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The Velocity Paradox: A Study on Algorithmic Coercion and Gig Worker Vulnerability in Quick-Commerce

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ABSTRACT

Quick-commerce platforms have compressed the retail delivery cycle from days to minutes, and in doing so have made delivery speed the central organising principle of an entire category of work. This study examines what that compression does to the workers who absorb it. Drawing on labour process theory and the emerging literature on algorithmic management, the paper advances the idea of a velocity paradox: the same algorithmic architecture that platforms present as a source of flexibility and earning freedom simultaneously functions as an instrument of coercion, because the promise of autonomy is conditional on the worker consenting to speed targets that are set, monitored and enforced by software rather than negotiated with a manager. A structured questionnaire comprising five demographic items and ten five-point Likert statements was administered to 160 quick-commerce delivery partners operating in an Indian metropolitan market, selected through purposive and snowball sampling. Data were analysed in SPSS using reliability analysis, exploratory factor analysis, Pearson correlation, multiple linear regression, one-way analysis of variance and an independent samples t-test. The instrument demonstrated acceptable internal consistency (overall Cronbach's alpha = .869) and the factor solution recovered the three intended constructs, explaining 70.29 per cent of the total variance. Perceived algorithmic coercion and safety-compromising behaviour together explained 36.2 per cent of the variance in worker vulnerability ($F(2, 157) = 44.453$, $p < .001$), with both predictors significant. Perceived coercion also varied significantly across daily hours logged ($F(3, 156) = 8.430$, $p < .001$), indicating that the workers most exposed to the platform are also the workers who experience its control most sharply. The findings suggest that worker vulnerability in quick-commerce is not an incidental by-product of a young industry but a structural outcome of how velocity is priced, measured and enforced.

Keywords: quick-commerce, algorithmic management, algorithmic coercion, gig work, worker vulnerability, platform labour, occupational safety

1. INTRODUCTION

1.1 The Emergence of Quick-Commerce as a Retail Form

Quick-commerce, commonly shortened to q-commerce, refers to the retailing of everyday goods with a delivery promise measured in minutes rather than days. Operating through a dense network of dark stores positioned inside residential catchments, platforms in this segment have compressed the fulfilment cycle to a degree that would have been considered commercially implausible a decade ago. In India the category has expanded from a narrow metropolitan experiment into a mainstream channel for groceries, pharmaceuticals,

electronics and prepared food, supported by low data costs, near-universal smartphone penetration and an abundant supply of urban labour willing to work on flexible terms.

What distinguishes quick-commerce from earlier waves of e-commerce is not merely the speed of delivery but the fact that speed has become the product itself. Where conventional online retail competed on assortment and price, q-commerce competes on the interval between the tap and the doorbell. That interval is manufactured by a supply chain in which the final, most variable and least controllable segment is a human being on a two-wheeler navigating congested urban traffic. Every promise made to the consumer at the front end is therefore converted, at the back end, into a time constraint imposed upon a delivery partner. The commercial proposition and the labour process are, in this sense, the same object viewed from two directions.

1.2 Algorithmic Management and the Reorganisation of Delivery Work

The coordination of this labour process is achieved almost entirely through software. Order allocation, route suggestion, performance measurement, incentive calculation and disciplinary action are executed by algorithmic systems that operate continuously and at scale, without the mediation of a human supervisor. Kellogg, Valentine and Christin (2020) describe these systems as a new contested terrain of control, arguing that algorithms now perform the classic managerial functions of direction, evaluation and discipline with a comprehensiveness that traditional supervision never achieved. Duggan, Sherman, Carbery and McDonnell (2020) similarly note that app-work reconstitutes the employment relationship around a technological interface rather than an organisational hierarchy.

The consequences of this reorganisation are not neutral. Because the algorithm is simultaneously the allocator of work, the measurer of performance and the arbiter of pay, the worker faces a counterparty that is always present, never negotiable and largely opaque. Möhlmann, Zalmanson, Henfridsson and Gregory (2021) observe that algorithmic management on labour platforms combines matching with control in a way that leaves workers uncertain about the rules governing their own earnings. Rosenblat and Stark (2016) had earlier identified the resulting information asymmetry as the defining feature of platform-mediated work, in which the party with the data sets the terms and the party without it can only comply or exit.

