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# An investigation of psychological well-being among platform riders in mainland China

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## Abstract

**Objectives** This study examined the relationships between work stressors (i.e., precarious work conditions, customer incivility, fast work pace, and job insecurity) and their relations with job satisfaction and emotional exhaustion among platform drivers in mainland China. In addition, we tested whether psychological capital (PsyCap) moderated the hypothesized relationships.

**Methods** 2539 platform drivers (Men = 2244; Women = 295, Mean age = 28.18, SD = 6.38) in Mainland China were recruited.

**Results** Work stressors were positively related to emotional exhaustion but negatively associated with job satisfaction. Regarding the hypothesized moderating effect, PsyCap moderated the association between precarious work conditions and fast work pace in predicting job satisfaction. Furthermore, PsyCap also interacted with precarious work conditions, job insecurity, and customer incivility in predicting emotional exhaustion.

**Conclusion** The occupational well-being of platform drivers was significantly related to their working conditions. PsyCap is a salient factor that alleviates the negative work stressors that affect these outcomes.

**Learning outcomes**

After reading this manuscript, the learner will be better able to.

- Identify key work factors that are significantly related to platform drivers' well-being.
- Evaluate the moderating role of psychological capital (PsyCap).

**Keywords** Platform riders, Occupational well-being, Psychosocial work stressors

## Introduction

In recent years, there has been a surge of temporary and short-term employment that is compensated on a piece-rate basis, driven by the online platforms that match and mediate relationships between workers and consumers [1, 2]. This growth of platform or "gig work" is seen across the globe. For example, in the US, the number of individuals who have earned money from an online gig platform is estimated to be around 16% of their population [3]. In Mainland China, the number of platform jobs is also booming. Among the various types of platform work, delivery riders for food ordering services represent a significant portion of the workforce. In 2021,

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more than 13 million platform riders were employed for food delivery platforms in China [4]. The expansion of this workforce is driven by national policies promoting an innovation-based economy, alongside the COVID-19 pandemic, which significantly boosted the demand for food delivery. In 2024, the number of online food delivery users surpassed 540 million. Consequently, numerous platform riders were hired to meet this demand.

Platform riders are self-employed and do not fit into conventional employment relations. For example, they face continuous monitoring compared to traditional contractual workers, where performance reviews are usually periodic. Their efficiency of food delivery is tracked via apps, ensuring they meet strict performance criteria. Riders often have a higher sense of job uncertainty because their work assignments are algorithm-driven, where the logic is not transparent, resulting in the instability of their income and a low sense of job autonomy. Due to the nature of the work, they have to work alone and have limited breaks, leading to high fatigue and a lack of coworker support. Thus, while most traditional employees have a structured work environment with clear expectations and support, platform riders often navigate more unpredictable and challenging work conditions. This distinct difference highlights the unique pressures and demands placed on gig economy workers.

Studies have documented platform riders' challenges and occupational well-being. The majority of these studies investigate the work experience of these workers in Western cultures, including Australia [5, 6], the UK [7, 8], the US [9, 10], Finland [11], Italy [12]. Although the primary job tasks between platform riders in China and the West are similar (i.e., delivering food to customers), there are differences in the working conditions between the two cultures, which may limit the generalization of the results gathered in Western cultures. For example, in Western countries, platform companies have faced increased scrutiny in recent years, which has led to some improvements in the working conditions of their riders. For example, in the UK, the Independent Workers Unions of Great Britain have worked with platform drivers to bargain with major platform companies to improve the working conditions of their members. However, no platform worker union has been established to negotiate collectively with companies for better work conditions in mainland China [13]. Besides, platform companies are responsible for providing specific benefits and protections to their riders, such as minimum wage laws, sick leave, and workers' compensation in the West. In mainland China, platform riders are typically classified as independent contractors, so they usually do not have access to these benefits [14].

Recently, there has been a growing interest in the work experience of platform riders in Mainland China [4, 15–17]. These research studies focus primarily on driving behaviors, traffic accidents, and safety [18]. With only a few exceptions, the well-being of platform riders is not frequently reported, even though studies suggest that well-being is a crucial factor that influences the riders' driving safety behavior and driving efficacy [4]. In one study, the meaning of work and job autonomy was related to job satisfaction, while competence was associated with mental strain [19]. Their study provided important insights into the importance of personal factors in predicting mental strain and outcomes among platform riders. However, the scope of their investigation is limited as many work characteristics have not been incorporated. Besides, no boundary or moderating factor was included to evaluate whether extraneous factors may exacerbate or buffer the impact of the hypothesized associations.

To address the knowledge gap, we adopted the Conservation of Resource model [20] as the guiding framework to investigate the relationship between work stressors experienced by platform riders and their occupational well-being (i.e., emotional exhaustion and job satisfaction). Based on this theoretical model, work stressors will drain employees' resources, and the depletion will lead to poorer occupational outcomes. However, the availability of resources will offset the net loss of resources. Thus, the association between stressors and outcomes will be moderated by the availability of resources, with higher resources weakening the stressor to well-being associations. Considering the scope of potential stressors, we focused on platform drivers' stressors reported earlier, including precarious work conditions, job insecurity, fast work pace, and customer incivility [21]. Furthermore, we will explore whether psychological capital (PsyCap) moderates the relationship between work stressors and outcomes.

This study will provide theoretical and practical contributions to the platform rider literature. From the theoretical point of view, results will supplement the extant research by empirically testing the impact of work stressors and psychological resources associated with platform riders' occupational well-being. From a practical point of view, the number of platform riders is expected to grow due to the strong demand for food delivery services and the opening of new platforms in China. Thus, locating salient factors that affect the well-being of this growing work population would be essential to support individual platformer riders and platform companies' overall productivity.

## Precarious work conditions and occupational well-being

Precarious work conditions are characterized by instability, uncertainty, lack of protection, low compensation, irregular hours, and a lack of benefits [22]. Although they

have been proposed as stressors for gig workers [19] and platform riders [23], there is a lack of quantitative studies to empirically test their impact on employees' occupational well-being.

