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ETHICAL REVIEW ON THE IMPACT OF WORK STRESS ON EMPLOYEE DEPRESSION

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Abstract: Introduction: The study is grounded in the Stress-Stressor-Health Outcome Model and the Conservation of Resources (COR) theory, by examining the mechanisms through which personal factors, such as psychological capital and work burnout, influence the relationship between work stress and employee depression, aims to provide valuable insights and guidance for future corporate psychological support services.
Methods: A total of 1,312 employees participated in an online survey, completing a self-report questionnaire that included the Work Stress Questionnaire, the Patient Health Questionnaire-9, the Psychological Capital Questionnaire, and the Job Burnout Questionnaire. A chain mediation model was employed to explore the relationships among these four variables.
Results: The results revealed that: (1) 13.6% of employees suffer from moderate or severe depression; (2) Job burnout mediates the relationship between job stress and employee depression, amplifying the effect of job stress on depression. (3) Psychological capital and job burnout serve as a chain mediator in the relationship between work stress and employee depression.
Conclusion: This suggests that under work stress, higher levels of job burnout are associated with a greater risk of depression; improving psychological capital can buffer job burnout and reduce the risk of depression.

Key words: work stress, psychological capital, job burnout, employee depression

Revisión ética sobre el impacto del estrés laboral en la depresión de los empleados

Resumen: Introducción: El estudio se basa en el Modelo de Resultados Estrés-Estrés-Salud y la teoría de la Conservación de Recursos (COR), al examinar los mecanismos a través de los cuales los factores personales, como el capital psicológico y el agotamiento laboral, influyen en la relación entre el estrés laboral y la depresión de los empleados, tiene como objetivo proporcionar información valiosa y orientación para futuros servicios de apoyo psicológico corporativo.
Métodos: Un total de 1.312 empleados participaron en una encuesta en línea, completando un cuestionario de autoinforme que incluía el Cuestionario de Estrés Laboral, el Cuestionario de Salud del Paciente-9, el Cuestionario de Capital Psicológico y el Cuestionario de Burnout Laboral. Se empleó un modelo de mediación en cadena para explorar las relaciones entre estas cuatro variables.
Resultados: Los resultados revelaron que: (1) el 13,6% de los empleados sufre de depresión moderada o severa; (2) El agotamiento laboral media la relación entre el estrés laboral y la depresión de los empleados, amplificando el efecto del estrés laboral sobre la depresión. (3) El capital psicológico y el agotamiento laboral sirven como mediador en cadena en la relación entre el estrés laboral y la depresión de los empleados.
Conclusión: Esto sugiere que bajo estrés laboral, los niveles más altos de burnout laboral se asocian con un mayor riesgo de depresión; Mejorar el capital psicológico puede amortiguar el agotamiento laboral y reducir el riesgo de depresión.

Palabras clave: estrés laboral, capital psicológico, burnout laboral, depresión de los empleados

Revisão ética do impacto do estresse no trabalho na depressão de funcionários

Resumo: Introdução: O estudo é fundamentado no Modelo Estresse-Estressor-Desfecho em Saúde e na teoria da Conservação de Recursos (COR), ao examinar os mecanismos através dos quais fatores pessoais, tais como capital psicológico e estafa no trabalho, influenciam a relação entre estresse no trabalho e depressão de funcionários, objetivando fornecer entendimentos valiosos e diretivas para serviços de apoio psicológico futuros.
Método: Um total de 1312 funcionários participaram em um levantamento online, completando um questionário de autorelato que incluía o Questionário de Estresse no Trabalho, o Questionário de Saúde do Paciente-9, o Questionário de Capital Psicológico e o Questionário de Estafa Profissional. Um modelo de mediação em cadeia foi empregado para explorar as relações entre essas quatro variáveis.
Resultados: Os resultados revelaram que (1) 13,6% dos funcionários sofrem de depressão moderada ou grave; (2) Estafa profissional medeia a relação entre estresse profissional e depressão de funcionários, ampliando o efeito do estresse profissional na depressão, (3) Capital psicológico e estafa profissional servem como um mediador de cadeia na relação entre estresse no trabalho e depressão de funcionários.
Conclusão: Isso sugere que sob estresse no trabalho, níveis mais altos de estafa profissional estão associados com um maior risco de depressão; melhorar o capital psicológico pode amortecer a estafa profissional e reduzir o risco de depressão.

