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What Factors Influence University Students' Well-Being and Satisfaction When Engaging in Gig or Platform-Based Work?

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Abstract: Despite rapid gig economy growth among university students, research on their well-being is limited. Using the JD-R model, this study examines how job demands (insecurity, income instability) and resources (social support) affect subjective well-being and job satisfaction in Chinese student gig workers, with work stress and engagement as mediators, and academic stress and algorithmic transparency as moderators. A cross-sectional survey of 155 Chinese student gig workers was analysed via SPSS and PROCESS. Results show insecurity negatively predicts well-being, income instability reduces satisfaction, and social support has the strongest positive effects. Work stress fully mediates the insecurity–well-being link, while engagement partially mediates social support effects. No moderation effects were found. Findings extend the JD-R model to this under-studied population, reveal distinct psychological pathways, and offer practical implications for platforms, universities, and policymakers. Limitations and future directions are discussed.

Keywords: Gig economy; University students; Job Demands–Resources model; Worker well being; Algorithmic transparency; Job satisfaction.

1. Introduction

Digital platform work has become a key driving force for innovation and employment growth [1]. Its growth is mainly due to the great increase in the demand for food and groceries distribution under the epidemic situation, and the commercial operation mode of the platform has also become the mainstream trend [2]. The platform economy in the EU has grown significantly from 2016 to 2020, and the total revenue has increased from about €3 billion to about €14 billion now. At present, there are about 500 digital labor platforms in operation in the EU, and the number of employees has increased from 28 million in 2022 to 43 million in 2025 [3]. China's gig economy is shifting from unregulated expansion toward comprehensive oversight. The sector employs 200 million workers, accounting for 27 % of China's total labour force [4].

Odd jobs are not a new phenomenon. Its history can be traced back to the forms of employment characterized by non-permanent arrangements, namely short-term contracts, freelancing and temporary work [5]. Traditionally, odd jobs are compared with permanent employment, and the outstanding thing is task-oriented, short-term and highly flexible work arrangements. With the development of digital technologies such as smart contracts and artificial intelligence, the nature of odd jobs has also changed. Digital platform (such as Uber, Meituan, and Upwork) not only connects suppliers and consumers, but also reshapes the core labor process, namely task assignment, performance supervision and payment [6].

The odd-job economy has many advantages, such as more flexibility in choosing working hours, tasks and places, lowering the threshold for entering the labor market and expanding the employment opportunities of traditional vulnerable groups [7]. However, these benefits are accompanied by great challenges, namely, insufficient social protection, algorithmic control and supervision, unstable income, unclear boundaries between work and personal life, etc., which will have adverse effects on workers' physical and mental health [8-11].

Although the research on odd jobs economy has expanded rapidly, there is still a huge gap. Previous studies have focused on employment problems such as employment instability, legal risks and platform management [12], yet relatively little attention has been paid to differences among worker groups or the well-being of university students. As a unique group, college students who participate in the odd-job economy should find a balance between the two, that is, the relationship between academic responsibility and platform-based employment. Although the scale of these students' participation in the odd-job economy is increasing, there is little research on their well-being

To address this gap, this study uses a questionnaire survey and applies the Job Demands-Resources (JD-R) model [13] to student gig work. The JD-R framework provides a mature perspective for studying the impact of job demands and resources on stress, engagement and welfare outcomes. This paper extends the model to students' odd jobs, trying to provide literature contributions for college students to achieve work-life balance in odd jobs economy, and then improve their happiness and satisfaction. Specifically, this study discusses the impact of job demand, resources, pressure, job involvement and algorithm transparency on the well-being and satisfaction of student odd jobs. The purpose of this study is to answer the following three research questions:

RQ1: How do job demands and resources affect the happiness and satisfaction of college students who take part-time jobs?

RQ2: How do job stress and job involvement affect the relationship between job characteristics and happiness?

RQ3: How does the transparency of algorithm results adjust the relationship between income instability and work pressure of students and odd jobs?

This study has contributed to the relevant literature both in

theory and practice. Theoretically speaking, this paper applies the (JD-R) model to a field that is less studied, that is, college students who take part in platform odd jobs. Although JD-R framework has been widely used in traditional organizational environment, there is little research on its applicability in students' odd jobs. After analyzing the comprehensive influence of job demand, job resources, job pressure, job input and the transparency of algorithm results, this paper provides a certain understanding of the psychological mechanism of students' odd job welfare and job satisfaction, enriches the literature on odd job economy and expands the empirical research scope of JD-R framework.

2. Literature Review and Research Questions

This chapter will make a comprehensive and critical review of the existing related literature and put forward the research content of this paper.

2.1. Key Concepts and Background

This chapter will make a comprehensive and critical review of relevant literature, and make a critical discussion on odd jobs economy, algorithm management and odd jobs welfare.

2.1.1. Gig economy and Precarious Employment

According to the above analysis, this paper uses the following operational definitions to represent the odd-job economy, that is, a non-standard form of employment, in which the digital platform is the core intermediary, and mobile applications are used to connect workers with customers and engage in short-term and task-based employment activities; Task assignment, performance evaluation and salary payment are mainly determined by algorithms; Workers are generally called independent contractors and have no stable social security and income security [14]. Temporary jobs are characterized by flexible schedules, project-based arrangements, and limited employer relationships [11]. Digital technology increases the dependence of organizations on flexible labor, and the platform provides people with new job opportunities in addition to traditional employment [15]. However, accessibility varies by platform and occupation; For example, Uber blacks require a large number of vehicles and qualification standards [16], indicating the gig economy is not uniformly low-barrier.

Existing research emphasizes that flexibility and labor market access are key advantages. The platform reduces the matching cost, realizes rapid task assignment, and also leaves room for employees to arrange time and place freely [17], thus attracting those who want to get extra income or non-traditional jobs [18]. But the distribution of autonomy is not equal, it is determined by skills, reputation, rating and bargaining power. So flexibility is limited, not absolute.

