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Article

Algorithmic Management in the Logistics and Delivery Industry: An Empirical Study of Riders' Job Burnout and Turnover Intention

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Abstract

The rapid expansion of platform-based delivery services has made algorithmic management a central feature of riders' everyday work. Although such systems improve coordination efficiency, they may also be associated with heightened psychological strain and workforce instability. This study examines how different dimensions of perceived algorithmic management are associated with riders' job burnout and turnover intention, and whether job satisfaction helps explain the relationship between burnout and turnover intention. Drawing on Maslach's multidimensional burnout framework and Conservation of Resources theory, the study uses survey-based primary data collected from 458 delivery riders in China. Statistical analyses were conducted using SPSS 26.0, including reliability and validity assessment, descriptive statistics, correlation analysis, multiple regression, and bootstrap mediation testing. The results show that algorithmic monitoring intensity, the stringency of reward and punishment rules, and order assignment volatility were all positively associated with emotional exhaustion, cynicism, and reduced personal accomplishment. Among these dimensions, the stringency of reward and punishment rules showed the strongest association with burnout across the regression models. The findings further indicate that emotional exhaustion, cynicism, and reduced personal accomplishment were all positively associated with turnover intention, with emotional exhaustion emerging as the strongest predictor. In addition, job satisfaction partially mediated the relationships between burnout and turnover intention. By differentiating among multiple forms of perceived algorithmic management and linking them to multidimensional burnout and turnover intention, this study extends current research on platform labor and algorithmic governance. The findings also offer practical implications for platform firms seeking to improve rider well-being, reduce turnover intention, and develop more sustainable management practices.

Keywords

Algorithmic management, Platform labor, Delivery riders, Job burnout, Job satisfaction, Turnover intention

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1. Introduction

Digital platforms have transformed the organization of work in the logistics and delivery industry by embedding managerial functions into algorithm-driven systems. In this setting, tasks are assigned, monitored, evaluated, and rewarded through real-time data processing rather than through conventional face-to-face supervision [1,2]. Such algorithmic systems have enhanced coordination efficiency and expanded the operational capacity of platform-based services. At the same time, however, they have also changed how labor is controlled, how performance is assessed, and how workers experience managerial authority in everyday work [2-4]. For delivery riders, whose work is already characterized by time pressure, mobility, and income uncertainty, algorithmic management may become a central feature of the work environment rather than a neutral technical background.

This issue is particularly important in the logistics and delivery sector, where riders form the operational backbone of platform-based service provision. In recent years, the rapid growth of digital delivery services has been accompanied by increasing public and academic concern about riders' working conditions, occupational strain, and employment instability. Riders often work under conditions of continuous digital monitoring, strict time requirements, performance-based ranking, and dynamic task allocation. These conditions may be experienced as persistent work demands that shape not only operational behavior but also workers' psychological well-being and their willingness to remain in the job. Accordingly, understanding how riders experience algorithmic management and how such experiences relate to burnout and turnover intention has become an important issue in both platform labor research and applied management scholarship [4].

Existing studies have begun to document the relationship between algorithmic management and employee well-being in platform work. Prior research suggests that digitally mediated control may be associated with reduced autonomy, increased stress, emotional exhaustion, and unfavorable work attitudes. However, several limitations remain in the current literature. First, algorithmic management is often treated as a broad or unified construct, which makes it difficult to identify which specific aspects of algorithmic control are more salient in shaping workers' experiences. In the rider context, algorithmic management may take different forms, including intensive monitoring, strict reward–penalty systems, and unstable order assignment, yet these dimensions are not always examined separately. Second, although burnout has received attention in platform labor research, it is still often discussed in general terms rather than through its multidimensional structure. Distinguishing among emotional exhaustion, cynicism, and reduced personal accomplishment may help provide a more nuanced understanding of riders' psychological responses to algorithmic control. Third, the existing literature has more frequently focused on direct strain outcomes than on the broader attitudinal processes through which strain may become linked to workforce instability. In particular, the role of job satisfaction in connecting burnout and turnover intention remains underexplored in the context of platform-based delivery work.

Against this background, the present study seeks to answer the following research question: How are different dimensions of perceived algorithmic management associated with riders' job burnout and turnover intention, and does job satisfaction help explain the relationship between burnout and turnover intention? To address this question, the study focuses on three dimensions of perceived algorithmic management–algorithmic monitoring intensity, the stringency of reward and punishment rules, and order assignment volatility–and examines their relationships with the three dimensions of job burnout, namely emotional exhaustion, cynicism, and reduced personal accomplishment. The study further investigates whether job satisfaction serves as a mediating mechanism linking burnout to turnover intention.

This study is grounded in Maslach's multidimensional burnout framework and Conservation of Resources theory. Maslach's framework provides the conceptual basis for distinguishing among different forms of burnout-related strain, while Conservation of Resources theory helps explain why resource-draining work experiences may be associated with reduced job satisfaction and stronger withdrawal intention. By combining these perspectives, the study develops an integrated framework for understanding how riders' subjective experiences of algorithmic control are related to psychological strain and potential workforce instability in platform labor arrangements.

The study contributes to the literature in three ways. First, it offers a more fine-grained conceptualization of perceived algorithmic management by distinguishing among monitoring intensity, reward–penalty stringency, and order assignment volatility, rather than treating algorithmic management as a single undifferentiated construct. Second, it links these dimensions to the multidimensional structure of burnout, thereby extending existing discussions of worker well-being in platform settings beyond generalized stress or exhaustion. Third, it integrates burnout, job satisfaction, and turnover intention into a broader explanatory framework, thereby contributing to research on how platform governance may be associated not only with worker strain, but also with retention-related outcomes. In this sense, the study extends current discussions of algorithmic management beyond immediate control and efficiency concerns toward the psychological and organizational implications of digitally governed labor.

2. Literature Review and Hypotheses Development

2.1 Theoretical Foundations

This study draws on two complementary theoretical perspectives: Maslach's multidimensional burnout framework and Conservation of Resources theory. Together, these perspectives provide a coherent basis for understanding how algorithmic management may be associated with riders' psychological strain, job-related attitudes, and turnover intention.

