the result of the interaction between the individual and the environment, which is a dynamic process. All these theories provide a solid theoretical basis for the research on work stress.

Work stress

Since the 1970s, the scope of research on stress has gradually expanded to the fields of sociology, management and organizational behaviour, and stress from work has received widespread attention. Kahn et al. (1965) introduced the study of stress to the field of business management and named it "work stress", alternatively known as "occupational stress". Rajeev et al. (2017) defined work stress as the dissonance between an individual's perception and the demands of the job, resulting in a psychological or physical state of stress; or a negative emotion that is harmful to the individual's body and mind because the person is not capable of performing the job. Quick et al. (1990) defined work stress as a generalised, regular and unconscious mobilisation of the body's natural capacity resources in the face of a stressor. Some scholars in China consider work stress a series of negative reactions that individuals physically and mentally show when their own abilities are not able to meet the demands in the workplace (Z. H. Li & Liao, 2001). Shi (2003) puts forward that work stress is a stimulus response that causes individuals to become stressed in the workplace because of differences in their abilities and needs.

The theories related to work stress can be classified into three main categories (Xiao, 2020): (1) person-environment fit theory: it considers work stress a problem related to the mismatch between the individual and the environment, and is widely recognised and applied in research on stress. It emphasises the outcome of the interaction between the individual and the environment. If the individual fits the environment, good adaptation will occur, otherwise there will be a poor stress response; (2) job demand-control model: it suggests that job stress arises from the interaction between job demand and job control. Karasek (1979) states that work stress is influenced not only by job demand but also by job control, both of which affect work stress. Job demand refers to the degree of job conformity, which mainly includes such factors as time pressure and role conflict. Job control refers to the extent to which relevant skills are used and decisions made to control the various aspects of the work process. Job demand can help not only unleash potential but also increase job stress, and effective job control processes can

reduce stress and increase motivation (Karasek, 1979). As research progressed, the social support dimension began to be introduced into the job demand-control model, which evolved into the job demand-control-support model, the main idea of which is that job control and support together can diminish the negative effects of job demand; (3) interaction model: The study conducted by Lazarus (1966) showed that stress is not influenced by the individual and the environment alone, but is closely related to the environment, the individual's evaluation of environmental stimuli and the threat that may arise. The relationship between the individual and the work environment is dynamic and is the result of interaction between the two. The individual evaluates the importance of the environment to him or her, followed by whether the individual has the resources to cope. Stress occurs only when the individual's resources are unable to meet the demands of the job, and this is the process by which work stress is created. Meanwhile, as time and task situations change, so does the way in which stress is coped with.

Based on the above theories related to stress and work stress and with reference to the definition of work stress in the studies on healthcare workers that “work stress is the physiological and psychological reactions of individuals whose work behaviours are threatened and later pressured when their personal characteristics interact with the objective environment” (N. Cai, 2019, p. 4), this study defines work stress among dentists as *a series of physiological, psychological and behavioural changes that occur when dentists are threatened or pressured by the interaction between the external environment and themselves at work.*

2.1.2 Existing studies on work stress

A synthesis of research from various sectors of society shows that work stress outcomes are related to performance, job satisfaction and turnover rates from an organizational perspective. Work stress is a double-edged sword at the organizational level; appropriate stress can increase employee motivation and improve productivity, while excessive work stress often leads to higher turnover rates and lower job satisfaction. Collins (1993) found through a survey of company accountants that prolonged high-pressure work environments significantly increased employees' turnover intention. Besides, an empirical study on work stress, career satisfaction and life satisfaction among college teachers suggested that high job stress reduced career satisfaction (Y. F. Chen & Mao, 2010).

Prolonged exposure to high levels of work stress can have a negative impact on the physical, mental and social well-being of healthcare workers. Studies have revealed that clinicians' work stress is at a higher level compared to the general workers (Thomas & Valli, 2006). Besides,

excessive work stress can cause high rates of job errors, low levels of job satisfaction, emotional exhaustion, increased levels of burnout and turnover intention. It can also induce negative behaviours such as smoking, alcohol abuse and suicide (K. W. Song et al., 2017). A survey on work stress outcomes among healthcare workers indicated that as healthcare workers are responsible for curing diseases, tremendous work stress persists, and when the stress cannot be relieved, burnout occurs, leading to reduced job satisfaction (T. A. Yang et al., 2017). Immense work stress can lead to not only poor work performance among doctors but also doctor-patient disputes in severe cases (A. Q. Wang et al., 2016).

The research on stress among healthcare workers in China took a relatively late start and is a relatively new area of research. The primary role of healthcare workers is to protect the lives and health of patients through medical treatment. In this process, healthcare workers are inevitably exposed to various stressors from within and outside the hospital. The results of an empirical study on healthcare workers conducted by L. J. Chen and Gou (2014) identified frequent work shifts, shortage of healthcare workers and limited attention to nursing to be the main work stressors. In a study on physician stress in emergency departments, W. Cai (2017) identified disharmonious DPRs, work overload, heavy job responsibilities, limited career development channels and difficulty to reconcile family and work relationships to be the main work stressors. A study by Y. Q. Yang et al. (2018) showed that healthcare workers have a wide range of work stressors, with occupational risk, doctor-patient communication, workload, work perception, social environment and organizational management being the main ones.

G. Li (2006) defines the profession of dentist as a general term for people who have received professional dental education and training, mastered the knowledge and skills related to dentistry, and obtained the corresponding academic qualifications, and are able to provide patients with correct and effective oral health services and facilitate the high-quality development of dental health. As an important part of the dental health service system, dentists play an important role in improving the quality of oral health services, effectively maintaining the oral health of the public and building harmonious DPRs. However, existing studies generally agree that dentistry is a stressful profession (Antanavičienė et al., 2020; Pan, Li, et al., 2015; K. W. Song & Kim, 2019). Presently, dentists in China are facing pressure from multiple sources.

1. Work aspects

Currently, China has a relatively small number of dental practitioners, who are faced with a heavy workload, a poor work environment and high medical risks. The incidence of oral diseases among Chinese residents is relatively high, while the ratio of dentists to the population

is close to 1:11,000, far below the standard of 1:5,000 set by developed countries and WHO (Qiang & Tian, 2012). The high demand for consultations and the low number of dental professionals has led to a fast-paced and relatively intense workload for dentists. Meanwhile, dental visits are characterised by long consultation times (30-40 minutes for one patient), frequent follow-ups, long working hours and high levels of concentration, leaving doctors in a state of high mental and physical strain for long periods of time. As a result, the physical fitness requirements of dentists are higher than those of other clinical departments (M. Hayes et al., 2009). Particularly, older, physically challenged and poorly sighted dentists face greater stress and workload.

In addition, the workplace of dentists is small and confined, with poor air circulation, and the medical equipment used is noisy, making the work environment not ideal and prone to medical risks. During the treatment of the oral cavity, dentists are required to maintain a certain posture for a long period of time, which can lead to cervical spondylosis, lumbar spondylosis and scapulohumeral periarthrititis (Pejčić et al., 2017; Y. Xu, 2017). Some therapeutic materials contain amalgam, and dentists may inhale gaseous mercury causing mercury poisoning, resulting in depression, irritability and insomnia (Möller & Spangenberg, 1996). Besides, dentists may also suffer physical injuries (caused by such factors as sharp instruments and ionising radiation), iatrogenic infections (such as hepatitis B and HIV) and chemical damage (caused by such factors as disinfectants, fillers and drugs) during patient contact (Fan, 2012).

2. Competency aspects

Due to the unique nature of dental treatment, the “one-to-one” model between doctor and patient is often adopted. The doctor mainly examines and treats the patient through his/her own hands, which is a refined operation performed by hand. The patient can also perceive the treatment process and treatment effect at any time during the treatment process, which also requires the doctor to have solid expertise and sophisticated skills (Wang & Guan, 2018) to gain the trust and recognition of patients. Besides, the oral cavity is seated in a special anatomical location as it is related to the patient's face and pronunciation and will directly affect social activities if not handled properly; the oral cavity, which performs the function of mastication as the gateway to the body, is directly related to the eating function. In particular, the condition of the oral cavity will directly influence the nutritional intake and physical health status of the elderly and young patients. All these characteristics require the doctor to have excellent skills to handle each procedure properly.

In addition, oral diseases are diverse, ranging from acute diseases with rapid onset and unbearable pain to chronic diseases that persist for years. So, dentists are required to make

treatment decisions for complex oral conditions; dental patients include young children and infants who are unable to cooperate as well as elderly patients with poor health conditions and cardiovascular, respiratory and digestive system diseases. Because of this, treatment solutions need to be well-considered, safe and effective; moreover, the systemic treatment of oral diseases is difficult and lengthy. The solutions provided by the dentist need to be based on the patient's physical condition and financial situation. And there may be a risk of medical errors. All these situations require a high level of professional skills from the dentists.

3. Patient aspects

Dentists need to interact and communicate with their patients on a long-term basis. The stressful feeling of frequent contact can be even more pronounced when dealing with patients who are picky, those who come from a different cultural background, and those who hold distrustful and sceptical attitudes. Due to the proximity to the patient, the length of the visit and the number of follow-up visits, the cost in terms of time and energy is high. Besides, if the treatment is unsatisfactory, the patient is likely to vent negative emotions on the dentist, putting psychological pressure on the dentist (Fan, 2012).

As the oral cavity is a highly sensitive organ, intraoral drilling and extraoral extractions can touch the patient's sensitive dental nerve, causing varying degrees of pain, which inevitably causes irritation and even fear in the patient, affecting their cooperation and compliance with treatment and making it more difficult for the doctor to treat the patient. In serious cases, patients may even doubt the doctor's skills because of the pain and make negative comments on the doctor as a result (Wang & Guan, 2018).

In addition, due to such factors as inadequate communication between doctors and patients in China, inadequate coverage of the medical insurance system, the large number of relevant examination items, high consultation fees and patients' high psychological expectations for the consultation, patients are prone to making complaints and even causing doctor-patient disputes once the treatment results are unsatisfactory. Many studies have shown that patients-related factors are the main factors causing increased stress among dentists (Choy & Wong, 2017; Gorter et al., 1999; K. W. Song et al., 2017).

4. Colleague aspects

Clinical diagnosis and treatment operations require the assistance of dental nurses or auxiliary personnel. There are hundreds of different types of equipment and consumables used in the treatment process as well as many different material specifications, which require the supporting staff to have a high level of professional familiarity to ensure efficient treatment. Therefore, dentists are highly dependent on competent assistants (Fan, 2012). In addition, many

hospitals do not have enough nurses in their dentistry departments (S. H. Huang et al., 2004) to carry out “four-handed operations”. Particularly, in primary care hospitals, where there is a serious shortage of nurses, dentists are required to carry out both doctor and nurse duties, and doctors are also responsible for tasks that should be carried out by nurses, resulting in inefficiency and wastage of time, further increasing the workload of dentists. Therefore, the lack of professional support staff for the team and the lack of professional familiarity of support staff can also exert pressure on the dentists.

2.1.3 Measurement of work stress

Due to the diversity and complexity of work stressors, it is necessary to factor in the various influences of the individual and the external environment when constructing work stress measurement models. The main types of work stress measures that have been applied by Chinese scholars are as follows.

1. Occupational Stress Indicator (OSI)

The OSI was designed by Cooper et al. (1988) and consists of three components: sources, moderators and consequences of occupational stress. The OSI provides a structured and relatively quantitative interpretation of the abstract concept of occupational stress and is widely used internationally. It has been translated into several languages and used in studies in different countries, regions and industrial contexts, and its reliability and validity have been widely demonstrated. The scale has been continually refined in terms of variable concept, item content, structure and statistical methods. The most recent version is the Occupational Stress Inventory-Revised (OSI-R), introduced in 1998, which provides a comprehensive measure of a respondent's occupational adjustment by measuring its three domains: occupational stress, psychological strain and coping resources (Xiao, 2020).

2. Job Content Questionnaire

The Job Content Questionnaire (JCQ) was designed by Karasek (1979) based on the job demands-control (JD-R) model and is available in both a proprietary version (71 full test items) and a shared version (27 abridged test items). It consists of such dimensions as job demands, job control and social support measured by items scored on a four-point Likert Scale. It has been used in large scale studies of occupational groups in the Nordic countries and the U.S., particularly in studies of work stress and physiological emergencies (e.g., hypertension, coronary heart disease and heart attacks). In Nordic countries such as Finland and Switzerland, a simplified version of the JCQ consisting of 9-1 compressed test items scored on a five-point

Likert scale is used (Xiao, 2020).

3. Work Stress Questionnaire

The Work Stress Questionnaire was developed by the American psychologist McLean's based on the person-environment fit theory and is composed of three dimensions: stressors, job satisfaction and coping strategies (Lam et al., 1985). The Stressors Scale measures whether the respondent is experiencing role conflict, role ambiguity and stressful supervisory support in the work situation. The questionnaire consists of 12 items scored on a five-point Likert scale.

4. Work stress scales for healthcare workers

Gray-Toft and Anderson (1981) designed the Nursing Stress Scale (NSS) to study nurses' stressors in terms of their work situation, interpersonal relationships and social support, and the results showed that nurses' stressors came from seven aspects. Based on the study by Gray-Toft and Anderson (1981), Chinese scholars took into consideration China's reality and found that the stressors of Chinese nurses came from five aspects: issues related to the nursing profession and nursing work, workload and time allocation, work environment and resources, patient care as well as management and interpersonal relationships (Y. Liu & Li, 2000).

For the specific group of dentists, Gorter et al. (1999) developed DEWSS, consisting of seven subscales with 92 items, namely work pressure (WP) (seven items), financial aspects (FA) (19 items), patient contacts (PC) (18 items), work contents (WC) (19 items), career perspective (14 items), team aspects (TA) (eight items) and professional and private life (PL) (six items). The scale has an overall Cronbach's α of 0.96 and a Cronbach's α of 0.77-0.91 for each dimension, indicating its good reliability and validity (Gorter et al., 1999).

2.1.4 Summary

With people's increasing demand for quality healthcare services and the development of medical technology, healthcare workers are required to have higher levels of professionalism and higher comprehensive qualities, which has posed a serious challenge to them and increased their work pressure. Compared to foreign countries, research on stress in China took a late start with limited research results. Despite so, with the increasing attention paid by the state and society to healthcare workers, research on work stress among healthcare workers is gradually increasing. However, most of the existing studies are focused on work stress among nurses. As an important part of the healthcare workforce, dentists also face stress in many ways. However, there are relatively few systematic studies on work stress among dentists, and even fewer studies on the relationship between work stress and DPR among dentists.

A review of existing literature shows that much has been reported about the sources and outcomes of work stress. It has been found that clinicians experience high levels of work stress compared to the general working population (Thomas & Valli, 2006), and that excessive work stress can cause high rates of job errors, low job satisfaction, emotional exhaustion, increased levels of burnout and turnover intention, and can also induce negative behaviours such as smoking, alcohol abuse and suicide (K. W. Song et al., 2017). Dentists have a heavy workload, face high occupational risks, suffer from high levels of patient impact, and work in a hostile professional environment. Y. Zhang et al. (2018) assessed dentists through a work stress survey and found that prolonged high stress among dentists can lead to depression, anxiety and reduced sleep quality. Pan, Li, et al. (2015) found that work stress significantly influenced the degree of emotional exhaustion among dentists. The impact of factors such as emotional labour strategies (surface acting and deep acting) and emotional intelligence related to personal emotion regulation on work stress requires further study.

2.2 Doctor-patient relationship (DPR)

2.2.1 Doctor-patient relationship

DPR, as its name suggests, refers to the relationship between healthcare workers and patients in the course of treatment. DPR is an important part of human culture, the key to healthcare services and the core of interpersonal relationships in health care (Long & Xiao, 2013). Focusing on DPR is one of the effective ways to ensure the standard and quality of healthcare services.

There is a relatively consistent understanding of the definition of DPR among researchers. It is generally agreed that DPR refers to the specific relationship between healthcare workers and patients in the process of medical practice. Researchers have defined DPR in a narrow sense and in a broad sense. Specifically, DPR in a narrow sense only refers to the relationship between doctor and patient (W. J. Zhang et al., 2014); while DPR in a broad sense refers to the relationship established between healthcare workers and the patient community based on medical activities, with the healthcare workers including doctors, nurses, medical laboratory technicians and hospital administrators, and the patient community including patients themselves as well as their families, friends and relatives (Rao, 2007).

From a technical perspective, DPR can be understood from two levels: technical and non-technical. The technical DPR refers to the extent to which the doctor treats the patient using the

appropriate treatment techniques and the patient cooperates with the doctor. DPR in the technical sense will have a direct impact on treatment outcomes and patient health as they relate to the core treatment process. The DPR in the non-technical sense refers to the communication between the doctor and the patient regarding the patient's condition during the treatment process, and the interaction between the doctor and the patient in terms of affect, mentality and emotions based on their own understanding and knowledge (Xie & Lan, 2005). The non-competency aspects of DPR are more difficult to master than the competency aspects, and the dynamic, changeable and unstable emotional states of doctors and patients bring uncertainty to a harmonious DPR. Therefore, more attention needs to be paid to the intangible non-competency aspects of DPR.

From the legal perspective, DPR is in fact a contractual relationship between the doctor and the patient on a voluntary and equal basis regarding the treatment of diseases. In this contractual relationship, both the doctor and the patient are given clear rights and obligations, and both must carry out their medical and non-medical activities within the framework of the contract. The right to information and the right to consent are central to this contract throughout the treatment process, and doctors can only implement treatment measures with the informed consent of the patient.

From an ethical perspective, DPR is a fiduciary relationship. Doctors are a group of people with medical expertise and skills who can judge the illness of the patient, propose a targeted treatment plan or treatment recommendation, and take appropriate treatment measures; patients entrust doctors to manage their health based on their trust that the treatment implemented by doctors can restore their health. On this basis, the doctor and the patient establish a relationship of mutual trust (Z. H. Zhang, 2018).

Based on the above description of the concept of DPR and with reference to the definition in the literature on DPR in China that "DPR is the work relationship between doctors and patients from the perspective of doctors" (Zeng et al., 2018, p. 57), in this study DPR focuses on *the relationship between doctors and patients and their family members*.

2.2.2 DPR in China

1. Status of DPR

DPR in China has been a huge challenge in the health care sector for years, causing healthcare workers to work under stressful and dangerous conditions (Pan, Yang, et al., 2015). DPRs are strained, and disputes between doctors and patients occur frequently.

In recent years, there has been frequent occurrence of “medical disputes” and violence against doctors. Yu et al. (2015) counted the number of vicious doctor-patient disputes that occurred in China from 2003 to 2013. They found that during the ten-year period, 101 vicious incidents of injury to doctors occurred, and 24 doctors lost their lives as a result. The main reasons for these cases were patients' dissatisfaction with the treatment outcomes, dissatisfaction with healthcare services and the high cost of medical treatment, accounting for 51%, 24% and 5% respectively.

According to the Research Report on Violence and Injuries in Hospital Settings published by Chinese Medical Doctor Association in 2014, violence against doctors was on the rise in China, with 63.7% of the 316 hospitals in the sample having experienced violence against doctors, an increase of 16% compared to 2008, and inpatient departments, outpatient departments and office buildings were the areas with the highest incidence of violence against doctors. Of the 8,388 healthcare workers in the sample, 98.7% said that incidents of violence against doctors had affected their own qualifications, and 87.2% reported impact of a greater extent.

Dentists, as important players of the healthcare workforce, are still faced with challenging DPRs. Due to the special nature of oral treatment, dentists need to be in close contact with the same patient or patients frequently, and the emotional perceptions of both sides are more sensitive. Intraoral operations not only bring pain, noise and other stimuli to patients, but also tend to bring anxiety and irritation to patients. Coupled with the inadequate medical insurance system at the present stage and the high cost of dental treatment, patients are prone to let out their negative emotions and comments on the dentist once the treatment is not as effective as they expected, leading to doctor-patient conflicts. Statistics suggest that doctor-patient disputes in dental care activities were also on the rise in recent years (Ye, 2014). Strained DPRs have become the biggest obstacle to the development of Chinese hospitals (S. T. Xu & Zhang, 2017).

2. Causes of strained DPRs

In the face of the increasingly strained DPRs, scholars have invested a great deal of effort in investigating and studying DPR. S. Z. Ma et al. (2017) argue that the DPRs in China are influenced by a variety of factors. The reasons for strained DPRs are multifaceted and include not only structural problems in healthcare caused by the uneven distribution of healthcare resources, the conflict between patients' demand for high-quality healthcare and the difficulty in meeting the quality of hospital services but also negative doctor-patient public opinion that reduces the level of social trust in hospitals.

The healthcare system and mechanism are yet to be perfected (Z. L. Zhang & Niu, 2021). First, the distribution of healthcare resources is uneven. Currently, there is a serious imbalance in the distribution of healthcare resources in China. Specifically, quality healthcare resources are mainly concentrated in developed regions and large hospitals, while less developed regions and grassroots hospitals are lagging behind in terms of software and hardware facilities, making it difficult for them to meet the needs of the public for medical treatment. As patients flock into large hospitals, grassroots hospitals are left unattended while large hospitals are overwhelmed. Second, the financial investment is insufficient. The government's investment in public hospitals, especially grassroots public hospitals, is seriously insufficient, with investment accounting for only 10% of hospital revenue, and hospitals have to adopt a profit-oriented development model for survival and development; grassroots hospitals find it difficult to implement the hierarchical diagnosis and treatment system (X. X. Li, 2018). Third, the medical insurance system is inadequate. China's current level of basic medical insurance is not high, and people still have to pay out of their own pockets for medical treatment. As a result, patients may vent their discontent on healthcare workers or seek financial compensation in the form of "medical disputes (Z. L. Zhang & Niu, 2021).

Healthcare quality is poor. A study points out that more than 80% of medical disputes are triggered by poor quality of healthcare services (Zheng, 2018). The poor quality of healthcare services is mainly reflected in the difficulty in making appointments, long queuing time, a cumbersome consultation process and poor communication between doctors and patients. Some patients even arrive at the hospital the day before to make an appointment, but the doctor's consultation time is only three minutes. Such service quality has exacerbated the tension between doctors and patients. Meanwhile, the frequent occurrence of doctor-patient disputes causes doctors to lack the sense of security and rely more on machines and equipment for diagnosis in the treatment process, lacking humanistic care for patients. This defensive treatment strategy of adopting self-protection will not only add to the burden of patients, but also worsen the already strained DPRs.

There is information asymmetry between doctors and patients. The continuous development in society, economy and medical technology has further raised people's expectations for healthcare services, but the treatment of diseases is a complex and systemic project. Besides, the physical differences between people can also affect the effectiveness of treatment. Asymmetric information between doctors and patients often leads to high psychological expectations of patients and their families for doctors' treatment outcomes,

which can easily lead to doctor-patient disputes if the treatment is not as effective as expected, or if medical accidents or incidents occur (Q. H. Liu, 2016).

Media reports are not entirely fair for hospitals and clinicians. In the information era, the Chinese media undoubtedly play an important role in reconciling DPRs. Studies have shown that Chinese media coverage of medical incidents is unprofessional, one-sided and superficial, as most media focus on the surface manifestations of the strained DPR without analysing its underlying causes (X. Z. Yang, 2012). In addition, the media tend to be “pro-vulnerable”. Specifically, the media generally consider patients as the vulnerable group and hospitals as the powerful group, and tend to take the moral high ground to criticize hospital staff (H. Y. Ma et al., 2018). The media like to report on incidents of doctor-patient disputes to attract attention, portraying DPR as an inharmonious social event, which in turn influences the public’s perception of hospitals as well as doctors. One study showed that the majority of respondents believed that past media coverage of DPRs was one-sided, unfair and detrimental to the healthy development of DPRs (Deng & Qiu, 2017).

2.2.3 Existing studies on DPR

American doctors Szasz and Hollender (1956) pointed out in the course of their basic theoretical analysis of the social role of DPR that the model of DPR was determined by the patient’s degree of perception. This theory has become the basis for the development of DPR in the modern era (Chen et al., 2015). The main models fall into the following categories (Szasz & Hollender, 1956): (1) Active-passive model: the patient is not well-educated, and there is no interaction between the two parties as the doctor makes decisions about the patient’s health during the treatment process without inviting the patient’s input into the decision-making process. The patient has unconditional trust in any decision made by the doctor and is completely passive in accepting the doctor’s medical treatment. In such a relationship, the doctor is placed in a position of omniscience over the patient (Ridd et al., 2009); (2) guidance-collaboration model: the patient does not have relevant medical knowledge, but has strong communication skills and is able to understand the doctor’s treatment decisions. The doctor guides the patient through the treatment while the patient actively cooperates with the treatment unconditionally; (3) shared decision-making model: this model emphasises cooperation between the doctor and the patient. The patient has some medical knowledge and would discuss with the doctor the appropriate treatment plan for the disease and cooperate with the doctor to complete the treatment process together.

By the end of the 20th century, the shared decision-making model had become widespread and dominant in DPR. Doctors had to not only treat patients' physical illnesses but also focus on their psychological well-being (Schofield, 1995). Since then, scholars outside China have focused more on the improvement of the medical cost system when studying DPR. As a result, there is a richer body of research on the theory of DPR abroad.

Research on DPR in China began in the 1980s. According to Z. X. Wang (2017), DPR in China has roughly gone through three stages of development: the first stage was characterized by generally stable DPR, and it began in the 1980s when China was in the early stage of the reform and opening-up. Although the wave of reform and opening-up influenced the direction of development of China's healthcare sector, China's healthcare industry was still operating under the planned economy system where hospitals strictly managed doctors, and social media paid little attention to hospitals and had limited communication power. As a result, DPR in China was in a relatively stable state. The second stage was the budding stage of doctor-patient disputes. It began in the 1990s when the government's financial support for public hospitals was gradually reduced and public hospitals had to move in the direction of chasing profits to survive and develop, resulting in a marked change in the service attitude and style of work among doctors. Besides, due to the uneven distribution of healthcare resources, problems such as the difficulty and high cost of accessing medical treatment continued to emerge, and problems with doctors' medical ethics, such as the receipt of red packets, were pronounced, leading to many doctor-patient disputes. The third stage was the stage of full-scale conflict. Since the beginning of the 21st century, the deepening health care system reform has caused healthcare facilities to be more profit-driven. To gain a competitive position in the market, some healthcare facilities have adopted market-oriented operations and outsourcing of departments to win patients; besides, there is constant media hype about medical disputes. Consequently, DPR has become an issue of major concern for the public. In addition, the factors that trigger doctor-patient disputes are also increasing, making the causes of doctor-patient disputes more complex, with non-medical factors beginning to take precedence over medical factors (Z. X. Wang, 2017).

Research on DPR in China can be broadly classified into the following categories (S. Y. Liu, 2019): (1) adoption of the observation method or experimental method to study the influencing factors of DPR and analyse the reasons that lead to the tension between doctors and patients. The observation method refers to the analysis of influencing factors from the perspectives of doctors, patients and both doctors and patients through descriptive studies of phenomena. Scholars have found that the factors influencing DPR include age, gender, income

level, education level, medical ethics, doctor-patient communication, doctor's humanistic care and media coverage; besides, age, gender, education level, income, position, receipt of red packets, job satisfaction, experience of doctor-patient disputes, work stress and high patient expectations are all significant factors influencing doctors' perceptions of DPR (X. L. Huang & Dai, 2016; X. X. Li, 2018; S. Y. Liu, 2019; H. Y. Ma et al., 2018; Pang, 2018; X. Y. Zhang & Zhang, 2018). The experimental method focuses on assessing the extent to which a particular intervention improves the perception of the DPR. For example, C. Chen (2019) adopted this method to study the positive role of nursing quality assessment system in optimising DPR. Scholars have investigated, categorised and made targeted suggestions and recommendations on the causes of the strained DPRs at present (Pang, 2018; J. Zhang & Zhu, 2017); (2) construction of a DPR measurement scale or a DPR perception indicator system. Based on previous studies, H. Yang and Wang (2011) translated and adapted the PDRQ-15 into Chinese and tested its reliability and validity. The results showed that excluding two of the indicators would make the scale more suitable for interpreting the sample results. Zeng et al. (2018) developed a DPR scale composed of two dimensions: "doctor-patient trust" and "patient-centred care" based on China's reality and the status of healthcare facilities in China. The scale was proved to have good reliability and validity by empirical studies; (3) exploration of how to build a harmonious DPR. Researchers have used behavioural appropriateness theory to study DPR and analysed the specific manifestations and causes of strained DPRs. They classified the sources of inappropriate affect into the body, groups, patients and healthcare providers and put forward relevant suggestions for improving DPR based on the reality (Y. Song et al., 2019). Dong et al. (2018) studied DPR from the perspective of the theory of incomplete contracts and concluded that there are various reasons for the incomplete performance of the doctor-patient contract, mainly including asymmetric medical information, disproportionate effort and reward, difficulty in accurately foreseeing medical risks, and unequal legal relationship between doctors and patients. They also pointed out that the synergy among the government, society, doctors and patients should be strengthened (Dong et al., 2018).

2.2.4 Measurement of DPR

Regarding the measurement of DPR, the most commonly accepted measures are the Patient-Doctor Relationship Questionnaire-9 (PDRQ-9) developed by Dutch scholars Van der Feltz-Cornelis et al. (2004) and the Difficult Doctor-Patient Relationship Questionnaire-10 (DDPRQ-10) developed by Hahn et al. (1996).

The PDRQ-9 is composed of nine items under three dimensions, namely patient satisfaction with the treatment, the helping attitude of the doctor and patient's attitude towards medical symptoms. The items were rated on a five-point Likert scale, with scores from 1-5 indicating not at all appropriate, somewhat appropriate, appropriate, mostly appropriate and totally appropriate. The total score for each dimension is obtained by adding up the scores of the items under each dimension, with higher scores indicating a better DPR and vice versa.

DDPRQ-10 contains three dimensions, namely, the doctor's subjective experience (five items), quasi-objective items regarding the patient's behaviour (four items), and symptoms combines elements of the patient's behaviour and the doctor's subjective response (one item). Each item is scored on a six-point Likert scale, ranging from 1 (not at all) to 6 (a great deal) (except for items 1, 7 and 9, which are scored from 6 (not at all) to 1 (a great deal)). The total score for each dimension is obtained by adding up the scores of the items under each dimension, and the higher the score, the better the DPR, and vice versa. Both scales were measured using large samples and showed good reliability and validity (H. Yang, 2011).

Zeng et al. (2018) developed the Doctor-Patient Relationship in China (DPR-C) to better suit the Chinese context. The scale is composed of two dimensions, namely "doctor-patient trust" and "patient-centred care", which are measured by ten items. The items are also scored on a six-point Likert scale, with scores ranging from 1 to 6, with higher scores indicating a better DPR, and vice versa. The scale has good reliability and validity, with the Cronbach's α values of the overall internal consistency of the ten items as well as the factors "doctor-patient trust" and "patient-centred care" being 0.90, 0.88 and 0.90, respectively, and the factor loadings of each item being greater than 0.7 (Zeng et al., 2018).