On the contrary, a large number of documents regard odd jobs as an unstable form of work. Bajwa et al. (2018) [19] pointed out the related occupational risks, employment instability, and platform-specific vulnerabilities, namely, industrial accidents, repeated strain, security threats, lack of insurance, training, career development opportunities, and collective bargaining rights. Platform risks come from classification, information asymmetry, algorithm allocation, supervision and rating system, which limit the control of staff on pricing, workload and evaluation. Low rating or violation will reduce the access to tasks or stop accounts. These factors will contribute to social isolation, fragmented identity and psychological stress [19].

Similarly, Nilsen et al. (2021) [20] argue that platform work disperses responsibility among workers, platforms, and clients, complicating accountability. When workers are classified as independent contractors, the platform will pass on the risks of safety, income and protection to individuals. Real-time distribution, ranking and piece-rate wages will increase work pressure. Lack of stable organizational relationship will weaken safety practice, peer support and collective representation. Therefore, uncertainty is not only unstable contracts, but also reduced support from institutions and organizations.

A core debate is whether odd jobs really give employees real autonomy, or whether direct supervision is replaced by more subtle control. Wood et al. (2018) [6] believe that although employees reserve the right to make formal decisions on tasks and time, it is determined by reputation, demand and income dependence. Duggan et al. (2019) [9] think that algorithmic management is to coordinate the labor force by means of rating, ranking and automatic allocation, thus affecting the access, income and visibility of tasks. So flexibility coexists with strong economic and algorithmic constraints.

2.1.2. Gig Work and Worker Well-being

Odd jobs can produce positive or negative results. On the positive side, the platform leaves employees more discretion in working time, place and workload, so that employees can connect paid work with family, education and other commitments-especially attractive to those who have non-traditional career paths [12]. Various platforms are conducive to reducing barriers in the labor market and providing income sources for people who encounter difficulties in traditional employment. The odd-job economy can improve skills, accumulate experience and improve employment competitiveness at some time [21].

However, this flexibility is often accompanied by a great sense of employment insecurity, that is, unstable income, limited social security and uncertain status, which leads to psychological pressure and job insecurity [17].

Algorithm management will aggravate these pressures. Although the algorithm improves the efficiency of task arrangement, supervision and payment, it will reduce workers' control of important work. Employees are evaluated by rating, ranking and automation indicators, but they lack an understanding of how these systems operate and how decisions are made. Continuous monitoring, asymmetric information and uncertain task access will all increase the perceived pressure and platform dependence [22].

Therefore, the existing evidence shows that odd jobs are related to the complex combination of flexibility, opportunity and psychological risk. However, most previous studies only paid attention to organizational achievements, such as productivity, service quality and platform efficiency, but paid little attention to individual achievements, such as subjective well-being, work stress, emotional exhaustion and job satisfaction [23].

2.1.3. Algorithmic Management and Welfare Outcomes

Algorithm management refers to entrusting part or all of management functions to algorithm system. In the platform operation, the algorithm gradually assumes the responsibilities of task assignment, performance supervision, evaluation, ranking, incentive distribution and sometimes even dispute resolution, which were previously performed by

human managers [24]. Therefore, algorithm management is not only a technical infrastructure, but also a mechanism of organizational control.

The algorithm-driven system has operational advantages, which can handle a large amount of data, assign tasks quickly, use standardized evaluation criteria among many workers, improve the efficiency of matching, and provide users with immediate feedback [25]. However, these practices have also aroused people's concerns about autonomy, fairness and information asymmetry [26]. Workers may be constantly monitored by indicators such as working hours, grading and acceptance rate, but their ability to understand, question or appeal to automated decision-making is weak.

A major problem is the transparency of the algorithm, which involves workers' understanding of information, procedures and deduction behind decision-making. Research will distinguish process transparency (how the algorithm works, including data and rules) from result transparency (why certain tasks, ratings or income results occur) [27].

These dimensions are not interchangeable. Process transparency can clarify the technical logic, and as a result, transparency explains the decisions that directly affect employees, especially those related to rating, task assignment and income. Greater transparency can improve the predictability of decision-making and reduce uncertainty [12].

However, the impact of transparency is unlikely to be equal and positive. Li et al. (2025) [12] It is found that different transparency forms will have different reactions to algorithm evaluation. Understanding the purpose or result of algorithmic decision-making will enable employees to constructively explain performance feedback. On the contrary, the detailed information about the algorithm sometimes makes the information overload, exposes the problematic decision-making rules, or increases the concern about fairness [28].

2.2. Research Gap

Therefore, this paper extends JD-R model to China college students who have not been fully studied in gig economy, and takes algorithm transparency as an important regulating variable to test the mediating effect of work pressure and work engagement, so as to provide a more comprehensive understanding of the influence of work demand and work resources on the well-being and satisfaction of students' gig workers and make up for these shortcomings.

2.3. Theoretical Framework

This section draws lessons from JD-R model. This study takes college students as the research object, including the specific regulating variables of demography that have not been discussed before in the study of odd jobs economy, and taking work pressure and work engagement as intermediary variables, filling the gap in the research of the influence of algorithms on individual psychology. Academic pressure, algorithm transparency, and the ability to integrate academic and work responsibilities. This study examines both negative (demand side) and positive (resource side) paths.