Palavras-chave: estresse no trabalho, capital psicológico, estafa profissional, depressão de funcionários

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1 Introduction

Depression is regarded as the leading mental health issue among employees in both enterprises and public institutions*(1-3)*. According to *the Ninth Survey of Chinese Workers(4)*, the total workforce in China is approximately 402 million, representing a key force driving the prosperity and development of various sectors in China. However, with social transformation, the acceleration of life and work rhythms, changes in production models and management systems, as well as heightened competition, mental health issues among Chinese workers have become increasingly prominent. Numerous studies have shown that the prevalence of depression among workers is generally higher than 30%*(2,5-9)*. Although an increasing number of companies are beginning to pay attention to employee depression, many still lack dedicated mental health services for their staff. Some companies that have implemented such services struggle with insufficient funding and budget allocation, which leads to limitations in service coverage, accessibility, and effectiveness. Between 1990 and 2019, the number of people diagnosed with depression in China increased from 31.3 million to 41 million, reflecting a 31% growth in cases*(10)*. This highlights the urgent need to address and improve the mental health of the workforce.

1.1 The Impact of Work Stress on Employee Depression

With the rapid development of the social economy and the growing complexity of the work environment, work-related stress has become one of the most prevalent psychological stressors in modern occupational groups*(11)*. Work stress refers to the pressure employees experience due to heavy workloads, role changes, overwhelming job responsibilities, or other work-related factors*(12)*. Previous research has shown that chronic work stress increases the risk of depression in individuals*(7,13-20)*.The effort-return imbalance model suggests that when employees experience high effort but low reward over an extended period, their stress significantly increases, thereby raising the risk of depression*(21)*. Similarly, the demand-control model argues that when job demands are high (e.g., heavy workload and tight deadlines) and decision-making autonomy is low (e.g., lack of control), employees are likely to experience significant stress. Prolonged psychological pressure under such conditions can lead to depression*(22)*. Therefore, excessive work stress can directly impact employee depression.

In today's society, the widespread use of information technology and digital tools has blurred the "work-life boundaries" for employees. Coupled with the uncertainties of globalization and market dynamics, companies often require employees to take on more tasks and responsibilities in order to enhance productivity and maintain competitive advantage. Faced with the dilemma of "reducing work stress to alleviate employee depression" versus "increasing work stress to boost corporate competitiveness", companies typically opt for the latter. However, some studies suggest that the relationship between work stress and employee depression is not direct, but is mediated or moderated by various factors. For instance, some studies have found that certain sources of work stress*(23)*, such as long working hours and workplace conflict*(24)*, are not associated with depressive symptoms. A meta-analysis by Virtanen et al.*(25)* on long working hours and depression also revealed significant heterogeneity in the relationship, which varied by survey area. Some individuals, despite facing high levels of work stress, employ positive coping strategies that do not negatively impact their physical and mental health*(26)*. Consequently, the level of depression among employees may be more closely linked to individual factors than to objective work stress. Since most companies are unable to reduce the objective work-related stress, they can instead focus on addressing employees' psychological factors by providing support services.

1.2 The Mediating Role of Job Burnout

Several studies have shown that job burnout plays a significant role in the relationship between work stress and employee depression*(20,27-29)*. Job burnout is a psychological response to chronic work stress, characterized by emotional exhaustion, depersonalization, and a diminished sense of personal accomplishment*(30)*. Work stress is the primary cause of job burnout, and there is a significant positive correlation between the two*(31-37)*.Job burnout is also a positive predictor of depression, the higher the level of burnout,

the greater the likelihood of developing depression*(20,38,39)*. The Stress-Stressor-Health Outcome Model*(40)* also emphasizes that various workplace stressors are key triggers of employees' psychological stress responses. If these psychological stress responses are not alleviated over time, they will further impact the individual's health, including mental health (e.g. depression), physical health (e.g. cardiovascular diseases) and behavioral performance (e.g. reduced work efficiency and increased turnover intentions). This model suggests that stress and health outcomes are not directly related, but rather mediated by psychological stress response. Therefore, based on this theory and related studies, this research proposes Hypothesis 1: The direct effect of work stress on depression may be relatively weak, but the influence of work stress on depression will be amplified through the mediating effect of job burnout, as shown in Figure 1.