2.2.5 Summary

DPR is a special part of healthcare activity and is inextricably linked to the social environment. Its influencing factors are also multi-faceted and from multiple aspects. Overseas research on DPR is relatively advanced, and the theoretical study of DPR is relatively well developed but not necessarily applicable to the Chinese context. Research on DPR in China mainly focuses on the discussion of how to build a harmonious DPR, the analysis of the causes and influencing factors of strained DPRs, and construction of an indicator system to measure DPR or perceptions of DPR from the perspectives of different theories. Most existing studies have investigated satisfaction with DPR from the patient's perspective, with few from the doctor's perspective, leading to biased evaluation of the factors influencing DPR. Studies that have

assessed DPR have also mostly been conducted on outpatients, residents and nurses, and very few have focused on work stress among dentists, and even less on the relationship between work stress and DPR among dentists.

2.3 Emotional labour

2.3.1 The development of the concept

The concept of emotional labour was first introduced by the American social psychologist Hochschild (1979) based on a study of the emotional work of flight attendants at Western Airlines. In 1983, he formally introduced the concept of emotional labour in his book entitled *The Managed Heart* and defined it as “the management of feeling to create a publicly observable facial and bodily display” (Hochschild, 1983, p. 7). According to Hochschild (1983), emotional labour is the process by which employees adjust their emotions to meet the needs of the organization during face-to-face verbal communication with customers.

Since then, more and more scholars have begun to focus on and study emotional labour, moving from the initial phenomenological analysis to mechanistic analysis. As scholars focused on different research directions and conducted research in different contexts, emotional labour has also been defined from different perspectives. See Table 2.1 below for details.

Table 2.1 Definition of emotional labour

Researcher(s)	Definition of emotional labour
Ashforth and Humphrey (1993)	“the act of displaying the appropriate emotion (i.e., conforming with a display rule)” (p. 90)
Morris and Feldman (1996)	“the effort, planning, and control needed to express organizationally desired emotions during interpersonal transactions” (p. 987)
Grandey (2000)	“the process of regulating both feelings and expressions for the organizational goals” (p. 97)
Diefendorff and Gosserand (2003)	a dynamic processing process in which individuals monitor and adjust emotional expression to align their emotional expression with the organization’s emotional expression rules
Brotheridge and Lee (2003)	employees’ regulation of their emotional display in an attempt to meet organizationally-based expectations specific to their roles
P. J. Wu (2003)	employees’ management and control of their emotions to meet organizational or regulatory requirements and thereby contribute to the economic benefits of the organization

Ashforth and Humphrey (1993, p. 90) defined emotional labour in their study as “the act of displaying the appropriate emotion”, arguing that organizations are concerned with employees displaying prescribed behaviours at work and are not concerned with their true emotions and feelings, and that individuals must express emotions in conformity with the

emotion display rule of the job. While this definition focuses on the expression of emotions, the definition by Hochschild (1979) emphasises the process of managing the expression of emotions.

Morris and Feldman (1996) differed from their predecessors by defining emotional labour from an interpersonal perspective as “the effort, planning and control needed to express organizationally desired emotions during interpersonal transactions” (Morris & Feldman, 1996, p. 987). They perceive emotional labour as a two-way communication and interaction process, an effort made in interpersonal relationships to keep one’s feelings in line with the emotions required by the organization.

Grandey (2000), building on the work of her predecessors, defined emotional labour from the perspective of individual psychological activity as “the process of regulating both feelings and expressions for the organizational goals” (Grandey, 2000, p. 97). This definition emphasises the process of the individual’s psychological activity and is closely linked to psychology. Diefendorff and Gosserand (2003) viewed emotional labour as a dynamic processing process where an individual monitors and adjusts his/her emotional expression to align his/her emotional expression with the organization’s emotional expression rules. In this sense, therefore, emotional labour is not static; it occurs during interpersonal communication and interactions and is a dynamic processing process of employees’ emotions.

Brotheridge and Lee (2003) consider emotional labour as employees’ regulation of their displayed emotions to meet the organization’s expectations for their specific roles.

Emotional labour is an integral part of the healthcare process. Patients may feel anxious, agitated and doubtful due to the uncertainty of disease treatment. To ensure that patients cooperate with and accept treatment, doctors are required to reassure patients. Adopting appropriate emotional labour can improve patient acceptance and trust and facilitate a harmonious DPR. This also shows that health care is an emotionally labour-intensive profession. This study defines emotional labour as the process by which dentists regulate their own emotions during interactions with patients to meet the hospital’s emotional expression rules.

2.3.2 Emotional labour strategies

Initially, Hochschild (1983) proposed two strategies for emotional labour: surface acting and deep acting. Surface acting refers to the phenomenon where individuals do not actually experience an emotion but act out the emotion required by the organization to fit in or meet the organization’s requirements; deep acting refers to the phenomenon where individuals actually

feel the emotion required by the organization and act out the appropriate emotion in a consistent manner. Based on the surface acting and deep acting proposed by Hochschild (1983), Ashforth and Humphrey (1993) added “the expression of genuine emotion” as a third strategy. The expression of genuine emotion refers to employees experiencing and expressing their emotions in a way that is consistent with the organization’s requirements, and where employees feel the emotions naturally instead of disguising them as described by Hochschild (1983). Currently, most scholars identify emotional labour strategies to consist of surface acting and deep acting.

As mentioned above, surface acting involves the individual displaying emotions in line with those required by the organization to fit in or to meet the needs of the organization without experiencing the said emotions. It mainly includes superficial behaviours such as modulating facial expressions, gestures or voice and tone. Employees who are engaged in surface acting regulate their emotional displays to meet the emotional display rule set by the organization without changing their feelings. Thus, surface acting is often considered “putting on an act”.

Deep acting involves putting effort into feeling and expressing the emotions required by the organization. The changes that employees make in this case are heartfelt and are often considered a “goodwill disguise”. Deep acting has positive outcomes for both the employee and the organization, including increased job satisfaction and occupational wellbeing.

2.3.3 Existing studies on emotional labour

The antecedents of emotional labour can be summarised as individual variables, organizational factors and the external variables.

First, individual variables mainly include such factors as age, gender, personality traits and emotional intelligence. Studies point out that for those who have a position, the older they get and the longer they work, the higher their emotional load (X. F. Gao & Yu, 2017; L. L. Li et al., 2019). Wharton and Erickson (1993) suggested that women perform much more emotional labour at home and at work than men, which was supported by the studies carried out by Kruml and Geddes (2000) as well as Totterdell and Holman (2003) who argued that women are more likely to understand the feelings of their clients. Existing research has also revealed that female nurses have good emotional management skills and are able to regulate their emotions effectively, whereas male nurses are relatively less able to regulate their emotions and are more likely to show their true emotions (Gulsen & Ozmen, 2020). Diefendorff and Gosserand (2003) found that individuals with different personality traits differed significantly in their performance of emotional labour. It has been suggested that emotional intelligence has a direct

impact on emotional labour and can be used to predict emotional labour. There is a positive correlation between the two. The higher emotional intelligence an employee has, the more able he/she is to accurately perceive the emotions required for the job and thus regulate performance to match the emotions required by the work environment (Brotheridge, 2006). The study by Grandey (2000) also showed that employees with high emotional intelligence are more adept at using deep acting to regulate emotion than those with low emotional intelligence.

In terms of organizational variables, organizational support has a positive effect in mitigating and reducing the negative effects of emotional labour. Organizational support and protection are mainly reflected in leadership commitment, giving full job autonomy and leadership style. Stable job content and sufficient job autonomy will have a positive impact on emotional labour (Morris & Feldman, 1996). Organizational commitment can be effective in reducing the emotional dissonance caused by excessive emotional labour (Abraham, 1998). The study conducted by Ma et al. (2020) showed that employees' emotional labour varied among organizations with different ownership types. Specifically, employees in private enterprises and foreign-invested enterprises in China engaged in higher levels of emotional labour than their counterparts in public organizations. In addition, different leadership styles can also have an impact on employees' emotional labour. In service-oriented companies, transformational leadership and servant leadership more likely to cause employees to choose deep acting (Z. Liu et al., 2014).

Finally, in terms of external variables, the factors that influence emotional labour can be clients, emotional episodes and work stress. Hochschild (1983) found that the choice, frequency and degree of emotional strategies differed between employees facing different clients. Flight attendants treated first class passengers more enthusiastically and showed positive emotions for longer periods of time compared to economy class passengers. A questionnaire survey of nurses conducted by Chou et al. (2012) revealed that nurses were more likely to perform surface acting when dealing with difficult and "troublesome" patients. In relation to emotional episodes, Kim et al. (2018) studied the emotional labour of female bank employees and found that violence in the workplace would negatively affect the emotional labour of female employees and even trigger depression among female employees. In addition, some scholars have found that work stress also affects emotional labour, and there is a significant correlation between the two; the higher levels of work stress, the higher levels of emotional labour, and the accumulation of negative emotions will in turn cause more work stress for employees, resulting in a vicious circle (Khalid et al., 2019).

In some of the early studies, scholars focused on the negative effects of emotional labour,

such as burnout and turnover intention. But subsequent research has found that the deep acting and surface acting of emotional labour have different effects on individuals and organizations.

At the individual level, deep acting is beneficial for alleviating burnout, whereas surface acting tends to produce or exacerbate individual experiences of burnout (Y. P. Chen & Wang, 2014). Kinman et al. (2011) investigated the relationship between emotional labour and job satisfaction based on a self-reported survey of 188 clergy in the U.K. and found that emotional labour negatively predicted job satisfaction; surface acting negatively predicted job satisfaction, whereas deep acting positively predicted job satisfaction (Kammeyer-Mueller et al., 2013). Surveys showed that dentists' emotional labour was a positive predictor of well-being (Jeung et al., 2017; R. Zhou, 2017). It has also been found that surface acting can lead to reduced individual fulfilment, increased stress, reduced job engagement and even emotional dissonance (Kammeyer-Mueller et al., 2013). In terms of the effect on turnover intention, deep acting and autonomic regulation can effectively reduce turnover intention, while surface acting positively predicts turnover intention (Ding & Zheng, 2016).

At the organizational level, individuals' emotional labour can also have an impact on the organization. It has been suggested that the frequent adoption of deep acting and authentic emotional expression by employees are beneficial to organizational performance (W. M. Xu & Song, 2013). In addition, emotional labour helps employees improve task completion rates, build and maintain good customer relationships, achieve a sense of self-fulfilment, and improve the service quality perceived by customers (Ren & Zhang, 2014).

Studies suggest that deep acting as an emotional labour strategy is positively related to employees' job performance, while surface acting is not related to job performance (Kammeyer-Mueller et al., 2013) or only marginally negatively related to employees' overall performance (Hülshager & Schewe, 2011). However, deep acting is also a form of emotional labour which also entails varying degrees of resource consumption and requires timely positive feedback or support to sustain the positive effect.

Healthcare work is an emotionally labour-intensive profession, and emotional labour is essential in the healthcare process. Doctors are faced with many patients with doubts and fears every day, and emotional reassurance can make patients more cooperative in their treatment. Engaging in appropriate emotional labour increases patient acceptance and trust and facilitates a harmonious DPR.

In recent years, there has been a growing body of research on emotional labour among healthcare workers. Studies based on large samples have shown that most nurses in China are engaged in moderate to high levels of emotional labour (X. Wu et al., 2018), and that

appropriate emotional labour has a positive effect in enhancing nurses' communication skills, creating a positive work atmosphere, and leading to improved nursing performance (Cheng et al., 2013). The work of dentists is characterised by the need to engage in a large amount of emotional labour. Firstly, a psychological analysis of patients undergoing outpatient surgery in dentistry revealed that preoperative stress and anxiety are common among dental patients (F. Liu, 2001). Besides, the operation of surgical instruments (e.g., dental drills, scrapers and scissors) during oral treatment generates high decibel instrument noise, which makes patients emotional tense and irritable; secondly, the oral cavity is a very sensitive organ. The surgical procedure will inevitably bring painful stimuli to patients, causing them to become fearful. As a result, dentists are faced with psychologically anxious and emotionally irritable patients on a daily basis, requiring them to perform more emotional labour. Emotional labour effectively ensures the smooth running of work, but it can also have an impact on the individual. A study investigating the emotional labour of dentists showed that the job characteristics of dentists significantly influence their level of emotional exhaustion (Pan, Li, et al., 2015).

Studies have shown that emotional labour in healthcare is positively associated with tension in patient-nurse relationship, which is significantly associated with burnout. The adoption of inappropriate emotional labour strategies can easily lead to burnout and affect the DPR, which is not conducive to the healthy development of the health care industry (D. Xiong, 2014). It has also been suggested that voluntary emotional labour by healthcare workers can significantly improve DPR (Yuan et al., 2021). However, prolonged emotional labour not only affects one's own psychological health, but also has a negative impact on improving work efficiency and building a harmonious and healthy DPR.

2.3.4 Measurement of emotional labour

Based on the elaboration of the concept of emotional labour, there are differences in the conceptualisation of the measurement dimensions of emotional labour due to the different research focuses on the organizational requirements of emotions and the ways in which individuals behave. A summary of the measurement dimensions of emotional labour used by scholars is presented in Table 2.2 below.

Table 2.2 Measurement dimensions of emotional labour

Dimension	Representative scholar(s)	Measurement dimensions
Two-dimensional	Hochschild (1983)	Surface acting and deep acting
	Grandey (2003)	Surface acting and deep acting
Three-dimensional	Diefendorff et al. (2005)	Surface acting, deep acting and expression of naturally felt emotions
Multi-dimensional	Ashforth and Humphrey (1993)	Surface acting, deep acting, expression of genuine emotion
	Morris and Feldman (1996)	Frequency of appropriate emotional display, attentiveness to required display rules, variety of emotions to be displayed emotional dissonance
	Brotheridge and Lee (2003)	Frequency, intensity, the duration of interaction, variety of emotional display, surface acting and deep acting

Currently, the widely used emotional labour measurement tools mainly include:

1. Emotional Labour Scale (ELS) by Brotheridge and Lee (2003): The ELS is a six-dimensional emotional labour scale consisting of frequency, intensity, the duration of interaction, variety of emotional display, surface acting and deep acting. The scale is composed of 15 items: three items under the frequency dimension, two items under the intensity dimension, one item under the duration of interaction dimension, three items under the variety of emotional display dimension, three items under the surface acting dimension and three items under the deep acting dimension. The items are scored on a five-point Likert scale with 1 indicating never, 2 rarely, 3 sometimes, 4 often and 5 always, and higher scores indicate higher levels of emotional labour.

2. Emotional Labour Strategy Scale (ELSS) by Diefendorff et al. (2005): The ELSS is based on the ways of emotional labour expression. The scale consists of three dimensions: surface acting, deep acting and expression of naturally felt emotions. The scale was designed with 14 items, including seven items under the surface acting dimension, four items under the deep acting dimension, and three items under the expression of naturally felt emotions dimension, and all the items are scored on a five-point Likert scale. The scale has been proven to have good reliability and validity based on large-sample surveys.

3. The Emotional Labour Scale by Grandey (2003): This scale is commonly used by researchers to measure emotional labour. It is composed of two dimensions, namely, surface acting and deep acting measured by eight items. The items are scored on a scale of 1-6 points, indicating “never”, “seldom”, “occasionally”, “sometimes”, “often” and “always”, respectively. Higher scores indicate more emotional labour, and vice versa.

2.3.5 Summary

Healthcare workers are a special group of people who are in long-term contact with patients and are constantly engaged in intense emotional labour. However, prolonged emotional labour not only affects their physical and mental health, but also affects their normal communication with patients and even the establishment of a harmonious DPR. Attention to the emotional labour of healthcare workers and study of the underlying factors that influence their emotional labour can help reduce the intensity of emotional labour among healthcare workers and relieve their work stress, thus establishing a good and harmonious DPR. Therefore, it is of great practical significance to study the emotional labour of healthcare workers. A review of existing literature shows that studies in China are generally focused on the emotional labour performed by clinicians, psychiatrists and ICU nurses, and that there is a lack of research on the relationship between the emotional labour strategies adopted by dentists and DPR (S. Zhou, 2018).

2.4 Emotional intelligence

2.4.1 Different approaches to define emotional intelligence

The research on emotional intelligence in the field of psychology dates back to very early days. The concept can be traced back to the 1920s when Thorndike (1919) introduced the concept of social intelligence. He defined social intelligence as the ability to understand and manage people and to act wisely in interpersonal relationships, and he considered social intelligence to be a component of intelligence. Thorndike's research inspired the study of emotional intelligence and laid a solid foundation for subsequent research and development of emotional intelligence.

In 1990, Mayer et al. (1990) proposed the notion of emotional intelligence and explained the concept of emotional intelligence as the ability to distinguish and coordinate one's own and others' emotions and to use information about emotions to help guide one's thinking. Mayer and Salovey (1997) redefined emotional intelligence in their paper entitled "What is Emotional Intelligence", in which they argued that emotional intelligence is "the ability to perceive emotions, to access and generate emotions so as to assist thought, to understand emotions and emotional knowledge, and to reflectively regulate emotions so as to promote emotional and intellectual growth". Their definition explicitly understands emotional intelligence as an intelligence that regulates one's own and others' emotions and that can also be used to explain

individual behavioural differences. Mayer et al. (2004) identified four dimensions of emotional intelligence, namely the ability to perceive emotion, the ability to use emotion to facilitate thought, the ability to understand emotion, and the ability to manage emotion. This concept reveals the relationship between emotion and cognition and recognizes the adaptative function of emotion.

In his book entitled *Emotional Intelligence*, Goleman (1995) describes emotional intelligence in layman's terms as the ability to manage emotions and to deal with work tasks in an appropriate manner and deal with stress with a calm state of mind based on a full understanding of one's emotions. He posits that emotional intelligence is composed of five dimensions, namely self-awareness, self-regulation, motivation, empathy and relationship management. Goleman's emotional intelligence model introduces personality and motivation, further expanding the breadth and depth of research on emotional intelligence.

Bar-On (1997) further revised the concept of emotional intelligence based on the Goleman model, considering emotional intelligence to be the sum of an individual's ability to adjust his or her behaviour in time to changes in the surrounding environment. In 1997, he compiled the "Bar-On Emotional Quotient Inventory: Technical Manual", in which he proposed a non-cognitive theory of emotional intelligence, arguing that emotional intelligence is the sum of a range of emotional, personality and interpersonal skills that influence a person's ability to cope with the demands and stresses of the environment, and that emotional intelligence affects a person's physical and mental health in addition to his or her success (Bar-On, 1997). This definition also emphasises the role of personality and motivation in emotional intelligence. Therefore, in the development of research on emotional intelligence, two theoretical models have gradually emerged, namely the ability model represented by Mayer et al. (2004) and the mixed model represented by Goleman (1995).

Based on the above theoretical and conceptual descriptions of emotional intelligence and with reference to the description of emotional intelligence in research on healthcare workers that "the emotional intelligence of healthcare workers refers to the ability of healthcare workers to be fully aware of their emotional problems in their daily work and regulate their negative emotions to better communicate with patients" (Pei, 2013, p. 2), this study defines emotional intelligence as *the ability of dentists to identify their own emotions and those of their patients, motivate themselves, manage their emotions and facilitate DPR in the course of their interactions with patients.*

2.4.2 Existing studies on emotional intelligence

1. Existing literature on emotional intelligence

Emotional intelligence has its origin in the Western field of psychology and has yielded rich research findings. Many researchers have validated that gender, age, cultural background, personality factors, individual mental health levels, organizational systems and organizational identification all have a significant impact on employees' emotional intelligence. For example, Mayer et al. (1999) found in their study that differences in age and gender can lead to differences in emotional intelligence; Branscum et al. (2013) identified emotional intelligence as a good predictor of mental health in their study of young people. Carmeli (2003) studied emotional intelligence based on an extensive case study of top managers working in different fields, and the results showed a significant positive relationship between emotional intelligence and work motivation, performance appraisal and organizational citizenship behaviour. Besides, emotional intelligence can also effectively regulate work-family conflict (Carmeli, 2003).

X. J. Wang (2002) studied the structure of emotional intelligence and considered the cognitive structure of emotions to be the connotation of emotional intelligence. He identified four components of emotional intelligence: the ability to understand one's own emotions, the ability to understand social emotions, the ability to facilitate thinking through emotions and the ability to monitor emotions in a mature way. Existing research on emotional intelligence is mainly conducted in the fields of education, healthcare and business, with the largest body of research conducted in the education sector. For example, T. Li (2004) studied the relationship between emotional intelligence and psychological well-being among college students, and the results showed a negative correlation between the two. J. Gao et al. (2011) studied the impact of emotional intelligence and other factors on the physical and mental health of college students and found that emotional intelligence had the greatest impact.

2. Emotional intelligence of healthcare workers

Currently, the quality of healthcare work is no longer solely dependent on the cure rate of diseases as an indicator but is also related to patient satisfaction. Therefore, there is also a need for healthcare workers to be better able to perceive, recognise, use and regulate emotions. Emotional intelligence has a role in predicting emotional labour, with higher emotional intelligence associated with more deeply expressive behaviours and a more accurate perception of the emotions required for the job, which can be regulated to demonstrate the emotions required for the work environment (Brotheridge, 2006).

W. H. Li (2021) found in her study on the status and influencing factors of emotional

intelligence among emergency department nurses that 73.08% of the 208 survey respondents had excellent levels of emotional intelligence, with nursing age, marital status and burnout being the main influencing factors. A study by Wagner et al. (2002) validated that the scores of patient satisfaction, incidence of medical errors and emotional intelligence were correlated. In a study of surgeons' emotional intelligence, X. W. Zhao et al. (2011) found that doctors with higher levels of emotional intelligence perceived less burnout, which led to positive engagement in their work and improved motivation and organizational performance. The level of emotional intelligence of healthcare workers can have an impact on job performance and DPR (Pu et al., 2017).

In recent years, scholars have conducted extensive studies on the relationship between DPR and emotional intelligence and have produced some research results, most of which indicate that emotional intelligence has a facilitating effect on DPR (Pei, 2013; Pu et al., 2017). A study in Taiwan also showed that patients' trust positively influenced doctors' emotional intelligence, which could also facilitate DPR (Weng, 2008; Weng et al., 2011). A prospective study on emotional intelligence also showed that training doctors on emotional intelligence was effective in improving patient satisfaction scores and had a positive impact on DPR (Dugan et al., 2014).

2.4.3 Measurement of emotional intelligence

Research has shown that emotional intelligence contains several dimensions, and several measurement scales have been developed by researchers. Representative scales include the Multifactor Emotional Intelligence Scale (MEIS), the Bar-on Emotional Quotient Inventory and the Wong and Law Emotional Intelligence Scale (WLEIS), which will be introduced one by one.

1. MEIS: In 1997, Mayer et al. (1999) developed the Multifactor Emotional Intelligence Scale (MEIS) based on their latest definition of emotional intelligence. It is based on ideas such as emotional creativity, social intelligence and non-verbal perception. This scale is an aptitude test scale in which participants are asked to complete a fixed number of tasks to determine their ability to perceive, identify and control their emotions. Mayer et al. (1999) regarded MEIS the best method to measure emotional intelligence. The MEIS measurement results showed an internal reliability of 0.96, indicating good construct validity.

2. Bar-on Emotional Quotient Inventory: The Bar-on Emotional Quotient Inventory (EQ-I) is the world's first standardised emotional intelligence scale and is highly regarded in academia. The scale is composed of 15 subscales designed with 133 items scored on a five-point Likert scale using a self-report method. The scale scores can be differentiated into a total EQ score,

scores for five component scales and scores for each of the 15 subscales. The EQ-I converts raw scores into standardised scores with a mean EQ score of 100 points and a standard deviation of 15 (Bar-On, 1997).

3. The WLEIS: Wong et al. (2004) developed WLEIS, which is a scale suitable for the Chinese context, based on the definition of emotional intelligence by Mayer et al. (1999) and previous literature. In 2004, Wong et al. (2004) revised the WLEIS and developed Wong's Emotional Intelligence Scale (WEIS). The scale divides emotional intelligence into four dimensions: (1) self-emotional appraisal (SEA), which refers to the individual's ability to accurately perceive his or her true emotions and to express them in an appropriate way; (2) others' emotional appraisal (OEA), which refers to one's perceiving and understanding the emotions of people around him or her; (3) regulation of emotion (ROE), which refers to the ability of people to manage their emotions effectively and to regulate them quickly; and (4) use of emotion (UOE), which is related to the ability of individuals to make use of their emotions to increase their personal performance (Wong et al., 2004). WLEIS does not go beyond the Salovey and Mayer model but has a clearer structure. Besides, WLEIS has been effectively used in the Chinese Mainland, Hong Kong and Singapore.

2.4.4 Summary

As research on emotional intelligence deepens in the fields of education, organization and managerial psychology, scholars are increasingly focused on the application of emotional intelligence. For individual employees, emotional intelligence is an important resource that can influence the quality of their life, the success of their careers, as well as their physical and mental health; for organizations, emotional intelligence is closely related to employees' ability to perceive, express and manage their emotions, which helps employees relieve work stress, soothe their emotions at work, form a good interpersonal atmosphere and thus promote the healthy and orderly development of the enterprise.

The effects of work stress are twofold. A moderate level of stress can increase employees' productivity and stimulate their potential, while prolonged high levels of stress can lead to physical and mental exhaustion, reduced productivity and emotional exhaustion, producing negative effects on both the individual and the organization. Employees with high levels of emotional intelligence are able to perceive their own and other people's emotions accurately, have strong adaptability, and are more prone to adopting appropriate means to reduce the adverse effects of stress and transform stress into positive outcomes (Furnham et al., 2002).

In terms of the relationship between emotional intelligence and emotional labour, emotional intelligence can influence and predict emotional labour. The higher levels of emotional intelligence, the more deep acting behaviours, the more accurate the perception of the emotions required for the job, and thus the regulation to demonstrate the emotions required for the work environment (Brotheridge, 2006). Emotional labour is the management of an employee's emotions in the workplace and is inevitably influenced by the individual's emotional intelligence. The two are closely related to each other as evidenced by a large body of research on their relationship.

The strained DPR in China today requires healthcare workers to have strong emotional management skills. Studies have shown that healthcare workers with higher levels of emotional intelligence have better job performance and are more likely to form good DPRs and nurse-patient relationships (Pei, 2013; Pu et al., 2017). Results of studies by Taiwanese scholars have shown that higher levels of emotional intelligence among doctors are associated with higher levels of patient trust and have a positive effect on DPR (Weng, 2008; Weng et al., 2011).

Most studies are focused on the status of emotional intelligence of healthcare workers or medical students and the relationship between emotional intelligence and patient satisfaction (Azimi et al., 2010; Gokhale et al., 2019; Hasegawa et al., 2016). The studies on the emotional intelligence of dentists are limited. It is important to study the status of emotional intelligence among dentists and the impact of emotional intelligence on work stress, emotional labour and DPR.

2.5 Empathy

2.5.1 Empathy as a complex concept

The concept of empathy was first introduced by Edward Titchener, who argued that human emotions could not only be seen but also felt, which was referred to as empathy by him (Titchener, 1909). Since then, scholars have studied empathy from a variety of perspectives, including traits, components and abilities. They generally agree that empathy is a complex concept that includes both emotional and cognitive components (Batson et al., 1995; Davis, 1983; Gladstein, 1987), and that it is an individual's ability to accurately infer the specific feelings and thoughts of others.

Allgood (1992) proposed two types of empathy: trait empathy and state empathy. Trait empathy is an innate personality trait that refers to an individual's ability to perceive the mental

states, emotions and feelings of others, and is a stable trait that exists within the individual and varies across individuals (Davis, 1983). State empathy is an acquired ability that refers to the emotional dynamics evoked by an individual in a particular situation (Batson et al., 1995) and is primarily used in therapeutic interpersonal relationships, where the therapist is able to objectively perceive the feelings and thoughts of others in a neutral manner and communicate these feelings to them in a situational manner. It has to do with specific situations. State empathy has both an affective component and a cognitive component. The affective component refers to the process by which an individual puts himself or herself in a similar emotional state to another person (Batson et al., 1995), while the cognitive component refers to the individual's ability to analyse and represent the emotions felt by another person (Gladstein, 1987).

Goubert et al. (2005) argue that the components of empathy include emotion, cognition and behaviour. Davis (1994) considered empathy a multi-dimensional concept and divided it into four dimensions, namely perspective taking, empathic concern, fantasy and personal distress. Specifically, perspective taking reflects the cognitive component of empathy, while empathetic concern and personal distress embody the affective component of empathy. Although different scholars have different views on the components of empathy, they all agree that empathy has to do with the process of perceiving the emotions of others and its feedback to one's own emotions and feelings. Singer and Lamm (2009) regard empathy as an individual's ability to feel and experience the emotions, feelings and psychological states of others.

The above definitions provide different perspectives on empathy. As a profound and complex concept, empathy cannot be easily defined in terms of traits, components or abilities as such definitions can hardly embody the characteristic of empathy as a dynamic psychological adjustment process. Currently, most scholars agree that empathy is the ability to accurately infer specific thoughts and feelings of others. As such, empathy is considered a valuable individual resource.

In healthcare contexts, researchers tend to define doctors' empathy as a cognitive attribute (Hojat et al., 2002). Hojat et al. (2002) define empathy as "a cognitive attribute that involves an ability to understand the patient's inner experiences and perspective and a capability to communicate this understanding" (Hojat et al., 2002, p. 1564). The clinical application of empathy is also known as clinical empathy, which is the ability of healthcare workers to use empathy as a motivation to build trust with patients, identify their emotional state and respond to their emotional needs in a timely and appropriate manner to better help patients and facilitate clinical care.

Based on the above elaboration on the concept of empathy and with reference to the definition of empathy by Hojat et al. (2002), this study defines dentists' empathy as *the capability of dentists to feel and understand patients' emotions in their clinical work, and to express this understanding to patients and make them feel it through communication.*

2.5.2 Existing studies on empathy

1. Existing literature on empathy

The notion of empathy was first proposed by Edward Titchener (1909). Since its birth, it has received widespread attention from researchers who have carried out a series of studies that have facilitated its development. In terms of the factors influencing empathy, a large body of research has been conducted on individual factors and situational factors; as to the areas of application of empathy, research findings have focused on the empathy of teachers and healthcare workers; regarding social phenomena related to empathy, scholars have mainly studied DPR and interpersonal relationships.

There has been a large body of research, both in China and internationally, on the factors influencing empathy. Individual factors include gender, age, job title and personality traits. Bratek et al. (2015) found a significant positive association between doctors' age and empathy. The results of the study carried out by R. Xu (2016) showed that gender, age, professional title and personality traits had a significant effect on college counsellors' empathy. Empathy requires certain situations to arise. In many cases, empathy can only occur in specific situations and relationships (J. S. Liu & Zhou, 2008). During empathic processing, situational cues can evoke an individual's previous experiences, thus coordinating the process of combining internal experiences with external situational evaluations (Hein & Singer, 2008). Hoffman (2000) states that empathy is something that individuals feel when they encounter another person's situation (such as pleasure and pain), often in relation to the same or similar experiences or situations that occurred in their own lives. In clinical practice, healthcare workers are prone to empathising with their patients. Nightingale et al. (1991b) suggest that if a doctor empathises with a patient, then the doctor will express and even share the emotions they experience with the patient in some way.