Maslach's multidimensional burnout framework conceptualizes job burnout as a three-dimensional construct consisting of emotional exhaustion, cynicism, and reduced personal accomplishment [5]. Emotional exhaustion refers to feelings of being emotionally overextended and depleted of psychological energy. Cynicism reflects a detached, indifferent, or negative attitude toward one's work. Reduced personal accomplishment refers to a declining sense of competence, value, and effectiveness at work. This framework is particularly useful in the present study because it enables a more differentiated assessment of riders' burnout experiences rather than treating burnout as a single undifferentiated condition.

In addition, Conservation of Resources theory suggests that individuals experience stress when valued resources are threatened, depleted, or insufficiently restored [6]. In platform-based work settings, algorithmic control practices may be experienced as persistent demands that consume time, energy, autonomy, and emotional resources. When such resource depletion accumulates, workers may experience burnout, evaluate their job more negatively, and become more inclined to consider leaving. Accordingly, Conservation of Resources theory offers an appropriate explanatory lens for understanding the association between perceived algorithmic management, burnout, job satisfaction, and turnover intention in the delivery rider context.

2.2 Algorithmic Management in Platform-Based Work

Algorithmic management refers to the use of data-driven digital systems to allocate tasks, monitor workers, evaluate performance, and administer rewards and penalties. In platform-based labor settings, algorithmic management often substitutes for direct human supervision by embedding control mechanisms into digital interfaces, delivery dispatching systems, ranking rules, and performance metrics [7,8]. This form of management has become especially prominent in the logistics and delivery industry, where platform companies rely on real-time tracking, dynamic scheduling, and automated performance control to coordinate large numbers of riders efficiently.

Existing studies suggest that algorithmic management may enhance operational efficiency while also generating substantial psychological and behavioral costs for workers . In particular, platform workers may experience algorithmic systems not merely as neutral technical tools, but as forms of intensified labor control that shape workload pressure, temporal urgency, performance uncertainty, and perceived autonomy [9]. In this study, the term *perceived* refers to riders' subjective evaluations and interpretations of platform algorithmic control practices rather than objectively observed technical system parameters. This distinction is important because workers' psychological and behavioral reactions are shaped not only by formal system features, but also by how such features are experienced in everyday work.

To capture this subjective experience more precisely, the present study conceptualizes perceived algorithmic management as comprising three related dimensions. The first is algorithmic monitoring intensity, referring to riders' perceptions of real-time digital surveillance such as location tracking, route recording, and working-time monitoring. The second is the stringency of reward and punishment rules, referring to workers' perceptions of the severity of ranking systems, fines, and incentive thresholds. The third is order assignment volatility, referring to perceived instability in task dispatching, including fluctuations in order quantity, route convenience, and delivery-time requirements. By distinguishing among these dimensions, the present study seeks to provide a more fine-grained understanding of how riders experience algorithmic control in their daily work.

2.3 Job Burnout, Job Satisfaction, and Turnover Intention in Platform Work

Job burnout has become an increasingly important concern in platform labor research because gig and delivery work often involves long working hours, irregular income, time pressure, customer-related stress, and low predictability. Prior studies have shown that workers in digitally controlled environments may experience heightened emotional strain, exhaustion, and alienation when job demands remain persistently high and personal resources are insufficiently replenished [10-12]. For delivery riders, such pressures may be intensified by algorithmic systems that continually evaluate performance, compress delivery time, and reduce flexibility in work execution.

Burnout is also closely related to job attitudes and withdrawal tendencies. Research in organizational behavior has consistently found that emotionally exhausted and psychologically detached employees tend to evaluate their jobs more negatively and exhibit stronger turnover intention [13-15]. Job satisfaction represents an employee's overall evaluative judgment of the job experience [14]. When workers experience persistent exhaustion, detachment, and diminished

accomplishment, their satisfaction with work conditions, rewards, and personal value realization may decline accordingly. This reduced job satisfaction may then contribute to stronger thoughts of quitting.

Although earlier research has established broad associations among job demands, burnout, job attitudes, and turnover, the platform labor context introduces distinctive conditions that deserve closer examination. In particular, the rider workforce operates under digitally mediated managerial authority, where work pressure is not only interpersonal or organizational, but also system-driven and continuously enacted through algorithms. This makes the delivery rider context especially relevant for examining how perceived algorithmic management is associated with multidimensional burnout and how burnout may further relate to job satisfaction and turnover intention.

2.4 Research Gap and Study Contribution

Despite the growing literature on algorithmic management and worker well-being, several gaps remain. First, prior studies often treat algorithmic management as a broad or unified construct, offering limited insight into how different forms of algorithmic control may be associated with distinct psychological outcomes. Second, although burnout is frequently discussed in platform work research, less attention has been paid to its multidimensional structure, particularly in the rider context. Distinguishing among emotional exhaustion, cynicism, and reduced personal accomplishment may provide a more nuanced understanding of how algorithmically controlled work environments are experienced.

Third, existing research has more often focused on immediate strain, autonomy, or well-being outcomes, whereas less work has integrated burnout with job satisfaction and turnover intention in a single explanatory framework within the context of platform delivery work. This limits understanding of how algorithmically structured work experiences may be associated not only with psychological strain, but also with workforce instability.

In response to these gaps, the present study makes three contributions. First, it differentiates perceived algorithmic management into monitoring intensity, reward–penalty stringency, and order assignment volatility. Second, it links these dimensions to the multidimensional structure of job burnout. Third, it examines job satisfaction as a mediating mechanism between burnout and turnover intention, thereby extending the discussion of algorithmic management beyond immediate strain toward a broader account of retention-related outcomes in platform labor.

2.5 Hypotheses Development

2.5.1 Perceived Algorithmic Management and Job Burnout

Algorithmic monitoring intensity may be associated with stronger job burnout because persistent digital surveillance can heighten the sense of being continuously evaluated and controlled. When riders feel that their location, route, speed, and work rhythm are constantly tracked, they may experience reduced autonomy and sustained psychological tension. Prior research suggests that continuous electronic monitoring may function as a workplace stressor and contribute to emotional strain [16]. Under such conditions, riders may be more likely to feel emotionally drained, develop a detached attitude toward their work, and question their own value and effectiveness. Therefore, the following hypothesis is proposed:

H1: Algorithmic monitoring intensity is positively associated with the three dimensions of riders' job burnout.