In line with earlier qualitative studies, we hypothesize that precarious work conditions would be negatively related to job satisfaction but positively related to emotional exhaustion. As suggested, platform drivers experience constant stress and uncertainty due to various factors. For example, platform companies do not open the assignment algorithm [24]. Therefore, riders may not know when they will receive their next job, and they would feel that they have little control over their work situation, which can lower their sense of job satisfaction, primarily when the platform work represents the primary finance source [4, 14, 16]. Drivers usually work alone and have limited opportunities to connect with other drivers or colleagues, causing feelings of loneliness and a lack of social support [25]. Finally, platform riders are often classified as independent contractors. Thus, they are not entitled to the same protections as conventional employees (e.g., health insurance or workers' compensation).

The precarious work conditions create uncertainty that may impair occupational well-being. Based on the above discussion, the following hypotheses were postulated:

**Hypothesis 1a** Precarious work conditions will be positively related to emotional exhaustion.

**Hypothesis 1b** Precarious work conditions will be negatively related to job satisfaction.

#### Fast work Pace and occupational well-being

The second work stressor is the fast work pace for platform food delivery. The fast work pace results from both individual motivation and organizational demands. At the personal level, platform riders are compensated by the actual delivery of the service (i.e., paid per delivery); with higher delivery efficiency, they will get more orders from the platform, resulting in higher income [26]. Thus, platform riders are strongly incentivized to deliver their food quickly. Besides, riders are also fined for each delayed order. And since delaying one order may cause delays to other subsequent orders, platform riders are constantly under pressure to deliver food promptly to meet these expectations and avoid the penalty.

At the organizational level, platform companies in mainland China operate in a highly competitive market where many food delivery companies are trying to secure their market share. These companies use delivery time as a key indicator to measure the effectiveness of their delivery process. They are expected to deliver food quickly and in good condition to ensure customer satisfaction, which is considered a top priority for the platforms [27].

Because of the limited time windows, platform riders may take risks by going against traffic laws and surpassing speed limits to ensure fast food delivery [28]. Recent research showed that platform riders who relied more heavily on their salary experienced more work injuries by accidents [29]. A fast work pace increases the risk and injury of platform riders and contributes to negative occupational well-being among platform riders. When riders constantly rush to meet delivery times, they may experience increased stress and fatigue, leading to job dissatisfaction and emotional exhaustion [30].

Based on the above discussion, the following hypotheses were formulated:

**Hypothesis 2a** A fast work pace will be positively related to emotional exhaustion.

**Hypothesis 2b** A fast work pace will be negatively related to job satisfaction.

### Job insecurity and occupational well-being

Job insecurity refers to employees' perception of the possibility of losing their jobs [31, 32]. Those worried about losing their job may experience cognitive or mental strain and perceived uncertainty about their future [33]. Meta-analyses show that job insecurity is closely related to physical symptoms and mental illness [34].

Platform riders perceive higher job insecurity than standard work arrangements because they are classified as independent contractors rather than organization-hired employees [35]. This lack of job security can create uncertainty and instability for platform riders, making it challenging to plan their finances and future employment [36]. Besides, platforms operate in a highly competitive market. The demand for their services can fluctuate rapidly. This can lead to periods of high or low demand, resulting in uncertainty of their income. Overall, the identity of independent contractors in a competitive market can create a sense of job insecurity for platform riders [16].

Job insecurity is hypothesized to be associated with job burnout and job dissatisfaction among platform riders [37]. Riders may worry about their job stability and income; they may be urged to work long hours and take on as many deliveries as possible to make ends meet [7]. This can lead to fatigue and exhaustion from overwork. The lack of a stable income can also contribute to financial stress and lead to burnout [36].

In sum, job insecurity can contribute to burnout among platform riders by increasing stress, anxiety, and financial insecurity and decreasing motivation and job satisfaction. Platform companies need to address these issues and provide support and benefits to their riders to ensure a positive work experience and prevent burnout.

**Hypothesis 3a** Job insecurity will be positively related to emotional exhaustion.

**Hypothesis 3b** Job insecurity will be negatively related to job satisfaction.

### Customer incivility and occupational well-being

The final stressor included in this study is customer incivility. Customer incivility refers to deviant behaviors perpetrated by someone in a customer or client role, with ambiguous intent to harm an employee, breaking social norms of mutual respect and courtesy [38, 39].

Customer incivility is common in the service industry [40, 41]. Research indicates that platform workers encounter impolite or abusive customer behavior during brief service interactions with their clients [42, 43]. Since platform riders usually work under a tight schedule, they have to deal with issues like traffic, weather, and other external factors (e.g., delayed food preparation from the restaurant). These factors may make them susceptible to customers' dissatisfaction or dismay, resulting in impolite behavior against the riders. Besides, platform riders may not have sufficient training to handle customers' complaints (e.g., conflict management to de-escalate emotionally charged interactions with customers).

Customer incivility can harm the mental health and well-being of platform riders. Firstly, dealing with uncivil customers can be emotionally exhausting. Riders may feel frustrated, angry, or anxious when encountering rude or abusive behavior. Platform riders may feel frustrated in the service interaction; however, they are expected to maintain a professional demeanor and provide quality customer service to avoid negative evaluations from the customer. Based on the conservation of resource model [20], the use of resources to regulate their mood can result in higher emotional exhaustion and lower job satisfaction. Besides, riders may feel they are not valued or respected by customers, which can decrease their job satisfaction and motivation to continue working for the platform. Finally, the company strategy of penalizing platform drivers' income when they receive bad reviews would inevitably contribute to burnout and job dissatisfaction.

Based on the above discussion, the following hypotheses were formulated:

**Hypothesis 4a** Customer incivility will be positively related to emotional exhaustion.

**Hypothesis 4b** Customer incivility will be negatively related to job satisfaction.

### Psychological capital as a moderator between work stressors and occupational well-being

Finally, we hypothesize that psychological capital (PsyCap) will moderate the associations between work stressors, emotional exhaustion, and job satisfaction. PsyCap refers to individuals' positive and developmental state with four personal qualities: hope, efficacy, resilience, and optimism [44]. It has been found to alleviate the impact of work stressors [45, 46]. For example, employees with higher PsyCap were found to have better psychological well-being when facing job insecurity [47]. Similarly, employees who have higher PsyCap also tend to report lower psychological distress when they are facing other work stressors, such as customer incivility [48, 49].