1.3 Conceptualising the Velocity Paradox

The central argument of this paper is that quick-commerce produces a distinctive form of contradiction which may be termed the velocity paradox. Platforms recruit on a promise of autonomy: the worker chooses when to log in, how long to stay online and which orders to accept. Yet the economic value of the platform rests on a delivery guarantee that cannot tolerate variation. The reconciliation of these two positions is achieved by making autonomy formally available but economically expensive. A worker retains the nominal right to decline an order or take a break, but exercising that right reduces acceptance scores, downgrades allocation priority, forfeits streak-based incentives and lowers effective earnings. Autonomy survives as a legal description of the relationship while being systematically withdrawn as a practical option.

Coercion in this setting therefore does not resemble the direct command of a supervisor. It operates through the architecture of choice. Veen, Barratt and Goods (2020) characterise this as a labour process in which control is exercised through the design of the application rather than through instruction, and Galière (2020) demonstrates how such arrangements secure worker consent to targets that were never subject to negotiation. The paradox is that the faster the platform moves, the more it must rely on workers voluntarily choosing outcomes that they would not choose if the costs were distributed differently. Velocity, in short, is purchased with worker discretion.

1.4 The Indian Gig Workforce and Its Structural Position

These dynamics acquire particular significance in the Indian context. Delivery partners in Indian quick-commerce are predominantly young men, frequently migrants to the city, often carrying vehicle loans or family obligations, and typically without alternative employment offering comparable daily liquidity. Surie and Koduganti (2016) documented early in the Indian platform economy that the flexibility on offer is experienced very differently by workers whose outside options are limited. Rani and Furrer (2021) extend this observation to developing economies generally, noting that algorithmic management in such settings interacts with weak labour protection and high labour supply to produce an unusually asymmetric bargain.

Workers in this position are classified as independent contractors and consequently fall outside most statutory protections concerning working hours, minimum wages, occupational safety and social security. They bear the cost of the vehicle, the fuel, the phone, the data connection and any injury sustained on the road. The Fairwork India ratings have repeatedly recorded low scores on fair pay, fair conditions and fair management across major platforms operating in the country (Fairwork, 2023). The structural position of the worker is therefore one in which the risks generated by the speed promise are individualised while the revenues generated by it are not.

1.5 Scope and Contribution of the Present Study

Much of the existing empirical work on algorithmic control has been qualitative, ethnographic and concentrated in North American, European and Australian ride-hailing or food-delivery contexts. Comparatively little quantitative evidence exists on quick-commerce specifically, where the delivery window is substantially shorter than in restaurant food delivery and the resulting time pressure correspondingly more acute. This study addresses that gap by measuring three constructs on a sample of 160 quick-commerce delivery partners: perceived algorithmic coercion, safety-compromising behaviour and worker vulnerability. It tests whether coercion and safety compromise jointly predict vulnerability, and whether perceived coercion differs across levels of exposure to the platform.

The contribution of the paper is threefold. Conceptually, it names and operationalises the velocity paradox as a measurable relationship rather than a rhetorical description. Empirically, it provides quantitative evidence from an Indian quick-commerce sample, a setting that remains under-represented in the literature. Practically, it identifies the specific design features of platform architecture through which speed is converted into risk, which is a

necessary precondition for any regulatory or managerial intervention that aims to address the problem at its source rather than at its symptoms.

2. REVIEW OF LITERATURE

2.1 Algorithmic Control and the Shifting Locus of Managerial Authority

The foundational observation in this field is that algorithmic systems have absorbed functions previously performed by human managers. Lee, Kusbit, Metsky and Dabbish (2015) provided one of the earliest empirical demonstrations, showing that workers managed by algorithms experienced assignment and evaluation decisions as less legitimate and less contestable than equivalent decisions made by people, largely because there was no interlocutor capable of explaining or revising them. Kellogg et al. (2020) subsequently systematised this insight, proposing that algorithmic control operates through six mechanisms spanning direction, evaluation and discipline, and arguing that its distinguishing feature is comprehensiveness: the system observes everything, continuously, and at negligible marginal cost.

Gandini (2019) situates these developments within labour process theory, contending that platform work does not escape the classical dynamics of control and resistance but relocates them into the interface. On this reading the application is not a neutral coordination device but the contemporary form of the factory floor. Veen et al. (2020), analysing Australian food-delivery work, demonstrate that platforms achieve control despite the formal absence of an employment relationship by configuring information, incentives and defaults so that compliant behaviour becomes the path of least resistance. Heiland (2021) adds a spatial dimension, showing that control over the movement of couriers through urban space constitutes a distinct and underexamined form of managerial power.