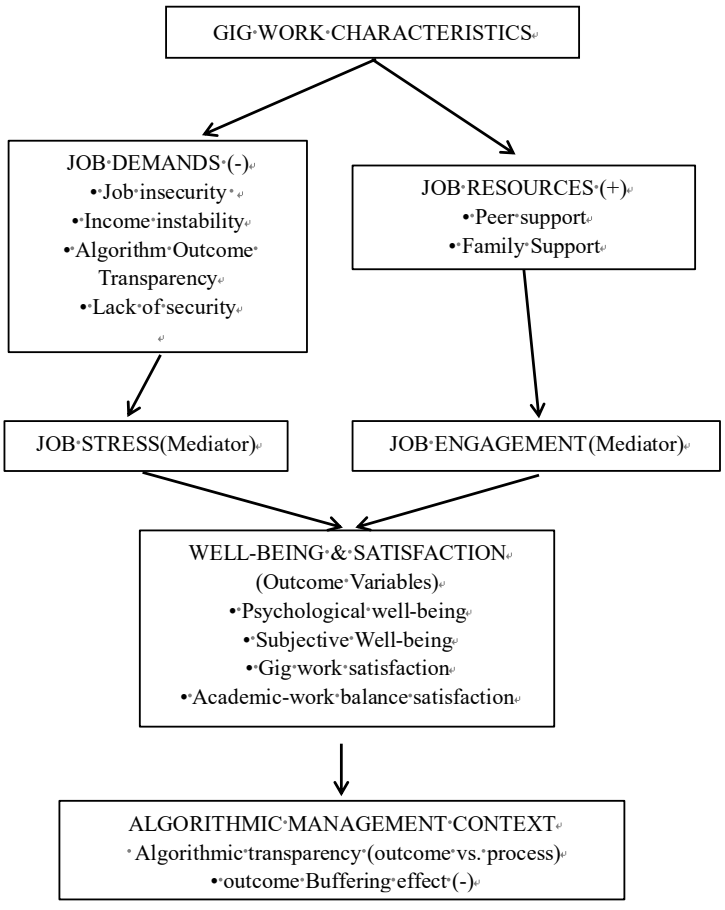


Figure 1. Conceptual Framework of the Study

2.4. Hypothesis

Despite the rapid expansion of research on the gig economy, several important gaps remain in the existing literature.

Gap 1: Main effects (H1–H2)

Previous studies have characterised gig work as precarious, with job insecurity, unstable income, and limited social protection [17, 19, 20]. These factors are typically examined

collectively as manifestations of precarity, rather than as distinct job demands that may differentially affect psychological outcomes. Likewise, although social support is a well-recognised job resource in organisational research, its influence on subjective well-being and job satisfaction among student gig workers has received limited empirical attention [12, 23].

Thus, it remains unclear whether specific job demands (job insecurity and income instability) and resources (social support) have distinct effects on student gig workers' well-being and job satisfaction. To address this gap, we propose:

H1: Job insecurity and income instability are negatively associated with the subjective well-being and job satisfaction of university students engaged in platform-based gig work.

H2: Social support is positively associated with the subjective well-being and job satisfaction of university students engaged in platform-based gig work.

Gap 2: Psychological mechanisms (H3–H4)

Second, existing studies have primarily focused on the direct relationships between gig-work conditions and worker outcomes, while the psychological mechanisms underlying these relationships remain insufficiently understood. Existing research has shown that precarious employment and algorithmic management are associated with adverse psychological experiences [19, 22], yet relatively few studies have examined whether work stress mediates the influence of job demands on workers' well-being. Likewise, although job resources are generally believed to promote positive work outcomes, limited empirical research has examined whether work engagement serves as the motivational mechanism by which social support enhances well-being and job satisfaction among student gig workers [12, 23].

Consequently, the psychological processes linking job demands and job resources to well-being outcomes remain insufficiently understood. To address this mechanism gap, the present study proposes:

H3: Work stress mediates the negative relationship between job insecurity and subjective well-being.

H4: Work engagement mediates the positive relationship between social support and subjective well-being and job satisfaction.

Gap 3: Boundary condition—Academic stress (H5)

Third, existing evidence sheds little light on boundary conditions (the situations in which job demands have stronger or weaker psychological effects). While the bulk of the previous research has examined the immediate effects of platform working conditions [19, 20], less attention is comparatively directed to contextual factors that may moderate these relationships. This limitation is particularly important to university students, as they experience simultaneous work-related demands and academic responsibilities. Academic stress will weaken the mental resources necessary to deal with job insecurity, and then increase job stress. However, there are few empirical studies on the interaction between academic and work-related needs.

Accordingly, this study puts forward the following assumptions:

H5: Academic stress positively regulates the relationship between job insecurity and job stress, so this positive relationship is stronger when academic stress is high.

Gap 4: Boundary condition—Algorithm outcome transparency (H6)

Although there are more and more researches on algorithm management, there are few studies on whether perceived algorithm transparency will affect the psychological results of platform work. Most of the work focuses on objective functions such as task assignment, evaluation and labor control [24-26], and pays little attention to subjective transparency perception [27]. Although higher transparency of results may improve the understanding of algorithm decision [12], it is still unclear whether it will reduce the work pressure caused by unstable income. Therefore, the present study proposes:

H6: Algorithm outcome transparency negatively moderates the relationship between income instability and work stress, such that the positive relationship is weaker when algorithm outcome transparency is high.

3. Methodology

3.1. Research Paradigm

This study adopts a positivist paradigm for objective measurement and hypothesis testing in the student gig economy. Paradigms shape method, data collection, and analysis choices [28].

The study examines factors affecting well-being and satisfaction of college gig workers—algorithmic management and job insecurity (stressors), and flexibility and social support (resources)—and thus adopts positivism as its core paradigm.

Positivism assumes an objective, fixed reality and seeks general causal laws and prediction [29], but faces limitations: value neutrality is unattainable; reducing phenomena to variable co-variations ignores unobservable mechanisms and agency; and human behaviour follows flexible rules, not natural laws [26].