We hypothesize that platform drivers with higher PsyCap can cope more positively with work stressors than those with lower PsyCap, resulting in better occupational well-being. Perceiving precarious work conditions, for example, is thought to be positively related to emotional exhaustion. However, this association may be buffered by PsyCap: Platform drivers with higher PsyCap are expected to report less emotional exhaustion despite working in precarious conditions because they have a stronger belief in their ability to perform the job well (efficacy) and are more likely to rebound from adversity and crises (resilience). Similarly, when facing job insecurity, platform drivers with higher PsyCap should use more positive attributions than negative attributions (personal performance failure that endangers employment), which could help support their overall occupational well-being. Similarly, drivers with higher PsyCap have a high expectation of finding ways to maintain their employment (hope).

Based on the above discussions, the following hypotheses were postulated:

**Hypothesis 5a** PsyCap moderates the relationship between work stressors and emotional exhaustion. In particular, the association between work stressors and emotional exhaustion becomes weaker when PsyCap is high.

**Hypothesis 5b** PsyCap moderates the relationship between work stressors and job satisfaction. In particular, the association between work stressors and job dissatisfaction becomes weaker when PsyCap is high.

## Methods

During 2022–2023, research assistants were sent out to Shenzhen and Guangzhou, two of the southern metropolitan cities in mainland China, to recruit participants. They approached the target participants by inviting them individually (i.e., approach platform riders when they are waiting for their orders outside the restaurants

or between their breaks) or sending out invitation survey links through Sina-microblog, Baidu PostBar, and other major online social network platforms. If the platform drivers agreed to join the survey, they would be given the QR code for the study. Before responding to the survey, participants were asked to read the research objectives and to provide their consent. The survey took about 15–20 min to complete. Upon the completion of the survey, participants were given a code number that they used to claim their participation fees. A total of 2539 participants completed the survey. Among these participants 2244 (88%) were men and 295 (12%) were women. The average age of the participants was 28.18 (SD = 6.38).

### Measures

#### *Precarious work conditions*

An 8-item platform work stress scale was used to measure the platform rider's perception of precarious work conditions [50]. Sample items included "There is no fixed workplace, and the distribution environment is complicated and unfamiliar" and "The salary system is unreasonable, and the working income is unstable." The scale demonstrated excellent internal reliability and correlated with participants' engagement in health-compromising behaviors (e.g., alcohol and cigarette consumption) in another study [51]. In this study, participants rated these four dimensions on a 5-point scale, ranging from "strongly disagree" to "strongly agree." The alpha coefficient for this scale is 94.

#### *Job insecurity*

Job insecurity was measured by the five-item subscale of the Copenhagen psychosocial questionnaire [52]. Sample items included "Are you worried about being unemployed" and "Are you worried about it being difficult for you to find another job if you become unemployed". Participants rated these four dimensions on a 5-point scale, ranging from 1 "strongly disagree" to 5 "strongly agree." The alpha coefficient for this scale was 0.86.

#### *Customer incivility*

Customer incivility was measured by the 10-item scale proposed by Wilson and Holmvall [39]. Sample items included "grumbled to you about slow service during busy times" and "made inappropriate gestures to get your attention." Participants rated these four dimensions on a 5-point scale, ranging from 1 "strongly disagree" to 5 "strongly agree." The alpha coefficient for this scale was 0.96.

#### *Fast work pace*

Fast work pace was measured by the three-item subscale of the Copenhagen psychosocial questionnaire [52]. Sample items included "your job requires you to work fast" and "a high pace is necessary." Participants rated on a 5-point scale, ranging from 1 "strongly disagree" to 5 "strongly agree." The alpha coefficient for this scale was.73.

#### *Psychological capital*

PsyCap was measured by a CPC-12 scale designed by Lorenz, Beer, Putz, and Heinitz [53]. Sample items include "I can think of many ways to reach my current goals" and "The future holds a lot of good in store for me." Participants rated on a 5-point scale, ranging from 1 "strongly disagree" to 5 "strongly agree." The alpha coefficient for this scale was 0.96.

#### *Emotional exhaustion*

The Maslach Burnout Inventory (MBI) subscale measures emotional exhaustion [54]. The measure comprises five items. A sample item is "I feel emotionally drained from my work." Participants rated whether they experienced exhausted emotions on a 7-point scale ranging from 1 "never" to 7 "daily." Cronbach's alpha for the scale was 0.93.

#### *Job satisfaction*

A three-item job satisfaction scale was used to measure job satisfaction in this study [55]. A sample item is, "I find real enjoyment in my job." The participants were invited to respond using a seven-point scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"). The Cronbach's alpha for the scale was 0.94.

## Results

### Assessment of common method variance

Since this study relied on self-reported measures, in which all data were gathered from the same source (i.e., participants' self-report data), common method variance (CMV) might have inflated the observed associations [56]. A Harman's one-factor test with exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) was performed to provide an estimate of the magnitude of the CMV and rule out this potential concern.

In the exploratory factor analysis, Harman's one-factor test indicates problematic method variance when the first factor accounts for more than 50% of the total variance among all study variables. Our EFA results showed that there were six unrotated factors with an eigenvalue over 1, and the solution accounted for 74.60% of the variance. The first extracted factor only accounted for 25.62% of the variance.

Two CFA models were computed to evaluate the degree of CMV further. In the first model, all items were loaded onto one latent factor (testing Harman's one factor), and in the second model, items were loaded onto the respective factors (the measurement model). It is

expected that, compared to the one-factor model, the measurement model would have better model fit, as the results could not be solely attributed to the same-source measurement effect. As expected, the one-factor model fit was poor ($\chi^2 = 99503.12$, $df = 860$, $p > .01$). In the second model, a seven-factor CFA model (i.e., job insecurity, precarious work environment, fast work pace, customer incivility, psychological capital, job satisfaction, and emotional exhaustion) was tested. In this model, all the items were specified to load on the corresponding construct. The $\chi^2$ of the seven-factor model was 9172.38 ($df = 839$, $p > .01$). The chi-square difference test between the one-factor model and the measurement model was significant ($\chi^2 = 90330.74$, $df = 21$, $p < .01$). Based on the EFA and CFA analyses, the results could not be solely attributed to the CMV.