1.3 The Mediating Role of Psychological Capital

Psychological capital refers to the positive psychological states exhibited by individuals during development, and the positive influence of these states have on individual behavior. It is a psychological resource that can be developed and enhanced, encompassing four dimensions: self-efficacy, hope, optimism and resilience*(41)*. The studies have demonstrated a significant negative correlation between psychological capital and job stress*(42-44)*, and it can significantly predict lower individual depression levels*(10,43,45-47)*. Work stress increases the occurrence of negative emotions by depleting psychological capital. As a protective factor for mental health, psychological capital mitigates the risk of depression by counteracting the negative emotions induced by work stress*(48)*. Therefore, psychological capital serves as a mediator in the relationship between job stress on depression.

However, unless severe negative events serve as stressors, the negative emotions exacerbated by the decline in psychological capital due to daily work stress do not necessarily lead to depression. Negative emotions only trigger depression after accumulating to a certain level, leading to psychological exhaustion (a quantitative to qualitative change, *42*). The studies have highlighted that job burnout is a precursor to depression*(49)*. The Conservation of Resources (COR) theory posits that psychological capital, as a psychological resource, can help individual cope with stress, achieve goals, or protect themselves from threats. High job stress depletes psychological capital, and the ongoing depletion of psychological capital is a key driver of job burnout. After resource exhaustion, individuals will lack coping abilities, feel out of control and helpless, leading to job burnout, which is an important cause of depression, ultimately increasing the risk of depression*(50)*. Therefore, psychological capital is more likely to mediate the relationship between work stress and job burnout, rather than between work stress and depression. Based on the above discussion, we propose Hypothesis 2: Psychological capital is an antecedent variable of job burnout, and both psychological capital and job burnout jointly mediate the effect of work stress on employee depression, as illustrated in Figure 1.

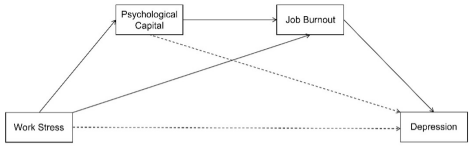


Figure 1: Hypothetical Model of Variable Relationships

To test the above hypotheses, this study utilized the Work Stress Questionnaire, the Patient Health Questionnaire-9 (PHQ-9), the Psychological Capital Questionnaire, and the Job Burnout Questionnaire to collect and analyze data from 1,312 employees across government agencies, enterprises, and public institutions in Tianjin. If the above assumption holds true, companies can focus their mental health services on enhancing employees' psychological capital and alleviating work burnout, thereby minimizing the negative impact of work stress on employee depression.

2 Methods

2.1 Participants

This study collected data online from employees of enterprises and institutions in Tianjin using the Questionnaire Star platform (https://www.wjx.cn/), resulting in a total of 1,312 questionnaires. After removing invalid questionnaires based on lie detection questions (for example, "please choose 'basically in line' for this question"), 1026 valid questionnaires were retained, yielding an effective recovery rate of 78.20%. The participants' ages ranged from 18 to 62 years, with a mean age of 37.29 ± 8.43 and 35.10% were men. Additional demographic information is provided in Table 1.

2.2 Tools

2.2.1 Work Stress Questionnaire

This study employed a questionnaire consisting of a three-item scale developed by Motowidlo, Packard, and Manning*(51)*"given":"John S."},{"family":"Manning","given":"Michael R."}],"issued":{"date-parts":[["1986"]]}}],"schema":"https://github.com/citation-style-language/schema/raw/master/csl-citation.json"} to assess participants' work stress. This questionnaire has been widely used to assess employee work stress, owing to its strong reliability and validity. The questionnaire employs a 5-point Likert scale, where "1" indicates strong disagreement and "5" indicates strong agreement, with higher scores reflecting greater agreement. In this study, the Cronbach's alpha coefficient for the questionnaire was 0.86; the structural validity measures were: X^2/df=6.69, RMSEA=0.07, SRMR=0.08, CFI=1.00, TLI=0.99, with standardized factor loadings ranging from 0.68 to 0.930, indicating good reliability and validity.