H1a: Algorithmic monitoring intensity is positively associated with emotional exhaustion.

H1b: Algorithmic monitoring intensity is positively associated with cynicism.

H1c: Algorithmic monitoring intensity is positively associated with reduced personal accomplishment.

The stringency of reward and punishment rules may also be associated with higher burnout. In platform delivery work, riders are often subject to fine systems, ranking mechanisms, and performance-linked incentives. When such rules are perceived as excessively strict, workers may remain in a persistent state of vigilance, fearing penalties and striving to meet demanding thresholds. Prior research indicates that high-control performance environments and hindrance-like stressors are linked to greater psychological strain [17]. Accordingly, stricter algorithmic reward–penalty rules may be related to stronger emotional exhaustion, more cynical work attitudes, and lower perceived accomplishment.

H2: The stringency of reward and punishment rules is positively associated with the three dimensions of riders' job burnout.

H2a: The stringency of reward and punishment rules is positively associated with emotional exhaustion.

H2b: The stringency of reward and punishment rules is positively associated with cynicism.

H2c: The stringency of reward and punishment rules is positively associated with reduced personal accomplishment.

Order assignment volatility may similarly be linked to burnout because unstable dispatching systems make work less predictable and more difficult to manage. Riders who perceive large fluctuations in order volume, inefficient routing, or unreasonable delivery-time requirements may find it harder to plan their work effectively. This instability may increase

time pressure, reduce feelings of control, and heighten frustration. Over time, such conditions may be associated with resource depletion, emotional fatigue, negative work attitudes, and a weaker sense of accomplishment.

H3: Order assignment volatility is positively associated with the three dimensions of riders' job burnout.

H3a: Order assignment volatility is positively associated with emotional exhaustion.

H3b: Order assignment volatility is positively associated with cynicism.

H3c: Order assignment volatility is positively associated with reduced personal accomplishment.

2.5.2 Job Burnout and Turnover Intention

Burnout has long been recognized as an important correlate of turnover intention. Emotional exhaustion may reduce workers' energy and willingness to sustain work involvement. Cynicism may weaken identification with the job and reduce attachment to the platform. Reduced personal accomplishment may lead individuals to question whether the job offers sufficient value, growth, or meaning. In each case, stronger burnout may be associated with a greater tendency to consider leaving the job.

H4: The three dimensions of job burnout are positively associated with riders' turnover intention.

H4a: Emotional exhaustion is positively associated with turnover intention.

H4b: Cynicism is positively associated with turnover intention.

H4c: Reduced personal accomplishment is positively associated with turnover intention.

2.5.3 The Mediating Role of Job Satisfaction

Job satisfaction represents an employee's overall evaluative judgment of work. In the context of delivery work, burnout may undermine such evaluations by depleting psychological resources and weakening positive perceptions of work conditions, income adequacy, recognition, and personal value realization. From the perspective of Conservation of Resources theory, prolonged exhaustion and work alienation may erode individuals' remaining motivational resources, thereby lowering job satisfaction. In turn, lower job satisfaction may strengthen withdrawal cognition and increase turnover intention [18]. Thus, job satisfaction may function as an important psychological mechanism linking burnout and turnover intention.

H5: Job satisfaction mediates the relationship between riders' job burnout and turnover intention.

3. Methodology

3.1 Research Design

This study employed a cross-sectional questionnaire survey design to examine the associations among perceived algorithmic management, job burnout, job satisfaction, and turnover intention among delivery riders. A survey-based design was considered appropriate because the focal constructs concern riders' subjective experiences, psychological states, and attitudinal evaluations, which are most directly captured through self-reported data.

Given the cross-sectional nature of the design, the findings should be interpreted as correlational patterns rather than definitive causal effects. The study was designed to test theoretically derived associations among the focal variables rather than to establish temporal causality.

3.2 Sample and Data Collection

Data were collected over a three-month period from July to September 2024. A structured questionnaire was administered through a combination of online and offline channels in order to improve access to delivery riders working under different platform conditions. Online responses were collected through a digital survey platform, while offline responses were gathered through field distribution at delivery stations and in areas with high rider concentration, such as commercial districts.

The study adopted a combination of convenience sampling and snowball sampling. This approach was used because delivery riders represent a mobile and operationally dispersed workforce that is often difficult to access through formal sampling frames [19]. A total of 520 questionnaires were distributed, of which 458 valid responses were retained for analysis after excluding incomplete and invalid submissions, resulting in an effective response rate of 88.08%.

The final sample size of 458 was considered adequate for the statistical procedures used in this study, including reliability assessment, correlation analysis, multiple regression, and bootstrap mediation testing. In addition, this sample size exceeds commonly accepted minimum thresholds for regression-based behavioral research involving multiple predictors and control variables.

Respondent demographic characteristics, including gender, age, work experience, and rider type, are reported in the Results section.

3.3 Measures

All constructs were measured using previously established scales adapted to the context of platform-based delivery work [20]. Responses were recorded using a five-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicate higher levels of the corresponding construct. To improve clarity and contextual appropriateness, the questionnaire items were reviewed and adjusted to reflect the everyday working realities of logistics and delivery riders.

3.3.1 Perceived Algorithmic Management

Perceived algorithmic management was measured using 12 items adapted from prior studies on algorithmic governance, platform labor control, and digitally mediated management. The construct was operationalized as comprising three dimensions.

The first dimension, algorithmic monitoring intensity, was measured with four items reflecting riders' perceptions of continuous digital surveillance, such as real-time location tracking and work trajectory monitoring. A sample item is: "The platform tracks my delivery trajectory in real time."

The second dimension, the stringency of reward and punishment rules, was measured with four items assessing perceptions of the severity of ranking systems, penalties, and incentive thresholds. A sample item is: "The platform's penalty system is excessively strict."

The third dimension, order assignment volatility, was measured with four items assessing instability in dispatching, route convenience, order volume, and time constraints. A sample item is: "Orders assigned by the system are often not route-efficient."