The notion of empathy has been applied extensively in the healthcare sector, and scholars have developed various types of scales to measure empathy. For example, Lauder et al. (2000) developed the Reynolds Empathy Scale (RES) based on patients' understanding of and reactions to nurses' words and actions. A study on the impact of empathy on HIV patients

indicated that empathetic doctors were able to increase patients' willingness to receive treatment and improve treatment outcomes to some extent (Flickinger et al., 2016). T. Wang et al. (2015) investigated the role of empathy in the relationship between nurses' subjective well-being and burnout by means of a questionnaire survey. The results showed that empathy mediated the influence of subjective well-being on burnout. M. Xiong et al. (2020) studied the relationship between empathy and DPR and found that empathy positively predicted DPR and could improve DPR. Y. J. Yang et al. (2021) also argued that doctors' stress levels were an important cause of strained DPRs, that empathy mediated the relationship between stress and DPR, and that doctors' ability to empathise was an important guarantee for building a harmonious DPR.

2. Empathy of healthcare workers

Existing research on the application of healthcare workers' empathy in clinical contexts has focused on two main aspects.

Empathy can improve patients' psychological state, treatment compliance and treatment outcomes (M. F. Wu & He, 2018). More communication between healthcare workers and patients reduces patient anxiety, and the reduction of anxiety positively contributes to treatment outcomes and physiological effects (Halpern, 2003). Steinhausen et al. (2014) argue that empathic behaviour can enhance communication between doctors and patients, bring them closer together, increase satisfaction with healthcare services, and promote patient relief and early recovery. A study by Down et al. (2019) showed that the better the doctor's empathy, the lower the incidence of acute metabolic complications in the diabetic patients they treated. Empathy facilitates clinical outcomes for patients and can improve the nurse-patient relationship (Nightingale et al., 1991b; Olson, 1995; Spiro et al., 1993). It can thus be seen that the demonstration of empathy by healthcare workers can give patients some psychological support and improve treatment outcomes and prognosis, leading to better treatment quality.

Empathy is beneficial in improving doctor-patient communication, alleviating conflict in DPR, and increasing the job satisfaction and well-being of healthcare workers (Salvarani et al., 2019). In clinical contexts, doctors' empathy has a positive effect on improving DPR and enhancing mutual trust, contributing to a harmonious DPR and increased job satisfaction among healthcare workers. It has been suggested that empathy can also improve patient satisfaction and reduce the incidence of unpleasant incidents and complaints between doctors and patients (Ak et al., 2011). It has also been suggested that empathy is a protective factor for healthcare workers in coping with work stress and maintaining physical and mental health (Landa et al., 2008).

Based on the above literature, empathy has a positive effect in both directions, on both patients and healthcare workers. The stronger the empathy of healthcare workers, the more patients can feel psychologically understood and comforted, the more they can actively cooperate with healthcare workers, leading to improved treatment compliance and outcomes as well as enhanced patient satisfaction; empathy also makes communication between doctors and patients more harmonious and smoother. It can facilitate adequate communication and build a trust mechanism between doctors and patients, ease DPR, enhance the job satisfaction and well-being of healthcare workers, and reduce the negative effects of work stress.

2.5.3 Measurement of empathy

Several empathy scales have been developed by scholars, depending on their research practice, field of study, research focus and research population.

1. Measurement of empathy from the cognitive perspective

Hogan (1969) considered empathy to be the rational and imaginative understanding of another person's situation or mental state and developed the Empathy Scale to measure cognitive empathy and empathy in perspective taking. The scale was a 64-item self-report measure of empathy and reported a reliability between 0.71-0.84 based on a survey among adult participants.

Borke (1976) used children as participants to measure their empathy. He inferred children's empathy by telling them a story, putting them in the middle of a story scene and later asking them to draw the facial expressions of the characters they felt in the story on a drawing paper.

The Jefferson Scale of Empathy (JSE), developed by Jefferson University in 2001, is one of the more commonly used measures of empathy (Kane et al., 2007). Because of its high internal consistency, JSE has been widely used to measure empathy among health professions (JSE-HP), medical students (JSE-S) and health profession students (JSE-HPS). Chinese scholars An et al. (2008) measured the reliability and validity of the Chinese version of JSE after translation, back translation and cultural adaptation. The measurement results showed that the reliability, content validity and structural validity of the scale were generally consistent with the results of studies abroad, indicating that the scale can be applied to the Chinese nurses.

2. Measurement of empathy from the affective perspective

Feshbach (1979) studied children's empathy and developed a scale (Feshbach Affective Situations Test of Empathy) to test empathy among younger children. The scale was designed with four sets of slides that expressed different emotions to the test taker, namely happiness,

sadness, anger and fear, and the test taker was asked to report their own emotional experience while understanding the story of each set of slides.

3. Measurement of empathy from multiple perspectives

In 1980, Davis (1980) developed a measure of empathy known as the Interpersonal Reactivity Index (IRI), which consists of four dimensions measured by 28 items with all the items scored on a five-point Likert scale. Davis (1980) adopted an empirical approach to measure the reliability and validity of IRI, and the results showed that IRI had good internal consistency as well as good discriminant and convergent validity.

2.5.4 Summary

Since its introduction, the concept of empathy has received widespread attention in the psychological community, and rapid progress has been made in related research. There has been extensive research on the connotations, influencing factors, measurement scales and areas of application of empathy. As healthcare research is focused on people, the communication between a doctor and a patient will inevitably include an emotional component on both sides. Health care is an emotionally labour-intensive profession, and emotional labour is essential in health care delivery. However, it is not clear how emotional labour is related to empathy among healthcare workers.

The results of the study suggest that empathy among healthcare workers contributes to doctor-patient communication and gives psychological support to patients, thereby improving patient compliance and treatment outcomes. In turn, harmonious doctor-patient communication can help alleviate the work stress of healthcare workers, enable them to maintain physical and mental health, and increases their job satisfaction and well-being. Therefore, empathy can also be considered as an individual resource. However, few studies have been conducted on the influence mechanism of empathy influences from the perspective of conservation of resources theory and the job demands-resources model. Even fewer studies have been conducted on empathy among dentists.

2.6 Conservation of resources theory

Hobfoll (1989) defines resources as “objects, personal characteristics, conditions, or energies that valued by the individual or that serve as a means for attainment of these objects, personal characteristics, conditions, or energies” (Hobfoll, 1989, p. 516). In general, resources are classified into four kinds: material resources, personal resources, condition resources and

energy resources. Specifically, material resources refer to resources that are rare and expensive and can indicate an individual's socio-economic status. Personal resources refer to personal characteristics, knowledge and experience, such as personal traits and psychological resources, which determine an individual's stress tolerance. Condition resources refer to the key resources that avail people to other resources, such as marriage, job positions and qualifications. Finally, energy resources refer to resources that can help an individual obtain other resources such as fame and reputation (Hobfoll, 1989).

2.6.1 Conservation of resources (COR) theory

Hobfoll (1989) proposed the COR theory which argues that an individual's assessment of the importance of the resources he or she has and the importance of the resources he or she has lost affects the individual's assessment of the work environment. The theory suggests that individuals' perceptions and evaluations of resources affect their work stress and that resources are an important factor influencing their physical and mental health (Hobfoll, 1989).

In a nutshell, firstly, loss of resources has forced a sense of threat among humans, which have made people conscious of protecting rare resources. So, the loss of resources is given the top priority, followed by access to resource; secondly, access to resources influences the ultimate consequences of stress. Access to resources allows for increased social recognition, increased self-esteem and many positive effects and can prevent loss of resources. Thirdly, if individuals have sufficient resources, they can avoid the threat of the loss of resources while being able to find more resources (Hobfoll & Shirom, 2001). The COR theory suggests that individuals are psychologically motivated to conserve, acquire and use resources, and explains how motivation is related to individual psychology, attitudes and behaviours. Because of this, the theory can be used to explain such phenomena as work stress and emotional exhaustion.

The COR theory proposed by Hobfoll (1989) focuses on how individuals cope with stress to better adapt to the changing social environment from the perspective of the input-output imbalance of individual resources. Specifically, a sense of threat arises when people feel that their resources are insufficient. When a loss of resources occurs, people would mobilise other resources to make up for the loss to cope with the stress and adapt to the environment. If the stress is too much, or if the lost resources are not replenished effectively and in a timely manner, people would experience burnout, which can negatively affect their physical and mental well-being (Hobfoll, 2002; Hobfoll & Shirom, 2001).

2.6.2 COR hypotheses

The COR theory provides a basis for the following hypotheses.

(1) The threat or likelihood of an unfavourable event occurring to the individual will prompt the individual to increase resource input.

(2) Individuals have two tendencies towards resource conservation: one is to find ways to protect resources that are beneficial to them, and the other is to accumulate as much as possible the resources they need.

Brotheridge (2006) used the COR theory to explain the relationship between emotional labour and burnout. He argues that individuals consume resources to manage and control their emotions when performing emotional labour, but this consumption of resources does not necessarily lead to physical and mental impairment. The reason for burnout is that the consumed resources are not replenished in a timely manner, and the imbalance in resources leads to emotional dissatisfaction which leads to the individual's reluctance to display the emotions expected by the organization, thus leading to burnout. If the resources consumed by the individual are replenished in a timely and effective manner, there will be no imbalance in resources, and the individual will not develop emotions that are incompatible with the organization, thereby the absence of burnout (Brotheridge, 2006). Several studies have shown that reduced job satisfaction and increased burnout among nurses are associated with prolonged engagement in inappropriate emotional labour (Y. P. Chen & Wang, 2014; Fernández-Castro et al., 2017; Zamperini et al., 2015).

According to the COR theory, this study argues that the work stress and emotional labour among dentists will lead to a certain degree of resource depletion in them and that cultivating the emotional intelligence of perceiving, expressing, regulating and controlling emotions can replenish the depleted resources and help dentists cope with work stress effectively in clinical practice, so that they can spontaneously choose appropriate emotional labour strategies and better carry out clinical work; in addition, developing dentists' empathy can help improve patients' recognition and trust, which is conducive to establishing good doctor-patient interactions and gaining social approval, timely replenishing the resources consumed by emotional labour, and facilitating the benign development of DPR; furthermore, a good DPR is a reflection of individuals' good job performance as well as a valuable resource that can replenish the resources consumed by the doctors themselves and increase their job satisfaction and well-being, making resources compensation greater than resources consumption and enable emotional labour to produce positive outcomes.

2.7 Job demands-resources model

The JD-R model classifies all job characteristics into two types: job demands and job resources. Job demands were defined as “those physical, psychological, social, or organizational aspects of the job that require sustained physical and/or psychological (cognitive and emotional) effort and are therefore associated with certain physiological and/or psychological costs” (Bakker et al., 2003, p. 344). Job demands are job characteristics that may cause stress and may also be referred to as job stressors if they exceed the employee’s adaptability. Therefore, the work stress and emotional labour explored in this study can be considered as categories of job demands.

Job resources are defined as “those physical, social, or organizational aspects of the job that (a) are functional in achieving work-related goals, (b) reduce job demands and the associated physiological and psychological costs, and (c) stimulate personal growth and development” (Xanthopoulou et al., 2007, p. 122), such as job control, social support, social feedback, compensation, career opportunities and organizational justice. In this sense, a healthy DPR in the healthcare sector is considered a valuable work resource, and an individual’s emotional intelligence and empathy can be considered effective individual resources or job resources in a broad sense.

The JD-R model suggests that job demands and job resources generate two independent psychological processes: the health impairment process and the motivational process (Bakker & Demerouti, 2007; Demerouti et al., 2001). Job demands are the main predictor of the health impairment process. If employees are subject to a high intensity and demanding work environment for long periods of time, their physiological resources will be consumed significantly, which in turn will lead to prolonged fatigue, emotional exhaustion and health impairment, resulting in negative organizational outcomes such as low performance and high turnover rates. The motivational process is one whereby job resources lead to such positive outcomes as enhanced employee performance, better job performance, improved business performance and lower turnover (Bakker & Demerouti, 2007; Demerouti et al., 2001).

Job demands and job resources influence each other and interact with each other. On the one hand, job resources can effectively reduce the impact of job demands on work stress. If employees are in a work environment with adequate resources, they tend to be more productive and relaxed and feel significantly less stress at work. Xanthopoulou et al. (2007) found in their study that job resources can effectively reduce the impact of job demands on burnout. Employees with more work resources are better equipped to cope with their daily tasks. On the other hand, job demands can in turn influence job resources. A demanding work environment

keeps employees motivated at all times and helps them mobilise their resources creatively, which in turn has a positive effect on job resources (Bakker & Demerouti, 2007).

The early JD-R model focused on the relationship between job characteristics and employees' occupational psychology without attention to the influence of personal characteristics. It is undeniable that individuals in the same work environment exhibit different states of being. The first personal characteristic variable to be introduced into the JD-R model was personal resources, an idea that was partly derived from COR theory.

Hobfoll (1989) classified resources into four basic kinds: objects, conditions, personal characteristics, and energies. Personal resources can be classified into various categories, including physiological, psychological, emotional, intellectual and capital characteristics (Hobfoll, 2002). Specifically, physiological characteristics are related to one's health status, energy level and vitality; psychological characteristics are related to one's mental health and self-efficacy; emotional characteristics are mainly reflected in one's emotional state, including satisfaction, empathy and gratitude; intellectual characteristics are mainly related to the skills, knowledge and experience one possesses; and capital characteristics refer to the time and money that one possesses. Xanthopoulou et al. (2009) argue that personal resources function in the same way as job resources in that they can reduce work stress as well as physical and mental exhaustion, help achieve work goals, and motivate personal growth and development. In this sense, the emotional intelligence and empathy involved in this study are valuable personal resources.

Hobfoll (2002) argues that people's needs are always evolving and that resources are an important way of satisfying individual needs. If an individual's resource needs are not fully met in a timely manner, the individual will experience stress and unpleasant emotions; and if such needs are met, the individual will experience pleasure.

From a dynamic perspective, if job demands are increased, employees are required to either work more efficiently or put in extra work to meet the increased demands; if the job resources available to employees are decreasing, it will be more difficult for them to access the job resources, which can lead to a risk of losing the resources. The COR theory suggests that both these situations increase stress and consume personal resources. The COR theory emphasises the role of personal resource factors and thus provides the theoretical basis for the JD-R model.

The core assumption of the JD-R model is that the more resources an individual has access to at work, the more it will help him or her to complete work tasks and reduce stress (Demerouti et al., 2001). With the introduction of personal resources, the JD-R model has been further developed, and its scope of application broadened. The model has been proven to be a good

predictor of job demands, burnout, turnover intention and job satisfaction.

According to the JD-R model and the COR theory, both emotional intelligence and empathy in this study can be considered as job resources. Besides, both work stress and emotional labour are job demands. On this basis, this thesis studies the interrelationship between job demands and job resources among dentists, puts forward theoretical hypotheses and a research model, and employs PROCESS macro to test the interrelationships between these variables.

2.8 Research hypotheses

2.8.1 The hypothesis on the relationship between work stress and DPR

Dentists have a heavy workload, need to meet high professional and competency requirements, are exposed to high medical risks, and face high levels of work stress from study and promotion. The immense work stress not only leads to poor work performance of dentists, but also causes dentist-patient disputes in severe cases (A. Q. Wang et al., 2016). Gorter et al. (1999) designed DEWSS to assess the work stress of 709 dentists in the Netherlands. The results of their study suggested that patient contacts had a significant impact on dentists' work stress. Besides, the scores of sub-scales and specific items indicated that factors related to patient contacts might be the root cause of worry and concern for dentists.

According to the JD-R model, dentists' work stress is a job demand. Prolonged exposure to high-intensity and demanding work environments triggers an energy-depleting process that can lead to emotional exhaustion and harmed health, as well as negative outcomes such as low performance and high turnover rates, which are detrimental to personal and organisational development. In this study, DPR is a reflection of a doctor's job performance.

Based on the above studies, this study proposes the following hypothesis:

H1: Work stress is negatively related to doctor-patient relationship.

2.8.2 The hypotheses on the relationship between work stress and emotional labour

Studies have shown that clinicians experience high levels of work stress compared to the general workforce (Thomas & Valli, 2006), and that high levels of work stress can lead to high rates of job errors, low job satisfaction, emotional exhaustion, increased levels of burnout and turnover intention, as well as negative behaviours such as smoking, alcohol abuse and suicide (K. W. Song et al., 2017). One study reported that work-related bullying is positively associated with both surface acting and deep acting among nurses, and deep acting is negatively related to

emotional exhaustion (Ma et al., 2021). Work stress triggers emotional responses that lead to inappropriate behaviour, prompting individuals to regulate their emotional responses to conform to organizational rules, a regulation process that involves both surface acting and deep acting (Grandey, 2000). Besides, emotional labour is also integral to the healthcare process. Dentists are faced with many doubtful and fearful patients on a daily basis. Emotional reassurance can lead to greater cooperation with treatment, and the adoption of appropriate emotional labour strategies can increase patient acceptance and trust, which will increase patients' cooperation with treatment.

According to existing research, emotional labour is associated with work stress. Specifically, the higher levels of work stress, the higher levels of emotional labour reflected in surface acting and/or deep acting; prolonged engagement in emotional labour will lead to the accumulation of negative emotions, which in turn will lead to greater work stress, thus causing a vicious cycle (Khalid et al., 2019).

Therefore, faced with enormous clinical work stress, dentists need to adopt different emotional labour strategies to regulate their own emotions while displaying to patients in a timely manner so as to increase patients' cooperation with treatment and gain greater recognition and trust from patients.

Based on the above literature, the following hypotheses are proposed:

H2: Work stress is positively related to surface acting.

H3: Work stress is positively related to deep acting.

2.8.3 The hypotheses on the relationship between emotional labour and DPR

Emotional labour is the way in which employees act out and manage their emotions to meet organizational or normative requirements and to enable the organization to achieve economic benefits (P. J. Wu, 2003). Healthcare is an emotionally labour-intensive profession. Healthcare workers need to be highly emotionally engaged in their work to ensure effective communication with patients, and therefore emotional labour is essential. Doctors are faced with many doubtful and fearful patients every day, and emotional reassurance can lead to greater cooperation with treatment. The adoption of appropriate emotional labour strategies can enhance patient acceptance and trust and facilitate a harmonious DPR. Therefore, it has been suggested that deep acting significantly predicts DPR. In other words, voluntary emotional labour by healthcare workers has a significant effect on improving DPR (Yuan et al., 2021).

Research has shown that deep acting strategy is generally positively related to employee

performance, while surface acting is not related to performance (Kammeyer-Mueller et al., 2013). A meta-analysis showed that surface acting affects occupational well-being and work attitudes and is marginally negatively related to job performance, while deep acting is weakly related to occupational well-being and work attitudes, but positively related to emotional expression and customer satisfaction (Hülsheger & Schewe, 2011).

According to the COR theory, surface acting needs to be supplemented by external energy to improve DPR and is prone to emotional dissonance. In comparison, deep acting is an inside-out emotional expression in which the individual's internal experience is consistent with the external emotional expression, and this display of authentic emotion allows the individual to accumulate resources (Goldberg & Grandey, 2007). However, deep acting is also a form of emotional labour that requires positive feedback or support from organizational or social resources to be effective.

Based on the above literature, this thesis puts forward the following hypotheses:

H4: Surface acting is negatively related to doctor-patient relationship.

H5: Deep acting is positively related to doctor-patient relationship.

2.8.4 The hypotheses on the role of emotional intelligence in the relationship between work stress and emotional labour

The work stress levels are high among clinicians (Thomas & Valli, 2006). Existing studies show that emotional labour is significantly associated with work stress, with higher levels of stress leading to higher levels of emotional labour; the accumulation of negative emotions from prolonged engagement in emotional labour will lead to higher levels of work stress, causing a vicious cycle (Khalid et al., 2019).

Emotional labour is the management of an employee's emotions during the work process and is influenced by the individual's emotional intelligence. Research suggests that the higher the levels of emotional intelligence, the higher the levels of engagement in deep acting, the more accurately the emotions required for the job are perceived, and thus the emotions required for the work environment are demonstrated through regulation (Brotheridge, 2006). Employees with high emotional intelligence are able to perceive their own and others' emotions accurately and have strong adaptability to adopt appropriate coping strategies in the face of stress (Furnham et al., 2002), mitigating the adverse effects of stress and facilitating the transformation of stress into a positive outcome.

According to the COR theory, work stress and emotional labour will cause a certain degree

of resource depletion in dentists. Such unfavourable events will prompt dentists to increase resource input. Emotional intelligence, as an effective personal resource, can attenuate the relationship between work stress and emotional labour by replenishing resources and reducing depletion in a timely manner.

On this basis, this thesis proposes the following hypotheses:

H6: Emotional intelligence attenuates the relationship between work stress and surface acting such that work stress is less positively related to surface acting among dentists with high emotional intelligence than those with low emotional intelligence.

H7: Emotional intelligence attenuates the relationship between work stress and deep acting such that work stress is less positively related to deep acting among dentists with high emotional intelligence than those with low emotional intelligence.

2.8.5 The hypotheses on the role of empathy in the relationship between emotional labour and DPR

Healthcare is focused on studying people, so the process of doctor-patient communication will certainly include the emotional component of both parties. Studies based on large samples have shown that Chinese nurses tend to perform moderate to high levels of emotional labour (X. Wu et al., 2018), and that appropriate emotional labour can improve nurses' ability to communicate effectively, create a positive departmental climate, and lead to better clinical care (Cheng et al., 2013). Research suggests that deep acting can significantly predict DPR and that healthcare workers' emotional labor plays a significant role in improving DPR (Yuan et al., 2021).

Drawn on the COR theory, emotional labour causes a certain level of resource consumption in the individual. When the lost resources are not compensated in time, resource imbalance can occur, resulting in psychological impairment and burnout (Brotheridge, 2006). It has been shown that nurses who are engaged in a chronic state of inappropriate emotional labour can experience reduced job satisfaction and increased burnout (Y. P. Chen & Wang, 2014; Fernández-Castro et al., 2017; Zamperini et al., 2015).

As a personal resource, empathy can timely replenish resources depleted by emotional labour. When resources consumed during emotional labour are replenished in a timely manner, individuals are able to display the emotion expected by the organization, ensuring both quality of work and the absence of adverse emotional reactions. T. Wang et al. (2015) conducted a questionnaire survey among nurses and found that empathy mediates the relationship between subjective well-being and burnout, and that empathy moderates the relationship between well-

being and burnout. In clinical contexts, the embodiment of doctors' empathy can help facilitate doctor-patient communication and enhance trust between doctors and patients. Good empathy of healthcare workers can effectively alleviate patients' anxiety and distress caused by illness and promote a harmonious DPR (Astrow, 2015). A survey showed that the empathy of healthcare workers was closely related to DPR, and that the choice of perspective taking, fantasy and personal distress in empathy had a positive predictive effect on the total score of DPR, and that empathy contributed to the improvement of DPR.

Therefore, this thesis puts forward the following hypotheses:

H8: Empathy attenuates the relationship between surface acting and DPR such that surface acting is less negatively related to DPR among dentists with high empathy than those with low empathy.

H9: Empathy attenuates the relationship between deep acting and DPR such that deep acting is less positively related to DPR among dentists with high empathy than those with low empathy.

Based on the above hypotheses, the research model for this study is constructed as shown in Figure 2.1 below.

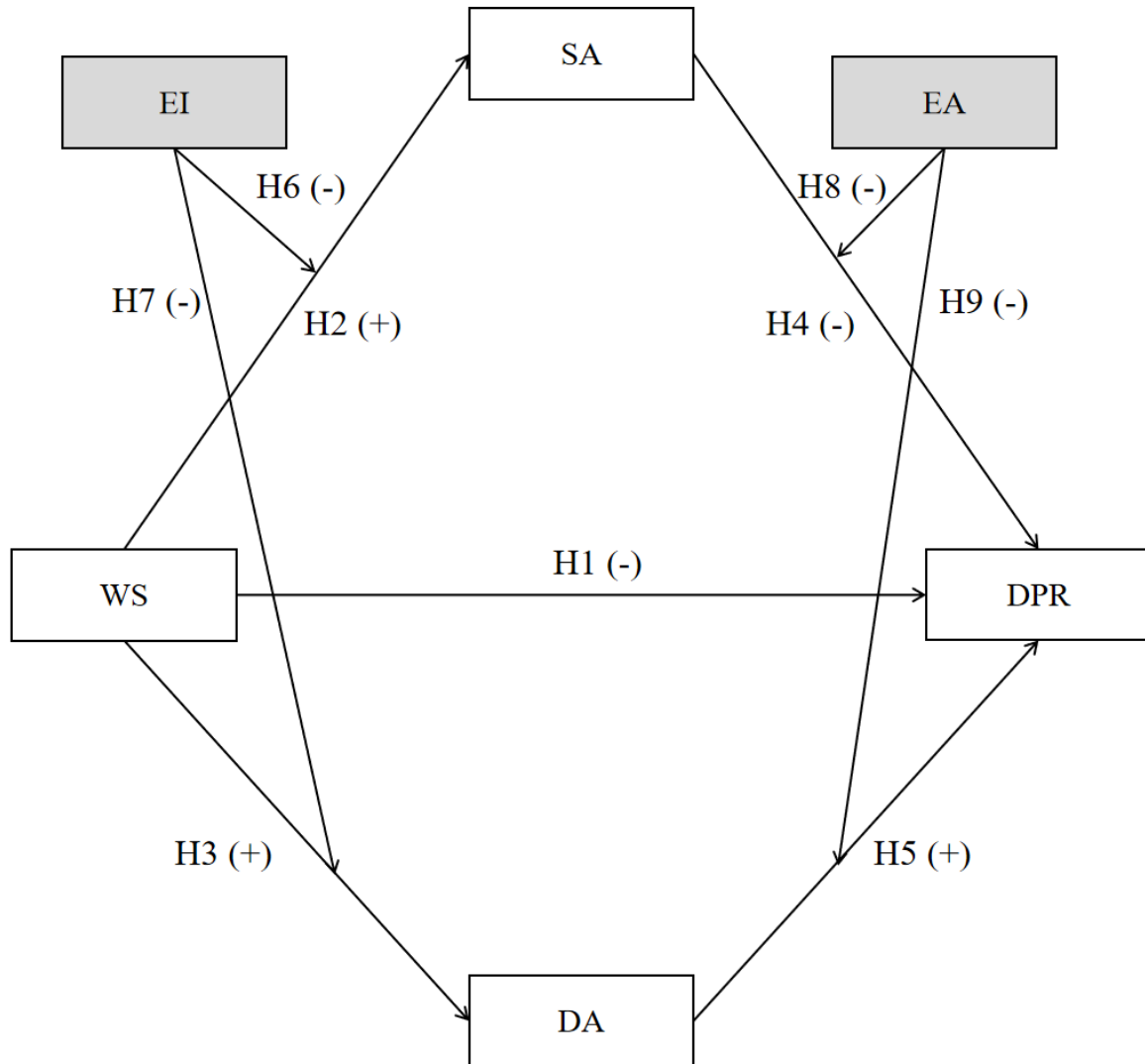


Figure 2.1 Hypothesized model of this thesis

Note: EI = emotional intelligence; SA = surface acting; EA = empathy; WS = work stress, DA = deep acting; DPR = doctor-patient relationship.

(+) indicates a positive value of the coefficient of effect in the model while (-) indicates a negative value of such coefficient.

The white boxes indicate that the hypothesized relationships with the related variables are mainly based on the JD-R model, while the grey boxes indicate that the hypothesized relationships with the related variables are mainly based on the COR theory.

Chapter 3: Research Methods

This study was a cross-sectional study designed with a convenience sampling method to collect data on socio-demographic variables and related measures from dentists in Shenzhen through a self-reported survey. The questionnaire was administered to dentists who met the inclusion criteria, which included socio-demographic information, dentists' work stress, emotional labour, DPR, emotional intelligence and empathy scales. Statistical analysis was performed using such software as SPSS 25.0 and AMOS 21.0. EFA, CFA and Cronbach's α values were used to measure the reliability and validity of each scale; descriptive statistics were used to understand the status of work stress and DPR among the dentists; independent samples t-test and one-way ANOVA were used to compare the differences in scores of measured variables between groups; Models 4 and 21 in the PROCESS macro developed by A. F. Hayes (2013) were used for testing the research hypotheses.

3.1 Research procedure and sampling

This study is a cross-sectional study, in which a questionnaire survey was conducted between October 2021 and November 2021, using a convenience sampling method with on-the-job dentists in various specialist and general hospitals in Shenzhen as respondents. Convenience sampling means that the researcher selects the units to be included in the sample based on the principle of convenience. In this study, a total of seven hospitals were selected as the study sites based on the administrative division, size and professional category to which they belonged. Among them, SZYY, BDYY and ETTY were municipal-level Grade A tertiary hospitals. The Dental Department of SZYY boasted first-class diagnosis and treatment technology and modern advanced equipment. With specialties in oral medicine, prosthodontics and orthodontics, it specialized in treating various tooth and dental pulp diseases, mucosal diseases and periodontal diseases. It was also at an advanced level in the city in the treatment of periodontal diseases and aesthetic restoration of the oral cavity. The Center for Oral Medicine of BDYY was equipped with 70 comprehensive dental treatment units and 38 beds. It operated nearly 2,000 surgeries per year. The department boasted a large number of internationally advanced equipment such as salivary gland endoscopy, arthroscopy and surgical navigation systems. It offered such specialties as endodontics, prosthodontics, orthodontics, periodontics and oral mucosa, with its

services covering routine treatment items in all the specialist areas. The Dental Department of ETTY covered an area of about 1,500 square meters with advanced facilities and specialties such as pediatrics dentistry, endodontics, restorative dentistry, orthodontics, periodontics and oral mucosa. ZDFB and LHYY were district-level Grade A tertiary hospitals. The healthcare team of the Dental Department of ZDFB boasted strong professional skills. The department was equipped with first-class medical equipment at home and abroad, and offered treatment services in maxillofacial surgery, endodontics, implantology, prosthodontics and periodontics. The Dental Centre of LHYY included sub-specialties such as oral medicine, oral and maxillofacial surgery, orthodontics, prosthodontics and preventive dental care. PSKQ was a municipal-level dental hospital. Its Dental Clinic boasted a number of specialties such as endodontics, paediatric dentistry, orthodontics, oral prophylaxis, periodontal mucosal disease, restorative dentistry and orthognathic orthodontics. The diagnosis and treatment level and the application of new technologies were among the best in China and advanced in the world. SZFY was a municipal-level specialist Grade A tertiary hospital. Its Dental Disease Prevention and Treatment Centre covered an area of 2,100 square metres and was equipped with a total of 40 dental chairs. It included sub-specialties such as paediatric dentistry, endodontics, periodontics, prosthetics and orthodontics.

The inclusion and exclusion criteria for the respondents were as follows.