2.2.2 Patient Health Questionnaire-9 (PHQ-9)

This study employed the PHQ-9 to assess the depressive symptoms in the participants. The scale is derived from the depression module of the Patient Health Questionnaire (PHQ) developed by Spitzer et al. in 1999*(52)* and is now widely used in clinical depression screening. The scale consists of 9 items that assess the participant's depressive mood over the past 2 weeks, using a 4-point scoring system ranging from 0 "not at all" to 3 "nearly every day". Higher scores indicate a greater severity of depression, where 0-4 indicates no depression, 5-9 indicates mild depression, 10-14 indicates moderate depression, and 15 or higher indicates severe depression. In this study, the scale's alpha coefficient was 0.90; the structural validity measures were: X^2/df=15.99, RMSEA=0.12, SRMR=0.05, CFI=0.92, TLI=0.89, with standardized factor loadings ranging from 0.53 to 0.84.

2.2.3 Psychological Capital Questionnaire

This study used the Positive Psychological Capital Questionnaire developed by Zhang et al *(53)* to assess the positive psychological states of employees in enterprise and institution during their growth and development. The scale comprises four dimensions: optimism, hope, self-efficacy, and resilience, with a total of 26 items, including reverse scoring for items 8, 10, 12, 14, and 25. The questionnaire employs a seven-point Likert scale, ranging from 1 "completely disagree" to 7 "completely agree". Higher scores indicate a greater positive orientation of psychological capital. After testing, the Cronbach's alpha coefficient for the questionnaire in this study was 0.95, and the structural validity measures were X^2/df=11.46, RMSEA=0.10,

Table 1 Basic Information of Survey Participants

Distribution Characteristics	Number	Percentage	Distribution Characteristics	Number	Percentage
Educational Level			Position Category		
Middle school or below	111	10.82%	Enterprise Staff	543	52.92%
High or vocational school	145	14.13%	Enterprise Management	205	19.98%
College or Bachelor	691	67.35%	Government Agency	278	27.10%
Postgraduate	79	7.70%			

SRMR=0.08, CFI=0.84, TLI=0.82, with standardized factor loadings ranging from 0.32 to 0.91. Items 2, 8, 10, 14, and 25 had standardized loadings below 0.5. Considering the homogeneity of these items' descriptions with others, their deletion resulted in the following structural validity measures: X^2/df=9.06, RMSEA=0.09, SRMR=0.05, CFI=0.91, TLI=0.90, indicating good reliability and validity. Therefore, these five items were excluded from the subsequent statistical analysis of psychological capital.

2.2.4 Job Burnout Questionnaire

The Job Burnout Questionnaire developed by Li *(54)* has been widely used in various professional fields, including teaching, law enforcement, business management, and corporate settings, to assess the behavioral and emotional exhaustion experienced by employees under prolonged stress. The questionnaire comprises three dimensions: exhaustion, depersonalization, and reduced personal accomplishment, consisting of 15 items scored on a 7-point scale, ranging from 1 "completely disagree" to 7 "completely agree," with reverse scoring applied to items 3, 6, 9, 12, and 15. A higher total score indicates a greater degree of job burnout. In this study, the Cronbach's alpha coefficient for the questionnaire was 0.86, and the structural validity measures were X^2/df=6.38, RMSEA=0.07, SRMR=0.06, CFI=0.92, TLI=0.90, with standardized factor loadings ranging from 0.38 to 0.88. After removing all items with standardized loadings below 0.5—namely, items 3 and 6—the structural validity measures of the questionnaire were X^2/df=6.03, RMSEA=0.07, SRMR=0.05, CFI=0.94, TLI=0.93. The revised questionnaire was used to assess the job burnout levels among employees.

2.3 Data Analysis

Firstly, analyze the current status of depression among employees in enterprises and institutions, and use SPSS27.0 to examine the differences in depression scores across various employee groups, such as gender, educational level, and job position category, with p<0.05 considered significant.

Secondly, to examine the significant impact of work stress on employee depression in enterprises and institutions, this study ranked the work stress scores of participants and selected the top 27% and bottom 27% as the high and low work stress group, respectively. Conduct independent sample t-tests on these two groups, with p<0.05 considered significant.

Thirdly, a structural equation analysis of work stress, psychological capital, job burnout, and depression was performed using Mplus (v8.3). The Bootstrap method was used to assess the mediating effects (n=5000, 95%CI). Specifically: (1) test the measurement model; (2) compute descriptive statistics and perform correlation analysis of these four variables; (3) establish and evaluate the structural equation of these variables, incorporating control variables (e.g., age, gender, position category, educational level) into the model. Specifically, work stress is treated as the independent variable, depression as the dependent variable, psychological capital and job burnout as mediators, and control variables as covariates for chain mediation testing. When the confidence interval does not include 0, it indicates that the mediating effect is significant*(55)*.