### Descriptive statistics

Correlation analyses were conducted to examine the interrelationships among work stressors, psychological capital, and the outcome variables (i.e., job satisfaction and emotional exhaustion). Precarious work conditions were significantly related to emotional exhaustion ($r = .66$, $p < .01$) and job satisfaction ($r = -.44$, $p < .01$). Work pace was significantly related to emotional exhaustion ($r = .17$, $p < .01$) and job satisfaction ($r = .04$, $p = .03$). Job insecurity was significantly related to emotional exhaustion ($r = -.11$, $p < .01$), but not to job satisfaction ($r = .01$, $p > .05$). Customer incivility was significantly related to emotional exhaustion ($r = .43$, $p < .01$) and job satisfaction ($r = -.23$, $p < .01$). Finally, PsyCap was significantly correlated with emotional exhaustion ($r = -.07$, $p < .01$) but not job satisfaction ($r = .05$, $p > .05$). Table 1 presents the detailed correlation analyses results.

### Moderated regression analysis

Moderated regression analyses were performed to examine the direct and interacting effects of work stressors and psychological capital on job satisfaction and emotional exhaustion. Demographic information (gender, age, and work level) was entered into Model 1 of each regression analysis. In Model 2, the main effects of work stressors (i.e., precarious work conditions, job insecurity, fast work pace, and customer incivility) and PsyCap were entered. In Model 3, all interaction terms (work stressors x PsyCap) were entered. All main effects of predictors and interaction terms were centered before entering the regression analyses [57]. Detailed results of the moderated regression analyses are presented in Table 2. If a statistically significant interaction effect is found, post-hoc simple slope analyses would be conducted to further reveal the associations.

Based on the regression analysis results (Model 2), demographic information and the main effect of major predictors explained 22% of the variance of job satisfaction ($F = 80.59$, $p < .01$). Work stressors and PsyCap were significant correlates in the regression model. In Model 3, all four interaction terms were entered. The overall model explained 23% of the variance of job satisfaction ($F = 57.72$, $p < .01$). In terms of the interaction effects, we found that the interactions between PsyCap and work pace ($b = 0.06$, $p < .01$) and PsyCap and precarious work conditions ($b = 0.06$, $p < .01$) were significant. Simple slope analyses were conducted, and Figs. 1 and 2 present these findings. Specifically, under fast work pace and precarious work conditions, participants with higher PsyCap reported better job satisfaction when compared to participants with lower PsyCap.

In predicting emotional exhaustion, demographic information, work stressors, and PsyCap accounted for 48% of the variance of emotional exhaustion ($F = 260.90$, $p < .01$). Among the work stressors, work pace, customer incivility, and precarious work conditions were significant predictors. PsyCap was negatively related to emotional exhaustion. In Model 3, all the interaction terms were entered, and the model explained 49% of the variance of emotional exhaustion. Three interaction terms were significant, including PsyCap x job insecurity ($b$ = -4.69, $p < .01$), PsyCap x customer incivility ($b = 3.12$, $p < .01$), and PsyCap x precarious work conditions ($b = 3.34$, $p < .01$). Simple slope analyses were performed. Across these interaction effects, when facing these work stressors, employees reported lower emotional exhaustion when they had higher PsyCap than participants who

**Table 1** Correlations and descriptive statistics of major variables

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1. Precarious work condition | (0.94) | | | | | | |
| 2. Job insecurity | −0.17** | (0.86) | | | | | |
| 3. Fast work pace | 0.14** | −0.11** | (0.96) | | | | |
| 4. Customer incivility | 0.40** | 0.02 | 0.10** | (0.73) | | | |
| 5. Psychological capital | 0.05** | 0.15** | −0.06** | 0.01 | (0.96) | | |
| 6. Job satisfaction | −0.44** | 0.01 | 0.04* | −0.23** | 0.04 | (0.93) | |
| 7. Emotional exhaustion | 0.66** | −0.11** | 0.17** | 0.43** | −0.07** | −0.40** | (0.94) |
| Mean | 23.95 | 12.95 | 11.38 | 22.39 | 53.25 | 9.86 | 20.05 |
| SD | 8.25 | 4.70 | 2.40 | 12.04 | 12.56 | 3.38 | 8.16 |

**Table 2** Moderated regression analysis

| | Job satisfaction | | | | Emotional exhaustion | | | |
|---|---|---|---|---|---|---|---|---|
| **Model 1** | | | $R^2$ | $F$ | | | $R^2$ | $F$ |
| | | | **0.01** | **3.00*** | | | **0.01** | **3.96**** |
| | ***B*** | ***t*** | | | ***B*** | ***t*** | | |
| Age | 0.06 | 2.96** | | | −0.07 | -3.28** | | |
| Gender (Male = 0; Female = 1) | 0.03 | 1.56 | | | −0.02 | −0.82 | | |
| Education | 0.00 | 0.04 | | | 0.04 | 1.91 | | |
| Working hours daily | 0.01 | 0.26 | | | 0.02 | 0.91 | | |
| **Model 2** | | | **0.22** | **80.59**** | | | **0.48** | **260.90**** |
| Age | 0.04 | 2.37* | | | −0.05 | -3.61* | | |
| Gender | 0.02 | 0.82 | | | 0.00 | −0.26 | | |
| Education | 0.01 | 0.57 | | | 0.00 | 0.03 | | |
| Working hours daily | −0.02 | −0.85 | | | 0.02 | 1.22 | | |
| Work pace | 0.10 | 5.72** | | | 0.07 | 4.58** | | |
| Job insecurity | −0.07 | -3.89** | | | 0.01 | 0.90 | | |
| Customer incivility | −0.06 | -3.21** | | | 0.19 | 12.02** | | |
| Precarious work condition | −0.45 | -22.79** | | | 0.58 | 36.02** | | |
| Psychological capital | 0.08 | 4.49** | | | −0.10 | -6.79** | | |
| **Model 3** | | | **0.23** | **57.72**** | | | **0.49** | **185.48**** |
| Age | 0.04 | 2.40* | | | −0.06 | -3.80** | | |
| Gender | 0.02 | 0.81 | | | 0.00 | −0.29 | | |
| Education | 0.01 | 0.53 | | | 0.00 | 0.12 | | |
| Working hours daily | −0.02 | −0.85 | | | 0.02 | 1.26 | | |
| Work pace | 0.10 | 5.38** | | | 0.07 | 4.78** | | |
| Job insecurity | −0.07 | -3.83** | | | 0.02 | 1.25 | | |
| Customer incivility | −0.06 | -3.01** | | | 0.19 | 11.64** | | |
| Precarious work condition | −0.45 | -23.00** | | | 0.58 | 36.02** | | |
| Psychological capital (PsyCap) | 0.08 | 4.24** | | | −0.12 | -7.70** | | |
| PsyCap x fast work pace | 0.06 | 3.18** | | | −0.01 | −0.83 | | |
| PsyCap x job insecurity | 0.00 | 0.19 | | | −0.07 | -4.69** | | |
| PsyCap x customer incivility | −0.04 | -1.89 | | | 0.05 | 3.12** | | |
| PsyCap x Precarious work condition | 0.06 | 2.83** | | | −0.05 | -3.34** | | |