A recurring theme across this literature is opacity. Rosenblat and Stark (2016) argue that information asymmetry is constitutive rather than incidental: the platform knows the demand distribution, the allocation logic and the true value of each trip, while the worker knows only what the screen displays at the moment of offer. Möhlmann et al. (2021) find that this asymmetry undermines the worker's capacity to plan, since the relationship between effort and reward cannot be reliably inferred. Griesbach, Reich, Elliott-Negri and Milkman (2019) document how food-delivery platforms use variable and partially concealed allocation rules to sustain a supply of available couriers well in excess of immediate demand.

2.2 Coercion, Consent and the Erosion of Autonomy in Platform Work

The second strand of literature addresses the mechanism by which platforms obtain compliance without issuing commands. Wood, Graham, Lehdonvirta and Hjorth (2019) offer the most influential formulation, finding that algorithmic management delivers genuine autonomy over scheduling alongside intensified work rhythms, low predictability and pervasive insecurity. Their conclusion that a gig can be simultaneously good and bad anticipates the paradox examined in this paper: flexibility and control are not opposites in platform work but co-produced outcomes of the same system.

Galière (2020) advances a Foucauldian account in which couriers actively consent to algorithmic management, internalising its metrics as standards of personal competence. Vasudevan and Chan (2022) similarly analyse the gamified elements of platform interfaces,

demonstrating how streaks, badges, surge maps and progress bars recruit the worker's own motivation into the service of platform throughput. Cameron and Rahman (2022) complicate the picture by showing that resistance and control are mutually constituted, with workers developing tactical knowledge that the platform then absorbs into subsequent design iterations.

The economic substrate of this consent is dependence. Schor, Attwood-Charles, Cansoy, Ladegaard and Wengronowitz (2020) demonstrate that the experience of platform work diverges sharply according to whether the worker treats it as supplementary or primary income, with dependent workers reporting substantially worse conditions and far weaker bargaining positions. Anwar and Graham (2021), writing on African gig economies, describe workers positioned between a rock and a hard place, where flexibility is real but exercising it is unaffordable. Goods, Veen and Barratt (2019) reach a comparable conclusion in their assessment of job quality in Australian platform food delivery, finding that autonomy claims are difficult to sustain once pay structure and allocation mechanics are taken into account.

2.3 Occupational Risk, Wellbeing and Worker Vulnerability

The third strand concerns consequences. Bajwa, Gastaldo, Di Ruggiero and Knorr (2018) provide a broad framework for the health of gig workers, identifying time pressure, income insecurity, absence of insurance and exclusion from occupational safety regimes as compounding hazards. In delivery work these hazards are concentrated in the road environment, where meeting a delivery deadline and observing traffic regulations are frequently in direct conflict. Griesbach et al. (2019) report couriers describing exactly this trade-off, and Heiland (2021) connects it to the spatial compression that platforms impose on urban journeys.

Rani and Furrer (2021) emphasise that in developing economies these risks are amplified by the absence of institutional recourse. A worker who is deactivated, penalised or under-compensated has no grievance mechanism, no union recognition in most cases, and no realistic access to adjudication. Fairwork (2023) records precisely this pattern across Indian platforms, with fair management and fair representation attracting the lowest scores. Surie and Koduganti (2016) had already observed that the Indian platform worker's position is shaped less by the technology itself than by the surrounding institutional vacuum in which the technology operates.

Taken together, the literature establishes that algorithmic systems exercise managerial authority, that this authority secures compliance through the structuring of incentives rather than through command, and that the resulting conditions generate identifiable occupational and economic harm. What remains comparatively untested is the quantitative relationship between these three elements within quick-commerce, where the delivery window is shortest and the time pressure most extreme. The present study addresses that question directly.

3. RESEARCH METHODOLOGY

Research design. The study adopts a quantitative, descriptive and causal research design based on primary cross-sectional data. A survey approach was selected because the constructs of interest concern subjective perceptions of control, behaviour and insecurity that are best

captured through self-report, and because the objective is to establish the strength and direction of relationships across a population rather than to reconstruct individual narratives.

Population and sample. The population comprises delivery partners actively working for quick-commerce platforms in an Indian metropolitan market. Because no public sampling frame exists for this population, a combination of purposive and snowball sampling was employed. Respondents were approached at dark-store pick-up points, charging stations and informal rest areas during operating hours, and additional respondents were reached through referrals from initial participants. A total of 178 questionnaires were distributed; 165 were returned and 160 were retained after removing incomplete and patterned responses, giving a usable sample size of 160 and an effective response rate of 89.9 per cent. The sample size satisfies the conventional requirement of at least ten observations per measured item for exploratory factor analysis, since ten items were measured.