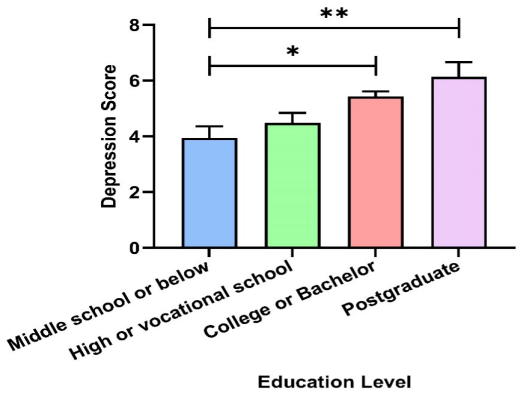
3 Results

3.1 Group Differences in Employee Depression

In this study, 52.2% of employees in enterprises and institutions showed no depression, 34.0% had mild depression, 9.0% had moderate depression, and 4.6% had severe depression. A score of 10 on the PHQ-9 is the cut-off point*(56)*, and the prevalence of moderate to severe depression among employees is 13.6%.

An independent samples t-test was conducted to compare the gender differences in depression scores among employees. The results indicated no significant difference in depression scores between males and females. A one-way ANOVA was performed to analyze the depression scores of employees with different educational backgrounds. The results showed that educational level significantly affected the depression scores of employees ($F_{(3,1022)}$=5.37, p=0.001, partial n^2=0.02), with a general trend indicating the higher educational levels were associated with higher depression levels. Postgraduate and undergraduate (or college)

depression scores were significantly higher than those of junior high school students (or below), as shown in Figure 2.



Education Levels (Note: * represent p<0.05, ** represent p<0.01, *** represent p<0.001, same below)

A variance analysis was conducted on the depression scores of employees in different positions, and the results revealed significant differences in depression scores among employees in these positions (Welch $F_{(2, 516.22)}$=11.67, p<0.001, partial n^2=0.02). Specifically, the depression levels of government agency are significantly higher than those of enterprise staff, and the depression levels of enterprise staff are significantly higher than those of enterprise management (p<0.05), as shown in Figure 3.

3.2 The Impact of Work Stress on Depression Among Employees

An independent samples t-test was performed on the high and low work stress groups, revealing that the depression scores of the high work stress group (7.83±5.42) were significantly higher than those of the low work stress group (2.52±3.03) $t_{(432.79)}$=14.23, p<0.001, Cohen d=1.21. This suggests that employees' work stress influences their depressive symptoms.

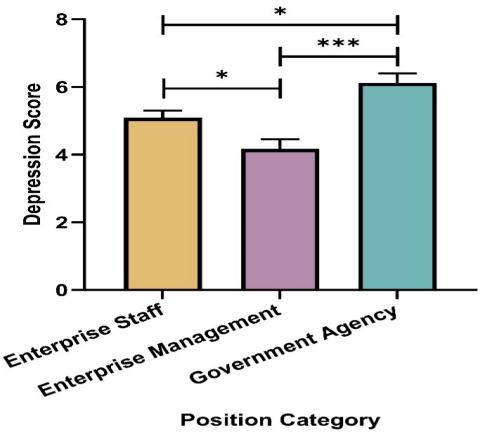


Figure 3. Employees Depression in Different Positions

3.3 The Chain Mediation Effect of Psychological Capital and Job Burnout

3.3.1 Test the Measurement Model

To evaluate the validity of the measurement model proposed in this study, we performed a series of confirmatory factor analyses on all items, specifically work stress (3 items), psychological capital (21 items), job burnout (13 items), and depression (9 items). As shown in Table 2, the fit indices for our hypothesized four-factor model are: X^2/df=8.41, RMSEA=0.09, SRMR=0.06, CFI=0.92, and TLI=0.90. This model demonstrated a better fit compared to the best competing model (a three-factor model that combines work stress and job burnout: X^2/df=13.42, RMSEA=0.11, SRMR=0.10, CFI=0.85, TLI=0.83). Additionally, among all models, the single-factor model exhibited the poorest fit (see Table 2). The Harman single-factor test further indicated that there were 8 factors with eigenvalue greater than 1,with the first factor explaining 34.34% of the variance, which is below the critical threshold of 40% *(57)*. these findings suggest that common method bias is not present in the multivariate data of this study.