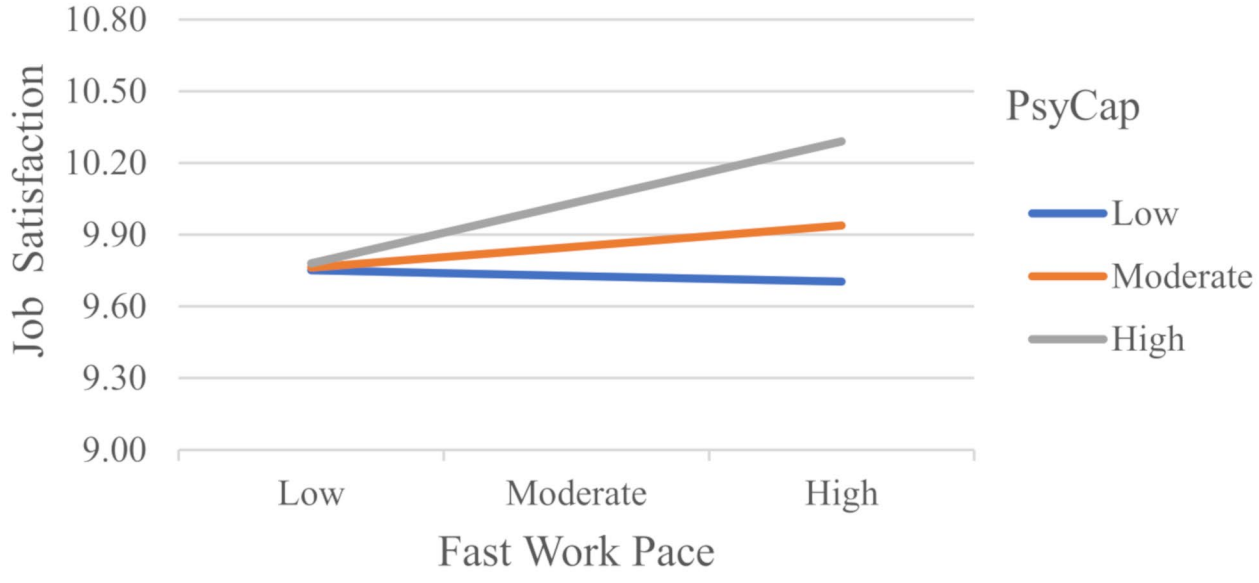


**Fig. 1** Interaction effect of Fast Work Pace and PsyCap in predicting Job Satisfaction

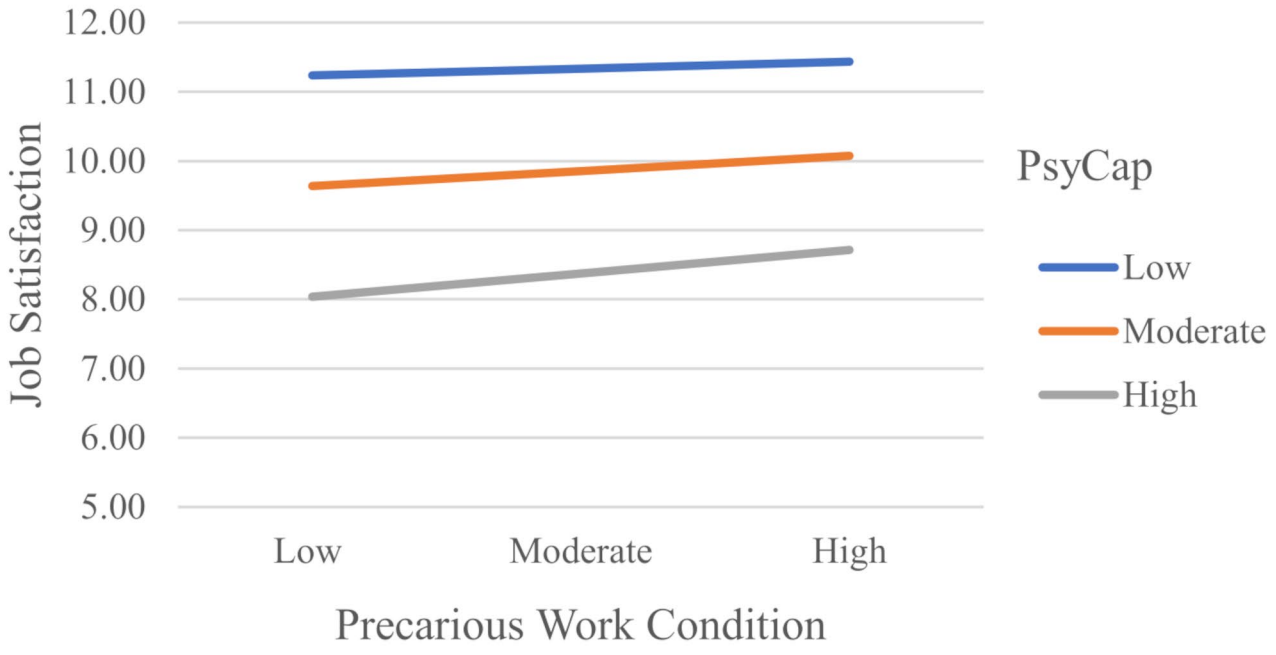


**Fig. 2** Interaction effect of Precarious Work Conditions and PsyCap in predicting Job Satisfaction

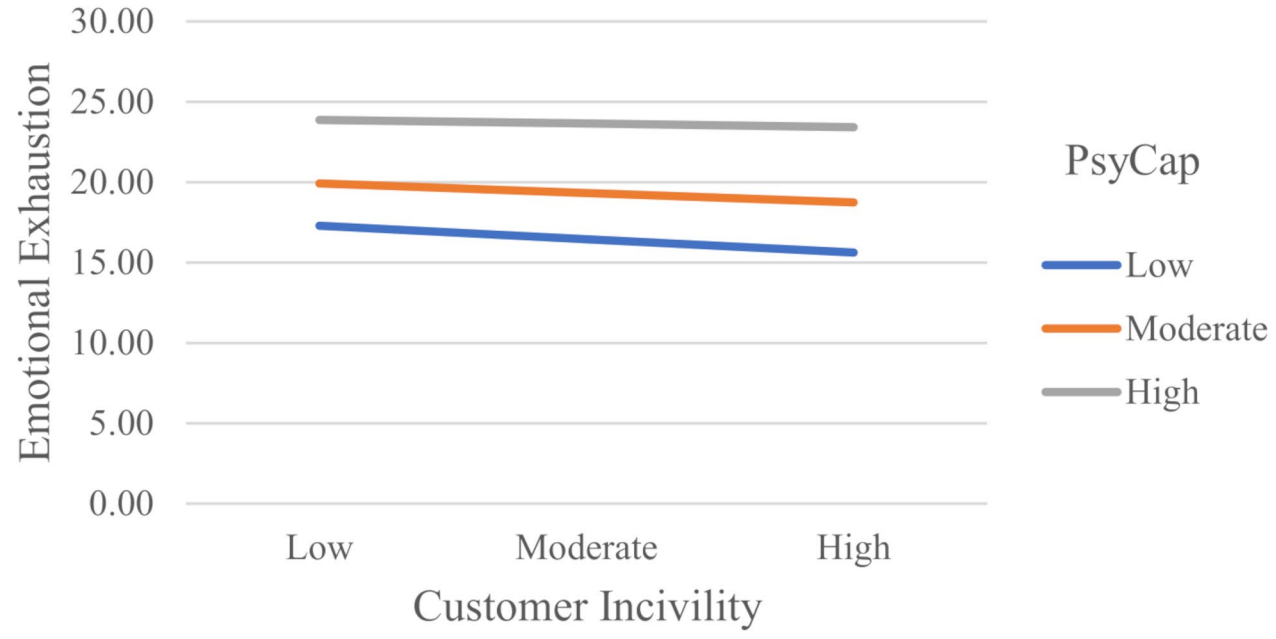


**Fig. 3** Interaction effect of Customer Incivility and PsyCap in predicting Emotional Exhaustion

had lower PsyCap. Figures 3, 4 and 5 present these associations graphically.

## Discussion

Previous research studies on Chinese platform riders often focus on their driving behaviors and safety risks. However, a paucity of studies examines factors that influence platform riders' well-being. To respond to the call for more research to understand the occupational well-being of platform workers [19, 58], this study documented the association between work stressors and occupational well-being among platform riders in China. We have also explored whether employees' psychological capital moderated stressors and well-being associations.