Inclusion criteria: (1) those who had been licensed as a dentist; (2) those who had registered to work in a formal government-certified healthcare facility; (3) those who had been working in the dental department of the certified healthcare facility for one year or more; and (4) those who had signed the informed consent.

Exclusion criteria: (1) those who were engaged in advanced studies outside the hospital or those who had engaged in more than one month of advanced studies outside the hospital (not on duty) within a year; (2) doctors who were absent on leave or holiday during the survey period; (3) doctors who were not dentists or those who were general practitioners; and (4) respondents whose questionnaires were not successfully recovered, who filled in less than 90% of the items, or who clearly chose the same option for most/all of the items.

A pre-survey was conducted in advance in September 2021 in the dental department of a hospital before the questionnaires were formally distributed. Twelve dentists who met the inclusion criteria were randomly selected for the pre-survey. Twelve questionnaires were distributed, and 12 valid questionnaires were recovered, representing a recovery rate of 100%. Based on the feedback from the 12 respondents, the questionnaires were revised.

A total of 252 questionnaires were distributed in the formal survey of this study, and 241

questionnaires were recovered, of which two questionnaires with apparently consistent options were excluded. As a result, a total of 239 valid questionnaires were recovered, with a valid recovery rate of 94.8% (239/252). The flow chart of the questionnaire survey is shown in Figure 3.1.

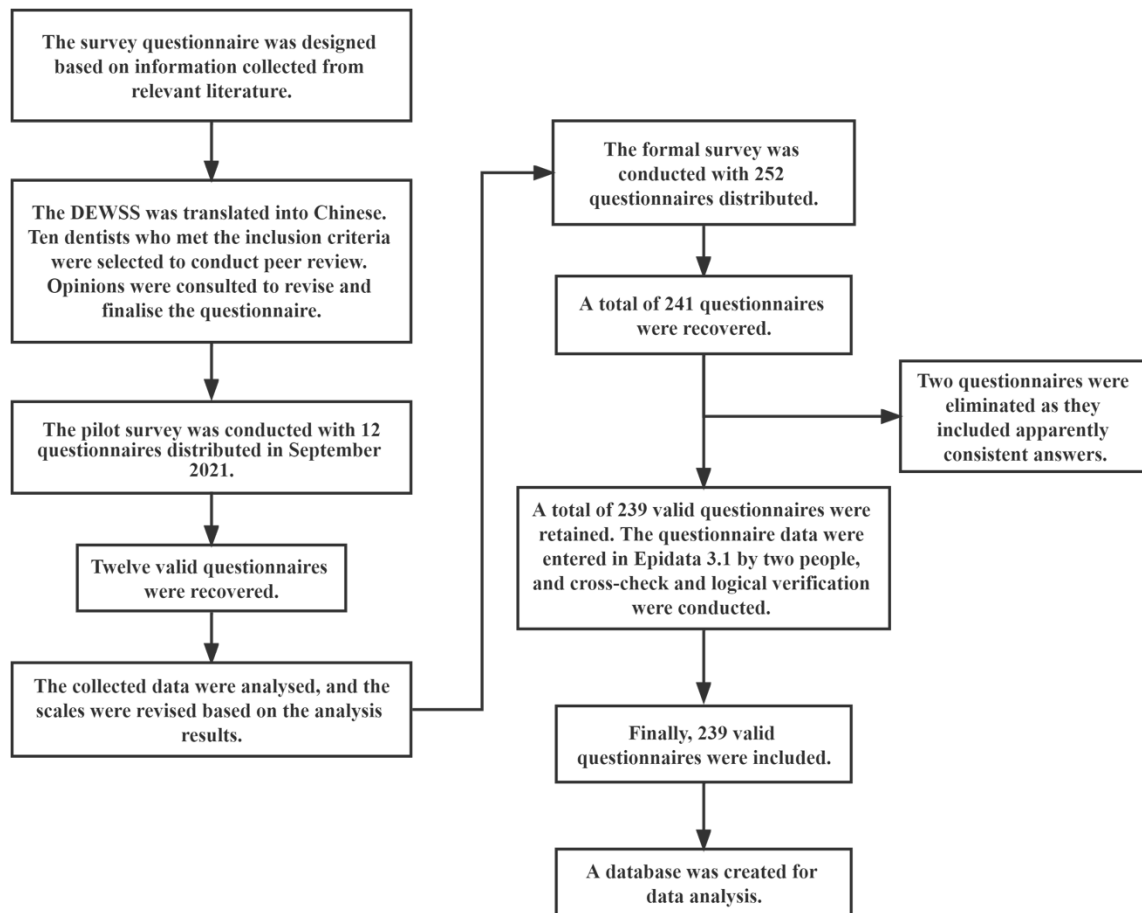


Figure 3.1 Flow chart of the questionnaire survey

3.2 Scales and questionnaire survey

This study adopted the questionnaire survey method. A total of six self-assessment scales were used to measure work stress (WS), emotional labour (EL), doctor-patient relationship (DPR), emotional intelligence (EI) and empathy (EA).

3.2.1 Measurement of work stress

This study drew on the DEWSS developed by Gorter et al. (1999). The scale contains seven subscales with 92 items, namely work pressure (WP) (seven items), financial aspects (FA) (19 items), patient contacts (PC) (18 items), work contents (WC) (19 items), career perspective (CP)

(14 items), team aspects (TA) (eight items) and professional and private life (PL) (six items). The overall Cronbach's α of the scale was 0.96, and the Cronbach's α of each dimension ranged from 0.77 to 0.91. Based on the DEWSS, the four subscales of patient contact, work pressure, work contents and team aspects were selected for this study, measured by a total of 53 items. The scale was translated into Chinese according to the Chinese culture. Then ten dentists were selected to conduct peer review on the translated scale, and the scales were revised based on their suggestions. The feedback rate of the peer review was 90%. Based on the peer feedback, the translations of the scales were revised again, and the final scale used contained a total of 50 items in four dimensions. Each item was scored on a five-point Likert scale, with 1 point indicating "not at all stressed", 2 points indicating "slightly stressed", 3 points indicating "somewhat stressed", 4 points indicating "stressed", and 5 points indicating "very stressed". The higher the score, the higher the level of stress at work; the lower the score, the lower the level of stress the work.

3.2.2 Measurement of emotional labour

Grandey (2000) proposed that emotional labour is the process by which individuals engage in a series of psychologically regulated activities to display the emotions desired by the organization and developed a commonly used scale to measure emotional labour. The scale is composed of two dimensions, surface acting (SA) and deep acting (DA), which are measured by eight items with an internal consistency coefficient of 0.750 (Grandey, 2003). The Emotional Labour Scale used in this study was based on the scale developed by Grandey (2003). It consists of two dimensions: surface acting and deep acting, measured by a total of eight items. Each item was scored on a six-point scale, consisting of "never", "seldom", "occasionally", "sometimes", "often" and "always". Higher scores for each item indicated more emotional labour, while lower scores indicated less emotional labour. A higher average score on a given dimension indicated that the respondents used that expression more often.

3.2.3 Measurement of DPR

The current study used the Doctor-Patient Relationship in China (DPR-C) scale developed by Zeng et al. (2018). The DPR-C scale consists of ten items under two dimensions, "doctor-patient trust" and "patient-centred care" (Zeng et al., 2018). To avoid neutral responses and to ensure that attitudes are clearly differentiated, a six-point Likert scale was used, with scores ranging from 1 point (strongly disagree) to 6 points (strongly agree). The higher the score, the

better the DPR; the lower the score, the worse the DPR. The scale has good reliability and validity, with an overall internal consistency coefficient of 0.90 for the ten items. The Cronbach's α values for "doctor-patient trust" and "patient-centred care" were 0.88 and 0.90, respectively, and the factor loadings for each item were greater than 0.70.

3.2.4 Measurement of emotional intelligence

The WLEIS developed by Wong and Law (2002) was used to measure four main dimensions, each consisting of four items, adding up to a total of 16 items. The four dimensions of emotional intelligence are: (1) self-emotions appraisal (SEA). This dimension focuses on an individual's ability to truly understand and express his or her own emotions; (2) others-emotions appraisal (OEA). This dimension reflects the individual's ability to feel and understand the emotional states of others. Individuals with high levels of OEA are more sensitive to the emotional experiences of others; (3) use of emotion (UOE). This dimension reflects the individual's ability to use their emotions flexibly; and (4) regulation of emotion (ROE). This dimension assesses how well individuals are able to control their emotions and how quickly they can recover from a bad emotional state (Wong & Law, 2002). The items were scored on a six-point scale, including "strongly disagree", "disagree", "somewhat disagree", "somewhat agree", "agree" and "strongly agree". The higher the score, the higher the emotional intelligence; the lower the score, the lower the emotional intelligence.

3.2.5 Measurement of empathy

The JSE-HP scale translated, back-translated and culturally adapted by An et al. (2008) was adopted for this study. JSE, abbreviated from the Jefferson Scale of Empathy (JSE), was developed by Hojat et al. (2002) from the Center for Research in Medical Education & Health Care at Jefferson University. The scale compiled and adapted by Chinese scholars An et al. (2008) consists of 20 items under three dimensions, namely perspective taking (ten items), emotional care (seven items), and empathetic thinking (three items). The scale has a KMO of 0.768, a Cronbach's α of 0.750, a split-half coefficient of 0.771 and a test-retest reliability of 0.659, indicating good reliability (An et al., 2008; Kane et al., 2007). Eleven of these items were selected for the survey of dentists in this study, with one dimension of perspective taking being retained. All items were scored on a six-point scale consisting of "strongly disagree", "disagree", "somewhat disagree", "somewhat agree", "agree" and "strongly agree". The higher the score, the higher the level of empathy.

3.2.6 Socio-demographic variables

Ten items were designed by the researcher to collect socio-demographic information on the dentists' gender, age, length of service, education level, professional title, marital status, average monthly income before tax, nature of the dental facility, size of the dental facility and type of employment. Age and length of service were continuous variables and were measured in years. All other variables were categorical. Except for gender which was a bicategorical variable, the remaining ones were multicategorical variables; there were four types of education level, junior college degree or below, bachelor's degree, master's degree and doctoral degree; four groups of professional titles were identified based on China's current title system: physician, attending physician, deputy chief physician and chief physician; types of marital status included unmarried, married and other (such as divorced); respondents were classified into four groups based on their average monthly income before tax with reference to the average income of doctors in Shenzhen public hospitals: the group earning below 10,000 yuan, the group earning 10,000-19,999 yuan, the group earning 20,000-29,999 yuan and the group earning more than 30,000 yuan; as to the nature of the dental facility, three types of dental facilities were identified, namely public healthcare facility, private healthcare facility and other healthcare facility according to whether the business entity was run by the government or by individuals; as to the size of dental facility, all the facilities were classified into three groups based on the number of dental chairs: the group with no more than ten dental chairs, the group with 11-30 dental chairs and the group with no less than 30 dental chairs; and there were three types of employment according to the common way of employing staff in healthcare facilities in China: permanent employment, conditional permanent employment and contract-based employment (temporary).

3.3 Data collection

The researcher obtained the consent and cooperation of the departments by communicating with the surveyed hospitals and their dental departments prior to the survey. The head of each dental facility or department provided the list and basic information of the staff in service. Then eligible respondents were screened according to the inclusion and exclusion criteria to form the survey list. A random number table was generated by SPSS 25.0 software. The list was compared according to the facility and the random number table in the questionnaire for one-to-one numbering to ensure that each respondent had only one unique identification number.

On the day of the survey, three to five uniformly trained surveyors went to the sites to check the list and numbers and distributed the questionnaires on a one-to-one basis. The main purpose of this session was to avoid the possibility where respondents provided false answers for fear of information disclosure. The surveyors were strictly required to be familiar with the content of the questionnaire as well as the requirements for questionnaire distribution and completion. During the survey process, informed consent was first obtained from the respondents. Then, the surveyors explained the purpose of this study, the content of the survey and the requirements for completing the questionnaire to the respondents using standardised instructions. Meanwhile, they also stressed to the respondents that the content of this survey was for research purposes only and would be kept absolutely confidential. Respondents read and answered the questionnaire independently in their own consultation rooms, without interference or influence from each other. Questions were answered by the surveyors on the spot. After the questionnaires were completed, the surveyors recovered the questionnaires, checked them on the spot, asked the respondents to fill in the missing items in a timely manner, and eliminated the questionnaires where the answers were obviously consistent or the same option was consistently chosen for most or all of the items, so as to ensure that they were authentic and valid. The survey was conducted on a voluntary basis, and the respondents' identity information was encrypted in advance.

After the questionnaires were recovered, the data were entered by two persons using Epidata 3.1 software, cross-checked and logically verified. Finally, after confirming that there were no errors, the data were exported as an Excel file for archiving and imported into SPSS 25.0 for subsequent data analysis.

3.4 Statistical analysis methods

This study adopted SPSS 25.0 and AMOS 21.0 to conduct CFA for each scale, and descriptive statistics, correlation analysis and one-way ANOVA were conducted on the collected data. For the CFA, if the model fit results of the scale were poor, EFA was repeated, and subsequently validated again through CFA. The model fit criteria were: chi-square (CMIN)/degree of freedom < 3.0 , comparative fit index (CFI) > 0.90 , root mean squared error of approximation (RMSEA) < 0.08 , and Tucker-Lewis index (TLI) > 0.90 .

The PROCESS macro developed by A. F. Hayes (2013) was used to test the moderated mediation model. First, the mediation model was tested using Model 4 in the PROCESS macro with surface acting and deep acting as mediators, respectively. If the mediation model held, the

moderated mediation model was further tested using PROCESS Model 21 (A. F. Hayes, 2013). If the moderated mediation model held, the effect of work stress on DPR was further tested using simple slope analysis when the two moderators, namely emotional intelligence and empathy, were at different levels (M-1SD, M and M+1SD), respectively. The 95% confidence intervals for the coefficients were estimated using a bias-corrected non-parametric percentile Bootstrap method (sample size = 5,000), where a 95% confidence interval not containing 0 was considered statistically significant. The significance level was $\alpha = .05$ (two-tailed).

3.4.1 Reliability analysis of scales

Reliability refers to the stability and consistency of questionnaire results when the same sample is repeatedly tested with no change in method. Reliability analysis methods include internal consistency coefficient, test-retest reliability, alternate form reliability and split-half reliability. This study applied SPSS 25.0 software and used the internal consistency coefficient (also known as Cronbach's α) to test the reliability of each scale. The higher the Cronbach's α , the higher the consistency of a set of variables being tested, and the higher the reliability. A scale is considered to have good reliability when its Cronbach's α is between 0.7 and 0.95 and considered to have poor reliability when Cronbach's α falls below 0.7 (Terwee et al., 2007).

This study applied SPSS 25.0 to test the internal consistency of each scale and obtain Cronbach's α values. In addition, the corrected item-total correlation (CITC) and the α coefficient after deletion of items were also calculated. It is usually required that the CITC should be greater than 0.4 and the Cronbach's α after the deletion of an item be smaller than before the deletion. If Cronbach's α goes up after the deletion of an item, then the item should be considered for deletion.

3.4.2 Validity analysis of scales

Validity refers to the accuracy of a questionnaire or the extent to which a questionnaire measures what it is supposed to measure. Validity is split up into face validity, content validity and construct validity. Factor analysis is often used to test the validity of a scale. The higher the validity coefficient, the better the questionnaire measures what it is supposed to measure. However, before factor analysis can be conducted, a prerequisite must be met: there must be strong correlations between the variables being measured. In addition, two principles must be followed: (1) Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is greater than 0.6; (2) the significance of Bartlett's test of sphericity is smaller than .01. A KMO value of 0.6 is

considered unacceptable; a KMO value of 0.6-0.7 is considered acceptable; a KMO value of 0.7-0.8 is good; a KMO value of 0.8-0.9 is suitable; a KMO value greater than 0.9 is very suitable for factor analysis. The significance of Bartlett's test of sphericity is used to measure the consistency of a set of variables, factor analysis is the primary choice when $p < .05$ (Schreiber, 2021).

SPSS 25.0 and AMOS 21.0 were applied to conduct EFA and CFA to test the construct validity of the questionnaire scales. The measurement criteria were: when the KMO was greater than 0.7, the factor loadings of the items were greater than 0.4, and the total variance explained of the extracted factors with eigenvalues greater than 1 was no less than 60%, the scale was considered to have good construct validity.

3.4.3 Descriptive statistics

1. Socio-demographic variables

Continuous variables in the sociodemographic data, such as age and length of service, were described mainly by means, standard deviations, extreme values, skewness and kurtosis; categorical variables, such as gender, marital status, average monthly income before taxes, nature of the dental facility, size of the dental facility and type of employment, were described mainly by frequency and constituent ratios.

2. Measurement variables

Scores on the Work Stress, Emotional Labour, DPR, Emotional Intelligence and Empathy scales were all measurement data. Therefore, the measurement data that followed a normal distribution were expressed as mean $\pm$ standard deviation, and the measurement data that did not follow a normal distribution were expressed as median (interquartile range).

3.4.4 Correlation analysis between variables

Pearson correlation analysis was used to explore the correlations between work stress, emotional labour, DPR, emotional intelligence, empathy, age and length of service. The greater the absolute value of the Pearson correlation coefficient, the stronger the correlation between two variables.

3.4.5 Independent samples t-test and one-way ANOVA of multiple independent groups

Based on the results of the test for homogeneity of variance, independent samples t-tests or corrected t-tests, one-way ANOVA or Kruskal-Wallis H-tests were conducted to compare the

differences in dentists' scores on work stress, emotional labour, DPR, emotional intelligence and empathy between two or more groups. If homogeneity of variance was met, the overall means of the two independent samples were compared using the independent samples t-test, and the overall means of the multiple independent samples were compared using one-way ANOVA; if homogeneity of variance was not met, the overall means of the two independent samples were compared using a corrected t-test for differences and the Kruskal-Wallis H-test for the multiple independent samples. If the differences among multiple groups were statistically significant, further pairwise comparisons were made using the least significant difference (LSD) test.

3.4.6 Test of the moderated mediation model

The moderated mediation model was tested using the PROCESS macro developed by A. F. Hayes (2013). First, the mediation model was tested using Model 4 in the PROCESS macro (X = work stress "WS"; Y = doctor-patient relationship "DPR"; and M = surface acting "SA"/deep acting "DA"). If the mediating effect was significant, the moderated mediation model was further tested using PROCESS Model 21 (X = work stress "WS"; Y = doctor-patient relationship "DPR"; M = surface acting "SA"/deep acting "DA"; W = emotional intelligence "EI"; and Z = empathy "EA"). If the moderated mediation model was validated, conditional process analysis (A. F. Hayes, 2013) was used to test the effect of work stress on DPR at different levels of the moderator (-1 standard deviation, mean and +1 standard deviation). Bias-corrected non-parametric percentile Bootstrap methods (sample size = 5,000) were used to estimate 95% confidence intervals for the coefficients, where 95% confidence intervals not containing 0 were considered statistically significant. The significance level was $\alpha = .05$ (two-tailed).

3.5 Reliability and validity tests of the scales

3.5.1 Reliability and validity tests of the Work Stress Scale

CFA results showed that the model fit for the work stress scale was not satisfactory (CMIN/DF = 2.715 < 3, CFI = 0.784 < 0.9, RMSEA = 0.085 < 0.1, TLI = 0.774 < 0.9; see Table 1 in Annex B for detailed results). After removing items 3, 5, 7, 8, 10, 12, 13-15, 18-21, 23-30, 33, 36, 37, 41, 43, 46, 49 and 50, the model fit was significantly increased (CMIN/DF = 1.939 < 3, CFI = 0.951 > 0.9, RMSEA = 0.063 < 0.1, TLI = 0.944 > 0.9; see Table 1 in Annex B for detailed

results). Therefore, the above items were removed from the subsequent analyses. Subsequently, EFA was conducted on the Work Stress Scale. Prior to conducting the EFA, KMO and Bartlett's test of sphericity were conducted on the Work Stress Scale, and the results showed that the KMO = .938, and approx. chi-square of the Bartlett's test of sphericity were significant ($p < .001$) (see Table 2 in Annex B for detailed results), indicating suitability for EFA. Based on the EFA results shown in Table 3.1, a total of four principal factors with eigenvalues greater than 1 were extracted and rotated with the %s of variance being 23.332%, 18.098%, 16.114% and 14.600% respectively, adding up to the total variance explained of 72.143% ($> 60\%$). The results of the rotated component matrix are presented in Table 3.1.

Referring to the content and dimensionality of the DEWSS, the four main factors were categorised as stress from work aspects, patient aspects and competency aspects and colleague-aspects. The reliability analysis results (see Table 3.2) showed that the overall Cronbach's α for the Work Stress Scale was 0.932, which was greater than 0.7, indicating that the scale had good internal consistency and high reliability. The CITC for all items exceeded 0.5, and if any of the items were removed, the Cronbach's α would be lower than the overall level. Therefore, all items should be retained.

Table 3.1 Exploratory factor analysis results of the Work Stress Scale

Factor	Item	Content	Initial eigenvalue	Extraction sums of squared loadings			Rotated component matrix ^a			
				Total	% of Variance	Cumulative %	1	2	3	4
Competency aspects	WS32	Always having to deliver perfect quality	9.291	4.900	23.332	23.332	.819			
	WS35	The risk of making mistakes					.786			
	WS34	Having to decide in complicated oral situations					.768			
	WS31	Not being able to mean as much for a patient as one wishes to					.747			
	WS39	The feeling of having to be a jack-of-all-trades					.741			
	WS40	Experiencing the gap between perfection and what is possible					.711			
	WS38	Realisation that one's work is perishable					.631			
Patient aspects	WS42	Difficulty of work	2.638	3.801	18.098	41.430	.601			
	WS11	Self-willed or impudent patients						.878		
	WS17	Unreasonable or demanding patients						.874		
	WS16	Distrustful patients						.808		
	WS9	Anxious patients						.786		
Colleague aspects	WS22	Negative comments	1.773	3.384	16.114	57.543		.735		
	WS48	Consultations with staff							.876	
	WS45	Small possibility of contact with colleagues							.816	
	WS44	Communication with staff							.779	
	WS47	Dependency on a good assistant							.746	
Work aspects	WS2	Amount of work	1.448	3.066	14.600	72.143				.881
	WS1	Time pressure								.874
	WS6	Long working days								.815
	WS4	Concentration while working								.619

Extraction method: Principal component analysis; rotation method: Caesar's normalized maximum variance method

Table 3.2 CITC and reliability analysis results of the Work Stress Scale

Item	Mean after item deletion	Variance after item deletion	CITC	Cronbach's α after item deletion	Cronbach's α
WS1	50.20	175.405	.564	.929	.932
WS2	50.07	175.273	.564	.929	
WS4	50.71	174.522	.596	.929	
WS6	50.42	174.863	.533	.930	
WS9	50.03	175.379	.584	.929	
WS11	49.70	175.140	.523	.930	
WS16	49.85	175.283	.542	.930	
WS17	49.74	174.351	.584	.929	
WS22	49.81	176.681	.531	.930	
WS31	50.62	176.723	.688	.927	
WS32	50.39	174.907	.695	.927	
WS34	50.32	174.916	.672	.927	
WS35	50.26	175.590	.641	.928	
WS38	50.58	176.278	.690	.927	
WS39	50.43	173.501	.723	.926	
WS40	50.32	173.910	.753	.926	
WS42	50.56	178.064	.693	.927	
WS44	51.22	178.554	.617	.928	
WS45	51.21	180.166	.561	.929	
WS47	51.28	180.614	.554	.929	
WS48	51.30	178.722	.607	.928	

Note: WS = work stress

3.5.2 Reliability and validity tests of the Surface Acting Scale

The CFA results showed that the model fit for the Surface Acting Scale was not satisfactory (CMIN/DF = 5.902 > 5, CFI = 0.970 > 0.9, RMSEA = 0.144 > 0.1, TLI = 0.939 > 0.9; see Table 3 in Annex B for detailed results). After the removal of item 4, the model fit was significantly improved (CMIN/DF = 1.132 < 3, CFI = 1.000 > 0.9, RMSEA = 0.024 < 0.05, TLI = 0.999 > 0.9; see Table 3 in Annex B for detailed results). Therefore, item 4 was removed from the subsequent analyses. Subsequently, EFA was conducted on the Surface Acting Scale. Prior to conducting the EFA, KMO and Bartlett's test of sphericity were conducted on the Surface Acting Scale (see Table 4 in Annex B for detailed results), and the results showed that KMO = 0.821 and the approx. chi-square of Bartlett's test of sphericity were significant ($p < .0001$) indicating that EFA was suitable. Based on the EFA results (see Table 5 in Annex B for detailed results), a total of one principal factor with an eigenvalue greater than one was extracted, explaining 74.622% of the variance (> 60%). The reliability analysis results showed (see Table 3.3) that the overall Cronbach's α for the Surface Acting Scale was 0.885, which was greater than 0.7, indicating that the scale had good internal consistency and high reliability. The CITC for all items exceeded 0.5, and the Cronbach's α values after deletion of each of the four items

were 0.876, 0.837, 0.822 and 0.872, respectively, all of which were smaller than the overall Cronbach's α (0.885). This indicated that if any of the items were removed, Cronbach's α would be lower than the overall level. Therefore, all items should be retained.

Table 3.3 CITC and reliability analysis results of the Surface Acting Scale

Item	Mean after item deletion	Variance after item deletion	CITC	Cronbach's α after item deletion	Cronbach's α
SA1	9.34	12.175	.686	.876	.885
SA2	9.21	11.645	.789	.837	
SA3	9.26	11.451	.829	.822	
SA5	9.16	11.986	.699	.872	

SA = surface acting

3.5.3 Reliability and validity tests of the Deep Acting Scale

As there were only three items in the Emotional Labour Scale reflecting the deep acting dimension, the number of different sample moments and the number of parameters to be estimated were both six, and the degree of freedom or the difference between the two was equal to 0. As the model was exactly identified under such conditions, and there was one and only one solution, it was not meaningful to discuss the goodness-of-fit of the model. Therefore, all the three items should be included in the model. The reliability analysis results showed (see Table 6 in Annex B for detailed results) that the overall Cronbach's α for the Deep Acting Scale was 0.904, which was greater than 0.7, indicating that the scale had good internal consistency and high reliability. The CITC for all items exceeded 0.5, and if any of the items were removed, the Cronbach's α would be lower than the overall level. Therefore, all items should be retained.

3.5.4 Reliability and validity tests of the DPR Scale

The CFA results showed that the model fit for the DPR Scale was satisfactory (CMIN/DF = $3.801 < 5$, CFI = $0.959 > 0.9$, RMSEA = $0.108 > 0.1$, TLI = $0.945 > 0.9$; see Table 7 in Annex B for detailed results). After removing items 5 and 9, the model fit was further increased (CMIN/DF = $2.388 < 3$, CFI = $0.984 > 0.9$, RMSEA = $0.076 < 0.1$, TLI = $0.977 > 0.9$; see Table 7 in Annex B for detailed results). However, the subsequent EFA results showed (KMO = 0.909, the approx. chi-square of the Bartlett's test was significant, $p < .001$) that only one factor with an eigenvalue greater than 1 was extracted, that the cumulative % of variance of the principal factor was 69.734% ($> 60\%$), and that the CFA results showed poor model fit. Therefore, the final choice was made to retain items 5 and 9 and conduct EFA again. The second EFA results showed a KMO value of 0.921; Bartlett's test chi-square was significant ($p < .001$); a total of two factors with eigenvalues greater than 1 were extracted; and the cumulative % of variance

by the principal factor was 80.192%, greater than 60% (see Tables 8 and 9 in Annex B for detailed results). The reliability analysis results showed (see Table 3.4) that the overall Cronbach's α was 0.951, which was greater than 0.7, indicating that the scale had good internal consistency and high reliability. The CITC for all items exceeded 0.5, and if any of the items were removed, the Cronbach's α would be lower than the overall level. Therefore, all items should be retained.

Table 3.4 CITC and reliability analysis results of the DPR Scale

Item	Mean after item deletion	Variance after item deletion	CITC	Cronbach's α after item deletion	Cronbach's α
DPR1	45.39	39.020	.747	.947	.951
DPR2	45.38	39.027	.784	.946	
DPR3	45.45	38.904	.759	.947	
DPR4	45.39	38.382	.770	.946	
DPR5	45.05	38.128	.829	.944	
DPR6	44.95	38.624	.813	.945	
DPR7	45.11	38.358	.814	.944	
DPR8	45.02	38.138	.828	.944	
DPR9	45.02	38.273	.781	.946	
DPR10	45.05	38.817	.772	.946	

DPR = doctor-patient relationship

3.5.5 Reliability and validity tests of the Emotional Intelligence Scale

The CFA results showed that the model fit for the Emotional Intelligence Scale was satisfactory (CMIN/DF = 2.414 < 3, CFI = 0.959 > 0.9, RMSEA = 0.077 < 0.1, TLI = 0.949 > 0.9; see Table 10 in Annex B for detailed results). After removing items 5, 12 and 15, the model fit was further increased (CMIN/DF = 1.672 < 3, CFI = 0.984 > 0.9, RMSEA = 0.053 < 0.1, TLI = 0.979 > 0.9; see Table 10 in Annex B for detailed results). Therefore, the three items were removed in subsequent analysis. Subsequently, EFA was conducted on the Emotional Intelligence Scale. Prior to conducting the EFA, KMO and Bartlett's test of sphericity were conducted on the Emotional Intelligence Scale (see Table 11 in Annex B for detailed results), and the results showed a KMO value of 0.888 and the Bartlett's test chi-square was significant ($p < .0001$), indicating that EFA was suitable. Based on the EFA results (see Table 12 in Annex B for detailed results), a total of three principal factors had a total variance explained of 76.018%, which was greater than 60%. The reliability analysis results showed (see Table 3.5) that the overall Cronbach's α was 0.924, which was greater than 0.7, indicating that the scale had good internal consistency and high reliability. The CITC for all items exceeded 0.5, and if any of the items were removed, the Cronbach's α would be lower than the overall level. Therefore, all items should be retained.