N = 1026. CFI, Comparative Fit Index; TLI, Tucker-Lewis Index; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Mean Square Residual.

3.3.2 Description of Statistics and Correlation Analysis

The means, standard deviations, and correlations of all variables are presented in Table 3. Work stress, depression, and job burnout exhibited significant positively correlations (r=0.49~0.65, p<0.001), whereas psychological capital showed significant negative correlations with work stress, depression, and job burnout (r=-0.62~-0.29, p<0.001). Age was significantly positively associated with work stress (r=0.13, p<0.001) and psychological capital (r=0.14, p<0.001), while it was negatively associated with depression (r=-0.09, p<0.01) and job burnout (r=-0.08, p<0.05).

3.3.3 Chain Mediation Analysis

First, the effects of age, gender, educational level and job position category on psychological capital, job burnout and depression were examined. According to the above analysis, age is associated with depression, psychological capital and job burnout, while job position category and educational level influence employees' depression scores.

Table 2 Measurement Model Test

Measurement Models	X^2	p	df	ΔX^2	CFI	TLI	RMSEA	SRMR
Assumed four-factor model	1227.34	<0.001	146	——	0.92	0.90	0.09	0.06
Competing Models								
Three-Factor Model Combining Work Stress and Depression	2564.96	<0.001	149	1337.62	0.81	0.78	0.13	0.08
Three-Factor Model Combining Work Stress and Job Burnout	1999.69	<0.001	149	772.35	0.85	0.83	0.11	0.10
Three-Factor Model Combining Job Burnout and Depression	1781.03	<0.001	149	553.69	0.87	0.85	0.10	0.08
wo-Factor Model Combining Work Stress, Job Burnout, and Depression	2880.01	<0.001	151	1654.67	0.79	0.76	0.13	0.09
Single-Factor Model of All Latent Variable Combinations	5042.34	<0.001	152	3815.00	0.61	0.57	0.18	0.11

Table 3 Description Statistics and Correlation Analysis Results for All Variables

Variable	M	SD	1	2	3	4
1.Work Stress	8.11	2.70	1			
2.Depression	5.19	4.74	0.49***	1		
3.Psychological Capital	105.73	18.75	-0.29***	-0.46***	1	
4.Job Burnout	35.39	12.01	0.56***	0.65***	-0.62***	1
5.Age	37.29	8.43	0.13***	-0.09**	0.14***	-0.08*

Note: *** represents p < 0.001, ** represents p < 0.01, * represents p < 0.05.

Further analysis of the effects of gender, job position category and educational level on psychological capital and job burnout revealed: (1) there is a significant gender difference in psychological capital (male: 108.33 ± 18.34, female: 104.33 ± 18.83, $t_{(1024)}$ =3.28, p=0.001, Cohen d=0.22); (2) all other tests yielded non-significant results. The above control variables with significant differences were incorporated into the structural equation model, with work stress as the independent variable, depression as the dependent variable, psychological capital and job burnout as mediating variables, age, job position category and educational level as control variables for depression, age and gender as control variables for psychological capital, age as a control variable for job burnout. The results show that the model fit indices were: X^2/df=6.50, RMSEA=0.07, SRMR=0.06, CFI=0.90, TLI=0.89, as illustrated in Figure 4 (for simplify, control variables were omitted). Specifically, (1) the direct effect of work stress on depression was not significant; (2) psychological capital did not mediate the relationship between work stress and depression; (3) job burnout mediated the effect of work stress on depression (Effect=0.31, 95%CI= [0.24,0.39]); (4) psychological capital and job burnout exhibited a serial mediating effect on the relationship between work stress and depression (Effect=0.08, 95%CI= [0.05,0.13]).

4 Discussion

4.1 Current Status of Employee Depression

According to the survey, 52.2% of employees exhibit no depression, 34.0% experience mild depression, 9.0% have moderate depression, and 4.6% suffer from severe depression. Based on the critical value classification standard proposed by Wang et al.*(56)*, a PHQ-9 score of 10 was used as the threshold, with 13.6% of employees scoring above this cutoff, indicating a need for special attention.