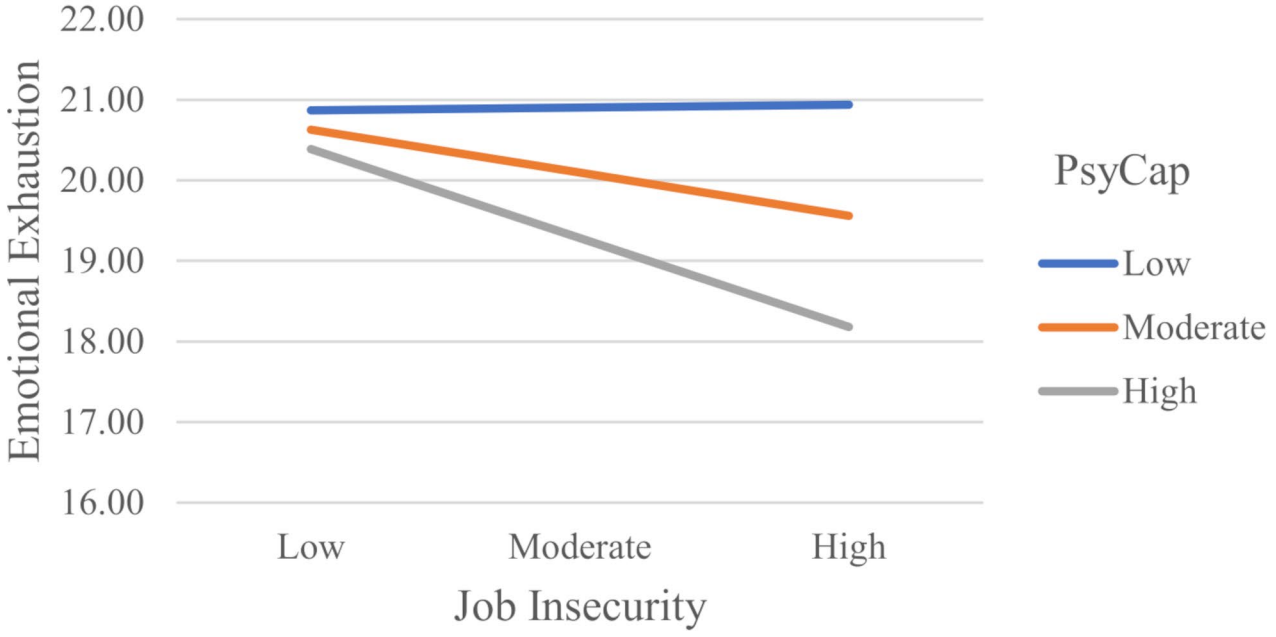


**Fig. 4** Interaction effect of Job Insecurity and PsyCap in predicting Emotional Exhaustion

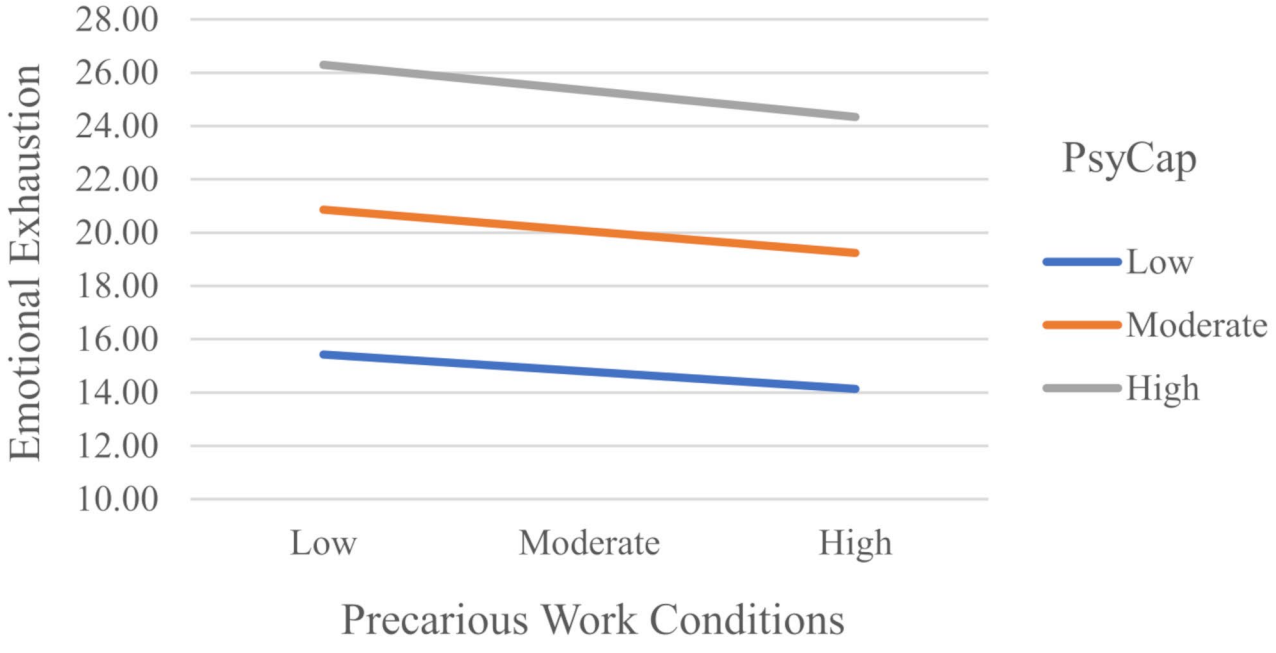


**Fig. 5** Interaction effect of Precarious Work Conditions and PsyCap in predicting Emotional Exhaustion

In general, we found that various work stressors were significantly related to job satisfaction and emotional exhaustion. Precarious work conditions encapsulate several features, including job insecurity, unpredictable work schedules, and lack of employment benefits, which collectively exacerbate stress levels among platform workers. While the association between precarious work conditions and well-being has often been discussed in qualitative studies [59–61], this study is among the first to test the association quantitatively among platform workers. The pressure of algorithmic work assignments and performance evaluations constantly makes workers feel monitored. Additionally, the lack of social support further diminishes job satisfaction, as platform workers often feel isolated and disconnected from their coworkers or their organization. Finally, the financial instability

inherent in the platform and other gig economy jobs forces workers to work long hours without adequate rest, contributing to physical and mental exhaustion.

Fast work pace and customer incivility also emerged as consistent predictors of job satisfaction and emotional exhaustion. In the fierce market competition, high delivery efficiency and customer satisfaction are vital for food platform companies to increase their market share [18]. The need to complete a high volume of deliveries within a limited time frame can pressure these riders immensely. This high work pace will result in constant work without breaks or recovery time [62], and the sense of little autonomy over their work pace will result in higher emotional exhaustion. Paradoxically, fast work pace was found to positively correlate with job satisfaction. It contradicts our original hypothesis. However, this surprising finding could be attributed to various reasons. For instance, a faster pace often means more deliveries per hour, allowing the rider to earn higher earnings. This financial incentive can boost job satisfaction. Additionally, completing more tasks in a shorter timeframe can give riders a sense of accomplishment and productivity, which positively impacts their overall job satisfaction.

Similarly, while existing research suggests that uncivilized customer behaviors can affect employees' occupational outcomes, there is a scarcity of empirical studies examining their impact on occupational well-being. In line with our hypothesis, platform drivers who indicated more customer incivility report lower job satisfaction and higher emotional exhaustion. This finding is generally in line with previous studies, which reveal the detrimental effect of customer incivility on front-line workers [63, 64]. In particular, when dealing with rude or