Despite these, positivism is retained because this study tests pre-established JD-R-based hypotheses on demands and resources affecting student well-being, focusing on statistical relationships [30]. This is also consistent with JD-R model's emphasis on hypothesis testing and quantitative analysis, which has been supported by existing studies [31]. Limitations will be acknowledged, and the discussion will interpret results theoretically.

The JD-R model, widely used in organisational behaviour and occupational health, explains how work conditions affect well-being, engagement, and burnout [13]. Job demands are ongoing physical or mental efforts (e.g., job insecurity, unstable income, performance pressure, algorithmic control); excessive demands deplete energy, causing stress, burnout, and reduced well-being [32].

Job resources help achieve goals, reduce demand costs, and promote growth (e.g., flexibility, autonomy, social support, skill development); adequate resources stimulate engagement and enhance well-being and satisfaction [33]. In this study, demands include algorithmic management and job instability (income/security); resources include flexibility (time/location) and social support (colleagues, family, platform).

Therefore, this research will use the JD-R model as a theoretical framework to, guide the formulation of hypotheses regarding the relationships between job demands, job resources, job stress, job engagement, and the well-being and satisfaction of college students engaged in part-time work.

3.2. Research Approach

Following Saunders et al. (2023) [28], this study employs deduction as its primary research methodology. In deduction, researchers first formulate research hypotheses based on

existing theories and literature, then collect and analyze data to verify whether these hypotheses hold true. Deduction emphasizes theoretical testing and is typically combined with the positivist paradigm, utilizing quantitative research methods. Quantitative research methods can be useful for this study, objectively measure various variables (algorithm control, instability, flexibility, social support, stress, engagement, well-being, and satisfaction). Examine the causal or associative relationships between variables [34].

3.3. Research Method

Having clarified the positivist research paradigm and deductive research logic, this study further determines that a quantitative research method will be adopted as the primary strategy for data collection and analysis. The core goal of this study is to test the relationship between multiple variables.

Table 1. Summary of Research Variables

Variable Categories	Specific Variables
Independent Variables	Job Instability, Social Support
Outcome Variables	Well-being, Job Satisfaction
Mediating Variables	Work Stress, Work Engagement
Moderating Variables	Academic Stress, Algorithm Transparency

In the complicated relationship between these variables (Table 1), the mediating effect and regulating effect should be tested by statistical analysis.

This paper uses structured questionnaire as a data collection tool, which can minimize the bias caused by researchers' subjective interpretation. First, the questionnaire uses standardized items and a uniform rating scale (such as the Likert scale). All respondents answer questions under the same conditions, thereby reducing bias caused by differences in researcher-respondent interactions [35]. Data is presented in numerical form, facilitating objective statistical analysis and reducing the researcher's subjective discretion during data interpretation [36]. questionnaires allow for anonymous responses, thereby reducing social desirability bias among respondents and enhancing data authenticity.

Based on the JD-R model, algorithm management theory, and the literature on the gig economy, this study has proposed six research hypotheses (H1–H6) covering main effects, mediating effects, and moderating effects. These hypotheses need to be tested using statistical methods (Table 2):

Table 2. Statistical Methods Used for Hypothesis Testing

Type of Hypothesis	Corresponding	Hypotheses Methods
Main Effects	H1, H2	Correlation analysis, multiple linear regression
Mediating Effects	H3, H4	PROCESS macro (Model 4)
Moderating Effects	H5, H6	PROCESS macro (Model 1)

3.4. Data Collection

3.4.1. Questionnaire Design

Part 1: Screening Questions, to ensure that respondents meet the study's inclusion criteria, two screening questions are included at the beginning of the questionnaire.

Table 3. Questionnaire design (part one)

Question Number	Question	Options
S1	Are you currently enrolled in a university or college in China (undergraduate or graduate program)?	□ Yes □ No (End of questionnaire)
S2	Have you engaged in any of the following part-time or platform-based jobs in the past six months? (Multiple selections allowed)	□ Food delivery (e.g., Meituan, Ele.me) □ Ride-hailing services (e.g., Didi Chuxing) □ Online part-time tasks (e.g., crowdsourcing platforms) □ E-commerce live streaming or short-video product promotion □ Freelance work (e.g., copywriting, design, translation, etc.) □ I have never engaged in any of the above (End survey)

Part Two: Demographic Information

Table 4. Questionnaire design (part two)

Question No.	Variable	Question	Options
D1	Gender	What is your gender?	□ Male □ Female □ Prefer not to say
D2	Age	What is your age?	□ 18–20 years old □ 21–23 years old □ 24 years old and above
D3	Grade Level	What is your current grade level?	□ Freshman □ Sophomore □ Junior □ Senior □ Graduate student or higher
D4	Hours Worked	How many hours per week do you typically work part-time?	□ Less than 5 hours □ 5–10 hours □ 11–20 hours □ 21 hours or more
D5a	Platform Type	Which of the following types of gig work do you do? (You may select more than one.)	□ Food delivery □ Ride-hailing/transportation services □ Online crowdsourcing/micro-tasks (e.g., data annotation, surveys, content moderation) □ E-commerce livestreaming/short-video sales □ Freelancing (copywriting, design, translation, programming, etc.) □ Other (please specify: _____)
D5b	Platform Type	Which platform do you use most often? (Please enter the platform name)	Please fill in: _____

Based on the theoretical framework and six research hypotheses (H1–H6) proposed in this study, the questionnaire needs to measure the following variables (Table). The table below presents the type (role) of each variable and its correspondence with the hypotheses.