The job position category and educational level both have significant effects on employees' depression scores. Specifically, employees working in government agencies have significantly higher depression scores than enterprise staffs, who, in turn, have significantly higher depression scores than enterprise managers. The findings of this study are largely consistent with the results of *the Report On National Mental Health Development In China*(2021-2022)*(49)*. Although the report didn't assess the depression levels of government agencies, it found that managers had the lowest depression scores, whereas service industry workers, self-employed individuals, and company staff exhibited moderate depression scores. However, in contrast to the findings of Madigan and Daly*(58)*, this study did not observe a decrease in depression levels with increasing educational level. Instead, the trend was reversed: Higher education levels were associated with higher depression score. Employees with graduate or undergraduate (or college) degrees had significantly higher depression scores than those with junior high school (or lower) de-

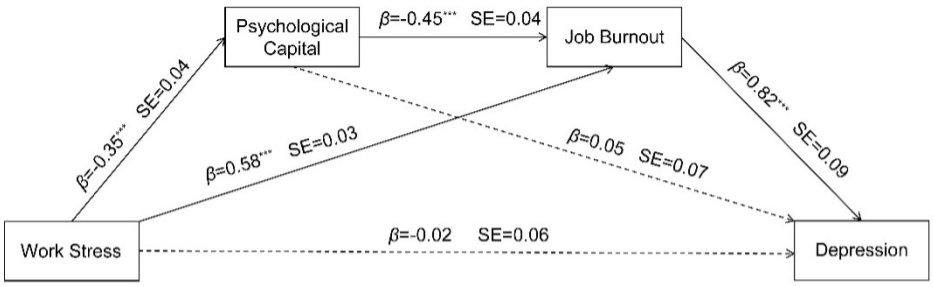


Figure 4 The Chain Mediation Effect of Psychological Capital and Job Burnout in the Relationship Between Work Stress and Depression

grees. The discrepancy in results may be attributed to the uneven distribution of data across different educational categories. For example, individuals with undergraduate (or college) degrees accounted for 67.3% of the sample, whereas those with graduate degrees comprised only 7.7%, which may have influenced the findings of this study.

4.2 Work Stress and Depression

This study ranked employees' work stress scores and categorized the top 27% and bottom 27% of participants as the high and low work stress groups, respectively. An analysis of the differences in depression scores between the two groups revealed that employees in the high work stress group had significantly higher depression scores than those in the low work stress group. This finding aligns with previous research, indicating that work stress is a significant determinant of employee depression*(56,59)*, supporting both the Effort-Reward Imbalance Model and the Demand-Control Model. However, when the work stress score was treated as a continuous variable in the mediation model, the direct effect of work stress on depression was not significant. The statistical results derived from group categorization may amplify the impact of extreme scores while overlooking intermediate scores, thereby increasing the likelihood of obtaining significant results due to exaggerated group differences. In contrast, modeling work stress scores as a continuous variable provides a more precise estimation of the relationship between work stress and depression. Combined with the subsequent analysis, these findings suggests that the effect of work stress on employee depression is mediated, indicating that the impact of work stress on depression is primarily exerted through indirect pathways.

4.3 The Intrinsic Mechanism of Work Stress Affecting Depression

Job burnout serves as a significant mediator in the relationship between work stress and depression, supporting Hypothesis 1. This is aligns with previous research, which identifies job burnout as a crucial pathway through which work stress impacts mental health*(20)*. Prolonged work stress may result in job burnout, manifesting as emotional exhaustion, depersonalization and reduced personal accomplishment, along with symptoms such as fatigue, diminished job satisfaction, self-doubt, and physical discomfort, ultimately heightening the risk of depression. The findings further support the stress-stressor-health outcome model, suggesting that work stress does not directly impact employee depression but instead affects depression levels by eliciting a psychological stress response (i.e., job burnout).

Moreover, work stress can influence employee depression by depleting psychological capital which subsequently leads to job burnout. In other words, psychological capital and job burnout jointly mediate the relationship between work stress and employee depression in a sequential manner. Psychological capital significantly mediates the relationship between work stress and job burnout; however, its mediating role between work stress and depression is not significant, supporting Hypothesis 2. These findings are consistent with Avey et al. *(42)*, indicating that negative emotions contribute to depression only after accumulating to a critical level and leading to psychological exhaustion (quantitative to qualitative change). As outlined in the Conservation of Resources Theory, high work stress depletes psychological capital, and the continuous depletion of psychological capital serves as a key driver of job burnout*(60)causing mass turnover, especially of primary medical staff. Little attention has been paid to the different dimensions of job burnout (emotional exhaustion, personality disintegration, and reduced sense of achievement*. Once resources are exhausted, individuals suffer from emotional exhaustion, depersonalization, and reduced sense of personal accomplishment, along with impaired coping ability, a sense of loss of control, and helplessness, ultimately heightening the risk of depression. Therefore, to mitigate or prevent depression induced by work stress, enhancing employees' psychological capital or alleviating job burnout are both effective intervention strategies.