disrespectful customers, riders must regulate their emotions (e.g., suppress their anger or fake emotions) to avoid emotional outbursts and escalate customer conflict. Such regulation will drain away significant emotional resources for riders and lead to poorer occupational well-being [65]. Thus, even though the interaction time with customers for each delivery is short, it is still a salient work stressor that hampers the negative well-being of the platform drivers.

Contrary to our hypothesis, there was no significant relationship between job insecurity and job satisfaction. At first glance, this finding is surprising since many previous studies have established a robust relationship between the two constructs [66]. However, this result may further reveal the difference between traditional and platform work. For example, when choosing to work in platform work, employees may enjoy features like job autonomy or control of when they wish to work. At the same time, they also understand the trade-off of this work arrangement, such as higher insecurity. Therefore, based on the self-selection process, platform drivers have different expectations of the job, and they understand that insecurity is embedded in platform work. This finding also highlights the need for further empirical research to elucidate the relationship between work stressors and outcomes among platform workers. This finding also corresponds to the recent call evaluation of the meaning of job and employment arrangement in the modern employment contexts, as the importance or the meaning of a sense of security may significantly differ across industries and their job incumbents [36].

Finally, our study underscores the role of PsyCap in moderating the relationship between work stressors and well-being. In general, platform riders with higher PsyCap are better equipped to handle stress. This finding aligns with the Conservation of Resources model [20], which posits that the magnitude of the relationship between stressors and strain also depends on available resources. Platform riders' stress, such as precarious work conditions and a fast work pace, will relate to the depletion of important resources, eventually associated with higher emotional exhaustion. However, the availability of PsyCap enables employees to offset net loss and maintain better occupational well-being under harsh working conditions. For example, our results showed that PsyCap positively moderates the relationship between a fast work pace and job satisfaction, as it enhances individuals' ability to cope with and thrive in demanding work environments. In a fast-paced work environment, resilience enables riders to handle stress and recover quickly from setbacks, while the optimistic propensity allows them to view a fast work pace as an opportunity for growth and success rather than a burden. These psychological qualities enable riders to view challenges more positively and feel confident in their abilities, leading to higher job satisfaction.