Higher composite scores indicate stronger perceptions of algorithm-driven managerial control.

3.3.2 Job Burnout

Job burnout was assessed using an adapted version of the Maslach Burnout Inventory—General Survey (MBI-GS) . The scale included 13 items reflecting three dimensions.

Emotional exhaustion was measured with five items assessing energy depletion and emotional fatigue. A sample item is: "My job makes me feel emotionally drained."

Cynicism was measured with four items capturing psychological detachment and declining involvement in work. A sample item is: "My interest in delivery work has declined over time."

Reduced personal accomplishment was measured with four items assessing diminished feelings of competence and work value. A sample item is: "I sometimes question whether my work as a rider is meaningful."

Higher scores indicate stronger burnout-related experiences.

3.3.3 Job Satisfaction

Job satisfaction was measured using four items adapted from established work attitude scales. These items assess respondents' overall evaluations of their current job, including work conditions, returns, and general employment experience. A sample item is: "Overall, I am satisfied with my current delivery job."

Higher scores indicate greater job satisfaction.

3.3.4 Turnover Intention

Turnover intention was measured using three items adapted from prior withdrawal cognition research. These items capture respondents' tendency to consider leaving their current job. A sample item is: "I often think about quitting my job as a delivery rider."

Higher scores indicate stronger turnover intention.

3.4 Analytical Strategy

Data analysis was conducted using SPSS 26.0. The analytical process proceeded in several steps.

First, the internal consistency of the measures was assessed using Cronbach's alpha coefficients and composite reliability values. Cronbach's alpha reflects the internal consistency of the items used to measure a construct, while composite reliability provides an additional estimate of measurement reliability.

Second, construct validity was assessed using average variance extracted and discriminant validity comparisons. These indicators were used to examine whether the items adequately captured their intended constructs and whether the focal constructs were empirically distinguishable from one another.

Third, descriptive statistics and Pearson correlation coefficients were computed to examine the central tendency, dispersion, and bivariate associations among the study variables. Positive correlation coefficients indicate that two variables tend to increase together, whereas negative coefficients indicate that one variable tends to decrease as the other increases.

Fourth, multiple regression analyses were conducted to test the proposed hypotheses regarding the associations between perceived algorithmic management and the three dimensions of job burnout, as well as between burnout dimensions and turnover intention. In the regression models, the standardized coefficient (β) indicates the relative strength and direction of the association between a predictor and the dependent variable, the *t*-value reflects the statistical significance of the coefficient estimate, the R^2 value represents the proportion of variance explained by the model, and the *F*-value indicates the overall significance of the regression model [21].

Finally, the mediating role of job satisfaction was examined using bootstrap analysis with 5,000 resamples. Bootstrapping was used to estimate indirect effects and their 95% confidence intervals. An indirect effect was considered statistically supported when the confidence interval did not include zero.

In all regression analyses, gender, age category, work experience, and rider type were included as control variables. Multicollinearity diagnostics indicated that collinearity was not a major concern.

3.5 Ethical Considerations

All research procedures adhered to general ethical principles for research involving human participants. Participation was voluntary, informed consent was obtained prior to questionnaire completion, and respondents were assured that their answers would remain anonymous and confidential. No personally identifying information was collected, and participants were informed that they could discontinue participation at any stage without penalty.

To reduce the likelihood of common method bias, several procedural measures were adopted during questionnaire design and administration. For example, respondents were assured of anonymity and the questionnaire wording was reviewed to enhance clarity and reduce ambiguity. These steps were intended to improve response quality and reduce evaluation apprehension.

4. Results

4.1 Sample Characteristics

Table 1 presents the demographic profile of the respondents. Among the 458 valid participants, 412 were male (89.96%) and 46 were female (10.04%). In terms of age, 128 respondents (27.95%) were aged 25 years or below, 245 (53.49%) were between 26 and 35 years old, and 85 (18.56%) were aged 36 years or above. Regarding work experience, 156 respondents (34.06%) had worked for one year or less, 213 (46.51%) had between two and three years of experience, and 89 (19.43%) had four or more years of experience. In addition, 287 respondents (62.66%) were dedicated riders, whereas 171 (37.34%) were crowdsourced riders.

Table 1. Demographic characteristics of the sample (N = 458).

Demographic Variables	Categories	Sample Size (n)	Proportion (%)
Gender	Male	412	89.96
	Female	46	10.04
Age	≤25 years	128	27.95
	26-35 years	245	53.49
	≥36 years	85	18.56
Work Experience	≤1 year	156	34.06
	2-3 years	213	46.51
	≥4 years	89	19.43
Delivery Type	Dedicated Rider	287	62.66
	Crowdsourced Rider	171	37.34

Note: Percentages may not sum to 100% due to rounding.

Overall, the sample was composed primarily of male riders and was concentrated in the young-to-middle adult age range, which is broadly consistent with the workforce profile typically observed in platform-based delivery work. The

diversity in work experience and rider type also provides a useful basis for examining variation in perceived algorithmic management and burnout-related outcomes across respondents.

4.2 Reliability and Validity of the Measures

The reliability and validity results are reported in Table 2. As shown, all Cronbach's alpha coefficients exceeded 0.85, indicating satisfactory internal consistency across the study constructs. Composite reliability values were also above the commonly accepted threshold of 0.70, further supporting the reliability of the measures [22]. In addition, the average variance extracted values for all constructs exceeded 0.50, suggesting acceptable convergent validity.

Table 2. Reliability, convergent validity, and discriminant validity of study constructs.

Variables	α	CR	AVE	1	2	3	4	5	6	7	8
1. AlgorithmicMonitoringIntensity	0.862	0.895	0.653	0.808							
2. Reward & Punishment Rules	0.875	0.902	0.671	0.624	0.819						
3. OrderAssignment Volatility	0.858	0.889	0.645	0.587	0.612	0.803					
4. Emotional Exhaustion	0.893	0.915	0.692	0.723	0.756	0.718	0.832				
5. Cynicism	0.886	0.908	0.685	0.695	0.732	0.674	0.812	0.828			
6. Reduced Accomplishment	0.879	0.901	0.678	0.654	0.687	0.632	0.785	0.763	0.823		
7. Job Satisfaction	0.867	0.896	0.662	-0.623	-0.654	-0.598	-0.745	-0.721	-0.689	0.814	
8. Turnover Intention	0.853	0.887	0.651	0.632	0.678	0.615	0.789	0.765	0.734	-0.756	0.807

Note: Diagonal elements represent the square roots of AVE. Off-diagonal elements represent inter-construct correlations. CR = composite reliability; AVE = average variance extracted.