Table 3.5 CITC and reliability analysis results of the Emotional Intelligence Scale

Item	Mean after item deletion	Variance after item deletion	CITC	Cronbach's α after item deletion	Cronbach's α
EI1	54.65	62.078	.556	.922	.924
EI2	54.61	60.469	.705	.917	
EI3	54.57	60.681	.697	.917	
EI4	54.40	61.167	.625	.920	
EI6	54.96	58.534	.731	.916	
EI7	54.99	57.603	.767	.914	
EI8	55.07	58.922	.709	.916	
EI9	54.88	59.125	.709	.916	
EI10	55.06	59.649	.568	.922	
EI11	54.90	58.327	.712	.916	
EI13	54.85	59.774	.650	.919	
EI14	54.94	59.274	.642	.919	
EI16	54.90	60.125	.622	.920	

Note: EI = emotional intelligence

3.5.6 Reliability and validity tests of the Empathy Scale

The CFA results showed that the model fit for the Empathy Scale was not satisfactory (CMIN/DF = 10.510 > 5, CFI = 0.843 < 0.9, RMSEA = 0.200 > 0.1, TLI = 0.804 < 0.9; see Table 13 in Annex B for detailed results). After the removal of items 1, 2, 5-7, 8, 10 and 11, the model fit was significantly improved (CMIN/DF = 0.397 < 3, CFI = 1.000 > 0.9, RMSEA < 0.0001, TLI = 1.000 < 0.9; see Table 13 in Annex B for detailed results). Therefore, the above items were removed from the subsequent analyses. Subsequently, EFA was conducted on the Empathy Scale. Prior to conducting the EFA, KMO and Bartlett's test of sphericity were conducted on the Empathy Scale (see Table 14 in Annex B for detailed results). The results showed that KMO = 0.839, and the Bartlett's test chi-square was significant ($p < .0001$), indicating that EFA was suitable. Based on the EFA results (see Table 11 in Annex B for detailed results), a total of one principal factor with an eigenvalue greater than one was extracted, explaining 79.541% of the variance (> 60%). The reliability analysis results showed (see Table 3.6) that the overall Cronbach's α for the Empathy Scale was 0.914, which was greater than 0.7, indicating that the scale had good internal consistency and high reliability. The CITC for all items exceeded 0.5, and the Cronbach's α values after deletion of each of the four items were 0.911, 0.873, 0.863 and 0.903, respectively, all of which were smaller than the overall Cronbach's α (0.914). This indicated that if any of the items were removed, Cronbach's α would be lower than the overall level. Therefore, all items should be retained.

Table 3.6 CITC and reliability analysis results of the Empathy Scale

Item	Mean after item deletion	Variance after item deletion	CITC	Cronbach's α after item deletion	Cronbach's α
EA3	15.83	6.252	.737	.911	.914
EA4	15.99	5.697	.847	.873	
EA8	15.93	5.781	.874	.863	
EA9	15.92	6.304	.759	.903	

Note: EA = surface acting

3.5.7 Common method variance

The Harman's one-factor test was used in this study to test for common method bias. The underlying assumption of this method is that if common method bias exists, EFA principal component analysis will extract only one factor with an eigenvalue greater than 1, or the variable variation will be explained primarily by the extracted common factor (typically greater than 40%). EFAs of all scale items showed that the first major common factor explained 37.849% (<40%) of the variance in the variables. Therefore, it could be assumed that common method bias would not have a large impact on the results estimated in this study.

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Chapter 4: Results and Hypotheses Testing

This chapter presents the results of descriptive statistics, correlation analysis, one-way ANOVA and hypotheses testing. First, results of descriptive statistics on the sociodemographic characteristics of the sample are presented, followed by the mean scores of main measurement variables including work stress and each of its dimensions, surface acting, deep acting, DPR, emotional intelligence and empathy. Then, results of the correlation analysis between two variables using Pearson correlation analysis are introduced. After that, independent samples t-test and a one-way ANOVA were conducted to examine whether the scores on the key measures differed among groups with different sociodemographic characteristics. Finally, Models 4 and 21 in the PROCESS macro were adopted to include age, marital status and professional title as covariates in a multi-factor regression model to test the moderated mediation model and further explore the specific role of each of the four dimensions of work stress in the model.

4.1 Descriptive statistics

4.1.1 Socio-demographic characteristics of the participants

A total of 239 respondents were included in this study, with a mean age (mean $\pm$ standard deviation) of 36.9 ± 8.7 years. Of all the respondents, 31.8% ($n = 76$) were male and 68.2% ($n = 163$) were female. In terms of education level, the majority of respondents had a master's degree (69.9%, $n = 167$), with the remaining 13.8% ($n = 33$) having a bachelor's degree and 15.5% ($n = 37$) having a doctoral degree. Most respondents (71.5%; $n = 171$) were married; 26.4% ($n = 63$) were unmarried; and 2.1% ($n = 5$) were divorced or had other types of marital status. In terms of average monthly income before taxes, the vast majority earned 10,000 yuan or more. Specifically, 76 (31.8%) earned 10,000-19,999 yuan per month; 104 (43.5%) earned 20,000-29,999 yuan per month; and 56 (23.4%) earned more than 30,000 yuan per month.

Among the work-related characteristics, the mean (mean $\pm$ standard deviation) of the respondents' length of service was 11.4 ± 10.0 years. In terms of professional title, 18% ($n = 43$) of the respondents had a junior title; 52.7% ($n = 126$) had an intermediate title; 17.2% ($n = 41$) had a deputy senior title; and 12.1% ($n = 29$) had a senior title. As to the nature of facility, all respondents were employed in public healthcare facilities. In terms of department size, 67.8%

(n = 162) of the respondents worked in a dental facility with at least 30 dental chairs, with the remaining 32.3% (n = 77) working in a facility with 11-29 dental chairs. In addition, 58.2% (n = 139) of the respondents were permanent employees; 19.7% (n = 47) were conditional permanent employees; and 22.2% (n = 53) were contract-based employees (temporary). See Table 4.1 for details.

Table 4.1 Socio-demographic characteristics of respondents (N=239)

Characteristic	Number	Percentage (%)
Age (years old) (Mean/S.D.)	36.9	8.7
Gender		
Male	76	31.8
Female	163	68.2
Education level		
Junior college degree or below	2	0.8
Bachelor's degree	33	13.8
Master's degree	167	69.9
Doctoral degree	37	15.5
Marital status		
Unmarried	63	26.4
Married	171	71.5
Divorced or other	5	2.1
Average monthly income before taxes (CNY)		
<10,000	3	1.3
10,000-19,999	76	31.8
20,000-29,999	104	43.5
≥30,000	56	23.4
Length of service (years old) (Mean/S.D.)	11.4	10.0
Professional title		
Junior title	43	18.0
Intermediate title	126	52.7
Deputy senior title	41	17.2
Senior title	29	12.1
Type of dental facility		
Public facility	239	100.0
Private facility	0	0.0
Other	0	0.0
Size of department		
≤10 dental chairs	0	0.0
11-30 dental chairs	77	32.2
≥30 dental chairs	162	67.8
Type of employment		
Permanent employment	139	58.2
Conditional permanent employment	47	19.7
Contract-based employment (temporary)	53	22.2

4.2 Correlation analysis among variables

Descriptive statistical analysis of the measures showed that the mean score (mean ± standard deviation) of work stress was 2.52 ± 0.66 , while the mean scores of the four dimensions, namely

work aspects, patient aspects, competency aspects and colleague aspects, were 2.60 ± 0.99 , 3.13 ± 0.98 , 2.52 ± 0.76 and 1.70 ± 0.74 . The mean score (mean $\pm$ standard deviation) of surface acting was 3.08 ± 1.12 ; the mean score (mean $\pm$ standard deviation) of deep acting was 3.47 ± 1.22 ; the mean score of DPR was 5.02 ± 0.69 ; the mean score of emotional intelligence was 4.57 ± 0.64 ; and the mean score of empathy was 5.31 ± 0.81 (see Table 4.2 for details). The absolute values of skewness of all the variables fell in the range of .110-1.913, less than 3; and the absolute values of kurtosis fell in the range of .268-6.701, less than 10. Thus, the sample can be considered to conform to a normal distribution (results not shown in the table).

As shown in the Pearson correlation analysis results in Table 4.2, there was a significant positive relationship between work stress and surface acting ($r = .334, p < .01$) and a significant negative relationship between work stress and emotional intelligence ($r = -.224, p < .01$). Surface acting and deep acting ($r = .400, p < .01$) were significantly positively related to DPR ($r = .144, p < .05$). Deep acting was significantly positively related to DPR ($r = .236, p < .01$) and empathy ($r = .171, p < .01$). There was a significant positive relationship between DPR and emotional intelligence ($r = .424, p < .01$). Besides, DPR was significantly positively related to empathy ($r = .506, p < .01$); and emotional intelligence was significantly positively related to empathy ($r = .313, p < .01$). In addition, age was significantly positively related to DPR ($r = .185, p < .01$) and emotional intelligence ($r = .172, p < .01$). Length of service was positively related to DPR ($r = .158, p < .05$) and emotional intelligence ($r = .148, p < .05$). However, age and length of service were not significantly related to work stress, surface acting, deep acting and emotional intelligence.

As to the four dimensions of work stress, work-related work stress was positively related to surface acting ($r = .284, p < .01$) and negatively related to emotional intelligence ($r = -.188, p < .01$) and empathy ($r = -.132, p < .05$), but was not significantly related to deep acting or DPR. Patient-related work stress was positively related to surface acting ($r = .227, p < .01$) and deep acting ($r = .145, p < .05$) and negatively related to emotional intelligence ($r = -.149, p < .05$). Competency-related work stress was positively associated with surface acting ($r = .297, p < .01$), negatively associated with emotional intelligence ($r = -.197, p < .01$), and not significantly associated with deep acting, DPR, or empathy. Similarly, colleague-related work stress was positively related to surface acting ($r = .204, p < .01$) and negatively related to emotional intelligence ($r = -.151, p < .05$). See Table 4.2 for details.

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Table 4.2 Means and Pearson correlation coefficients of the measured variables

Variable	Mean ± S.D.	Work Stress	Work aspects	Patient aspects	Competency aspects	Colleague aspects	Surface acting	Deep acting	DPR	Emotional intelligence	Empathy	Age	Length of service
Work stress	2.52±0.66	(.932)											
Work aspects	2.60±0.99	.723**	(.878)										
Patient aspects	3.13±0.98	.716**	.308**	(.903)									
Competency aspects	2.52±0.76	.891**	.528**	.489**	(.928)								
Colleague aspects	1.70±0.74	.717**	.465**	.295**	.613**	(.894)							
Surface acting	3.08±1.12	.334**	.284**	.227**	.297**	.204**	(.885)						
Deep acting	3.47±1.22	.127	.089	.145*	.103	.024	.400**	(.904)					
DPR	5.02±0.69	-.001	-.009	.019	.024	-.070	.144*	.236**	(.951)				
Emotional intelligence	4.57±0.64	-.224**	-.188**	-.149*	-.197**	-.151*	-.011	.058	.424**	(.924)			
Empathy	5.31±0.81	-.099	-.132*	-.070	-.023	-.125	-.020	.171**	.506**	.313**	(.914)		
Age	36.9±8.7	.079	.115	.107	.016	.008	-.113	-.103	.185**	.172**	.003	1	
Length of service	11.4±10.0	.078	.112	.095	.020	.019	-.126	-.098	.158*	.148*	-.008	.978**	1

Note: Pearson correlation analysis: * $p < .05$, ** $p < .01$. The overall Cronbach's α of each scale is shown in diagonal brackets.

4.3 Variance analyses by socio-demographic characteristics

For the groups by socio-demographic characteristics that met the assumption of homogeneity of variance, independent samples t-tests for overall means of the measured variables between two groups were carried out; and one-way ANOVA for overall means of the measured variables between three or more groups was carried out. Pairwise comparisons were further made using LSD test if the between-group differences were statistically significant ($p < .05$). Comparisons between two and multiple groups that violated the assumption of homogeneity of variance were made using Welch's t-test and Kruskal-Wallis H test, respectively. In this study, gender and department size were dichotomous variables and independent samples t-test or Welch's t-test was conducted. Education level, marital status, average monthly income before taxes, professional title and type of employment were multicategorical variables and were analysed using one-way ANOVA or Kruskal-Wallis H-test.

4.3.1 Variance analyses by gender and department size

The results showed that all measured variables met the assumption of homogeneity of variance ($p > .05$) between two groups and were eligible for independent samples t-test. An exception was work stress, which did not meet the assumption of homogeneity of variance between groups by gender and department size ($F = 4.306, p < .05$; $F = 9.701, p < .05$), and Welch's t-test should be conducted to compare the difference in the overall means between two groups.

In terms of gender, the mean score of surface acting among male dentists (3.40 ± 1.04) was significantly higher than that among female dentists ($2.93 \pm 1.13, p = .003$). There were no significant differences reported/observed between male and female dentists in the mean scores of work stress, deep acting, DPR, emotional intelligence and empathy ($p > .05$).

Regarding department size, dentists working in a dental department with at least 30 dental chairs scored significantly higher in work stress (2.58 ± 0.71) than those working in a dental department with less than 30 dental chairs ($2.40 \pm 0.52, p = .034$). In addition, the emotional intelligence score (4.51 ± 0.64) was significantly lower among dentists working in a dental department with at least 30 dental chairs than that among those working in a dental department with less than 30 dental chairs ($4.70 \pm 0.63, p = .026$). Scores for surface acting, deep acting, DPR and empathy did not differ significantly between dentists working in departments of different sizes ($p > .05$). See Table 4.3 for details.

Table 4.3 Differences in the scores on the measured variables by gender and department size

Measured variable	Socio-demographic variable	Group	Number	Mean $\pm$ S.D.	Homogeneity of variance test		Mean comparison	
					<i>F</i>	<i>p</i>	<i>p</i>	MD
Work Stress	Gender	Male	76	2.65 $\pm$ 0.71	4.306	.039	.051	.188
		Female	163	2.46 $\pm$ 0.63				
	Size of department	<30 dental chairs	77	2.40 $\pm$ 0.52	9.701	.002	.034	-.174
		$\geq$ 30 dental chairs	162	2.58 $\pm$ 0.71				
Surface acting	Gender	Male	76	3.40 $\pm$ 1.04	1.733	.189	.003	.466
		Female	163	2.93 $\pm$ 1.13				
	Size of department	<30 dental chairs	77	2.90 $\pm$ 1.07	.750	.387	.092	-.263
		$\geq$ 30 dental chairs	162	3.17 $\pm$ 1.14				
Deep acting	Gender	Male	76	3.46 $\pm$ 1.10	3.412	.066	.916	-.018
		Female	163	3.48 $\pm$ 1.28				
	Size of department	<30 dental chairs	77	3.45 $\pm$ 1.13	1.981	.161	.815	-.040
		$\geq$ 30 dental chairs	162	3.49 $\pm$ 1.27				
Doctor-patient relationship	Gender	Male	76	5.07 $\pm$ 0.62	.220	.639	.073	.447
		Female	163	5.00 $\pm$ 0.72				
	Size of department	<30 dental chairs	77	5.09 $\pm$ 0.74	.907	.342	.274	.104
		$\geq$ 30 dental chairs	162	4.99 $\pm$ 0.66				
Emotional intelligence	Gender	Male	76	4.63 $\pm$ 0.63	.033	.856	.330	.087
		Female	163	4.54 $\pm$ 0.65				
	Size of department	<30 dental chairs	77	4.70 $\pm$ 0.63	.271	.603	.026	.198
		$\geq$ 30 dental chairs	162	4.51 $\pm$ 0.64				
Empathy	Gender	Male	76	5.20 $\pm$ 0.83	.681	.410	.184	-.149
		Female	163	5.35 $\pm$ 0.79				
	Size of department	<30 dental chairs	77	5.34 $\pm$ 0.83	.018	.893	.640	.052
		$\geq$ 30 dental chairs	162	5.29 $\pm$ 0.79				

Note: MD stands for mean difference.

4.3.2 Variance analysis by socio-demographic variables

According to variance analysis results, all measured variables met the assumption of homogeneity of variance between groups ($p > .05$) and were qualified for one-way ANOVA.

In terms of education level, the mean scores for the surface acting performed by dentists with a master's degree or a doctoral degree were 3.11 ± 1.13 and 3.36 ± 0.98 , respectively, significantly higher than the 2.66 ± 1.14 for dentists with a bachelor's degree (all the p values were less than .05).

Regarding marital status, the mean scores for DPR and emotional intelligence differed significantly among the unmarried group, the married group and the group with other types of marital status. DPR scores were relatively higher for divorced dentists or dentists with other types of marital status ($5.52 \pm 0.48, p < .05$) and married dentists ($5.08 \pm 0.71, p < .05$) compared to unmarried dentists (4.82 ± 0.58). Besides, the emotional intelligence scores of the married group (4.62 ± 0.62) were significantly higher than those of the unmarried group ($4.41 \pm 0.68, p < .05$) and were not significantly different from those of the divorced group ($4.88 \pm 0.57, p > .05$). Differences in the scores for work stress, surface acting, deep acting and empathy were not statistically significant among dentists with different types of marital status.

Dentists with different levels of average monthly income before taxes only differed significantly in emotional intelligence scores. The results showed that the emotional intelligence scores were significantly higher for dentists earning 30,000 yuan or more per month (4.78 ± 0.56) than for those earning 20,000-29,999 yuan per month ($4.53 \pm 0.61, p < .05$), those earning 10,000-19,999 yuan per month ($4.49 \pm 0.70, p < .05$) and those earning less than 10,000 yuan per month ($3.88 \pm 0.63, p < .05$) (see Table 4.6 for details). In terms of professional title, DPR scores were significantly higher in the senior title group (5.36 ± 0.47) than in the intermediate title group ($5.00 \pm 0.62, p < .05$) and the junior title group ($4.83 \pm 0.80, p < .05$). There were no significant differences in scores on all key measured variables among groups of different types of employment. See Tables 4.4, 4.5 and 4.6 for details.

Table 4.4 Differences in the scores of the measured variables by socio-demographic characteristics

Measured variables	Sociodemographic characteristics	Group	N	Mean $\pm$ S.D	Homogeneity of variance test		Mean comparison	
						<i>p</i>	<i>F</i>	<i>p</i>
Work Stress	Education level	Bachelor's degree or below	35	2.50 $\pm$ 0.73	> .05		.650	.523
		Master's degree	167	2.50 $\pm$ 0.66				
		Doctoral degree	37	2.64 $\pm$ 0.61				
	Marital status	Unmarried	63	2.53 $\pm$ 0.59	> .05		.101	.904
		Married	171	2.52 $\pm$ 0.68				
		Divorced or other	5	2.39 $\pm$ 0.95				
	Average monthly income before taxes (CNY)	<10,000	3	2.75 $\pm$ 1.04	> .05		1.089	.354
		10,000-19,999	76	2.41 $\pm$ 0.62				
		20,000-29,999	104	2.57 $\pm$ 0.65				
		$\geq$ 30,000	56	2.57 $\pm$ 0.71				
	Professional title	Junior title	43	2.40 $\pm$ 0.66	> .05		1.171	.321
		Intermediate title	126	2.51 $\pm$ 0.64				
		Deputy senior title	41	2.64 $\pm$ 0.69				
		Senior title	29	2.61 $\pm$ 0.73				
	Type of employment	Permanent employment	139	2.57 $\pm$ 0.68	> .05		1.121	.328
		Conditional permanent employment	47	2.47 $\pm$ 0.65				
		Contract-based employment	53	2.43 $\pm$ 0.61				
		Bachelor's degree or below	35	2.66 $\pm$ 1.14 _a				
Surface acting	Education level	Master's degree	167	3.11 $\pm$ 1.13 _b	> .05		3.795	.024
		Doctoral degree	37	3.36 $\pm$ 0.98 _b				
	Marital status	Unmarried	63	3.06 $\pm$ 1.14	> .05		.129	.879
		Married	171	3.10 $\pm$ 1.13				
		Divorced or other	5	2.85 $\pm$ 0.96				
	Average monthly income before taxes (CNY)	<10,000	3	2.92 $\pm$ 1.18	> .05		1.135	.336
		10,000-19,999	76	2.90 $\pm$ 1.10				
		20,000-29,999	104	3.21 $\pm$ 1.15				
		$\geq$ 30,000	56	3.10 $\pm$ 1.11				

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Measured variables	Sociodemographic characteristics	Group	N	Mean ± S.D	Homogeneity of variance test <i>p</i>	Mean comparison <i>F</i> <i>p</i>
	Professional title	Junior title	43	2.92±1.13	> .05	1.331 .265
		Intermediate title	126	3.19±1.11		
		Deputy senior title	41	3.10±1.14		
		Senior title	29	2.80±1.14		
	Type of employment	Permanent employment	139	3.02±1.08	> .05	2.930 .055
		Conditional permanent employment	47	3.43±1.16		
		Contract-based employment	53	2.93±1.16		

Note: The same superscript (^a, ^b) indicates that the between-group differences did not have statistical significance, which different superscripts indicate that the between-group differences had statistical significance. $p < .05$

Table 4.5 Differences in the scores of the measured variables by socio-demographic characteristics

Measured variables	Sociodemographic characteristics	Group	N	Mean ± S.D	Homogeneity of variance test <i>p</i>	Mean comparison <i>F</i> <i>p</i>
Deep acting	Education level	Bachelor's degree or below	35	3.13±1.38	> .05	1.94 .145
		Master's degree	167	3.56±1.21		
		Doctoral degree	37	3.38±1.08		
	Marital status	Unmarried	63	3.33±1.29	> .05	2.503 .084
		Married	171	3.55±1.19		
		Divorced or other	5	2.47±0.99		
	Average monthly income before taxes (CNY)	<10,000	3	2.56±0.69	> .05	1.184 .317
		10,000-19,999	76	3.56±1.20		
		20,000-29,999	104	3.54±1.25		
		≥30,000	56	3.29±1.21		
	Professional title	Junior title	43	3.60±1.22	> .05	1.674 .173
		Intermediate title	126	3.53±1.16		
		Deputy senior title	41	3.09±1.40		
		Senior title	29	3.59±1.19		
		Permanent employment	139	3.45±1.29		

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Measured variables	Sociodemographic characteristics		Group	N	Mean ± S.D	Homogeneity of variance test	Mean comparison	
						<i>p</i>	<i>F</i>	<i>p</i>
Doctor-patient relationship	Type of employment	Conditional permanent employment	47	3.63±1.23	> .05	1.082	.340	
		Contract-based employment	53	3.40±1.04				
	Education level	Bachelor's degree or below	35	5.06±0.61	> .05	4.677	.010	
		Master's degree	167	5.05±0.72				
		Doctoral degree	37	4.87±0.60				
	Marital status	Unmarried	63	4.82±0.58 ^a	> .05	2.606	.052	
		Married	171	5.08±0.71 ^b				
		Divorced or other	5	5.52±0.48 ^{bc}				
	Average monthly income before taxes (CNY)	<10,000	3	4.57±0.21	> .05	3.626	.014	
		10,000-19,999	76	4.88±0.78				
		20,000-29,999	104	5.05±0.56				
		≥30,000	56	5.18±0.75				
	Professional title	Junior title	43	4.83±0.80 ^a	> .05	.929	.396	
		Intermediate title	126	5.00±0.62 ^a				
		Deputy senior title	41	5.04±0.82 ^{ab}				
		Senior title	29	5.36±0.47 ^b				
	Type of employment	Permanent employment	139	5.07±0.68	> .05			
		Conditional permanent employment	47	4.97±0.65				
		Contract-based employment	53	4.93±0.73				

Note: $p < .05$

Table 4.6 Differences in the scores of the measured variables by socio-demographic characteristics

Measured variables	Sociodemographic characteristics	Group	N	Mean S.D	$\pm$ <i>p</i>	Homogeneity of variance test	Mean comparison <i>F</i> <i>p</i>
Emotional intelligence	Education level	Bachelor's degree or below	35	4.64±0.61			
		Master's degree	167	4.57±0.62	> .05		.336 .715
		Doctoral degree	37	4.51±0.76			
	Marital status	Unmarried	63	4.41±0.68 ^a			
		Married	171	4.62±0.62 ^b	> .05		3.138 .045
		Divorced or other	5	4.88±0.57 ^{ab}			
	Average monthly income before taxes (CNY)	<10,000	3	3.88±0.63 ^a			
		10,000-19,999	76	4.49±0.70 ^a			
		20,000-29,999	104	4.53±0.61 ^a	> .05		3.842 .010
		≥30,000	56	4.78±0.56 ^b			
	Professional title	Junior title	43	4.58±0.66			
		Intermediate title	126	4.47±0.67			
		Deputy senior title	41	4.73±0.56	> .05		2.624 .051
		Senior title	29	4.75±0.51			
	Type of employment	Permanent employment	139	4.56±0.61			
		Conditional permanent employment	47	4.65±0.72	> .05		.549 .578
		Contract-based employment	53	4.53±0.65			
Empathy	Education level	Bachelor's degree or below	35	5.31±0.74			
		Master's degree	167	5.34±0.81	> .05		1.007 .367
		Doctoral degree	37	5.13±0.82			
	Marital status	Unmarried	63	5.17±0.90			
		Married	171	5.34±0.77	> .05		1.486 .228
		Divorced or other	5	5.65±0.49			
	Average monthly income before taxes (CNY)	<10,000	3	5.33±1.15			
		10,000-19,999	76	5.22±0.76			
		20,000-29,999	104	5.33±0.82	> .05		.411 .745
		≥30,000	56	5.37±0.84			
	Professional title	Junior title	43	5.38±0.73			
		Intermediate title	126	5.27±0.79			
		Deputy senior title	41	5.18±1.05	> .05		1.381 .249
		Senior title	29	5.54±0.53			
	Type of employment	Permanent employment	139	5.28±0.86	> .05		.208 .812

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Measured variables	Sociodemographic characteristics	Group	N	Mean S.D	±	Homogeneity of variance test <i>p</i>	Mean comparison	
							<i>F</i>	<i>p</i>
		Conditional permanent employment	47	5.35±0.78				
		Contract-based employment	53	5.34±0.67				

Note: $p < .05$

4.4 Hypotheses testing: The mediation and the moderation effects

This study used PROCESS Models 4 and 21 to discuss the effect of work stress on DPR through the mediation of surface acting and deep acting, respectively. Emotional intelligence and empathy were then added as moderators to test the moderated mediation model. Conditional process analysis was used to examine the effect of the independent variable on the outcome variable when the moderators were at different levels (M-1SD, M, M+1SD). Finally, this study tested the moderated mediation model using each of the four dimensions of work stress as independent variables, exploring the specific role of each dimension in the model.

4.4.1 The mediating role of surface acting

This study used Model 4 in PROCESS macro to test the mediating role of surface acting in the effect of work stress on DPR. Age, marital status and professional title were added to the model as covariates. The results showed a significant positive effect of work stress on surface acting ($\beta = .345, p < .0001$) and a significant positive effect of surface acting on DPR ($\beta = .182, p = .008$). The effect of work stress on DPR was not significant ($\beta = -.077, p = .254$). This indicated that the mediating role of surface acting in the effect of work stress on DPR stood and that work stress had no direct effect on DPR.

As shown in the results presented in Table 4.5, the model was estimated using the bias-corrected non-parametric percentile Bootstrap method (sample size = 5000), which showed that the mediating role of surface acting in the relationship between work stress and DPR was significant. The indirect effect was: $\beta = .063$ (95% BootCI: [.012, .126]). In addition, the direct effect of work stress on DPR was not significant ($\beta = -.077$, 95%CI: [-.218, .058], $p = .254$), and the total effect of work stress on DPR was not significant ($\beta = -.014$, 95%CI: [-.146, .116], $p = .822$). The above results suggested that H1 “Work stress is negatively related to doctor-patient relationship” and H4 “Surface acting is negatively related to doctor-patient relationship” were not supported, but H2 “Work stress is positively related to surface acting.”) was supported. See Table 4.7 and Figure 4.1 for details.

Table 4.7 The mediating effect of surface acting on the influence from work stress on DPR

Model	Effect		LLCI	ULCI	<i>p</i>
Independent variable: WS	Total effect	-.014	-.146	.116	.822
Mediator: SA	Direct effect	-.077	-.218	.058	.254
Outcome variable: DPR	Indirect effect*	.063	.012	.126	/

Note: LLCI refers to the lower limit of the 95% confidence interval, and ULCI refers to the upper limit of the 95% confidence interval; *Indirect effects were estimated using the bias-corrected non-parametric percentile Bootstrap method (sample size = 5000) with 95% confidence intervals. Results are statistically significant if the interval does not contain 0.

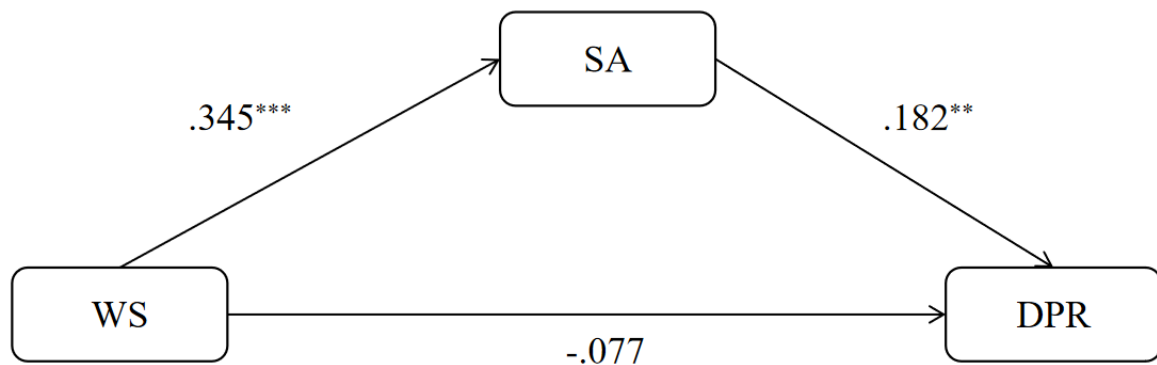


Figure 4.1 The model of the mediating effect of surface acting on the influence from work stress on DPR

Note: SA = surface acting; WS = work stress; DPR = doctor-patient relationship. ** $p < .01$, *** $p < .001$

4.4.2 The mediation model moderated by emotional intelligence and empathy

As indicated by the results in Figure 4.2, work stress had a significant effect on surface acting ($\beta = .667, p < .0001$) after using PROCESS Model 21 and including age, marital status and professional title as covariates in the model. The interaction of work stress and emotional intelligence had a marginally significant effect on surface acting ($\beta = -.252, p = .089 < .1$). Therefore, emotional intelligence could be considered to have moderated the effect of work stress on surface acting.

On the other hand, the effect of surface acting on DPR was significant ($\beta = .119, p < .001$). Furthermore, the interaction between surface acting and empathy had a significant negative effect on DPR ($\beta = -.110, p = .004$), suggesting that the effect of surface acting on DPR was moderated by empathy. The above results suggest that H6 “Emotional intelligence attenuates the effect of work stress on surface acting” was supported and H8 “Empathy attenuates the effect of surface acting on DPR” was supported.