Instrument. The questionnaire comprised two sections. The first recorded five demographic and work-profile characteristics: age group, educational qualification, tenure on the platform, average hours logged per day, and average monthly earnings from platform work. The second contained ten statements measured on a five-point Likert scale anchored at 1 (strongly disagree) and 5 (strongly agree). Four statements measured perceived algorithmic coercion (APC1–APC4), three measured safety-compromising behaviour (SCB1–SCB3) and three measured worker vulnerability (VUL1–VUL3). Items were drafted with reference to the constructs identified by Wood et al. (2019), Veen et al. (2020) and Kellogg et al. (2020), and were translated into the local vernacular and back-translated to preserve meaning. The instrument was pilot-tested on 20 respondents who were excluded from the final sample.

Hypotheses. Four hypotheses were formulated on the basis of the reviewed literature:

H1: Perceived algorithmic coercion is significantly and positively associated with safety-compromising behaviour among quick-commerce delivery partners.

H2: Perceived algorithmic coercion is significantly and positively associated with worker vulnerability.

H3: Perceived algorithmic coercion and safety-compromising behaviour jointly explain a significant proportion of the variance in worker vulnerability.

H4: Perceived algorithmic coercion differs significantly across groups of workers logging different numbers of hours per day.

Analytical procedure. Data were coded and analysed using IBM SPSS Statistics. The analysis proceeded in five stages. First, frequency distributions were computed for the demographic variables. Second, the reliability of each construct was assessed using Cronbach's alpha, and the suitability of the data for factor analysis was tested using the Kaiser–Meyer–Olkin measure of sampling adequacy and Bartlett's test of sphericity. Third, exploratory factor analysis was conducted using principal component extraction with varimax rotation to verify the dimensional structure of the ten items. Fourth, Pearson product-moment correlations and multiple linear regression were used to test H1, H2 and H3, with regression diagnostics comprising the Durbin–Watson statistic and the variance inflation factor. Fifth, one-way analysis of variance with Levene's test of homogeneity, and an independent samples

t-test, were used to examine group differences and test H4. A significance threshold of .05 was applied throughout.

Ethical considerations. Participation was voluntary and unpaid, informed consent was obtained verbally before administration, no personally identifying information was recorded, and respondents were informed that they could withdraw at any point. Interviews were conducted during rest periods so as not to affect respondents' earnings.

4. RESULTS AND ANALYSIS

4.1 Demographic Profile of Respondents

Table 1 presents the demographic and work-profile characteristics of the 160 respondents across the five profiling variables.

Table 1. *Demographic and work profile of respondents (N = 160)*

Variable	Category	Frequency	Percentage (%)
Age (years)	18–24	50	31.2
	25–31	68	42.5
	32–38	32	20.0
	39 and above	10	6.2
Educational qualification	Up to secondary	46	28.8
	Higher secondary	54	33.8
	Graduate	46	28.8
	Post-graduate	14	8.8
Tenure on platform	Less than 6 months	34	21.2
	6–12 months	48	30.0
	1–2 years	46	28.8
	More than 2 years	32	20.0
Average hours logged per day	Up to 8 hours	37	23.1
	9–10 hours	45	28.1
	11–12 hours	41	25.6
	More than 12 hours	37	23.1
Average monthly earnings (₹)	Below 15,000	36	22.5
	15,001–20,000	60	37.5
	20,001–25,000	46	28.8
	Above 25,000	18	11.2

Note. Percentages are rounded to one decimal place and may not sum to exactly 100.

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The profile confirms that quick-commerce delivery work in the sampled market is performed overwhelmingly by young workers, with 73.7 per cent of respondents aged below 32 years. Educational attainment is moderate, with 37.6 per cent holding a graduate or post-graduate qualification, which suggests that platform work is absorbing labour that might otherwise have entered formal salaried employment. Work intensity is high: 48.7 per cent of respondents log more than ten hours per day and 23.1 per cent exceed twelve hours, well beyond the statutory daily limit applicable to formal employment. Earnings remain concentrated in the lower bands, with 60.0 per cent reporting monthly platform income of ₹20,000 or less despite these hours. Figure 1 displays the age distribution.