Table 5. Summary of Variables and Their Corresponding Hypotheses

Variable Type	Variable Name	Corresponding Hypothesis	Number of Measurement Items
Independent Variables	Job Demands (job insecurity, income instability)	H1	8
Independent Variables	Social Support (Peer Support, Family Support)	H2	8
Mediators	Work Stress	H3	4
Mediators	Work Engagement	H4	4
Moderators	Academic Stress	H5	4
Moderators	Outcome Transparency	H6	4
Outcome Variables	Well-being	H1, H2, H3, H4	4
Outcome Variables	Job Satisfaction	H1, H2	4

3.4.2. Scale Design

To ensure the reliability and validity of the measurements, this study will use or adapt established, validated scales from the existing literature. All scales will employ a 5-point Likert scale, where 1 = strongly disagree and 5 = strongly agree.

Table 6. Measurement Scales and Questionnaire Items

Variable	Scale Source	Sample Item
Job insecurity	De Witte et al. (2016)	I worry that I might lose this part-time job in the future It's hard for me to say how long this part-time job will last. Even if I perform well, I can't guarantee that I'll be able to keep this job long-term. The platform could change its rules at any time, which could affect the stability of my job
Income instability	Cobo et al. (2022)	My monthly gig income fluctuates greatly My part-time income is sometimes lower than I expected My income is heavily influenced by seasonal factors or platform promotions The uncertainty of my income is causing me financial stress
Social support	Zimet et al. (1988)	My friends will help me when I encounter difficulties at work I can count on my friends or classmates to help me with my side job Whenever I need someone to talk to, there's always a friend or classmate willing to listen to my work-related worries. My friends understand why I do gig work and the pressures that come with it When I feel stressed at work, my family encourages me My family provides practical help (such as time and financial support) when I need it. My family doesn't mind that I spend time on side gigs My family understands and supports my decision to take on gig work
Work Stress	Cohen et al. (1983)	I feel unable to cope with the various demands of my job My part-time job makes me feel nervous and anxious Even when I'm not working, I still think about work-related issues. Work-related stress has affected my sleep quality or daily life
Work Engagement	Schaufeli et al. (2006)	I am passionate about my part-time job I've really enjoyed this part-time job When I work part-time, I feel full of energy I would be willing to do this job even if I weren't paid
Academic Stress	Self-constructed (based on literature)	Academic tasks cause a great deal of stress I find it hard to balance my studies and my part-time job. I often feel like I don't have enough time because of my schoolwork. Academic pressure affects my performance at my part-time job
Outcome Transparency	Hellman et al. (2022)	I understand how platform ratings affect my income I know what data the platform uses to evaluate my performance I can clearly understand why the platform assigned me a particular task or order When my income changes, the platform will explain how it was calculated
Well-being	Diener et al. (1985)	I am satisfied with my current life situation I feel full of energy and able to handle my daily tasks Overall, my quality of life is good. Working gig jobs hasn't lowered my life satisfaction
Job satisfaction	(Reynolds& Kincaid, 2024)	Overall, I am satisfied with this part-time job I would recommend this part-time job to my friends Considering the effort I put in, I'm satisfied with the rewards this job provides. I would like to continue doing similar gig work in the future

Since there is no established scale for measuring academic stress, 60 eligible data sets were collected and tested prior to data collection.

Table 7. KMO and Bartlett's Test of Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.812
Bartlett's Test of Sphericity	Approx. Chi-Square = 278.257
	df = 6
	Sig. < .001

Table 8. Component Matrix for Academic Stress Items

Item	Component 1
Academic tasks cause me a great deal of stress	.885
I often feel like I don't have enough time because of my schoolwork	.852
I find it hard to balance my studies and my part-time job	.836
Academic pressure affects my performance at my part-time job	.776
Extraction Method: Principal Component Analysis	
a. 1 component extracted	

An exploratory factor analysis (EFA) was conducted on the Academic Stress Scale (Table). The results showed a KMO value of 0.812 (>0.8, indicating excellent suitability for factor analysis), and Bartlett's sphericity test was significant (χ^2 = 278.257, df = 6, $p < 0.001$), suggesting that the data possessed good construct validity. Principal component analysis was used to extract common factors. Based on the criterion of eigenvalues > 1, a total of 1 common factor was extracted, with a cumulative variance explained of 70.249% (exceeding the acceptance criterion of >60%). The factor loadings for each item ranged from 0.776 to 0.885 (all > 0.4), with no instances of cross-factor loadings. Therefore, the scale has a unidimensional structure and good validity.

Table 9. Total Variance Explained for the Academic Stress Scale

Component	Total	Initial Eigenvalues % of Variance	Cumulative %	Total	Extraction Sums of Squared Loadings% of Variance	Cumulative %
1	2.810	70.249	70.249	2.810	70.249	70.249
2	.525	13.115	83.363			
3	.379	9.484	92.848			
4	.286	7.152	100.000			

3.4.3. Sampling Method

The sampling design for this study is convenience sampling, Convenience sampling is a non-probability sampling method in which researchers select samples based on their accessibility, availability, or willingness to participate, rather than by randomly drawing them from the population [29].

Table 10. Sampling Implementation Plan

Step	Specific Actions
1. Survey Distribution Channels	Distribute the survey link through online channels such as WeChat
2. Platform Coverage	Target different platform types (food delivery, ride-hailing, online part-time jobs, e-commerce livestreaming, freelancing) separately to ensure sample diversity
3. Incentives	Offer a small cash prize giveaway to increase the survey response rate
4. Data Collection Period	Estimated collection time: 1–2weeks
5. Invalid Questionnaire Screening Criteria	Delete questionnaires that meet any of the following criteria: (1) Completed in an unreasonably short time (<3 minutes); (2) All questions selected the same answer; (3) Failed the screening questions (S1/S2)

4. Analysis and Findings

4.1. Scale Reliability Analysis

Reliability analysis is used to evaluate the internal consistency and measurement stability of the research scale, which is the premise to ensure the quality of questionnaire data and the credibility of empirical conclusions. The mainstream reliability evaluation standard in academic research is that a Cronbach's α coefficient is greater than 0.8, which means the reliability of the scale is very good, $0.7 \leq \alpha < 0.8$ means the acceptable reliability, and α less than 0.7 means the consistency of the project is not good, so the scale needs to be revised and adjusted. All the measurement scales used in this study are revised and optimized on the basis of mature scales at home and abroad, including nine potential variables. The specific reliability test results are shown in Table 11.