Discriminant validity was assessed by comparing the square root of each construct's average variance extracted with its correlations with other constructs. In all cases, the square root of average variance extracted was greater than the corresponding inter-construct correlations, indicating that the focal variables were empirically distinguishable from one another. Taken together, these results suggest that the measurement model demonstrated acceptable reliability, convergent validity, and discriminant validity for the purposes of the present analysis.

4.3 Descriptive Statistics and Correlation Analysis

Table 3 presents the means, standard deviations, and Pearson correlation coefficients for the study variables. The mean values for the three dimensions of perceived algorithmic management ranged from 3.21 to 3.56, indicating that respondents generally reported moderate to relatively high levels of algorithmically structured control in their daily work. Among the burnout dimensions, emotional exhaustion showed the highest mean value ($M = 3.68$, $SD = 0.95$), followed by cynicism ($M = 3.52$, $SD = 0.91$) and reduced personal accomplishment ($M = 3.32$, $SD = 0.88$). By contrast, job satisfaction was below the scale midpoint ($M = 2.87$, $SD = 0.93$), while turnover intention was relatively elevated ($M = 3.45$, $SD = 0.94$). These descriptive results suggest that the sampled riders experienced noticeable work strain and comparatively low job-related positivity.

The correlation results were directionally consistent with the proposed hypotheses. Specifically, algorithmic monitoring intensity, the stringency of reward and punishment rules, and order assignment volatility were all positively correlated with emotional exhaustion, cynicism, reduced personal accomplishment, and turnover intention. These positive coefficients indicate that stronger perceptions of algorithmic control tended to coexist with higher burnout and stronger withdrawal cognition. For example, the correlation between reward and punishment stringency and emotional exhaustion was relatively strong ($r = 0.756$, $p < .01$), suggesting that riders who perceived algorithmic reward–penalty rules as stricter also tended to report higher emotional depletion.

In addition, all three burnout dimensions were negatively correlated with job satisfaction and positively correlated with turnover intention. Job satisfaction was negatively associated with turnover intention ($r = -0.756$, $p < .01$), indicating that riders with lower overall satisfaction were also more likely to report stronger intentions to leave. Overall, these correlation patterns provide preliminary support for the proposed relationships and justify proceeding to the multivariate regression analyses.

Table 3. Descriptive statistics and correlations among study variables.

Variables	Mean (M)	Standard Deviation (SD)	1	2	3	4	5	6	7	8
1. Algorithmic Monitoring Intensity	3.56	0.87	1	-	-	-	-	-	-	-
2. Stringency of Reward and Punishment Rules	3.48	0.92	0.624**	1	-	-	-	-	-	-
3. Order Assignment Volatility	3.21	0.89	0.587**	0.612**	1	-	-	-	-	-
4. Emotional Exhaustion	3.68	0.95	0.723**	0.756**	0.718**	1	-	-	-	-
5. Cynicism	3.52	0.91	0.695**	0.732**	0.674**	0.812**	1	-	-	-
6. Reduced Personal Accomplishment	3.32	0.88	0.654**	0.687**	0.632**	0.785**	0.763**	1	-	-
7. Job Satisfaction	2.87	0.93	-0.623**	-0.654**	-0.598**	-0.745**	-0.721**	-0.689**	1	-
8. TurnoverIntention	3.45	0.94	0.632**	0.678**	0.615**	0.789**	0.765**	0.734**	-0.756**	1

Note: *p < .05, **p < .01, ***p < .001.

4.4 Regression Analysis and Hypothesis Testing

To test H1 to H4, multiple regression analyses were conducted. In the regression models, the standardized coefficient (β) indicates the relative strength and direction of the association between an independent variable and the dependent variable, the *t*-value reflects the statistical significance of the coefficient, the R^2 value indicates the proportion of explained variance in the dependent variable, and the *F*-value reflects the overall significance of the regression model. Gender, age category, work experience, and rider type were included as control variables in all models.

4.4.1 Effects of Perceived Algorithmic Management on Job Burnout

As shown in Table 4, all three dimensions of perceived algorithmic management were positively associated with emotional exhaustion, cynicism, and reduced personal accomplishment.

For emotional exhaustion, algorithmic monitoring intensity (β = 0.235, p < .001), the stringency of reward and punishment rules (β = 0.287, p < .001), and order assignment volatility (β = 0.203, p < .001) were all positively and significantly associated with the dependent variable. The regression model explained 62.3% of the variance in emotional exhaustion (R^2 = 0.623, F = 156.342, p < .001). Among the three predictors, the reward–penalty dimension showed the strongest standardized association, suggesting that stricter algorithmic performance rules were more closely linked to emotional exhaustion than the other two dimensions in this sample. Accordingly, H1a, H2a, and H3a were supported.

For cynicism, algorithmic monitoring intensity (β = 0.218, p < .001), the stringency of reward and punishment rules (β = 0.265, p < .001), and order assignment volatility (β = 0.187, p < .01) also showed significant positive associations. The model explained 58.7% of the variance in cynicism (R^2 = 0.587, F = 138.564, p < .001). As in the emotional exhaustion model, reward–penalty stringency exhibited the largest coefficient among the three dimensions. Thus, H1b, H2b, and H3b were supported.

For reduced personal accomplishment, algorithmic monitoring intensity (β = 0.196, p < .01), the stringency of reward and punishment rules (β = 0.224, p < .001), and order assignment volatility (β = 0.172, p < .01) remained significantly and positively associated with the outcome variable. The model explained 52.4% of the variance in reduced personal accomplishment (R^2 = 0.524, F = 112.789, p < .001). Again, perceived reward–penalty stringency showed the strongest standardized association among the three predictors. Therefore, H1c, H2c, and H3c were supported.