4.4 Ethical review

As social entities with both economic and ethical functions, companies bear social responsibilities such as production, livelihood, and education. The divergence between instrumental rationality and value rationality has led to differences in the

ethical practices of companies. For example, companies that operate primarily on instrumental rationality, without ethical guidelines, often increase work demands in pursuit of profit maximization. On the other hand, companies that emphasize value rationality and ethical principles tend to adopt a "people-oriented" ethical approach. It is evident that different companies exhibit varying value orientations in their ethical practices. Finding a balance between profit-seeking and ethical values is crucial for the harmonious development of both the company and its employees. This study reveals that personal psychological factors, such as psychological capital and work burnout, can mitigate the negative impact of work stress on employee depression. This may represent a potential balance point between profit and ethics for companies. Based on this finding, companies should proactively offer psychological health support to employees and implement more detailed intervention measures. During the implementation process, it is also essential to ensure the ethicality of psychological interventions. Specifically:

First, enterprises should prioritize employees with moderate to severe depression and implement targeted mental health screening and intervention programs. Psychological counseling, health lectures or supportive groups*(61)* can provide professional assistance to individuals at high-risk of depression and help reduce their depression levels. However, this does not mean that employees with less severe depression should be overlooked. When providing mental health services, companies should ensure that all employees have equal access to benefits. They should avoid labeling mental health services as being solely for specific groups, and instead offer preventive and supportive services to all employees.

Second, managing job burnout should be considered a key strategy for alleviating employee depression. Enterprises should implement effective measures to mitigate employee job burnout, such as optimizing management systems (e.g., Employee Assistance Programs, *62*), establishing appropriate work-rest mechanisms, enhancing employee autonomy, and fostering a sense of value and achievement in their workplace. And, enhancing the employees' psychological capital can serve as a protective mechanism against the impact of work stress on job burnout and depression. Enterprises can adopt psychological capital intervention strategies, such as hope training, optimism cultivation, self-confidence building, resilience development, to help employees strengthen their psychological resources. In work environments that cannot be easily modified, strengthening employees' resilience can fundamentally enhance their ability to cope with stress and reduce the risk of depression. It is important to note that these interventions must also adhere to ethical principles. For instance, mental health interventions should not be overly coercive. When intervening in employees' mental health, companies must respect employees' autonomy and right to choose. Employees must give informed consent and voluntarily participate, ensuring that no form of coercion is involved.

Finally, the mental health services provided by companies should be sustainable and yield long-term benefits. Companies should avoid focusing solely on short-term improvements while overlooking the long-term health management needs. To ensure the continued effectiveness of these interventions, companies should implement ongoing tracking and evaluation. Moreover, any personal or mental health data involved in the intervention process should be anonymized and kept confidential to prevent data breaches or misuse, thereby safeguarding employees from potential negative consequences.

5 Conclusion

This study found that: (1) 13.6% of employees suffer from moderate or severe depression, and highlighting the need for enterprises to pay special attention to this population; (2) Job burnout mediates the relationship between work stress and employee depression, thereby amplifying the impact of work stress on worker depression; (3) Psychological capital and job burnout jointly mediate the effect of work stress on employee depression in a sequential manner. Work stress affects employee depression by depleting psychological capital which in turn drives job burnout. Enhancing psychological capital can mitigate job burnout among employees and lower the risk of depression.

Data Sharing Statement

The data that support the findings of this study are available on request from the first author (E-mail: zqhouou@126.com). The data are not publicly available due to privacy or ethical restrictions.

Ethics Approval Statement

This study complies with the ethical principles outlined in the Declaration of Helsinki. This study was approved by the Ethics Research Committee of the Tianjin Normal University (No.2023112304). The cover page of the questionnaire explained the study's purpose and assured participants of their anonymity, confidentiality, and right to refuse participation.

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Author Contributions

QZ: Conceptualization, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. JL: Data curation, Investigation, Visualization, Writing – original draft. KT: Conceptualization, Methodology, Validation, Methodology, Writing – original draft, Writing – review & editing, Funding acquisition.

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