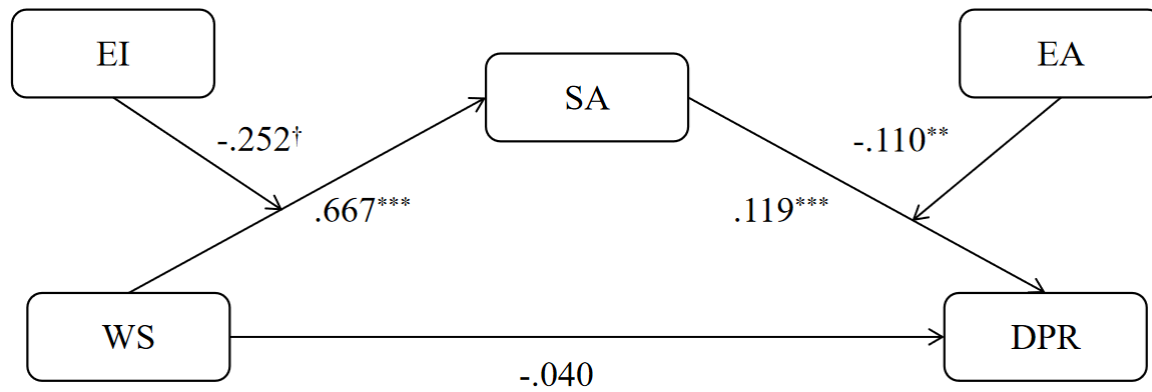


Figure 4.2 The WS->SA->DPR mediation model moderated by emotional intelligence and empathy

Note: EI = emotional intelligence; SA = surface acting; EA = empathy; WS = work stress; DPR = doctor-patient relationship. $^{\dagger}p < .1$, $**p < .01$, $***p < .001$

Simple slope analysis further revealed (as shown in Figure 4.3(A)) that at low levels of emotional intelligence ($M-1SD = -0.642$), work stress had a significant positive effect on surface acting ($\beta_{\text{low}} = .828, p < .0001$). At moderate levels ($M = 0.000$) of emotional intelligence, work stress had a significant positive effect on surface acting ($\beta_{\text{medium}} = .667, p < .0001$). Similarly, at high levels of emotional intelligence ($M + 1SD = 0.642$), work stress had a significant positive effect on surface acting ($\beta_{\text{high}} = .505, p < .001$). The above results suggested that the direct effect of work stress on surface acting decreased as emotional intelligence increased. In other words, regardless of emotional intelligence, dentists with higher levels of work stress performed surface acting more, but this positive effect was greater among dentists with lower levels of emotional intelligence.

As shown in Figure 4.3(B), at low levels of empathy ($M-1SD = -0.806$), surface acting had a significant positive effect on DPR ($\beta_{\text{low}} = .208, p < .0001$). Similarly, at moderate levels of empathy ($M = 0.000$), surface acting had a significant positive effect on DPR ($\beta_{\text{medium}} = .119, p < .001$). However, at high levels of empathy ($M + 1SD = 0.695$), the effect of surface acting on DPR was not significant ($\beta_{\text{high}} = .043, p = .314$). These results suggest that, within a certain range, the direct effect of surface acting on DPR decreased with increasing empathy. In other words, regardless of empathy, dentists engaged in more surface acting had a better self-perceived DPR. But the positive effect was greater among dentists with lower levels of empathy and was only statistically significant among dentists with low or moderate levels of empathy.

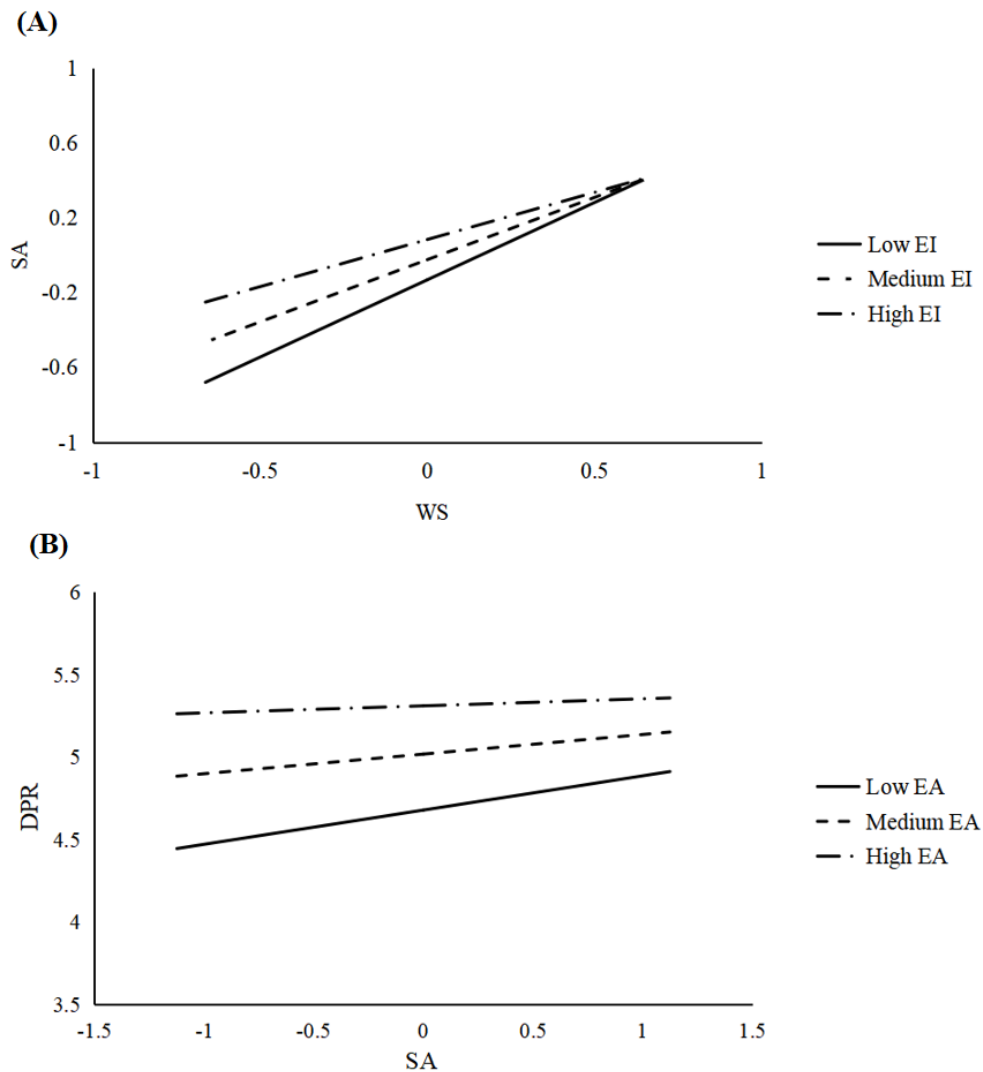


Figure 4.3 Simple slope analysis of the moderating effect of emotional intelligence and empathy

Furthermore, as shown by the results in Table 4.8, the indirect effect of work stress on DPR was moderated by empathy. Regardless of the level of emotional intelligence, the indirect effect of work stress on DPR was significant at low and moderate levels of empathy (95% BootCI all excluding 0), while the indirect effect of work stress on DPR was not significant at high levels of empathy (95% BootCI all including 0).

Table 4.8 The direct effect and indirect effect of the moderated mediation model (mediator: surface acting)

Model	Effect	Level	β	LLCI	ULCI	<i>p</i>
Independent variable: SA Moderator: EA Outcome variable: DPR	Direct effect	Low	.208	.113	.302	< .0001
		Medium	.119	.050	.188	< .001
		High	.043	-.041	.126	.314
Independent variable: WS Mediator: SA Moderators: EI, EA Outcome variable: DPR	Indirect effect*	/	-.040	-.158	.077	.500
		Low EI – Low EA	.172	.047	.262	/
		Low EI – Medium EA	.099	.035	.166	/
		Low EI – High EA	.035	-.042	.140	/
		Medium EI – Low EA	.138	.040	.220	/
		Medium EI – Medium EA	.079	.028	.145	/
		Medium EI – High EA	.028	-.033	.122	/
		High EI – Low EA	.105	.020	.231	/
		High EI – Medium EA	.060	.012	.149	/
		High EI – High EA	.022	-.026	.117	/

Note: LLCI refers to the lower limit of the 95% confidence interval, and ULCI refers to the upper limit of the 95% confidence interval; *Indirect effects were estimated using the bias-corrected non-parametric percentile Bootstrap method (sample size = 5000) with 95% confidence intervals. Results are statistically significant if the interval does not contain 0. SA = surface acting; EA = empathy; DPR = doctor-patient relationship; WS = work stress; EI = emotional intelligence

4.4.3 The mediating role of deep acting

This study used Model 4 in PROCESS macro to test the mediating role of deep acting in the effect of work stress on DPR. Age, marital status and professional title were added to the model as covariates. The results showed a significant positive effect of work stress on deep acting ($\beta = .139, p = .033$) and a significant positive effect of deep acting on DPR ($\beta = .254, p < .001$). The effect of work stress on DPR was not significant ($\beta = -.050, p = .430$). This indicated that the mediating role of deep acting in the effect of work stress on DPR was supported and that work stress did not have a direct effect on DPR. As shown in the results in Table 4.9, the model was estimated using the bias-corrected non-parametric percentile Bootstrap method (sample size = 5000). The results indicated that the mediating role of deep acting in the relationship between work stress and DPR was significant. The indirect effect was: $\beta = .035$ (95% BootCI: [.001, .082]). In addition, the direct effect of work stress on DPR was not significant ($\beta = -.077$, 95%CI: [-.218, .058], $p = .254$), and the total effect of work stress on DPR was not significant ($\beta = -.049$, 95%CI: [-.180, .077], $p = .430$). The above results suggest that H1 “Work stress is negatively related to doctor-patient relationship.” was not supported, but H3 “Work stress is positively related to deep acting.” and H5 “Deep acting is positively related to doctor-patient relationship.” were supported. See Figure 4.4 and Table 4.9 for details.

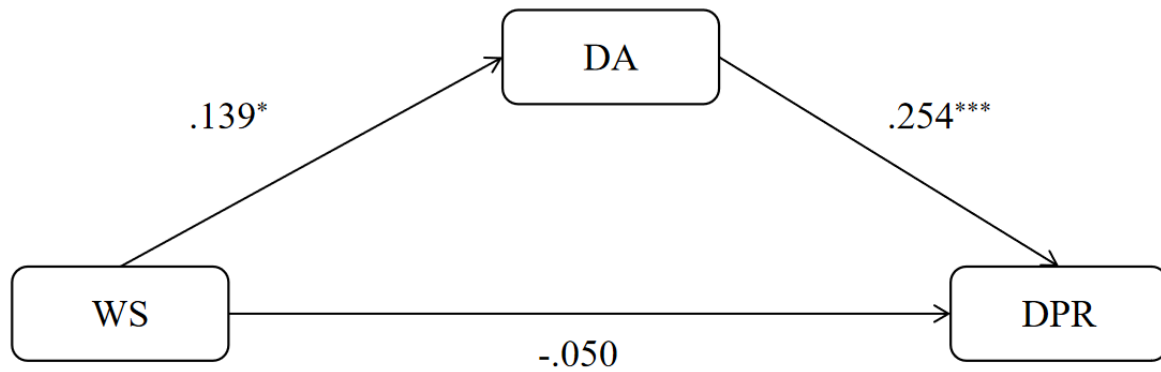


Figure 4.4 The model of the mediating role of deep acting in the relationship between work stress and DPR

Note: DA = deep acting; WS = work stress; DPR = doctor-patient relationship. * $p < .05$, *** $p < .001$

Table 4.9 The mediating role of deep acting in the relationship between work stress and DPR

Model	Effect	LLCI	ULCI	p
Independent variable: WS	Total effect	-.014	.116	.822
Mediator: DA	Direct effect	-.049	.077	.430
Outcome variable: DPR	Indirect effect*	.035	.082	/

Note: LLCI refers to the lower limit of the 95% confidence interval, and ULCI refers to the upper limit of the 95% confidence interval; *Indirect effects were estimated using the bias-corrected non-parametric percentile Bootstrap method (sample size = 5000) with 95% confidence intervals. Results are statistically significant if the interval does not contain 0. WS = work stress; DA = deep acting; DPR = doctor-patient relationship

4.4.4 The mediation model moderated by emotional intelligence and empathy

As shown by the results in Figure 4.5, after using PROCESS Model 21 and including age, marital status and professional title as covariates in the model, work stress had a significant effect on deep acting ($\beta = .359$, $p = .005$). The interaction of work stress and emotional intelligence had a marginally significant effect on deep acting ($\beta = -.308$, $p = .070$). Therefore, emotional intelligence could be considered to moderate the effect of work stress on deep acting.

In the meantime, deep acting ($\beta = .096$, $p = .002$) had a significant positive effect on DPR. Furthermore, the interaction between deep acting and empathy had a significant negative effect on DPR ($\beta = -.090$, $p = .005$), suggesting that the effect of deep acting on DPR was moderated by empathy. The above results suggest that H7 “Emotional intelligence attenuates the effect of work stress on deep acting.” and H9 “Empathy attenuates the effect of deep acting on DPR.” were supported.

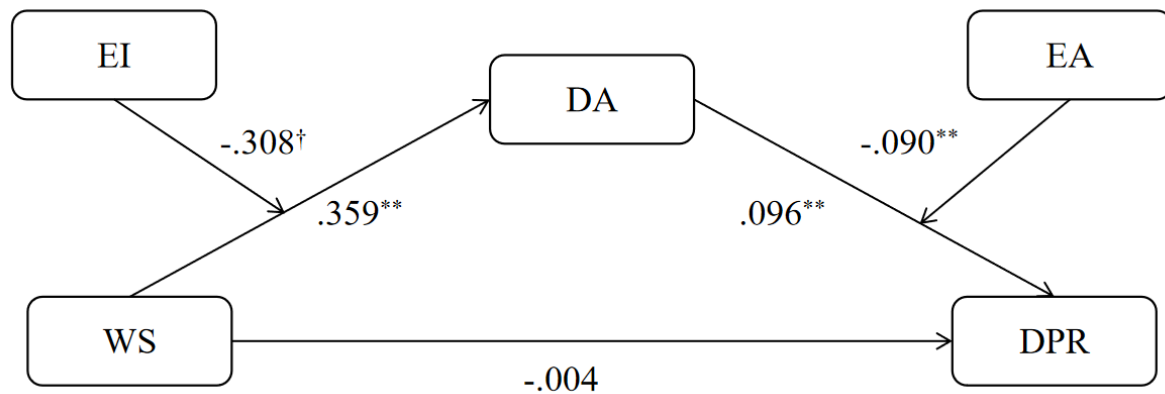


Figure 4.5 The WS->DA->DPR mediation model moderated by emotional intelligence and empathy

Note: EI = emotional intelligence; DA = deep acting; EA = empathy; WS = work stress; DPR = doctor-patient relationship. † $p < .1$, ** $p < .01$, *** $p < .001$

Simple slope analysis further revealed (Figure 4.6(A)) that at low levels of emotional intelligence ($M - 1SD = -0.642$), work stress had a significant positive effect on deep acting ($\beta_{low} = .556, p = .003$). At moderate levels of emotional intelligence ($M = 0.000$), work stress had a significant positive effect on deep acting ($\beta_{medium} = .359, p = .005$). Similarly, at high levels of emotional intelligence ($M + 1SD = 0.642$), the effect of work stress on deep acting was not significant ($\beta_{high} = .161, p = .267$). The above results suggested that, within a certain range, the direct effect of work stress on deep acting decreased as emotional intelligence increased. In other words, irrespective of emotional intelligence, dentists suffering from higher levels of work stress were engaged in higher levels of deep acting. However, this positive effect was greater among dentists with lower levels of emotional intelligence and was only statistically significant among dentists with low or moderate levels of emotional intelligence.

As shown in Figure 4.6(B), at low levels of empathy ($M - 1SD = -0.806$), deep acting had a significant positive effect on DPR ($\beta_{low} = .168, p < .0001$). Similarly, at medium levels of empathy ($M = 0.000$), deep acting had a significant positive effect on DPR ($\beta_{medium} = .096, p = .002$). However, at high levels of empathy ($M + 1SD = 0.695$), the effect of deep acting on DPR was not significant ($\beta_{high} = .033, p = .378$). The above results suggested that, within a certain range, the direct effect of deep acting on DPR decreased as empathy increased. Furthermore, as shown by the results in Table 4.8, the indirect effect of work stress on DPR was moderated by emotional intelligence and empathy. The indirect effect of work stress on DPR was significant (95% BootCI did not contain 0) in low emotional intelligence-low empathy, low emotional intelligence-medium empathy, medium emotional intelligence-low empathy and medium emotional intelligence-medium empathy scenarios. However, the indirect effect of work stress on DPR was not significant when at least one of the two moderators, namely emotional intelligence and empathy, was at high levels (95% BootCI containing 0).

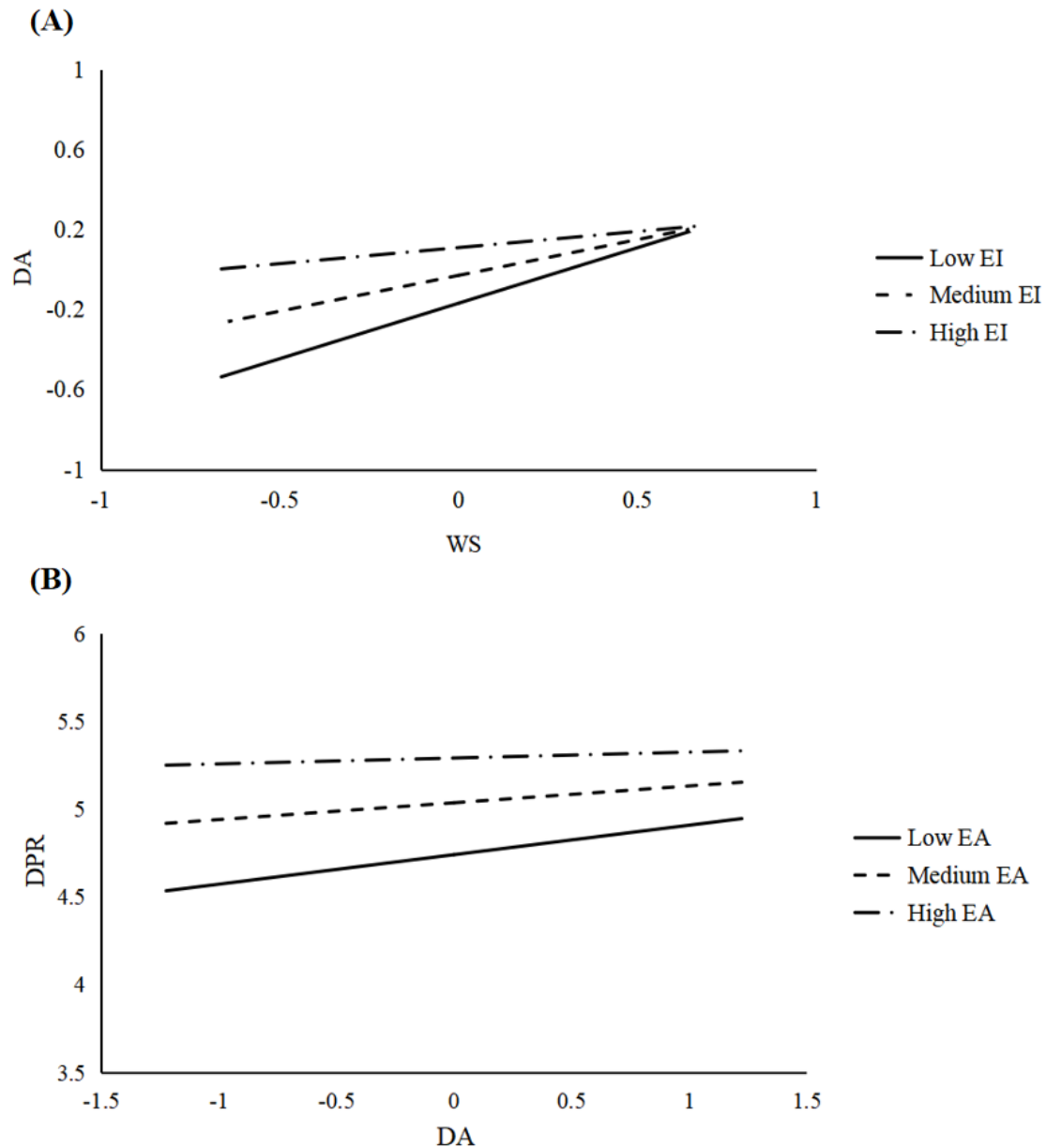


Figure 4.6 Simple slope analysis of the moderating roles of emotional intelligence and empathy

Table 4.10 The direct and indirect effects of the moderated mediation model (mediator: deep acting)

Model	Effect	Level	Effect size	LLCI	ULCI	<i>p</i>
Independent variable: DA	Direct effect	Low	.168	.089	.247	< .0001
Moderator: EA		Medium	.096	.035	.157	.002
Outcome variable: DPR		High	.033	-.041	.108	.378
Independent variable: WS	Direct effect	/	-.004	-.116	.108	.940
Mediator: DA	Indirect effect*	Low EI – Low EA	.093	.019	.166	/
Moderators: EI, EA		Low EI – Medium EA	.053	.012	.102	/
		Low EI – High EA	.019	-.019	.077	/
		Medium EI – Low EA	.060	.011	.117	/
Outcome variable: DPR		Medium EI – Medium EA	.034	.007	.072	/

Medium EI – High EA	.012	-.014	.052	/
High EI – Low EA	.027	-.021	.109	/
High EI – Medium EA	.015	-.013	.064	/
High EI – High EA	.005	-.013	.041	/

Note: LLCI refers to the lower limit of the 95% confidence interval, and ULCI refers to the upper limit of the 95% confidence interval.

*Indirect effects were estimated using the bias-corrected non-parametric percentile Bootstrap method (sample size = 5000) with 95% confidence intervals. Results are statistically significant if the interval does not contain 0.

DA = deep acting; EA = empathy; DPR = doctor-patient relationship; WS = work stress; EI = emotional intelligence

4.5 Hypotheses testing: The moderated mediation model with each of the four aspects of work stress as the independent variable

Based on the model validated in the previous section, to further explore the specific role played by each dimension of work stress in the model, this study respectively used each of the four dimension of work stress (work aspects, patient aspects, competency aspects and colleague aspects) as the independent variable and estimated the direct and indirect effects of each dimension on DPR and analysed the mediating role of emotional labour and moderating roles of emotional intelligence and empathy in the effect of different dimensions of work stress on DPR.

4.5.1 The mediating roles of surface/deep acting in the relationship between each of the four dimensions of work stress and DPR

Model 4 in PROCESS macro was used with age, marital status and professional title added as covariates to test the mediating effect of each of the four dimensions of work stress, namely work aspects, patient aspects, competency aspects and colleague aspects, on DPR.

The results showed that in the four models with surface acting as a mediator (as shown in Figure 4.7), the direct effects of each dimension on surface acting were statistically significant (work: $\beta = .294$, $p < .0001$; patients: $\beta = .248$, $p < .001$; competency: $\beta = .300$, $p < .0001$; colleagues: $\beta = .202$, $p = .002$); the direct effects of surface acting on DPR were all statistically significant (work: $\beta = .184$, $p = .006$; patients: $\beta = .164$, $p = .014$; competency: $\beta = .163$, $p = .016$; colleagues: $\beta = .178$, $p = .007$); and the direct effects of each dimension on DPR were not statistically significant. These results suggested that the mediating effects of surface acting on the influence of each dimension of work stress, including work, patients, competency and colleagues, on DPR were all established, but each dimension of work stress had no direct effect on DPR.

Of the four models with deep acting as the mediator (see Figure 4.7), only the model shown

in Figure 4.7 (F) indicated a significant positive effect of patient-related work stress on deep acting ($\beta = .164, p = .012$), while work stress related to work, competency and colleagues did not have a significant effect on deep acting. In addition, deep acting also had a significant positive effect on DPR in the model with patient-related work stress as the independent variable ($\beta = .253, p < .001$). Nevertheless, the effect of work stress on DPR was not significant in any of the models. These results suggested that the mediating role of deep acting was only established in the model where patient-related work stress influenced DPR.

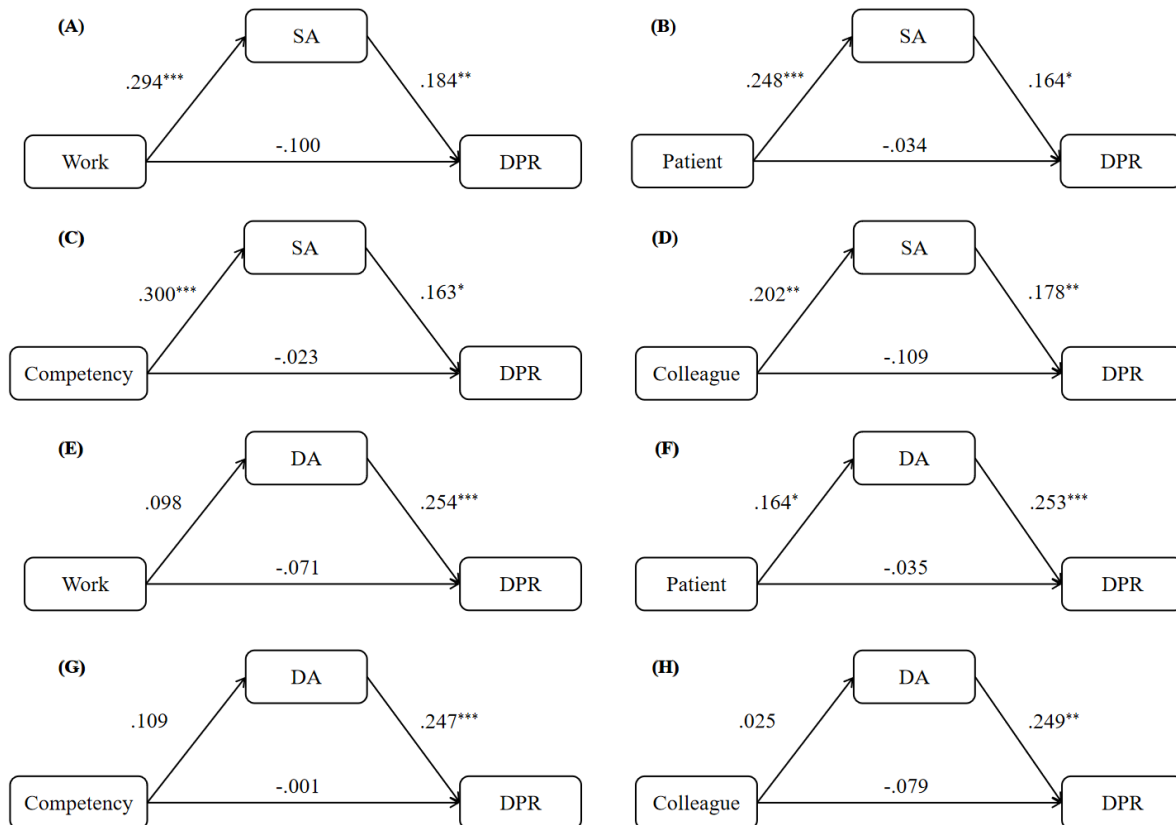


Figure 4.7 Mediation models of the effect of surface acting/deep acting on the influence from each dimension of work stress on DPR

Note: SA = surface acting; DA = deep acting; DPR = doctor-patient relationship; work = work aspects; patient = patient aspects; competency = competency aspects; colleague = colleague aspects. * $p < .05$, ** $p < .01$, *** $p < .001$

As shown by the results in Table 4.11, the models were estimated using the bias-corrected non-parametric percentile Bootstrap method (sample size = 5,000). The results showed that the mediating effect of surface acting on the relationship between each dimension of work stress and DPR was significant. The indirect effects of each dimension of work stress on DPR mediated by surface acting were: work: $\beta = .054$ (95% BootCI: [.007, .106]); patients: $\beta = .041$ (95% BootCI: [.002, .091]); competency: $\beta = .049$ (95% BootCI: [.004, .104]); and colleagues: $\beta = .036$ (95% BootCI: [.002, .084]). Deep acting played a significant mediating role in the relationship between patient-related work stress and DPR, and the indirect effect was: $\beta = .054$

(95% BootCI: [.007, .106]).

Table 4.11 The mediating roles of surface/deep acting in the relationship between each dimension of work stress and DPR

Model	Effect		LLCI	ULCI	<i>p</i>
Independent variable: Work-related work stress	Total effect	-.046	-.122	.058	.482
Mediator: SA	Direct effect	-.100	-.162	.023	.138
Outcome variable: DPR	Indirect effect*	.054	.007	.106	/
Independent variable: Patient-related work stress	Total effect	.007	-.084	.094	.916
Mediator: SA	Direct effect	-.034	-.115	.067	.606
Outcome variable: DPR	Indirect effect*	.041	.002	.091	/
Independent variable: Competency-related work stress	Total effect	.026	-.090	.137	.687
Mediator: SA	Direct effect	-.023	-.139	.097	.728
Outcome variable: DPR	Indirect effect*	.049	.004	.104	/
Independent variable: Colleague-related work stress	Total effect	-.073	-.185	.049	.254
Mediator: SA	Direct effect	-.109	-.219	.017	.092
Outcome variable: DPR	Indirect effect*	.036	.002	.084	/
Independent variable: Patient-related work stress	Total effect	.006	-.084	.094	.916
Mediator: DA	Direct effect	-.035	-.112	.063	.583
Outcome variable: DPR	Indirect effect*	.041	.006	.085	/

Note: LLCI refers to the lower limit of the 95% confidence interval, and ULCI refers to the upper limit of the 95% confidence interval.

*Indirect effects were estimated using the bias-corrected non-parametric percentile Bootstrap method (sample size = 5000) with 95% confidence intervals. Results are statistically significant if the interval does not contain 0.

SA = surface acting; DPR = doctor-patient relationship; DA = deep acting

4.5.2 The mediation model moderated by emotional intelligence and empathy

Figure 4.8 shows the estimation results of the moderated mediation model using PROCESS Model 21 with age, marital status and professional title adjusted.