Interestingly, we also found a surprising finding where PsyCap indeed amplified the effect of customer incivility on emotional exhaustion. In particular, employees with higher PsyCap tend to report higher, but not lower, levels of emotional exhaustion when dealing with customer incivility. It is surprising because PsyCap is generally expected to serve as a buffer to work stressors, including customer incivility. We speculated that when employees are low in PsyCap, they will not attempt to remedy the work situation. Instead, they may avoid potential confrontations with these customers, and this passive coping could indeed help the riders to preserve their important psychological resources. However, possessing positive psychological qualities, such as optimism and hope, may lead riders to persist in trying to improve the situation or maintain a positive outlook, despite ongoing negative interactions in the context of customer incivility. This persistence can lead to emotional exhaustion as riders continually strive to invest their time and effort in coping with these customers. Further research is needed to

investigate this association and elucidate its underlying mechanism.

### Practical implications

Our study revealed that work stressors were significantly associated with job satisfaction and emotional exhaustion. Therefore, platform companies should address these issues by mitigating the adverse effects of precarious work conditions on their well-being. For example, riders are unaware of the task assignment algorithm, preventing them from understanding how many tasks they will receive and whether accepting or declining tasks will affect their future allocations. To reduce this uncertainty, platform companies could provide basic information about the assignment mechanisms and clarify how task acceptance or refusal rates might influence future job allocations. A more transparent work system could enhance riders' occupational well-being by giving them a greater sense of autonomy over their work.

Secondly, organizations should prioritize riders' well-being and safety over financial incentives. The competitive nature of platform providers in China, focusing on delivery efficiency and customer satisfaction, adds stress to riders who must comply with organizational requirements. Hence, organizations should consider offering employment benefits, such as fair wages, minimum working income, and maximum working hours / availability time, to protect the rights and well-being of platform riders.

Thirdly, platform companies can offer training and support to riders, teaching strategies for managing demanding customers. This training could include methods for handling conflict and tips for de-escalating emotionally charged situations. Additionally, platform companies and restaurants can educate customers on appropriate behavior when interacting with riders and establish policies for dealing with uncivil behavior.

Finally, Psychological Capital (PsyCap) played a crucial role in moderating the relationship between work stressors and outcomes. Although we found that employees with higher PsyCap tend to report higher emotional exhaustion when they were facing customer incivility, employees with higher PsyCap typically reported better occupational well-being when facing other work stressors. Therefore, supporting platform drivers' well-being could involve developing their PsyCap through structured intervention programs, such as online or virtual-based training. Prior studies have demonstrated the effectiveness of enhancing employees' PsyCap through training. Considering platform riders' varying schedules, self-paced PsyCap training could improve training effectiveness by accommodating their preferences.

### Limitations and future directions

This study has several limitations, and its results must be interpreted cautiously. First, this study uses a cross-sectional, self-administered online survey for data collection. This approach does not allow for the delineation of cause and effect between work stressors and outcomes. Moreover, common method variance may affect observed associations [56]. Since platform workers usually work independently, obtaining data from supervisors or co-workers is not feasible. Thus, future studies should get data from other sources (e.g., spouses or partners) for external validation, especially regarding job satisfaction and emotional exhaustion.

Second, this study recruited only platform riders; other platform workers were excluded. Platform work represents a wide array of job functions or duties in which it differs, along with the duration of service, actual work tasks, income per job, etc [67]. Therefore, even though some of the work stressors explored in this study, such as precarious work conditions, will be experienced by other forms of platform workers, findings may not be readily generalized in different work contexts. For example, online content creation providers may have greater autonomy in crafting their work schedules and controlling the work pace compared to platform riders. Thus, future studies are needed to understand how these stressors impact the well-being of other types of platform workers.

Third, we have only focused on four work stressors that may predict platform riders' emotional exhaustion and job satisfaction. However, other factors may significantly affect employees' well-being, such as the uncertainty due to algorithmic management [68]. More studies are thus warranted to investigate factors that might predict employees' well-being.

Finally, we measured the employees' overall perception of precarious work conditions and found supporting evidence of the importance of employees' perceived precarious work environment in predicting outcomes. Precarious work could be conceptualized in a multi-dimensional approach, including precarity of work, precarity at work, and precarity from work. Thus, researchers may look at different dimensions of precarious work conditions and delineate the relationship between various forms of precarious work and their relationship with health and job outcomes.

## Conclusion

Platform work offers flexibility and autonomy that traditional jobs often lack. However, this freedom comes with significant trade-offs, particularly concerning worker well-being. This study identifies precarious work conditions, job insecurity, rapid work pace, and customer incivility as primary stressors affecting job satisfaction and

emotional exhaustion among platform drivers in mainland China. This contradicting nature is best described by the concept of flexi-vulnerability recently proposed [69]. To some employees, especially those who perform platform delivery as a part-time job, the sense of job control and autonomy to craft their work schedule could support better well-being. However, many full-time platform riders do not have such privilege as their work is bound by organizational work expectations and their motivation to increase their income. Thus, instead of employees benefiting from the flexible work arrangements, some employees are entrapped with longer work hours and performing "de-flexible" and "sticky" job [16]. More research is needed to reveal the impact of this new work arrangement on platform workers' well-being.

#### Author contributions

FC performed data analysis and draft the manuscript, DW commented and revised the manuscript, ZYL and LC coordinated data collection, performed data cleaning.

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#### Data availability

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

## Declarations

#### Ethics approval and consent to participate

The Ethics Committee of Shenzhen University reviews the project. All the participants were asked to read the research objectives signed a consent form before participating in the study.

#### Consent for publication

The manuscript does not contain any identifiable information or images of participants.

#### Competing interests

The authors declare no competing interests.

#### EQUATER network reporting guideline

Not applicable.

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## Publisher's note