Taken together, these findings indicate that stronger perceptions of algorithmic control were consistently associated with more severe burnout-related experiences across all three burnout dimensions. They also suggest that the reward–penalty aspect of algorithmic management may be particularly salient in understanding riders' burnout.

Table 4. Regression results of perceived algorithmic management predicting job burnout dimensions.

Dependent Variables	Independent Variables	β	t-value	R^2	*F*-value
Emotional Exhaustion	Algorithmic Monitoring Intensity	0.235***	4.872	0.623	156.342***
	Stringency of Reward and Punishment Rules	0.287***	5.921		
	Order Assignment Volatility	0.203***	4.215		
Cynicism	Algorithmic Monitoring Intensity	0.218***	4.563	0.587	138.564***
	Stringency of Reward and Punishment Rules	0.265***	5.432		
	Order Assignment Volatility	0.187**	3.987		
Reduced Personal Accomplishment	Algorithmic Monitoring Intensity	0.196**	4.123	0.524	112.789***
	Stringency of Reward and Punishment Rules	0.224***	4.789		
	Order Assignment Volatility	0.172**	3.765		

Note: All models include controls (gender, age, work experience, rider type). *p < .05, **p < .01, ***p < .001.

4.4.2 Effects of Job Burnout on Turnover Intention

Table 5 reports the regression results for the relationships between the three burnout dimensions and turnover intention. Emotional exhaustion (β = 0.324, p < .001), cynicism (β = 0.287, p < .001), and reduced personal accomplishment (β = 0.215, p < .001) were all positively and significantly associated with turnover intention. The model explained 65.4% of the variance in turnover intention (R^2 = 0.654, F = 189.456, p < .001).

Table 5. Regression results of job burnout dimensions predicting turnover intention.

Dependent Variable	Independent Variables	β	t-value	R^2	*F*-value
Turnover Intention	Emotional Exhaustion	0.324***	6.872	0.654	189.456***
	Cynicism	0.287***	6.123		
	Reduced Personal Accomplishment	0.215***	4.987		

Among the three predictors, emotional exhaustion had the largest standardized coefficient. This indicates that, relative to cynicism and reduced personal accomplishment, emotional exhaustion showed the strongest association with riders' intention to leave. In substantive terms, riders who felt more psychologically depleted were more likely to report stronger withdrawal cognition. Accordingly, H4a, H4b, and H4c were all supported.

4.5 Mediation Analysis

To test H5, bootstrap mediation analysis with 5,000 resamples was conducted following the regression-based mediation approach proposed by Hayes [23]. Bootstrapping estimates indirect effects and their confidence intervals without relying on normality assumptions. An indirect effect is generally considered statistically supported when its 95% confidence interval does not include zero.

As reported in Table 6, job satisfaction significantly mediated the relationships between each burnout dimension and turnover intention. For emotional exhaustion, the indirect effect through job satisfaction was 0.156, with a 95% confidence interval of [0.102, 0.213]. For cynicism, the indirect effect was 0.132, with a 95% confidence interval of [0.087, 0.178]. For reduced personal accomplishment, the indirect effect was 0.108, with a 95% confidence interval of [0.065, 0.152]. In all three cases, the confidence intervals excluded zero, indicating statistically supported mediation.

Table 6. Bootstrap analysis of the mediating effects of job satisfaction.

Mediating Paths	Direct Effect	Indirect Effect	Total Effect	95% Confidence Interval
Emotional Exhaustion → Job Satisfaction → Turnover Intention	0.324***	0.156***	0.480***	[0.102, 0.213]
Cynicism → Job Satisfaction → Turnover Intention	0.287***	0.132***	0.419***	[0.087, 0.178]
Reduced Personal Accomplishment → Job Satisfaction → Turnover Intention	0.215***	0.108***	0.323***	[0.065, 0.152]

Note: Bootstrap resamples = 5,000; Confidence interval = 95%.

At the same time, the direct effects remained significant, which suggests that job satisfaction played a partial, rather than full, mediating role. In other words, burnout was associated with stronger turnover intention both directly and indirectly through lower job satisfaction. On this basis, H5 was supported.

4.6 Summary of Key Findings

Several findings are especially noteworthy. First, all three dimensions of perceived algorithmic management were positively associated with all three dimensions of burnout, suggesting a robust relationship between riders' perceptions of algorithmic control and psychological strain. Second, among the three algorithmic management dimensions, the stringency of reward and punishment rules showed the strongest association with burnout across models. Third, all three burnout dimensions were positively associated with turnover intention, with emotional exhaustion emerging as the strongest predictor. Finally, job satisfaction functioned as a partial mediating mechanism linking burnout to turnover intention. Overall, these results support the proposed framework and highlight a consistent pattern in which more adverse perceptions of algorithmic management coexist with greater burnout, lower satisfaction, and stronger intentions to leave.

5. Discussion

5.1 Theoretical Discussion

The purpose of this study was to examine how perceived algorithmic management is associated with riders' job burnout and turnover intention, and whether job satisfaction helps explain the relationship between burnout and turnover intention in the context of platform-based delivery work. The results offer several important insights.

First, the findings show that algorithmic monitoring intensity, the stringency of reward and punishment rules, and order assignment volatility were all positively associated with emotional exhaustion, cynicism, and reduced personal accomplishment. This pattern is broadly consistent with prior research indicating that algorithmic systems, while designed to enhance efficiency and coordination, may also intensify labor control and increase strain in platform work settings . The present study extends this literature by showing that riders' subjective perceptions of algorithmic control are not associated with burnout in a general sense only, but with all three of its core dimensions. This multidimensional pattern is important because it suggests that algorithmic management may be linked not only to fatigue, but also to detachment and weakened feelings of competence.

Among the three dimensions of perceived algorithmic management, the stringency of reward and punishment rules displayed the strongest standardized association with all three burnout dimensions, particularly emotional exhaustion. This finding suggests that riders may experience algorithmic control most intensely when it is tied to penalties, rankings, and incentive thresholds. In practical terms, the constant possibility of fines, score reductions, or reward loss may make platform work psychologically demanding even when riders remain technically flexible in terms of work entry and exit. This finding helps refine existing discussions of algorithmic management by indicating that not all aspects of algorithmic control are equally salient. In the rider context, the performance-consequential dimension of the algorithm appears especially closely linked to burnout-related strain.