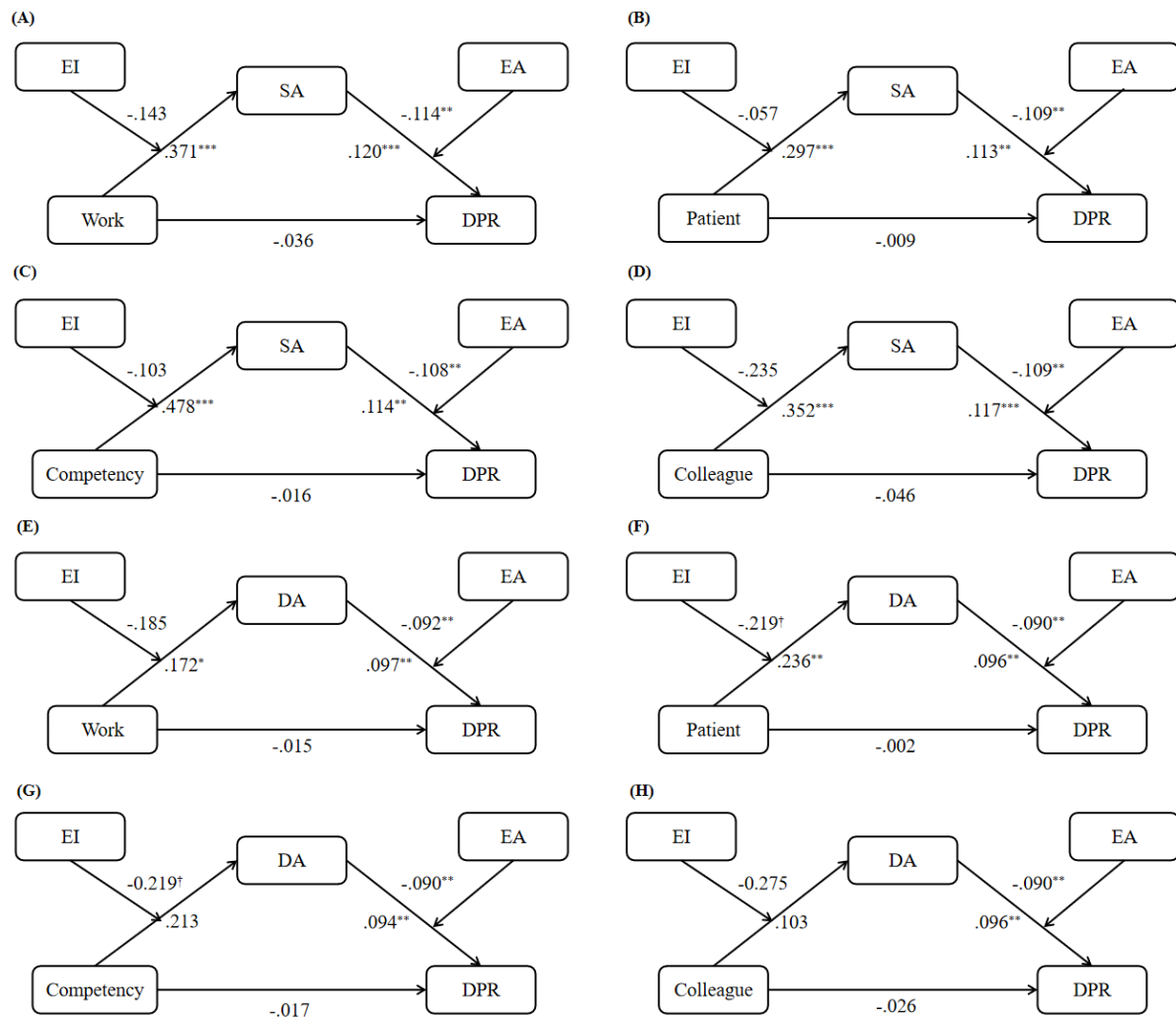


Figure 4.8 The mediation models (with each dimension of work stress as the independent variable) moderated by emotional intelligence and empathy

Note: EI = emotional intelligence; SA = surface acting; EA = empathy; DA = deep acting; DPR = doctor-patient relationship; work = work aspects; patient = patient aspects; competency = competency aspects; colleague = colleague aspects. † $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$.

In all the four models with surface acting as the mediator (see Figure 4.8), the interactions between each of the four dimensions of work stress, namely work, patients, competency and colleagues, and emotional intelligence were not significant, and emotional intelligence did not moderate the influence of each dimension of work stress on surface acting. In the model with work-related work stress as independent variable (see Figure 4.8 (A)), work stress had a significant positive effect on surface acting ($\beta = .371, p < .0001$); surface acting had a significant positive effect on DPR ($\beta = .120, p < .001$); and the interaction between surface acting and empathy had a significant negative effect on DPR ($\beta = -.114, p = .003$), indicating that the effect of surface acting on DPR was moderated by empathy. Results of simple slope analysis further revealed (Figure 4.9 (A)) that at low levels of empathy ($M - 1SD = -0.806$), surface acting had a significant positive effect on DPR ($\beta_{\text{low}} = .211, p < .0001$); at medium levels of

empathy ($M = 0.000$), surface acting had a significant positive effect on DPR ($\beta_{\text{medium}} = .120, p < .001$); however, at high levels of empathy ($M + 1SD = 0.695$), surface acting did not have a significant effect on DPR ($\beta_{\text{high}} = .041, p = .321$). The above results suggested that within a certain range, the direct effect of surface acting on DPR decreased as empathy increased. In other words, regardless of empathy, dentists who performed surface acting more had better self-perceived DPR. However, this positive effect was greater among dentists with lower levels of empathy and was only statistically significant among dentists with low or medium levels of empathy.

Similar to the model with work-related work stress as the independent variable, in the model with surface acting as the mediator and patient-related work stress, competency-related work stress and colleague-related work stress as the independent variables (see Figure 4.8 (B), (C), (D)), the interaction between each dimension of work stress and emotional intelligence did not have a significant effect on surface acting, and emotional intelligence did not moderate the direct effect of each dimension of work stress on surface acting. In the models with each dimension of work stress as the independent variable, the interaction between surface acting and empathy had a significant negative effect on DPR (patient-related work stress (B): $\beta = -.109, p = .004$; competency-related work stress (C): $\beta = -.108, p = .004$; colleague-related work stress (D): $\beta = -.109, p = .004$), suggesting that the effect of surface acting on DPR was moderated by empathy. Results of simple slope analysis further revealed (Figure 4.9 (B), (C), (D)) that surface acting had a significant effect on DPR at low or medium levels of empathy ($M - 1SD = -0.806$; $M = 0.000$) in the models with patient-related work stress, competency-related work stress or colleague-related work stress as the independent variable, and the effect size decreased as empathy increased. However, at high levels of empathy ($M + 1SD = 0.695$), surface acting had no significant effect on DPR. These results suggested that the direct effect of surface acting on DPR still decreased as empathy increased in the models with patient-related work stress, competency-related work stress or colleague-related work stress as the independent variable. The more dentists performed surface acting, the better their self-perceived DPR. This positive effect was greater among dentists with low levels of empathy and was only statistically significant among dentists with low or medium levels of empathy.

In contrast to the case where surface acting was the mediator, the mediating role of deep acting was only supported in the model on the relationship between patient-related work stress and DPR (see Section 4.4 for detailed results). With the addition of the moderators emotional intelligence and empathy (see Figure 4.8 (E), (F)), work-related work stress ($\beta = .172, p = .044$) and patient-related work stress ($\beta = .236, p = .004$) had a significant positive effect on the deep

acting, and deep acting had a significant positive effect on DPR in the models with work-related work stress ($\beta = .097, p = .002$) and patient-related work stress ($\beta = .096, p = .002$) as the independent variables; and the interaction between deep acting and empathy had a significant positive effect on DPR in the models with work-related work stress ($\beta = -.092, p = .005$) and patient-related work stress ($\beta = -.090, p = .005$) as the independent variables. These results suggested that the effect of deep acting on DPR was moderated by empathy. In addition, the interaction between patient-related work stress and emotional intelligence had a marginally significant negative effect on deep acting ($\beta = -.219, p = .056$), suggesting that emotional intelligence moderated the effect of patient-related work stress on deep acting. Results of simple slope analysis further revealed (Figure 4.9 (E), (F)) that deep acting triggered by work-related work stress had a significant effect on DPR at low or medium levels of empathy ($M - 1SD = -0.806; M = 0.000$) ($\beta_{low} = .171, p < .0001; \beta_{medium} = .097, p = .002$); similarly, at low or medium levels of empathy ($M - 1SD = -0.806; M = 0.000$), deep acting triggered by patient-related work stress had a significant effect on DPR ($\beta_{low} = .167, p < .0001; \beta_{moderate} = .096, p = .002$). However, at high levels of empathy ($M + 1SD = .695$), deep acting triggered by work-related work stress or patient-related work stress did not have a significant effect on DPR. Furthermore, as shown in Figure 4.9 (G), patient-related work stress had a significant effect on deep acting at low or medium levels of emotional intelligence ($M - 1SD = -0.642; M = 0.000$) ($\beta_{low} = .376, p < .001; \beta_{medium} = .236, p = .004$), but this effect was not significant ($\beta_{high} = .095, p = .371$) at high levels of emotional intelligence ($M + 1SD = 0.642$).

The mediating role of deep acting was not established in the models with competency-related work stress or colleague-related work stress as the independent variable (see Figure 4.8). Therefore, the moderating role of empathy in the influence of deep acting on DPR would no longer be discussed.

The above results suggested that the direct effect of deep acting on DPR decreased as empathy increased within a specific range in the model with work-related work stress as the independent variable; emotional intelligence and empathy respectively moderated the relationship between deep acting and DPR in the model with patient-related work stress as the independent variable; and the mediating and moderating effects of the above variables did not hold in the models with competency-related work stress or colleague-related work stress as the independent variable.

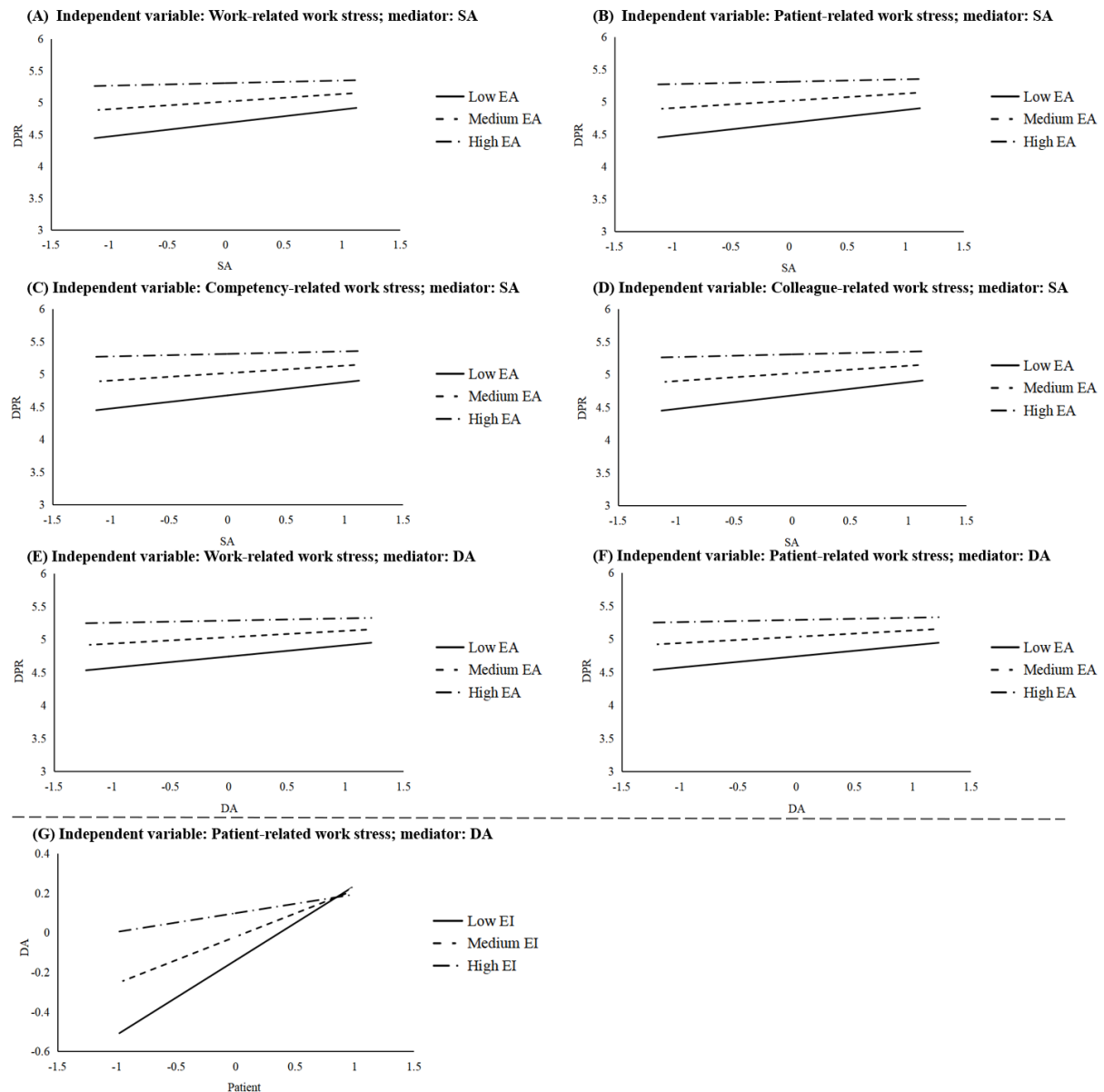


Figure 4.9 Simple slope analysis of the moderating effects in the models of each dimension of work stress

Note: SA = surface acting; DA = deep acting; DPR = doctor-patient relationship; EA = empathy; EI = emotional intelligence

4.6 Hypotheses testing results

In the model with work stress as the independent variable, both surface acting and deep acting played a mediating role, and the moderating roles of emotional intelligence and empathy were also validated. For the models with each dimension of work stress as the independent variable, surface acting mediated the effect of each dimension of work stress on DPR, while deep acting only mediated the effects of work-related work stress and patient-related work stress on DPR. In addition, empathy played a moderating role in the models with each dimension of work stress

as the independent variable, while the moderating role of emotional intelligence was only significant in the model on the influence of patient-related work stress on DPR mediated by deep acting.

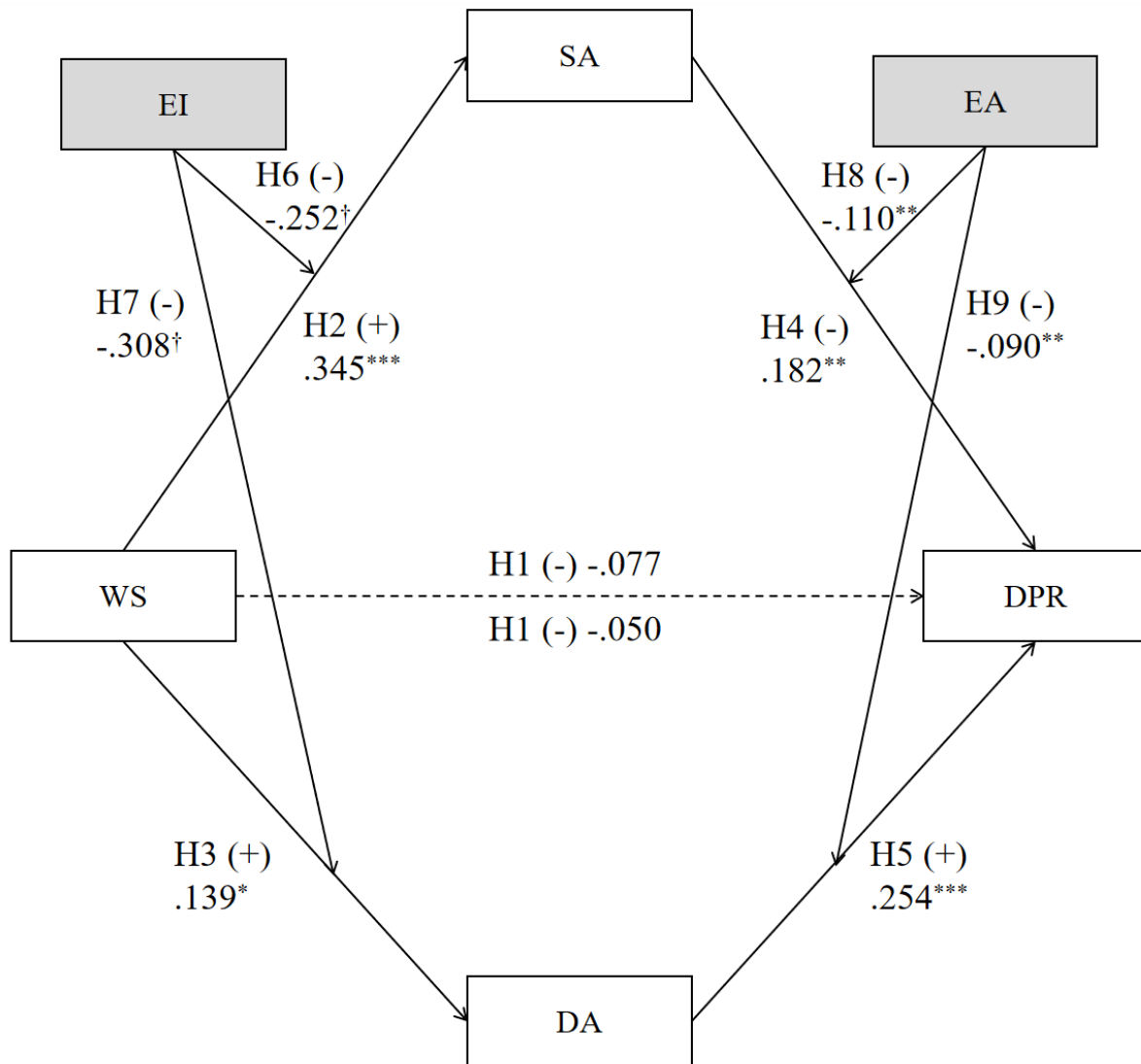


Figure 4.10 Testing results of the hypothesized model

Note: EI = emotional intelligence; SA = surface acting; EA = empathy; WS = work stress, DA = deep acting; DPR = doctor-patient relationship.

† $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$. Full lines indicate that the hypotheses are supported while dotted lines suggest that the hypotheses are not supported.

(+) indicates a positive value of the coefficient of effect in the model while (–) indicates a negative value of such coefficient.

The white boxes indicate that the hypothesized relationships with the related variables are mainly based on the JD-R model, while the grey boxes indicate that the hypothesized relationships with the related variables are mainly based on the COR theory.

Chapter 5: Discussion and Conclusions

This chapter summarises and discusses the status of work stress and DPR among dentists, as well as the differences in work stress and DPR by sociodemographic characteristics. The results are compared to previous studies to explore possible causes. After that, the testing results of the hypothesized model are discussed, and the findings of this study are summarised. Finally, the theoretical and managerial implications, limitations and suggestions for future research are elaborated on.

5.1 The status of work stress and DPR among dentists

As people's oral health needs continue to increase and the requirements for dental health services become more and more detailed, the work stress faced by dentists in China is increasing, which poses new challenges to DPR. Therefore, exploring the possible factors influencing DPR among dentists and analysing the relationship between work stress and DPR are of great relevance to diagnosis and treatment practice, hospital management and policy formulation.

The results of this study showed that the mean score of work stress among dentists was 2.52 ± 0.66 points (total score five points), indicating that work stress among dentists was at a medium level, which is different from the general perception in society that doctors are under a lot of work stress (Sang et al., 2020), and is also inconsistent with the results of the survey conducted by Y. Lu et al. (2017) on work stress among doctors. This might be attributable to the fact that due to the impact by the COVID-19 pandemic, the number of non-emergency patients in the dental outpatient clinics dropped, and the number of follow-up visits was consciously reduced, leading to a reduction in dentists' workload. As a result, the dentists did not perceive a high level of work stress. Reassuringly, the mean score of DPR was 5.02 ± 0.69 points, indicating that dentists' self-perceived DPR was good. Some studies have shown that good DPRs are conducive to improving doctors' job satisfaction and well-being. Department and hospital managers should continue to maintain and further the good DPRs, which will contribute to the physical and mental health of dentists and enable patients to enjoy safer and better quality care.

Of the four dimensions of work stress, patient-related work stress scored the highest with a mean score of 3.13 ± 0.98 points, followed by work-related work stress with a mean score of

2.60 ± 0.99 points; competency-related work stress had a mean score of 2.52 ± 0.76 points; and colleague-related work stress scored the lowest with a mean score of 1.70 ± 0.74 points. This is consistent with the study by Choy and Wong (2017) who found that patient-related stress was the main work stressor for dentists. A study conducted by Yansane et al. (2021) in the U.S. also revealed that close to half of the dentists reported having made errors during consultations in the past six months, and that nearly 20% expressed fear of being sued for medical disputes. It is safe to speculate that dentists' fear of making operational errors or being sued may be one of the reasons for the high level of patient-related work stress. In addition, as dentists usually perform treatment alone close to patients, they are required to have high levels of professionalism and a high level of cooperation from dental nurses is also required. This naturally causes dentists to experience higher levels of work-related work stress and competency-related work stress. Besides, dentists mainly perform treatment procedures beside the dental chair and can hardly avoid patients' subjective experience. It can be easily imagined that this is a major test of their professional skills, and to a certain extent is also one of the reasons for the high levels of patient-related work stress and competency-related work stress.

The mean scores of surface acting and deep acting of dentists were 3.08±1.12 points and 3.47±1.22 points, respectively, which were at medium level. Dentists perform deep acting more frequently at work. In addition, the current standardised treatment process in hospitals has also reduced dentists' work stress to a certain extent, which can reduce the depletion caused by emotional labour. This finding is consistent with the study conducted by R. Zhou (2017), who found that dentists engaged in deep acting more often and had a stronger sense of occupational well-being. This study holds that this finding also explains, to some extent, why the self-perceived DPR was better among the surveyed dentists in this study.

The mean score of emotional intelligence of the dentists in this study was 4.57 ± 0.64 points, indicating that the emotional intelligence of the respondents was at a medium-to-high level. It has been found that both high emotional intelligence and high empathy are conducive to improving the performance of healthcare workers, improving doctor-patient communication, and mitigating conflict in DPR (Weng, 2008).

In addition, the mean score of empathy of the dentists in this study was 5.31 ± 0.81 points, indicating that the empathy of the respondents was at a fairly high level. The study conducted by Kim et al. (2004) shows that physician empathy can improve patient satisfaction and compliance. Research also suggests that physician empathy contributes to indirectly improving long-term patient outcomes (Neumann et al., 2007), which may also be one of the reasons for the better self-perceived DPR of the surveyed dentists in this study.

5.2 Variance analyses results and interpretations

Significant differences in work stress were only found between groups of dentists with different department sizes. Specifically, the work stress levels of the dentists working in a department with at least 30 dental chairs were significantly higher than those of the dentists working in a department with less than 30 dental chairs. There may be several reasons for this. First, the more the dental chairs, the larger the number of dentists, and the greater the competition and interpersonal pressure from peers. Besides, the number of patients in the waiting list generally increases with the increase in the number of dental chairs, which leads to more time pressure for the dentists. The anxiety of waiting patients and the noisy working environment can also cause stress to dentists to some extent. Meanwhile, there were no significant differences in work stress experienced by dentists with different sociodemographic characteristics such as gender, education level, marital status, average monthly income before taxes, professional title and type of employment. At present, there is no clear conclusion as to whether there are differences in the manifestation of work stress among dentists of different genders. A study of Korean dentists by Jin et al. (2015) showed that younger dentists and male dentists were more likely to experience burnout. However, the results of another study were consistent with the present study in that they did not reveal significant differences in work stress among dentists of different genders. However, they found that fear of medical errors, conflicts with patients and feeling burdened with learning clinical knowledge were the main stressors that led to depression, anxiety or sleep disorders among dentists (K. W. Song et al., 2017). From the perspective of marital status, some studies have shown that divorce or separation has a significant impact on increased burnout (Guo et al., 2018). Some studies show that perceived social support (e.g., from family, friends or organizations) is beneficial in reducing work stress (Y. Liu et al., 2021; Molero Jurado et al., 2018). Such differences in work stress were not seen among groups with different types of marital status in this study. This may be because the respondents as a whole were all experiencing relatively low levels of work stress or because monthly income and other sociodemographic factors not investigated masked differences among groups with different types of marital status. The absence of significant differences in work stress among groups with different average monthly income before taxes, professional titles and types of employment may also be attributed to the same reasons. In addition, considering that the survey was conducted during the period of regular prevention and control of the COVID-19 pandemic, the number of visits to the dental departments of each hospital decreased to varying degrees due to the requirements to provide negative nucleic acid test results and the high-risk environment of

the hospitals. This might have contributed to reduced work stress for the dentists. Based on the above analysis, this study holds that for dentists, the main work stressors are still work and patient aspects compared to sociodemographic factors. Workload may also be a direct cause of the differences in the amount of their perceived work stress.

In terms of emotional labour, there were no significant differences in deep acting among dentists with different socio-demographic characteristics such as gender, education level and marital status. However, this study found that male dentists scored significantly higher on surface acting than female dentists, suggesting that male dentists tend to perform surface acting more in their work. This is inconsistent with the finding by Han et al. (2018) that females were more inclined to perform emotional labour, which led to depressive symptoms. In addition, there were differences in dentists' surface acting scores by education level. Dentists with a doctoral degree or a master's degree had higher scores on surface acting than those with a bachelor's degree or lower. Dentists with higher levels of education also had a higher mean score on deep acting than those with lower levels of education, but this difference was not statistically significant. Regarding the reasons for this finding, on the one hand, it could be that within the public healthcare system, dentists with higher degrees usually face more pressing demands for promotion and take on more demanding research tasks and even administrative matters, causing them to perform emotional labour more frequently. On the other hand, it may also be due to the fact that dentists with higher education levels have a relatively better grasp of skills and professional content, are more comfortable in dealing with the demands of their work and their patients and are able to adapt to the emotional display rules of the organization by engaging in surface acting.

It has been shown that adopting surface acting strategy means that external emotional displays are not aligned with internal cognitive assessments and true emotional experiences, and such discrepancies can cause varying degrees of work fatigue as it causes doctors to passively make more effort to maintain the emotions that need to be displayed externally (L. Liu et al., 2018).

This study also found that self-perceived DPR among dentists differed significantly among dentists with different types of marital status and professional titles. Specifically, the self-perceived DPR of married dentists and dentists with other types of marital status such as divorced was better than that of unmarried dentists. This is in line with the results of the study by D. Xiong (2014) and may be due to the fact that people who have experienced marriage have more diverse social roles and are therefore better at managing relationships with patients. From the perspective of professional titles, dentists with deputy senior or senior titles also scored

higher on DPR than those with intermediate or junior titles. Considering that promotion in professional title is relatively strongly associated with length of service and extensive work experience, this phenomenon may be related to the fact that dentists with higher titles have more work experience and are better at handling relationships with patients. In addition, this study also identified marginally significant differences in the scores on self-perceived DPR among dentists with different monthly income levels, while there was a positive correlation between professional title and average monthly income before taxes. Therefore, this study infers that income level may also be a cause of better self-perceived DPR among dentists with higher professional titles through external incentives.

As to emotional intelligence and empathy, scores on empathy in this study did not show significant differences among groups with different socio-demographic characteristics such as gender, marital status, education level, average monthly income before taxes or professional title. However, this study indicated that married dentists had significantly higher emotional intelligence than unmarried dentists. This may be because married dentists are more attentive to the emotions of others and are better able to express and control their own emotions. In addition, the group with higher levels of monthly income also had significantly higher emotional intelligence than the groups with low levels of monthly income. It has been found that there is a significant positive association between high emotional intelligence and higher pay mainly because people with high emotional intelligence are better at networking and have access to more resources and help, which in turn leads to better performance and pay (Sanchez-Gomez et al., 2021).

5.3 Hypotheses testing results and discussion

5.3.1 Testing result of the hypothesis on the relationship between work stress and DPR

The results showed that H1 “Work stress is negatively related to doctor-patient relationship” was not supported. In other words, dentists' work stress did not have a direct impact on DPR. Based on dentists' scores on work stress and DPR, the correlation coefficient between work stress and DPR was negative but not statistically significant. It is assumed that the main reasons for this result were the relatively low work stress scores and the wide variation in subjectively perceived work stress and DPR among the respondents. Besides, according to the JD-R model, job demands and job resources generate two relatively independent psychological processes, namely energy depletion and motivational process (Bakker & Demerouti, 2007). In other words,

increased work stress due to factors such as high job demands may continually deplete dentists' emotional resources, with a concomitant negative impact on DPR. In turn, high work stress due to high job demands may also increase work engagement, which may have a positive effect on DPR. Therefore, the lack of a significant negative relationship between work stress and DPR in this study may be due to the fact that these two processes cancel each other out, hiding the direct effect of work stress on DPR.

In addition, although this study did not find a direct effect of work stress on DPR, it did reveal a fully mediating effect of work stress on DPR through emotional labour. This suggests that work stress has a significant indirect effect on DPR and that doctors' work stress can affect DPR through both surface acting and deep acting.

5.3.2 Testing results of the hypothesis on the relationships between work stress and surface/deep acting

The results supported H2 and H3. In other words, work stress is positively related to both surface acting and deep acting. Related studies have also shown that work stress can positively predict emotional labour, with higher levels of work stress associated with higher levels of emotional labour (Khalid et al., 2019). The work contents of dentists often require them to deal with patients with high emotional expressions, who often carry negative emotions such as doubt, fear and distress. This environment of high emotional demands at work means that dentists are correspondingly subject to high levels of work stress. According to the JD-R model, when job demands increase, leading to increasing work stress, dentists will also need to perform more emotional labour to increase patients' cooperation with treatment (Jeung et al., 2017). It is important to note that the generation of demands will inevitably consume a certain level of resources. When these resources are not adequately replenished, emotional exhaustion can occur, leading to poor work outcomes (Bakker & Demerouti, 2007).

5.3.3 Testing results of the hypotheses on the relationships between surface acting/deep acting and DPR

The results showed that H4 was not supported while H5 was supported. Specifically, deep acting is positively related to DPR. Although H4 was not supported, this study revealed that surface acting is significantly positively related to DPR. This is consistent with the findings of some studies that emotional labour can positively predict job satisfaction and job performance (Chou et al., 2012; Grandey, 2003). The possible reason is that by displaying the emotions

needed by the organization at work through appropriate emotional labour, dentists can enable their patients to perceive their outwardly positive emotional expressions, thus facilitating DPR.

In combination with the above results that H2 and H3 were supported, this study validated the full mediation roles of surface acting and deep acting in the relationship between work stress and DPR. Although the direct effect of work stress on DPR was not significant, which is inconsistent with the results found by some scholars (A. Q. Wang et al., 2016), this aptly reflects another important pathway in which work stress affects DPR through emotional labour as a mediator. This suggests that, when aiming to improve DPR, attention should be paid not only to the various stressors that result in dentists' work stress but also to regulating the emotional labour performed by dentists at work.

After analysing the models with each of the four dimensions of work stress as the independent variable, it was found that all the four dimensions of work stress, namely work, patients, skills and colleagues, had a significant positive effect on surface acting, and that surface acting mediated the influence of each of these four dimensions on DPR. However, deep acting only mediated the effect of patient-related work stress on DPR. This demonstrates that when dealing with patients, dentists adopted both surface acting and deep acting strategies, and such emotional labour ultimately had a positive impact on DPR. This finding suggests that, despite the same purpose of improving DPR, dentists tend to "fake" the required emotions in response to work stress related to work aspects, competency aspects and colleague aspects rather than trying to change their own inner feelings and emotions to adapt to the organisation's desired emotional displays from the inside out. Only when dealing with patients are dentists able to attempt to change their emotions from within by adopting the emotional labour strategy of deep acting. This may be because simply "faking" expressions, tone of voice or body language when dealing with patients is not enough to satisfy the emotional display rules, or to adapt to the organization's required emotions. Instead, dentists are more required to show empathy to meet patients' expectations. From the perspective of the JD-R model, this suggests that dentists indeed experience more stress when dealing with patients than they do when dealing with work stress related to work, competency or colleagues, such as long working hours, difficulty of work and dependency on a good assistant and therefore have greater job demands which cause them to adopt the more complex emotional labour strategy of deep acting. However, there is no research showing that higher levels of work stress are associated with a higher likelihood of adopting deep acting strategy. More relevant research is needed in the future to further explore how work stress levels are related to emotional labour strategies.