Table 11. Reliability Analysis Results

Variable Name	Abbrev.	Items	Cronbach's α	Reliability Evaluation
Job Insecurity	Job	4	0.914	Excellent
Income Instability	Inc	4	0.912	Excellent
Social Support	Soc	8	0.950	Excellent
Work Stress (Mediator)	Work	4	0.844	Excellent
Work Engagement (Mediator)	WorkE	4	0.845	Excellent
Academic Stress (Moderator)	Acade	4	0.858	Excellent
Algorithm Outcome Transparency	Out	4	0.881	Excellent
Subjective Well-being	Well	4	0.879	Excellent
Part-time Job Satisfaction	JobS	4	0.885	Excellent

From the results of reliability test, it can be seen that Cronbach'sα coefficients of all the nine structures in this study are between 0.844 and 0.950, which are greater than the academic standard of 0.8, indicating that the internal consistency of the scale is good. It is worth pointing out that Cronbach'sα coefficient of social support scale is up to 0.950, which shows that the internal consistency of the scale is very high and there is strong project redundancy.

4.2. Demographic Descriptive Statistics of the Sample

In order to explain the overall distribution of valid samples and whether the samples are representative, this paper makes a frequency statistical analysis of four demographic and behavioral variables, namely, gender, age, academic level and weekly part-time working hours. The detailed sample distribution results are shown in Table 12.

Table 12. Demographic Characteristics of the Sample

Demographic Variable	Category	Total Frequency	Valid Percentage (%)
Gender	Male	69	44.5
	Female	80	51.6
	Prefer not to disclose	6	3.9
Age	18–20	48	31.0
	21–23	81	52.3
	≥24	26	16.8
Academic Grade	Freshman	32	20.6
	Sophomore	24	15.5
	Junior	52	33.5
	Senior	25	16.1
	Postgraduate and above	22	14.2
Weekly Working Hours	<5 hours	27	17.4
	5–10 hours	62	40.0
	11–20 hours	51	32.9
	>21 hours	15	9.7

4.3. Descriptive Statistics of Core Variables

All the latent variables in this study are measured by five-point Likert scale (1= very different, 5= very agree). The average score of each item under each variable is the observed value of the latent variable. The higher the average score, the higher the respondents' perception of this dimension. In this paper, the minimum, maximum, mean, standard deviation and standard error of all core variables are statistically analyzed, and the analysis results are shown in Table 13.

Table 13. Descriptive Statistics of the Research Variables

Variable	Min	Max	Mean	SD	SE
Job Insecurity	1.00	4.75	3.6565	0.94755	0.076
Income Instability	1.25	4.75	3.6694	0.95088	0.076
Social Support	1.25	5.00	3.7323	0.87898	0.071
Work Stress	1.00	4.75	3.7758	0.82236	0.066
Work Engagement	1.50	4.75	3.7032	0.84120	0.068
Academic Stress	1.25	4.75	3.7871	0.83637	0.067
Algorithm Outcome Transparency	1.25	4.75	3.6806	0.89349	0.072
Subjective Well-being	1.25	4.75	3.6516	0.88250	0.071
Part-time Job Satisfaction	1.25	4.75	3.6984	0.88855	0.071

From the descriptive statistical results, we can see that the average value of all constructs is between 3.65 and 3.79, indicating that their level is higher than the average level. College students' evaluation of platform odd jobs in terms of

job demand, social resources, stress and happiness is at a medium to high level. Academic stress $M = 3.7871$ and work stress $M = 3.7758$ are highest, while social support also scores relatively high, suggesting effective emotionaland practical help from family, peers, and social networks. Unstable work and income are typical characteristics of platform odd jobs, which makes student workers generally think that employment and income are unstable.

4.4. Pearson Correlation Analysis

Before multiple linear regression analysis, all the core variables are analyzed by double-tailed Pearson correlation analysis to understand the direction, strength and significance of the relationship between variables, and to check whether there are multiple collinearity problems. Academic research generally believes that a correlation coefficient lower than 0.7 indicates no severe multicollinearity, which meets the prerequisites for regression analysis. The full variable correlation matrix is shown in Table 14.

Table 14. Correlation Matrix of the Research Variables

Variable	Job	Inc	Soc	Work	WorkE	Acade	Out	Well	JobS
Job	1								
Inc	0.604**	1							
Soc	-0.252**	-0.262**	1						
Work	0.486**	0.551**	-0.219**	1					
WorkE	-0.105	-0.090	0.221**	-0.104	1				
Acade	0.081	0.170*	-0.042	0.450**	0.075	1			
Out	-0.344**	-0.486**	0.248**	-0.268**	0.166*	-0.077	1		
Well	-0.316**	-0.269**	0.506**	-0.396**	0.360**	-0.153	0.309**	1	
JobS	-0.346**	-0.399**	0.465**	-0.260**	0.574**	-0.043	0.481**	0.561**	1

Note: *p < 0.05, **p < 0.01

Correlation results support H1, as job insecurity and income instability are significantly negatively correlated with subjective well-being and job satisfaction. Social support is significantly positively correlated with both outcomes, supporting H2. Consistent with the JD-R dual-path mechanism, work demands positively predict work stress, while social support promotes work engagement. Higher algorithm transparency is linked to lower perceived instability, indicating platform rules positively shape perceptions. The maximum correlation (0.604) is below 0.7, confirming no severe multicollinearity and suitability for further regression and mechanism testing.