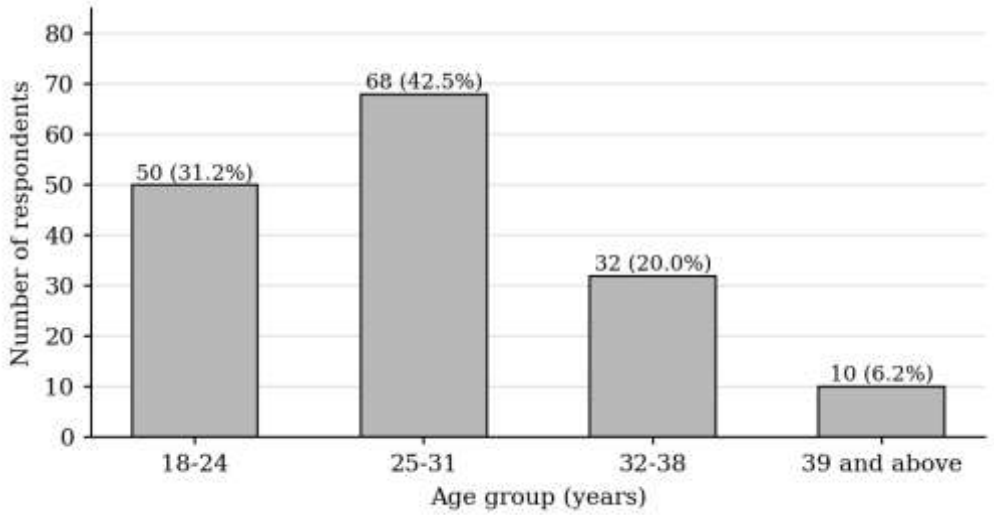

Figure 1. *Distribution of respondents by age group*

4.2 Reliability and Sampling Adequacy

Before proceeding to inferential analysis, the internal consistency of the three scales and the factorability of the correlation matrix were assessed. The results are reported in Table 2.

Table 2. *Reliability statistics and tests of sampling adequacy*

Construct	No. of items	Cronbach's alpha	Interpretation
Perceived algorithmic coercion (APC)	4	.823	Good
Safety-compromising behaviour (SCB)	3	.799	Acceptable
Worker vulnerability (VUL)	3	.831	Good
Overall scale	10	.869	Good
Kaiser–Meyer–Olkin measure of sampling adequacy		**.866**	**Meritorious**

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Construct	No. of items	Cronbach's alpha	Interpretation
Bartlett's test of sphericity: approx. χ^2		**658.482**	**df = 45, p < .001**

Note. Cronbach's alpha values above .70 are conventionally treated as acceptable. KMO values above .80 indicate that the sample is well suited to factor analysis.

All three constructs exceed the conventional .70 threshold for internal consistency, and the overall scale reliability of .869 indicates that the ten items function coherently as a single instrument. The Kaiser–Meyer–Olkin value of .866 falls in the meritorious range and Bartlett's test is highly significant, confirming that the correlation matrix is not an identity matrix and that factor analysis is appropriate.

4.3 Descriptive Analysis of Likert Items

Table 3 reports the wording, central tendency, dispersion, distributional properties and agreement level for each of the ten Likert statements. Agreement is defined as the proportion of respondents selecting either 4 (agree) or 5 (strongly agree).

Table 3. *Item-wise descriptive statistics and level of agreement (N = 160)*

Code	Statement	Mean	SD	Skewness	Kurtosis	Agreement (%)
APC1	The in-app delivery timer requires me to ride faster than I consider safe	4.031	0.827	–.463	–.472	75.0
APC2	I am aware that my location and speed are being tracked throughout my shift	4.200	0.783	–.528	–.697	80.0
APC3	Declining or missing an order reduces the orders I am offered afterwards	3.931	0.825	–.211	–.791	68.8
APC4	The incentive and penalty structure leaves me little real choice over my hours	3.750	0.816	–.140	–.535	62.5
SCB1	I disregard traffic rules or signals in order to meet a delivery deadline	3.944	0.818	–.174	–.879	68.8
SCB2	I skip meals or rest breaks to protect my rating and incentive streak	3.725	0.846	–.323	–.109	62.5
SCB3	I continue working when unwell or in unsafe weather to	3.681	0.835	–.131	–.222	57.5

Code	Statement	Mean	SD	Skewness	Kurtosis	Agreement (%)
	avoid losing earnings					
VUL1	My weekly income is unpredictable and I cannot plan household expenses	3.775	0.876	–.284	–.594	64.4
VUL2	I have no effective way to contest a penalty, low rating or deactivation	3.888	0.861	–.438	–.409	70.6
VUL3	I feel physically exhausted and anxious at the end of a working day	3.588	0.900	.075	–.807	50.6

Note. Responses were recorded on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree). Agreement denotes the combined proportion of "agree" and "strongly agree" responses. Skewness and kurtosis values within ±2 indicate approximate normality.