Second, all three burnout dimensions were positively associated with turnover intention, with emotional exhaustion showing the strongest relationship. This finding is consistent with burnout theory and previous turnover research suggesting that emotionally depleted workers are more likely to disengage from work and consider leaving [24,25]. In the present context, emotional exhaustion may be particularly consequential because delivery work depends heavily on sustained energy, concentration, time responsiveness, and tolerance for daily operational stress. When riders feel chronically drained, their willingness to continue working under platform conditions may decline more sharply than when they experience cynicism or reduced accomplishment alone. Thus, although all three burnout dimensions matter, emotional exhaustion appears to be the most immediate burnout-related correlate of withdrawal cognition in this sample.

Third, the results support the mediating role of job satisfaction. Specifically, burnout was associated with turnover intention both directly and indirectly through lower job satisfaction. This finding provides a more refined understanding of how strain-related experiences are linked to retention outcomes in platform labor. Rather than functioning solely as an endpoint of psychological distress, burnout also appears to be associated with a broader deterioration in work-related evaluation. From the perspective of Conservation of Resources theory, this pattern is meaningful because workers who experience sustained resource depletion may not only feel exhausted and detached, but may also evaluate their work more negatively, thereby becoming more likely to consider leaving. In this sense, job satisfaction operates as an attitudinal pathway through which burnout-related strain is associated with stronger turnover intention.

The findings also contribute to the broader literature on algorithmic management in several ways. First, by differentiating among monitoring intensity, reward–penalty stringency, and order assignment volatility, the study responds to calls for more fine-grained conceptualizations of algorithmic control rather than treating it as a single undifferentiated construct. Second, by examining emotional exhaustion, cynicism, and reduced personal accomplishment separately, the study provides a more nuanced picture of burnout in the rider context. Third, by integrating burnout, job satisfaction, and turnover intention into one framework, the study extends prior work beyond immediate stress outcomes and toward a broader account of workforce instability in digitally governed labor arrangements.

At the same time, the findings should be interpreted cautiously. Because the study was based on cross-sectional survey data, the reported relationships should be understood as statistical associations rather than definitive causal effects. Nevertheless, the overall pattern is theoretically coherent and empirically consistent with prior studies on job demands, burnout, work attitudes, and turnover in high-pressure work settings. The present findings therefore offer useful evidence that riders' subjective experiences of algorithmic governance are closely linked to their psychological well-being and retention-related attitudes.

Overall, this study suggests that algorithmic management is associated with workforce instability not only through direct work pressure, but also through a broader psychological process involving burnout and declining job satisfaction. For scholars, this highlights the importance of examining platform labor through multidimensional psychological constructs rather than narrowly focusing on efficiency or autonomy alone. For practitioners, it underscores that the design of algorithmic control systems may shape not only operational outcomes, but also riders' willingness to remain in platform work over time.

5.2 Managerial Implications

The findings of this study offer several practical implications for platform firms, frontline operations managers, and policymakers concerned with the sustainability of digitally governed delivery work.

First, the results suggest that platform companies should pay closer attention to the psychological consequences of algorithmic control systems, rather than evaluating such systems solely in terms of efficiency and delivery speed. In particular, the stringency of reward and punishment rules showed the strongest association with burnout across the regression models. This indicates that riders may experience algorithmic governance most intensely when it is tied to fines, ranking penalties, and rigid performance thresholds. Platform firms should therefore review whether existing penalty structures are excessively punitive, overly frequent, or insufficiently transparent. Moderating the intensity of punishment mechanisms and ensuring that performance standards are realistic may help reduce riders' emotional exhaustion and improve retention-related outcomes.

Second, the findings highlight the importance of improving the transparency and perceived fairness of algorithmic management. Riders are more likely to respond negatively when monitoring, order assignment, and performance evaluation are experienced as unpredictable or opaque. Platform operators may therefore benefit from providing clearer explanations of how orders are allocated, how performance is assessed, and under what conditions penalties or rewards are triggered. Greater transparency may help reduce uncertainty, strengthen perceptions of procedural fairness, and lessen the likelihood that riders interpret algorithmic management as arbitrary or excessively controlling.

Third, platform firms should recognize that different dimensions of algorithmic management may require different intervention strategies. Monitoring intensity may be addressed by avoiding unnecessarily intrusive tracking practices and by ensuring that monitoring is used for operational support rather than purely disciplinary purposes. Reward–penalty stringency may be improved by reducing disproportionate fines, softening rigid thresholds, and introducing more balanced evaluation criteria. Order assignment volatility may be mitigated by improving dispatch stability, reducing unreasonable delivery-time compression, and increasing route rationality. In other words, algorithmic management should not be treated as a single managerial lever; its different components should be adjusted in more targeted ways.

Fourth, the results suggest that rider well-being should be considered an operational issue as well as a human issue. Emotional exhaustion emerged as the burnout dimension most strongly associated with turnover intention, indicating that psychological depletion may have direct implications for workforce stability. For platform companies, this means that burnout is not merely an individual welfare concern, but also a practical management issue that may affect rider retention, service continuity, and customer experience. Interventions such as more realistic delivery windows, rest-support mechanisms, flexible complaint review procedures, and channels for rider feedback may help reduce emotional strain and strengthen continued participation in platform work.

Fifth, the mediating role of job satisfaction suggests that retention may be improved not only by reducing strain, but also by strengthening riders' overall evaluation of their work experience. Platform firms may therefore benefit from complementing control-oriented systems with supportive practices, such as clearer communication, recognition mechanisms, fairer dispute resolution, and more predictable income-related arrangements. Improving satisfaction may help weaken the pathway through which burnout becomes associated with stronger turnover intention.

Finally, the findings also have implications for policymakers and labor regulators. Because algorithmic management increasingly shapes riders' working conditions, questions of transparency, fairness, and worker protection should not be left entirely to platform discretion. Regulatory guidance that encourages explainable dispatching logic, fairer penalty systems, and better safeguards for flexible workers may contribute to healthier and more sustainable platform labor environments. In this sense, improving algorithmic management is not only a matter of organizational design, but also an emerging issue of labor governance in the digital economy. Organizations should therefore balance algorithmic efficiency with employee support mechanisms to reduce adverse psychological and behavioral outcomes [26].