4.5. Multiple Linear Regression: Main Effect Test (H1, H2)

To test the main effects of work demands and social resources on college students' gig work well-being, this study takes subjective well-being and part-time job satisfaction as dependent variables, and incorporates job insecurity, income instability and social support into the multiple linear regression model to verify Hypotheses H1 and H2. The specific regression results are shown in Tables 15 and 16.

Table 15. Multiple Linear Regression Results

Predictor	B	SE	Beta	t	p	VIF
Constant	2.715	0.436	—	6.224	0.000	—
Job Insecurity	-0.163	0.080	-0.175	-2.022	0.045	1.63
Income Instability	-0.042	0.080	-0.046	-0.527	0.599	1.67
Social Support	0.452	0.072	0.450	6.312	0.000	1.08

Model fit: $R=0.543$, $R^2=0.295$, Adjusted $R^2=0.281$, $F=21.101$, $p<0.001$

Table 16. Multiple Linear Regression Results for Job Satisfaction

Predictor	B	SE	Beta	t	p	VIF
Constant	3.459	0.436	—	7.937	0.000	—
Job Insecurity	-0.103	0.080	-0.110	-1.282	0.202	1.63
Income Instability	-0.219	0.080	-0.234	-2.721	0.007	1.67
Social Support	0.380	0.072	0.376	5.310	0.000	1.08

Model fit: $R=0.553$, $R^2=0.306$, Adjusted $R^2=0.292$, $F=22.199$, $p<0.001$

H1: The effects of job insecurity and income instability differed across the two outcome variables. In the subjective well-being model, job insecurity has a significant negative predictive effect ($\beta=-0.175$, $p<0.05$), while income instability shows no significant effect. In the job satisfaction model, income instability significantly negatively predicts job satisfaction ($\beta=-0.234$, $p<0.01$), while job insecurity has no significant predictive effect. Overall, the findings provide partial support for the proposed effects of job demands on the two outcome variables. Therefore, Hypothesis 1 was partially supported.

H2: Social support positively predicts happiness and job satisfaction. Social support exerts a significant positive predictive effect on both subjective well-being ($\beta=0.450$,

p<0.001) and part-time job satisfaction (β=0.376, p<0.001), which indicates that social support can effectively improve college students' psychological experience and work satisfaction in platform gig work. Thus, Hypothesis H2 is fully supported.

4.6. Bootstrap Test for Mediation Effects (H3, H4)

This study adopts Hayes PROCESS Model 4 with 5,000 Bootstrap repeated samples and a 95% bias-corrected confidence interval to test mediating effects. According to the standard judgment criteria, a mediating effect is statistically significant when the confidence interval does not contain zero; otherwise, the mediating pathway is invalid.

H3: Work Stress Mediates Job Insecurity → Subjective Well-being

Table 17. Bootstrap Mediation Analysis Results for H3

Effect Type	Effect Value	Boot SE	Boot LLCI	Boot ULCI	Significance
Total Effect	-0.294	0.071	-0.434	-0.154	Significant
Direct Effect	-0.150	0.078	-0.305	0.005	Insignificant
Indirect (Work Stress)	-0.144	0.043	-0.235	-0.069	Significant

The empirical results show that the 95% confidence interval of the direct effect includes zero, while the confidence interval of the indirect effect of work stress excludes zero. In accordance with Bootstrap mediation effect judgment standards, this pathway constitutes a full mediation effect (rather than partial mediation) (Table 6 Bootstrapped Mediation Results., 2024). Specifically, work stress mediates the negative relationship between job insecurity and college students' subjective well-being, which fully supports Hypothesis H3. The internal mechanism is that job insecurity significantly increases college students' platform work stress, and the elevated work stress further depletes individual psychological resources, thereby reducing subjective well-being. After controlling for the mediating variable of work stress, job insecurity no longer has a direct predictive effect on subjective well-being.

H4: Work Engagement Mediates Social Support → Well-being Job Satisfaction

Table 18. Bootstrap Mediation Analysis Results for H4

Effect Type	Effect Value	Boot SE	LLCI	ULCI	Significance
Total Effect	0.508	0.071	0.369	0.647	Significant
Direct Effect	0.450	0.069	0.315	0.586	Significant
Indirect (WorkE)	0.058	0.027	0.016	0.120	Significant
Total Effect	0.470	0.072	0.328	0.613	Significant
Direct Effect	0.359	0.062	0.236	0.483	Significant
Indirect (WorkE)	0.111	0.033	0.050	0.184	Significant

The test results indicate that the indirect effect confidence intervals of social support affecting subjective well-being and job satisfaction through work engagement both exclude zero, and the direct effects remain statistically significant. This verifies that work engagement plays a significant partial mediating role between social support and college students' gig work well-being and satisfaction, fully supporting Hypothesis H4 (Table 18). Specifically, adequate social support provides college students with emotional and instrumental resources for part-time work, effectively improving their work engagement; positive work engagement further optimizes their part-time work experience, and ultimately enhances subjective well-being and job satisfaction.

4.7. Moderation Effect Test (H5, H6)

This study adopts PROCESS Model 1 to test the moderating effects of academic pressure and algorithm outcome transparency (Table 19). To eliminate multicollinearity between main effect terms and interaction terms, all independent variables and moderating variables are mean centered before constructing interaction terms. Meanwhile, standardized residual diagnostic plots are inspected to verify the normality and homoscedasticity of the regression model, ensuring the robustness of moderating effect test results.