Every item records a mean above the scale midpoint of 3.00, indicating that the phenomena measured are widely experienced rather than confined to a minority. The highest agreement attaches to continuous surveillance (APC2, M = 4.200, 80.0 per cent agreement) and to the coercive effect of the delivery timer (APC1, M = 4.031, 75.0 per cent agreement), which together locate the source of pressure squarely in the design of the application. Notably, 68.8 per cent of respondents admit to disregarding traffic rules to meet deadlines (SCB1), a figure that converts an abstract discussion of algorithmic control into a concrete road-safety concern. The construct with the lowest mean is worker vulnerability, yet even here 70.6 per cent report having no effective means of contesting a penalty or deactivation (VUL2), confirming the absence of institutional recourse identified by Rani and Furrer (2021). All skewness and kurtosis values lie within ±1, satisfying the normality assumptions required for parametric testing. Figure 2 presents the item means graphically.

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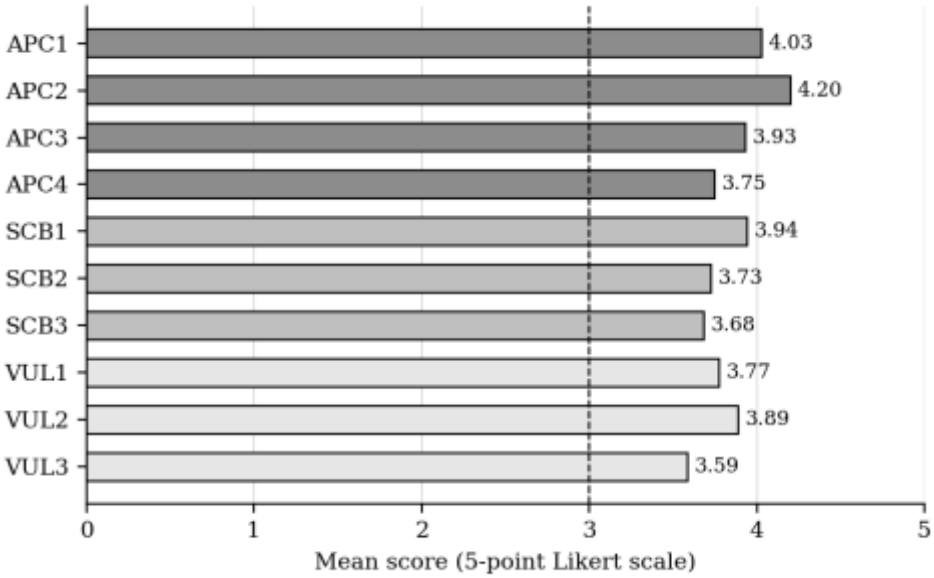

Figure 2. *Mean scores of the ten Likert items by construct*

4.4 Exploratory Factor Analysis

Principal component analysis with varimax rotation was performed on the ten items. Three components recorded eigenvalues exceeding unity, accounting cumulatively for 70.29 per cent of total variance: 45.92 per cent, 13.89 per cent and 10.48 per cent respectively. The scree plot in Figure 3 shows a clear inflexion after the third component, supporting the three-factor solution.

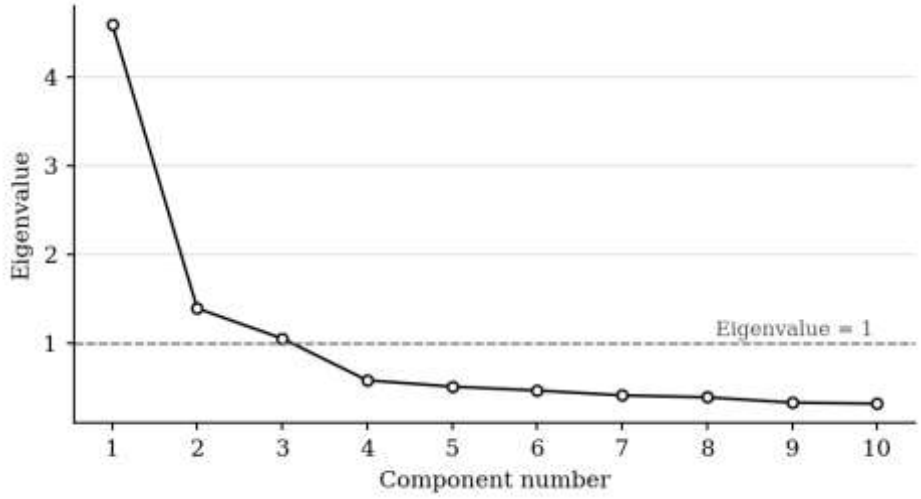

Figure 3. *Scree plot of eigenvalues from principal component analysis*

Table 4. *Rotated component matrix and communalities*

Item	Component 1 (APC)	Component 2 (VUL)	Component 3 (SCB)	Communality
APC1	.816	.233	.044	.722