6. Conclusions and Future Perspectives

6.1 Conclusion

This study examined the relationships among perceived algorithmic management, job burnout, job satisfaction, and turnover intention in the context of platform-based delivery work. Drawing on Maslach's multidimensional burnout framework and Conservation of Resources theory, the study investigated how riders' subjective perceptions of algorithmic control are associated with emotional exhaustion, cynicism, reduced personal accomplishment, and subsequent turnover intention.

The findings indicate that the three dimensions of perceived algorithmic management–algorithmic monitoring intensity, the stringency of reward and punishment rules, and order assignment volatility–were all positively associated with the three dimensions of job burnout. Among these factors, the stringency of reward and punishment rules showed the strongest association with burnout across the regression models. In addition, emotional exhaustion, cynicism, and reduced personal accomplishment were all positively associated with turnover intention, with emotional exhaustion emerging as the strongest predictor. The results further showed that job satisfaction partially mediated the relationships between burnout and turnover intention, suggesting that burnout was associated with stronger intentions to leave both directly and indirectly through lower job satisfaction.

Taken together, these findings contribute to the growing literature on algorithmic management by showing that riders' experiences of digitally mediated control are closely linked to multidimensional psychological strain and workforce instability. Rather than treating algorithmic management as a single undifferentiated construct, this study highlights the importance of distinguishing among different forms of perceived algorithmic control and examining how they relate to different aspects of burnout. The study also extends existing work by integrating burnout, job satisfaction, and turnover intention into a broader framework that helps explain why platform workers may become more inclined to withdraw from digitally governed labor arrangements.

From a practical perspective, the findings suggest that platform firms should pay closer attention to the psychological consequences of algorithmic control systems. Management practices that rely excessively on penalties, unstable dispatching, and intensive monitoring may be associated with lower job quality and stronger turnover intention among riders. Accordingly, efforts to improve rule transparency, reduce excessive punishment pressure, and increase the perceived fairness and predictability of algorithmic management may be beneficial not only for rider well-being, but also for workforce stability and service continuity.

6.2 Limitations

This study should be interpreted in light of several limitations. First, the sample was obtained through a combination of convenience sampling and snowball sampling. Although this approach made it possible to access a mobile and hard-to-reach occupational group across multiple regions, it may reduce the representativeness of the sample and limit the generalizability of the findings to the broader population of platform riders. Future research should therefore be cautious when extending the present results beyond similar rider groups and work contexts.

Second, the study employed a cross-sectional design based on self-reported questionnaire data. As a result, the findings reflect statistical associations among the focal variables rather than definitive causal relationships. Although the proposed framework is theoretically grounded, the temporal ordering of the variables cannot be firmly established using a single-wave design. Moreover, self-reported data may be influenced by response tendencies, subjective interpretation, and shared method variance, even though procedural measures were adopted to reduce this risk.

Third, the study was conducted within the specific institutional and occupational context of China's logistics and delivery platform economy. Platform governance systems, labor regulations, performance expectations, and rider working conditions may differ across countries, cities, and platform models. Therefore, the external validity of the findings may be constrained when considering other forms of gig work or other national and regulatory settings.

Fourth, although this study differentiated among three dimensions of perceived algorithmic management and three dimensions of burnout, the overall model did not include additional contextual or individual-level boundary conditions. Factors such as organizational support, perceived fairness, coping strategies, resilience, employment dependence, and platform tenure may shape how riders interpret and respond to algorithmic control. The omission of such variables means that the present model offers a focused but not exhaustive account of rider burnout and turnover intention.

Finally, the study relied on regression-based analysis and bootstrap mediation testing, which were suitable for the proposed hypotheses but do not fully capture potentially more complex relational structures. For example, reciprocal relationships, nonlinear associations, or conditional indirect effects may also be relevant in algorithmically governed work environments. These issues remain open for future investigation.

6.3 Future Research Directions

Several directions for future research emerge from the present study. First, future studies may adopt longitudinal,

time-lagged, or multi-wave designs to examine the temporal dynamics linking perceived algorithmic management, burnout, job satisfaction, and turnover intention. Such designs would provide a stronger basis for clarifying the direction and development of these relationships over time.

Second, future research may improve generalizability by drawing on more systematic sampling strategies and by examining broader groups of platform workers across different delivery platforms, industries, and geographic contexts. Comparative studies across countries or across types of gig work would be particularly valuable for identifying whether the present findings are context-specific or more broadly applicable to algorithmically managed labor.

Third, subsequent studies may incorporate moderating and boundary variables that help explain when and for whom algorithmic management is more strongly associated with burnout. Variables such as perceived organizational support, fairness perceptions, digital literacy, coping strategies, resilience, and employment dependence may help clarify differences in workers' responses to algorithmic control.

Fourth, future research may extend the present model by examining additional attitudinal and behavioral outcomes. Beyond turnover intention, algorithmic management and burnout may also be associated with service quality, safety behavior, work engagement, voice behavior, organizational identification, or actual turnover. Exploring these outcomes would deepen understanding of the broader organizational consequences of algorithmic labor governance.

Finally, future studies may benefit from combining quantitative and qualitative approaches. While survey data are useful for identifying general patterns, interviews, diary studies, and field-based qualitative research may provide richer insight into how riders interpret algorithmic control in real time and how these interpretations shape their emotions, coping behaviors, and retention decisions. Mixed-method approaches may therefore offer a more comprehensive understanding of platform work under conditions of algorithmic management.

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Ethics Statement

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Authors' Contributions

Qian Li: Conceptualization, Methodology, Data Collection, Formal Analysis, Writing – Original Draft Preparation; Peilin Li: Data Curation, Visualization, Writing – Review & Editing; KeongSai Chan: Supervision, Validation, Writing – Review & Editing.

Conflict of Interest

The authors declare no conflict of interest.

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Generative AI tools were used only for language editing and grammar improvement. The authors take full responsibility for the content of this manuscript.

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