Table 19. Summary of Mediation Analysis Results

Hypothesis	Interaction Term	β	SE	t	p	Result
H5	Well → Acade (X→M)	-0.1454	0.0757	-1.9199	0.0567	Marginally significant
	Acade → Job (M→Y)	0.038	0.0882	0.4313	0.6669	Not significant
	Well → Job (Direct Effect)	-0.3336	0.0836	-3.9922	0.0001	Significant
	Well→Acade→Job (Indirect Effect)	-0.0055	0.0161	-	-	Not support
H6	Inc → Acade (X→M)	0.1529	0.0805	1.9007	0.0592	Marginally significant
	Acade → Job (M→Y)	-0.0247	0.0743	-0.3326	0.7399	Not significant
	Inc → Job (Direct Effect)	0.5741	0.0746	7.6955	<0.0001	Significant
	Inc→Acade→Job (Indirect Effect)	-0.0038	0.0137	-	-	Not support

H5 (Well → Acade → Job): The indirect effect 95% Bootstrap CI includes 0, so the mediating effect of Acade is

not supported. Well has a significant negative direct effect on Job.

H6 (Inc → Acade → Job, controlling for Out): The indirect effect 95% Bootstrap CI still includes 0, so the mediating effect of Acade is not supported. Inc has a significant positive direct effect on Job.

H5: Academic Pressure Moderates Job Insecurity → Work Stress

Taking job insecurity as the independent variable, academic pressure as the moderating variable, and work stress as the dependent variable, the moderating model is constructed. The results show that the regression p-value of the interaction term is greater than 0.05, and the Bootstrap confidence interval contains zero, indicating that the moderating effect of academic pressure is not significant, and Hypothesis H5 is not supported. This result suggests that the positive predictive effect of job insecurity on work stress will not change significantly with the fluctuation of academic pressure.

H6: Algorithm Outcome Transparency Moderates Income Instability → Work Stress

The moderating model with income instability as the independent variable, algorithm outcome transparency as the moderating variable, and work stress as the dependent variable is tested. The results show that the p-value of the interaction term is 0.998, and the confidence interval contains zero.

5. Discussion

Based on the results of the empirical analysis, this chapter explores the comprehensive mechanisms through which various variables influence the well-being of college students engaged in part-time work from both theoretical and practical perspectives. Through a questionnaire survey and statistical analysis of 155 Chinese college students engaged in part-time work, the six hypotheses of this study were partially confirmed. This chapter will discuss each hypothesis in turn, engage the research findings in dialogue with the existing literature, interpret unexpected results, and summarize the theoretical contributions, practical implications, research limitations, and future directions.

5.1. Theoretical Contributions

First, by extending the JD-R model to the “college student gig worker population”—a group that has not been sufficiently studied this study provided empirical support for the “demand-exhaustion” and “resource-motivation” dual pathways within this group, while also revealing domain-specific differences where academic stress and work stress may operate independently of one another. Second, the study identified the distinct roles of work stress and work engagement as mediating psychological mechanisms: work stress fully mediated the negative impact of insecurity on well-being, while work engagement partially mediated the positive effect of social support. Third, this study did not find empirical support for the proposed moderating role of algorithm outcome transparency, transparency has no evidence was found that the objective stress caused by income instability itself.

5.2. Lessons from Practice

The instability of platform income will have a negative impact on job satisfaction. The platform should consider the minimum income guarantee or a more stable order distribution mechanism, and improve the understandabilityof algorithm rules to establish long-term trust.

For universities: Social support is the core protective factor. Colleges and universities should carry out seminars on peer counseling and work-study balance, strengthen the establishment of support networks, and incorporate odd jobs into the career development and mental health service system.

For policymakers: College students engaged in odd jobs should be included in the scope of labor protection, and the key point is to protect their rights and interests in income stability, transparent algorithm and appeal channels. Although the regulatory role of transparency has not been confirmed in this paper, its institutional value cannot be ignored [37].

5.3. Limitations of the Study and Future Directions

First of all, the design of cross-sectional study can not determine the causal relationship, so future research should use longitudinal study design to study the dynamic changes and time series relationship of each variable.

Secondly, there may be common method bias in self-reported data. Future research can supplement these data with objective platform data (such as actual income records and working hours).

Thirdly, the convenient sampling method makes the research results not universal, because the samples are recruited by online channels and there is self-selection bias, so the future research should adopt the probability sampling method to improve the representativeness of the samples.

Fourthly, the accuracy of the transparency measurement method of this algorithm needs to be improved. Due to the public's lack of understanding of this concept, in future research, such as scenario simulation or experimental design, a more detailed measurement scale should be formulated to improve the accuracy of measurement.

6. Conclusion

This paper mainly studies various factors that affect college students' subjective well-being and job satisfaction in platform odd jobs. Compared with full-time platform workers, there is not enough research at present. This paper uses (JD-R) model to explore how job demand (job insecurity, income instability), resources (social support), psychological mechanism (work pressure, job involvement) and situational factors (academic pressure, algorithm transparency) jointly affect the experience of college odd jobs.

The results show that many factors influence happiness. Job insecurity will reduce subjective well-being, and income instability will reduce job satisfaction, indicating that different types of uncertainty will have different effects on the results. Social support is the most important protective factor, which has a direct and positive impact on the results, and will have an indirect impact by increasing job participation. In addition, job stress completely mediates the relationship between insecurity and happiness, and job involvement partially mediates the relationship between support and results. These findings support the dual "health damage" and "incentive" processes of JD-R model in students' working environment.

However, this study also found several findings that challenged the existing cognitive assumptions. Academic pressure and algorithm transparency did not significantly regulate the correlation. It can be seen that college students

are more capable than expected to distinguish between academic pressure and work pressure, thus preventing academic pressure from aggravating work pressure; Although the transparency of the algorithm can make workers understand the decision-making mechanism of the platform, it cannot alleviate the psychological pressure caused by the unstable objective income. These findings show that not all background resources will have the same impact on the platform work, and whether the transparency of the algorithm is effective depends on the specific organizational and institutional conditions.

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