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Item	Component 1 (APC)	Component 2 (VUL)	Component 3 (SCB)	Communality
APC2	.757	.195	.158	.636
APC3	.740	.180	.210	.625
APC4	.746	.177	.262	.657
SCB1	.180	.222	.763	.664
SCB2	.186	.188	.813	.731
SCB3	.105	.241	.819	.740
VUL1	.218	.806	.214	.744
VUL2	.256	.799	.145	.725
VUL3	.136	.832	.277	.786
Eigenvalue	**4.592**	**1.389**	**1.048**	—
Variance explained (%)	**45.92**	**13.89**	**10.48**	**70.29**

Note. Extraction method: principal component analysis. Rotation method: varimax with Kaiser normalisation. Rotation converged in five iterations. Loadings above .70 are treated as the defining items of each component.

The rotated solution reproduces the intended three-factor structure precisely. Each item loads above .74 on its designated component and below .29 on all others, indicating both convergent and discriminant validity. Communalities range from .625 to .786, confirming that the extracted factors account for a substantial share of the variance in every item. The four coercion items constitute the first and largest component, which is consistent with the theoretical expectation that perceived algorithmic control is the dominant organising dimension of the workers' experience.

4.5 Correlation and Regression Analysis

Table 5 reports, in Panel A, the descriptive statistics and Pearson correlations among the three composite constructs, and in Panel B, the multiple regression model in which worker vulnerability is regressed on perceived algorithmic coercion and safety-compromising behaviour.

Table 5. *Correlation matrix and multiple regression predicting worker vulnerability*

Panel A: Descriptive statistics and Pearson correlations					
Construct	**Mean**	**SD**	**APC**	**SCB**	**VUL**
Algorithmic coercion (APC)	3.978	0.657	1		
Safety compromise	3.783	0.704	.433**	1	

(SCB)					
Worker vulnerability (VUL)	3.750	0.760	.501**	.516**	1

Panel B: Multiple regression coefficients (dependent variable: worker vulnerability)					
Predictor	**B**	**Std. error**	**Beta**	**t**	**Sig.**
(Constant)	0.673	0.332	—	2.027	.044
Algorithmic coercion	0.395	0.082	.342	4.831	<.001
Safety compromise	0.398	0.076	.368	5.209	<.001
Model summary: R = .601; R^2 = .362; Adjusted R^2 = .353; SE = 0.611					
ANOVA: F(2, 157) = 44.453, p < .001; Durbin–Watson = 2.007; VIF = 1.230					

Note. ** Correlation is significant at the .01 level (two-tailed). Beta denotes standardised regression coefficients.

All three bivariate correlations are positive, moderate in magnitude and significant at the .01 level. Perceived algorithmic coercion is associated with safety-compromising behaviour at r = .433, supporting H1, and with worker vulnerability at r = .501, supporting H2. The strongest bivariate association is between safety compromise and vulnerability (r = .516), which indicates that the behavioural adaptations workers make in order to satisfy the platform are themselves a substantial contributor to their precarious position.

4.6 Group Differences by Exposure to the Platform

To test H4, a one-way analysis of variance was conducted with perceived algorithmic coercion as the dependent variable and average hours logged per day as the factor. An independent samples t-test was additionally used to compare worker vulnerability between shorter-tenure and longer-tenure respondents. Results appear in Table 6.

Table 6. *One-way ANOVA and independent samples t-test results*

Panel A: One-way ANOVA — perceived algorithmic coercion by daily hours logged					
Group (hours per day)	**N**	**Mean**	**SD**	**F**	**Sig.**
Up to 8 hours	37	3.716	0.613		
9–10 hours	45	3.817	0.647	8.430	<.001
11–12 hours	41	4.037	0.663		
More than 12 hours	37	4.372	0.516		
Between groups: SS = 9.580, df = 3, MS = 3.193; Within groups: SS = 59.093, df = 156, MS = 0.379					
Levene's test: F = 0.632, p = .596; Eta squared = .140					
Panel B: Independent samples t-test — worker vulnerability by tenure					

Group (tenure)	N	Mean	SD	t	Sig.
Less than one year	82	3.606	0.775	2.504	.013
One year and above	78	3.902	0.717	df = 158	MD = 0.296

Note. MD denotes mean difference. Levene's test for equality of variances was non-significant in both panels, so equal variances were assumed.