5.3.4 Testing results of the hypotheses on the moderating role of emotional intelligence in the relationship between work stress and DPR mediated by surface acting/deep acting

H6 and H7 were supported by the results. In other words, emotional intelligence moderately attenuates the effect of work stress on surface acting/deep acting. The results showed that the interaction between work stress and emotional intelligence had a marginally significant effect on emotional labour. In other words, the positive effect of work stress on surface acting/deep acting was attenuated among dentists with high emotional intelligence than among those with low emotional intelligence. From the perspective of the COR theory, emotional intelligence, as a personal resource, compensates for the depletion of emotional resources to some extent, thus allowing dentists to meet the demands caused by work stress without performing more emotional labour. Furthermore, it has been found that higher emotional intelligence is significantly associated with low levels of burnout and higher levels of job satisfaction (Weng et al., 2011). These results suggest that increasing dentists' emotional intelligence can help protect the depletion of emotional resources in their work and thus achieve the positive work outcomes expected by the organization.

5.3.5 Testing results of the hypotheses on the moderating role of empathy in the relationship between work stress and DPR mediated by surface acting/deep acting

H8 and H9 were supported in this study. In other words, empathy attenuates the relationships between surface/deep acting and DPR. Specifically, the positive effect of surface acting/deep acting on DPR was less pronounced among dentists with high empathy than among those with low empathy. From the JD-R model and the COR theory, in the emotional labour process, empathy, as a supplement to personal resources, to some extent compensates for the depletion of resources caused by emotional labour and mitigates the impact caused by emotional labour. Besides, the study done by Weng et al. (2011) indicates that doctors' empathy has a positive impact on patients' self-reported health status and indirectly affects patient satisfaction. From this perspective, dentists' empathy has the potential to increase patient trust and adherence, thereby positively influencing DPR (Kim et al., 2004; Neumann et al., 2007). This reminds us of the importance of cultivating the empathy of dentists at ordinary times in order to maintain a good DPR.

5.4 Research findings

5.4.1 Finding 1

The dentists in the surveyed hospitals had medium levels of work stress, high levels of emotional labour and near-good levels of DPR.

According to the statistical analyses results shown in Table 4.2, dentists experienced certain levels of work stress, and patient-related work stress had the most significant effect, followed by work-related work stress, competency-related work stress and colleague-related work stress successively; dentists performed high levels of emotional labour, and the level of deep acting was higher than that of surface acting; and dentists' self-perceived DPRs were close to good.

5.4.2 Finding 2

Dentists' work stress affected DPR through the mediating role of emotional labour.

As shown in the Pearson correlation analysis results in Table 4.2, work stress was significantly and positively correlated with surface acting, and surface acting and deep acting were significantly positively correlated with DPR.

According to the results in Figure 4.1 and Figure 4.4, analysis using the PROCESS macro Model 4 showed that work stress had a significant positive effect on both surface acting and deep acting, that surface acting and deep acting had a significant positive effect on DPR, and that the direct effect of work stress on DPR was not significant.

Emotional labour fully mediated the effect of work stress on DPR. In the face of work stress, dentists may adopt appropriate emotional labour strategies to improve DPR and increase their resources to better cope with their job demands. In addition, the direct effect of work stress on DPR was not significant, which suggests that the pathways by which work stress influenced DPR were not necessarily linear.

5.4.3 Finding 3

The dentists in the surveyed hospitals had high levels of emotional intelligence, and emotional intelligence marginally moderates the effect of work stress on emotional labour.

According to the Pearson correlation analysis results in Table 4.2, there was a significant positive correlation between work stress and surface acting and a significant negative correlation between work stress and emotional intelligence. DPR was significantly positively correlated with emotional intelligence.

According to the results in Figure 4.2 and Figure 4.5, the analysis using PROCESS macro Model 21 showed work stress had a significant positive effect on both surface acting and deep acting, that the interaction between work stress and emotional intelligence had a marginally significant effect on both surface acting and deep acting.

Therefore, it can be concluded that emotional intelligence marginally moderates the effect of work stress on emotional labour. Specifically, emotional intelligence moderately attenuates the effect of work stress on emotional labour, and the positive effect of work stress on emotional labour is less pronounced in groups with high emotional intelligence than in groups with low emotional intelligence.

5.4.4 Finding 4

The levels of empathy of the dentists in the surveyed hospitals were close to good, and empathy significantly moderated the effect of emotional labour on DPR.

The Pearson correlation analysis results in Table 4.2 showed that surface acting and deep acting were significantly positively correlated with DPR, that deep acting was significantly positively correlated with DPR and empathy, and that DPR was significantly positively correlated with empathy.

Based on the results in Figure 4.2 and Figure 4.5, the analysis using the PROCESS Model 21 showed that surface acting and deep acting had a significant positive effect on DPR, and that the interaction between surface acting/deep acting and empathy had a significant negative effect on DPR.

Therefore, it can be concluded that empathy significantly moderates the effect of emotional labour on DPR. Specifically, empathy attenuates the effect of emotional labour on DPR, and the positive effect of emotional labour on DPR is less pronounced in groups with high empathy than in groups with low empathy.

5.4.5 Finding 5

Table 4.2 presents the results of Pearson correlation analysis on the four dimensions of work stress (work, patients, competency and colleagues). Specifically, work-related work stress was positively correlated with surface acting and negatively correlated with emotional intelligence and empathy; patient-related stress was positively correlated with both surface acting and deep acting and negatively correlated with emotional intelligence; competency-related work stress was positively correlated with surface acting and negatively correlated with emotional

intelligence; and colleague-related work stress was positively correlated with surface acting and negatively correlated with emotional intelligence.

As shown by the results of analyses on the role of each dimension of work stress in the models presented in Figure 4.7 and Table 4.11, surface acting mediated the effect of each dimension of work stress on DPR, while deep acting only mediated the effects of work-related work stress and patient-related work stress on DPR. Furthermore, based on the results in Figures 4.8 and 4.9, empathy played a mediating role in all the models with each dimension of work stress as the independent variable, while the moderating effect of emotional intelligence was only significant in the model on the effect of patient-related work stress on DPR mediated by deep acting.

Based on the above findings, it can be concluded that for all the models with work stress as the independent variable and DPR as the dependent variable, both surface acting and deep acting played a mediating role. Besides, empathy had a significant moderating effect in the pathways by which each dimension of work stress affected DPR, while emotional intelligence only had a significant moderating effect in the process where patient-related work stress affected DPR through deep acting.

5.5 Theoretical implications

This study bears the following three theoretical implications.

Firstly, this study has explored the pathways by which work stress influences DPR, work stress influences emotional labour and emotional labour influences DPR among dentists based on the JD-R model and the COR theory. The results showed that work stress influences DPR through the mediating role of emotional labour (surface acting and deep acting). This study has also compared and analysed these influence pathways. To the best of the researcher's knowledge, this study is the first empirical study using the JD-R model and the COR theory on a group of Chinese dentists. In this sense, it has enriched the literature on the JD-R model and the COR theory.

Secondly, this study fills a gap in the research on the mechanism by which emotional labour influences the relationship between work stress and DPR among dentists. This study found that emotional intelligence marginally moderates the effect of work stress on emotional labour (surface acting and deep acting). Specifically, emotional intelligence moderately attenuates the effect of work stress on emotional labour, and the positive effect of work stress on emotional labour is less pronounced in groups with high emotional intelligence than in groups with low

emotional intelligence. Besides, the effect of emotional labour on DPR is moderated by empathy. Specifically, empathy moderately attenuates the effect of emotional labour on DPR, and the positive effect of emotional labour on DPR is less pronounced in the group with high empathy than in the group with low empathy. This finding fills a gap in research on the mechanisms by which emotional labour, emotional intelligence and empathy influence DPR among dentists.

Finally, this study is one of the few empirical studies in China focused on dentists' work stress and DPR. This study is the first study that has introduced a dentists' work stress scale from the international literature, identified the four dimensions (work, patients, competency and colleagues) of work stress among Chinese dentists, explored the different roles of each dimension of work stress in the hypothesized model. In this sense, this study provides a measurement tool and literature references for future research on work stress among Chinese dentists.

5.6 Managerial implications

This study found that dentists in the seven surveyed hospitals in Shenzhen, China had levels of work stress, high levels of emotional labour and near-good levels of DPR, that dentists' work stress influenced DPR through the mediating role of surface acting and deep acting, with emotional intelligence and empathy playing a moderating role in this influence pathway. Based on the above findings, this study proposes the following policy recommendations for government authorities and policy makers, managers of dental hospitals/clinics and dentists.

5.6.1 Implications for government authorities and policy makers

Government authorities and policy makers should be aware of status of work stress and DPR among dentists and the factors that influence them, so that effective management policies and comprehensive measures can be put in place to improve the reality.

In view of the emotional labour involved in dentists' work and the significant influences of emotional intelligence and empathy on the relationship between work stress and DPR shown in this study, it is necessary to add emotional management (such as curriculum and even qualification assessment) to the training of dentists to increase the overall importance attached to emotional management and facilitate the improvement of emotional management.

The results of this study reveal that patients and work are the two main work stressors for dentists. Dentists experience work stress due to their worry about medical errors or medical

disputes during their contact with patients. This suggests that government authorities and policy makers should develop more proactive policies to deal with medical errors or medical disputes. Besides, there should be a clear process and feedback mechanism for handling patient complaints so that disputes can be dealt with in accordance with the applicable rules and regulations to safeguard the legitimate rights of dentists and patients.

With regard to work stress caused by work aspects, competent authorities should formulate targeted policies to speed up the training of dental professionals, promote the career change of graduates, and reduce the turnover of healthcare workers; improve the working environment of dentists and develop effective occupational protection measures to reduce medical risks; increase the proportion of supporting staff in dental departments and optimise the human resources of dental health services; expand the scope of medical insurance coverage for dental care and reduce the number of patients seeking medical treatment to reduce the cost of medical treatment for patients, improve the patient experience, and facilitate communication between dentists and patients. Efforts should be made to strengthen the development of the oral health service system and achieve the goals of China's Oral Health Action Plan (2019-2025) (China's National Health Commission, 2019, March 5).

5.6.2 Implications for dental hospitals/clinics and managers

Healthcare facilities should focus on developing dentists' emotional intelligence and empathy and provide complementary resources at all levels to balance the depletion of dentists' emotional labour resources and improve DPR.

This study found that emotional labour fully mediates the relationship between work stress and DPR, and that emotional intelligence and empathy play a moderating role in this pathway of influence. This finding reminds dental hospitals/clinics and managers of the importance to pay attention to the effect of emotional labour on DPR and enhance healthcare workers' capability to manage and utilise emotions so that patients can receive high quality and efficient healthcare services. Managers can take targeted measures at the organizational level to increase training in emotional management, facilitate the proper understanding and use of emotional labour among healthcare workers, improve individuals' emotional intelligence and empathy, and use emotional intelligence as an indicator for recruitment and promotion assessment.

This study found significant differences between groups of dentists working in departments of different sizes. Specifically, those working in a department with at least 30 dental chairs experienced significantly higher levels of stress than those working in a department with less

than 30 dental chairs. In view of this, it is important for dental hospitals/clinics and managers to improve the working environment of dentists by subdividing their specialties, implementing zoning, and limiting the number of dental chairs without reducing overall medical resources to reduce their work stress.

The results of this study show that patient aspects and work aspects are the two main work stressors. This finding suggests that dental hospitals/clinics and managers should pay more attention to rationalising work arrangements and staffing, organising work content in a rational manner, and taking more proactive measures to deal with potential conflicts between dentists and patients. In the event of medical conflicts, timely psychological counselling should be provided to the dentists concerned to relieve psychological stress and prevent the clinical treatment from being affected by the dentists' negative psychological states, thus facilitating the benign development of DPR.

5.6.3 Implications for dentists

Dentists should focus on improving their own emotional management skills, adopt appropriate emotional labour strategies, improve their emotional intelligence and empathy, accumulate more resources, and enhance work efficiency and personal performance to facilitate their own career development.

This study found differences in the surface acting scores of dentists with different educational levels. Specifically, dentists with a doctoral degree or a master's degree had higher scores on surface acting than those with a bachelor's degrees or below. This finding suggests that dentists, especially male dentists and dentists with high education levels, should avoid performing surface acting strategy-dominated emotional labour at work as it is detrimental to their physical and mental health and career development.

According to the influences of the four dimensions of work stress analysed in this study, on an individual level, dentists need to take the initiative to adjust their mindset and awareness, manage their emotions, put themselves in the patient's shoes and respond appropriately and in a timely manner, better utilise emotions, improve doctor-patient communication, enhance social recognition and occupational well-being, and plan their career development in a rational manner. Besides, in terms of competency and colleagues, dentists should seek more education and training opportunities and strengthen peer exchanges to improve their performance; colleagues should also communicate and collaborate more with each other. In a nutshell, dentists should

strive to improve the quality of oral health services from different levels and actively develop a healthy and harmonious DPR.

5.7 Research limitations

All the variables in the questionnaires used in this study, including work stress, DPR, emotional labour, emotional intelligence and empathy, were self-reported by the dentists and some objective outcome variables were not. Respondents' subjective feelings may affect the validity of the questionnaire. Besides, as the survey was only conducted in seven hospitals in Shenzhen and the survey data was collected from a limited sample of dentists, it remains to be tested whether the findings can be generalised across regions.

As this study was a cross-sectional study, its findings are mainly about the relationships between work stress, DPR, emotional labour, emotional intelligence and empathy. The causal relationships among them are yet to be further investigated in future longitudinal studies.

Due to the limited sample size, this study was not able to examine whether dentists in different departments had different outcomes and pathways of influence regarding the relationships between emotional labour, work stress and DPR. The status of emotional labour and its influence among dental nurses and healthcare workers assisting dentists in other departments remains to be explored in further research.

The questionnaire survey of this study was conducted during the period of regular prevention and control of the COVID-19 pandemic. During this special period, there were major changes in people's daily life and medical treatment process, such as irregular home quarantine measures, delayed access to medical treatment for non-emergency cases, and the requirement to provide negative nucleic acid test result prior to consultation. These special requirements had a multifaceted and multi-level impact on DPR and people's psychological well-being, and therefore may have had an impact on the analysis results of the relationships among dentists' work stress, DPR and emotional labour.

5.8 Research prospects

Future researchers may carry out studies on emotional labour in different types of hospitals and among different types of doctors. Chinese doctors are employed in different types of hospitals at all levels, including public hospitals (primary, secondary and tertiary hospitals), military hospitals, private hospitals and Sino-foreign joint venture hospitals. The sample of this study

consisted of dentists from seven public hospitals. As the surveyed hospitals and sample are limited, the level of work stress and the status of DPR among healthcare workers may vary significantly from those in private and other types of hospitals. Because of this, doctors in different types of hospitals may experience different levels of stress and may have different perceptions of DPR, which may also affect emotional labour, emotional intelligence and empathy. Future research could be conducted in different types of hospitals and among different types of doctors to provide a comprehensive and accurate picture of the impact of emotional labour on the relationship between work stress and DPR, based on which effective measures can be formulated and taken to cope with work stress and improve DPR.

Research can be carried out to further investigate the relationship between the level of work stress and the choice of emotional labour strategies. This study found that of the four dimensions of work stress among dentists, patient-related work stress had the strongest influence, followed by work-related work stress, competency-related work stress and colleague-related work stress and that emotional labour fully mediated the relationship between work stress and DPR. Surface acting mediated the influence of each dimension of work stress on DPR. However, deep acting only mediated the effect of patient-related work stress on DPR. This suggests that dentists are under more stress when dealing with patients and take the organization's emotion display rules more seriously during patient contact. Dentists need to change their inner feelings and engage in deep acting in addition to performing surface acting. There is a gap in existing literature regarding whether the degree or magnitude of work stress affects the choice of emotional labour strategies. Therefore, it is necessary to carry out further research to investigate the relationship between the level of work stress and the choice of emotional labour strategies.

Further researchers can further explore the impact of emotional labour on the relationship between work stress and DPR from the perspective of job resources. According to the JD-R model, job resources are the physical, psychological, social or organizational aspects of the job that may help achieve work goals, reduce job demands and consumption of associated resources, and stimulate personal growth, learning and development. Examples of job resources are social support, feedback, remuneration, career development opportunities and organizational justice. This study investigated the influence of personal resources, including emotional intelligence and empathy, on the mediating role of emotional labour in the relationship between work stress and DPR. It did not further explore the roles of other job resources such as career development opportunities, organizational support and salary and compensation, which are also very important factors in society and deserve in-depth study.

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Annex A: Survey Questionnaire on the Relationship Between Work Stress and Doctor-patient Relationship Among Dentists

Dear Madam/Sir.

Thank you for participating in this survey. All items in this questionnaire are single-choice items. Please tick (✓) the number that best matches your actual situation. The questionnaire will only be used for group statistics. Your personal information and the completed questionnaires will not be disclosed to any third party. Please rest reassured to fill in the questionnaire. Thank you!

Part 1: The items below are aimed at understanding your stress levels at work. Please choose the number that best reflects your reality.

No.	Item	Not at all stressed	Slightly stressed	Somewhat stressed	Stressed	Very stressed
1	Time pressure	1	2	3	4	5
2	Amount of work	1	2	3	4	5
3	Working behind schedule	1	2	3	4	5
4	Concentration while working	1	2	3	4	5
5	Pace of work	1	2	3	4	5
6	Long working days	1	2	3	4	5
7	Administration	1	2	3	4	5
8	Dissatisfied patients	1	2	3	4	5
9	Anxious patients	1	2	3	4	5
10	Difficult or uncooperative patients	1	2	3	4	5
11	Self-willed or impudent patients	1	2	3	4	5
12	Verbally or physically aggressive patients	1	2	3	4	5
13	Patients appearing too late or not at all	1	2	3	4	5
14	Patients negotiating about costs	1	2	3	4	5

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15	Defaulters	1	2	3	4	5
16	Distrustful patients	1	2	3	4	5
17	Unreasonable or demanding patients	1	2	3	4	5
18	Patients from other cultures with conflicting attitudes on health care	1	2	3	4	5
19	Particular children	1	2	3	4	5
20	Parents interfering with treatment of their child	1	2	3	4	5
21	Lack of appreciation	1	2	3	4	5
22	Negative comments	1	2	3	4	5
23	Chronic problems for which there is no cure	1	2	3	4	5
24	Inflicting pain	1	2	3	4	5
25	Complaints about colleagues	1	2	3	4	5
26	Lack of sufficient skills to solve dental problems	1	2	3	4	5
27	Having to perform differently from the ideal situation	1	2	3	4	5
28	Lack of opportunity to deliver qualitatively optimal care	1	2	3	4	5
29	Impression that one's work is qualitatively insufficient	1	2	3	4	5
30	Always having to be emotionally well-balanced in practice	1	2	3	4	5
31	Not being able to mean as much for a patient as one wishes to	1	2	3	4	5
32	Always having to deliver perfect quality	1	2	3	4	5
33	Responsibility for a patient's oral situation	1	2	3	4	5
34	Having to decide in complicated oral situations	1	2	3	4	5
35	The risk of making mistakes	1	2	3	4	5
36	The risk of a medical emergency situation	1	2	3	4	5
37	Switching over from one patient to another	1	2	3	4	5
38	Realisation that one's work is perishable	1	2	3	4	5
39	the feeling of having to be a jack-of-all-trades	1	2	3	4	5
40	Experiencing the gap between perfection and what is possible	1	2	3	4	5
41	Colleagues' judgement when a patient asks for second opinion	1	2	3	4	5
42	Difficulty of work	1	2	3	4	5
43	Threat of complaints and subsequent procedures	1	2	3	4	5
44	Communication with staff	1	2	3	4	5
45	Small possibility of contact with colleagues	1	2	3	4	5
46	Dependency on a good assistant	1	2	3	4	5

47	The professional relation with assistant	1	2	3	4	5
48	Consultations with staff	1	2	3	4	5
49	Absence or turnover of staff	1	2	3	4	5
50	Having to plan and organise everything by oneself	1	2	3	4	5

Part 2: The items below are aimed at understanding your interaction with patients. Please choose the number that best reflects your reality.

No.	Item	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
1	My understanding of the emotional status of the patients and their families is an important component.	1	2	3	4	5	6
2	Empathy is an important therapeutic factor in medical treatment.	1	2	3	4	5	6
3	Empathy enables me to become a successful healthcare worker.	1	2	3	4	5	6
4	My understanding of my patients' feelings gives them a sense of validation that is therapeutic in its own right.	1	2	3	4	5	6
5	I consider understanding my patients' body language as important as verbal communication in physician-patient relationships.	1	2	3	4	5	6
6	I try to pay attention to my patients' emotions in condition observation and history taking.	1	2	3	4	5	6
7	I try to understand what is going on in my patients' minds by paying attention to their nonverbal cues and body language.	1	2	3	4	5	6
8	I believe that empathy is an important therapeutic factor in medical treatment.	1	2	3	4	5	6
9	I try to think like my patients in order to render better care.	1	2	3	4	5	6
10	My patients are more likely to believe in the treatment effect when I empathize with them.	1	2	3	4	5	6
11	I try to imagine myself in my patients' shoes when providing care to them.	1	2	3	4	5	6

Part 3: The items below are aimed at understanding your emotional state of being at work. Please choose the number that best reflects your reality.

No.	Item	Never	Seldom	Occasionally	Sometimes	Often	Always
1	I put on an act in order to deal with patients in an appropriate way.	1	2	3	4	5	6
2	I fake a good mood.	1	2	3	4	5	6
3	I fake the emotions that I must show to patients.	1	2	3	4	5	6
4	I just pretend to have the emotions I need to display for my job.	1	2	3	4	5	6
5	I put on a "mask" in order to display the emotions I need for the job.	1	2	3	4	5	6
6	I try to actually experience the emotions that I must show.	1	2	3	4	5	6
7	I make an effort to actually feel the emotions that I need to display toward patients.	1	2	3	4	5	6
8	I work hard to feel the emotions that I need to show to patients.	1	2	3	4	5	6

Part 4: The items below are aimed at understanding your relationship with patients. Please choose the number that best reflects your reality.

No.	Item	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
1	My patients trust me to put their needs first.	1	2	3	4	5	6
2	My patients trust the diagnosis and treatment plans I developed for them.	1	2	3	4	5	6
3	My patients are happy to follow the treatment plan I recommend.	1	2	3	4	5	6
4	My patients believe that the tests I request them to do are reasonable.	1	2	3	4	5	6
5	I often patiently communicate with my patients and their families.	1	2	3	4	5	6
6	I always carefully inform my patients about the risks that may arise from their treatment.	1	2	3	4	5	6
7	I always earnestly help my patients and their families.	1	2	3	4	5	6
8	I often compare multiple options to provide my patients with the most reasonable diagnosis and treatment plan.	1	2	3	4	5	6
9	I am proud of my expertise in helping my patients effectively.	1	2	3	4	5	6

10	I am more than happy to receive the follow-up visits by my patients.	1	2	3	4	5	6
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Part 5: The items below are aimed at understanding your usual emotional state of being. Please choose the number that best reflects your reality.

No.	Item	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
1	I have a good sense of why I have certain feelings most of the time	1	2	3	4	5	6
2	I have good understanding of my own emotions	1	2	3	4	5	6
3	I really understand what I feel.	1	2	3	4	5	6
4	I always know whether or not I am happy.	1	2	3	4	5	6
5	I always know my friends' emotions from their behaviour.	1	2	3	4	5	6
6	I am a good observer of others' emotions.	1	2	3	4	5	6
7	I am sensitive to the feelings and emotions of others.	1	2	3	4	5	6
8	I have good understanding of the emotions of people around me.	1	2	3	4	5	6
9	I always set goals for myself and then try my best to achieve them.	1	2	3	4	5	6
10	I always tell myself I am a competent person.	1	2	3	4	5	6
11	I am a self-motivated person.	1	2	3	4	5	6
12	I would always encourage myself to try my best.	1	2	3	4	5	6
13	I am able to control my temper and handle difficulties rationally.	1	2	3	4	5	6
14	I am quite capable of controlling my own emotions.	1	2	3	4	5	6
15	I can always calm down quickly when I am very	1	2	3	4	5	6
16	I have good control of my own emotions.	1	2	3	4	5	6

Part 6: Personal background (Please fill in the answer on the underline).

1	Your gender:___	(1) Male	(2) Female
2	Your age: __	() years old	
3	Your length of service:___	() years	
4	Your highest education level: ____	(1) Junior college degree or below	(2) Bachelor's degree (3) Master's degree (4) Doctoral degree
5	Your professional title:___	(1) Physician	(2) Attending physician (3) Associate chief physician (4) Chief physician
6	Your marital status:___	(1) Unmarried	(2) Married (3) Other (such as divorced)
7	Your average monthly income before tax: __	(1) Below 10,000 yuan	(2) 10,000-19,999 yuan (3) 20,000-29,999 yuan (4) 30,000 yuan or more
8	The nature of the dental facility you are working in __	(1) Public facility	(2) Private facility (3) Other
9	The size of the dental facility you are working in:___	(1) ≤10 dental chairs	(2) 11-30 dental chairs (3) ≥30 dental chairs
10	Your type of employment: ____	(1) Permanent employment	(2) Conditional permanent employment (3) Contract-based employment

This is the end of the survey. Thanks very much for your support!

Annex B: Tables

Table 1 The goodness-of-fit indices of the Work Stress Scale (initial model and the modified model)

Index	Reference value	Measured value	GoF	Measured value after modification	GoF after modification
CMIN/DF	<5, <3 (better)	2.715	Very good	1.939	Very good
CFI	>0.9	0.784	Poor	0.951	Very good
RMSEA	<0.1, <0.05 (better)	0.085	Good	0.063	Good
TLI	>0.9	0.774	Poor	0.944	Very good

Table 2 KMO and Bartlett's test of sphericity for the Work Stress Scale

KMO test based on sufficient samples			.938
Bartlett's test of sphericity	Approx. Chi-Square		9737.757
	df		1225
	Sig.		< .0001

Table 3 The goodness-of-fit index of the Surface Acting Scale (initial model and the modified model)

Index	Reference value	Measured value	GoF	Measured value after modification	GoF after modification
CMIN/DF	<5, <3 (better)	5.902	Poor	1.132	Very good
CFI	>0.9	0.970	Very good	1.000	Very good
RMSEA	<0.1, <0.05 (better)	0.144	Poor	0.024	Very good
TLI	>0.9	0.939	Very good	0.999	Very good

Table 4 KMO and Bartlett's test of sphericity for the Surface Acting Scale

KMO test based on sufficient samples			.821
Bartlett's test of sphericity	Approx. Chi-Square		546.724
	df		6
	Sig.		< .0001

Table 5 Total variance explained of the Surface Acting Scale

Component	Initial eigenvalues			Extracted sums of squared loadings			Rotated sums of squared loading		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	2.985	74.622	74.622	2.985	74.622	74.622	/	/	/
2	0.456	11.399	86.021						
3	0.356	8.899	94.920						
4	0.203	5.080	100.000						

Extraction method: Principal component analysis

Table 6 CITC and reliability analysis results of the Deep Acting Scale

Item	Mean if item deleted	Variance if item deleted	CITC	Cronbach's α if item deleted	Cronbach's α
EL6	7.04	6.784	.764	.900	
EL7		6.95	6.068	.863	.816
EL8		6.85	5.983	.805	.904

Table 7 The goodness-of-fit index of the Doctor-Patient Relationship Scale (initial model and the modified model)

Index	Reference value	Measured value	GoF	Measured value after modification	GoF after modification
CMIN/DF	<5, <3 (better)	3.801	Good	2.388	Very good
CFI	>0.9	0.959	Very good	0.984	Very good
RMSEA	<0.1, <0.05 (better)	0.108	Acceptable	0.076	Good
TLI	>0.9	0.945	Very good	0.977	Very good

Table 8 KMO and Bartlett's test of sphericity for the Doctor-Patient Relationship Scale

KMO test based on sufficient samples			.921
Bartlett's test of sphericity	Approx. Chi-Square		2306.827
	df		45
	Sig.		<.0001

Table 9 Total variance explained of the Doctor-Patient Relationship Scale

Component	Initial eigenvalues			Extracted sums of squared loadings			Rotated sums of squared loading		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	6.939	69.39	69.39	6.939	69.39	69.39	4.5	44.995	44.995
2	1.08	10.802	80.192	1.08	10.802	80.192	3.52	35.197	80.192
3	0.449	4.495	84.687						
4	0.358	3.577	88.264						
5	0.271	2.711	90.975						
6	0.248	2.479	93.454						
7	0.214	2.14	95.594						
8	0.186	1.86	97.454						
9	0.137	1.369	98.823						
10	0.118	1.177	100						

Extraction method: Principal component analysis

Table 10 The goodness-of-fit index of the Emotional Intelligence Scale (initial model and the modified model)

Index	Reference value	Measured value	GoF	Measured value after modification	GoF after modification
CMIN/DF	<5, <3 (better)	2.414	Very good	1.672	Very good
CFI	>0.9	0.959	Very good	0.984	Very good
RMSEA	<0.1, <0.05 (better)	0.077	Good	0.053	Very good
TLI	>0.9	0.949	Very good	0.979	Very good

Table 11 KMO and Bartlett's test of sphericity for the Emotional Intelligence Scale

KMO test based on sufficient samples			.888
Bartlett's test of sphericity	Approx. Chi-Square		2570.92
	df		78
	Sig.		< .0001

Table 12 Total variance explained of the Emotional Intelligence Scale

Component	Initial eigenvalues			Extracted sums of squared loadings			Rotated sums of squared loading		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	6.88	52.924	52.924	6.88	52.924	52.924	3.789	29.15	29.15
2	1.721	13.24	66.163	1.721	13.24	66.163	3.445	26.497	55.647
3	1.281	9.855	76.018	1.281	9.855	76.018	2.648	20.372	76.018
4	0.969	7.455	83.473						
5	0.423	3.257	86.731						
6	0.367	2.82	89.55						
7	0.286	2.204	91.754						
8	0.27	2.076	93.83						
9	0.213	1.642	95.472						
10	0.192	1.478	96.95						
11	0.163	1.252	98.202						
12	0.125	0.959	99.161						

13 0.109 0.839 100

Extraction method: Principal component analysis

Table 13 The goodness-of-fit index of the Empathy Scale (initial model and the modified model)

Index	Reference value	Measured value	GoF	Measured value after modification	GoF after modification
CMIN/DF	<5, <3 (better)	10.510	Poor	0.397	Very good
CFI	>0.9	0.843	Poor	1.000	Very good
RMSEA	<0.1, <0.05 (better)	0.200	Poor	<0.0001	Very good
TLI	>0.9	0.804	Poor	1.000	Very good

Table 14 KMO and Bartlett's test of sphericity for the Empathy Scale

KMO test based on sufficient samples			.839
Bartlett's test of sphericity	Approx. Chi-Square		696.718
	df		6
	Sig.		< .0001

Table 15 Total variance explained of the Empathy Scale

Component	Initial eigenvalues			Extracted sums of squared loadings			Rotated sums of squared loading		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	3.182	79.541	79.541	3.182	79.541	79.541	/	/	/
2	0.396	9.897	89.439						
3	0.268	6.704	96.143						
4	0.154	3.857	100						

Extraction method: Principal component analysis