Perceived algorithmic coercion differs significantly across the four exposure groups, $F(3, 156) = 8.430$, $p < .001$, with an eta squared of .140 indicating a large effect by conventional standards. The pattern is monotonic: mean perceived coercion rises steadily from 3.716 among those logging up to eight hours to 4.372 among those exceeding twelve hours. H4 is supported. This gradient is the empirical signature of the velocity paradox, since the workers who exercise their nominal freedom to work longer are precisely the workers who report the least freedom in how they work. The t-test in Panel B shows that longer-tenured workers report significantly higher vulnerability than newer entrants ($t(158) = 2.504$, $p = .013$, mean difference = 0.296), indicating that exposure to the platform does not produce security through experience but accumulates disadvantage over time. Figure 5 displays the construct means across exposure groups.

5. DISCUSSION

The results provide quantitative support for a proposition that has so far been advanced largely through qualitative work: that algorithmic management in high-velocity delivery does not simply coordinate labour but reconstructs the worker's decision environment so that unsafe and self-harming choices become economically rational. The correlation between perceived coercion and safety-compromising behaviour, and the significant regression weight attaching to both in predicting vulnerability, indicate that these are not parallel phenomena but sequential ones. Pressure exerted through the interface is converted into behaviour on the road, and behaviour on the road is converted into economic and physical precarity.

The monotonic increase in perceived coercion across hours logged is the most theoretically consequential finding. If flexibility operated as platforms describe it, the workers with the greatest voluntary engagement would report the greatest sense of control. The opposite is observed. This is consistent with the dependence mechanism identified by Schor et al. (2020) and with Wood et al.'s (2019) finding that autonomy and intensification co-occur. It suggests that the meaningful unit of analysis is not the individual decision to accept an order but the cumulative structure within which such decisions are made.

The tenure finding deserves particular attention. In conventional employment, tenure ordinarily brings security, seniority and improved terms. Here it brings the reverse. Longer-tenured workers report higher vulnerability, which is consistent with Cameron and Rahman's (2022) account of platforms absorbing worker tactics into subsequent design revisions, and with the observation that loan obligations and depreciating vehicles accumulate faster than earnings improve. Time on the platform appears to deepen dependence rather than to relieve it.

6. CONCLUSION

This study set out to examine whether the speed promise on which quick-commerce is built imposes measurable costs on the workers who deliver it. Using a sample of 160 delivery partners and a ten-item Likert instrument of demonstrated reliability, it found that perceived algorithmic coercion is widespread, that it is significantly associated with safety-compromising behaviour, and that the two together explain slightly more than a third of the variance in worker vulnerability. It further found that perceived coercion increases systematically with exposure to the platform and that vulnerability increases with tenure. The velocity paradox is therefore not a rhetorical device but an observable empirical structure: the flexibility the platform offers is real in form and negated in practice by the economic consequences attached to exercising it.

Several implications follow. For platform operators, the finding that safety compromise is the stronger proximate predictor of vulnerability indicates that interventions targeting the delivery timer, the penalty structure and the visibility of countdown mechanics would act closer to the source of harm than post-hoc insurance schemes. Decoupling incentive eligibility from acceptance rates, removing visible countdowns from the rider interface, and building weather and traffic contingencies into the delivery estimate rather than into the rider's discretion would each reduce the conversion of commercial urgency into personal risk. For policymakers, the absence of contestation mechanisms reported by 70.6 per cent of respondents points to algorithmic due process — a right to explanation, review and appeal of automated penalties — as a minimally invasive and high-value regulatory intervention. For researchers, the study demonstrates that constructs developed in qualitative platform scholarship can be operationalised quantitatively and tested in non-Western settings.

The study has limitations that qualify these conclusions. The cross-sectional design permits the identification of association but not of causal direction; it is possible that workers who already feel vulnerable perceive algorithmic systems as more coercive. The reliance on purposive and snowball sampling within a single metropolitan market restricts generalisability, and self-reported admissions of traffic violations may be affected by social desirability bias in either direction. Future research should pursue longitudinal designs that track workers across tenure, incorporate objective platform telemetry alongside self-report, and extend the analysis comparatively across cities and platform brands. A mixed-methods extension combining this instrument with rider interviews would also help establish the mechanisms through which perceived coercion is translated into behaviour. Notwithstanding these limits, the evidence assembled here indicates that velocity in quick-commerce is not free, and that its price is currently paid almost entirely by the least protected participant in the transaction.

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