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IS GIG WORK THE SAME FOR EVERYONE? PSYCHOSOCIAL JOB DEMANDS, RESOURCES, AND WELL-BEING IN PLATFORM WORK ACROSS EUROPE: EVIDENCE FROM THE GIG-OSH STUDY

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Highlights
- On-location and web-based gig work have distinct psychosocial risk profiles.
- On-location workers face higher levels of emotional distress, aggression and violence.
- Job demands predict poor health and well-being more strongly than job resources.

Abstract
Objectives: Research on digital platform work increasingly highlights unclear employment arrangements and pressures related to algorithmic management. This study aimed to describe psychosocial working conditions in web-based and on-location gig work using the job demands-resources (JD-R) model and examine associations between job demands, job resources, factors preventing resource depletion (FPRD), and health outcomes among platform workers. **Material and Methods:** Cross-sectional data were drawn from the GIG-OSH project conducted in 7 European countries (Belgium, Denmark, Finland, Poland, Spain, Sweden, and the United Kingdom). Data were collected through an online survey in November 2023 – April 2024. The analytic sample comprised 3299 platform workers (1476 on-location, 1823 web-based). A project-specific questionnaire assessed socio-demographic characteristics, employment conditions, workload, occupational safety and health hazards, psychosocial working conditions, algorithmic management, and health outcomes. Psychosocial factors were classified as job demands, job resources, or FPRD within an extended JD-R framework. **Results:** Platform work was characterized by an imbalance between job demands and resources, particularly among on-location workers. Compared with web-based workers, they reported greater exposure to emotionally disturbing situations, aggression, violence, discrimination, and sexual harassment. Working alone was common in both groups but more prevalent in web-based work. Factors preventing resource depletion indicators, especially absence of fines and protection against fraudulent bookings, were more favourable in web-based work. Higher job demands were significantly associated with poorer health outcomes, with emotionally disturbing situations showing the strongest effect. Job resources demonstrated modest protective associations, whereas FPRD indicators, particularly not working while ill, were consistently associated with better health. **Conclusions:** Platform work involves substantial psychosocial risks linked to poorer well-being and health, supporting the JD-R model. Distinct psychosocial profiles of web-based and on-location work highlight the need for targeted occupational health and platform policy interventions. Int J Occup Med Environ Health. 2026;39(5)

Key words:
occupational health, psychosocial working conditions, job demands–resources model, platform work, gig economy, algorithmic management

INTRODUCTION

The emergence and controversy of the gig economy

The gig economy is rapidly expanding across various sectors, reshaping labor markets and sparking debate. While it offers new opportunities enabled by technology, it also raises concerns about declining worker rights and well-being [1]. Technology in this sector facilitates easier hiring and firing, which leads to the erosion of traditional protections. As Lucas Biewald, CEO of CrowdFlower, said in 2010, "Before the Internet, it would be really difficult to find someone, sit them down for ten minutes and get them to work for you, and then fire them after those ten minutes. But with technology, you can actually find them, pay them the tiny amount of money, and then get rid of them when you don't need them anymore" [2].

Scholars struggle to build an universal definition of gig work. In a recent study, Cropanzano et al. [3] identified 78 definitions varying in scope and reference points, concluding that gig work is not a specific job class but rather a mode of organizing work that can apply to diverse occupations. In the present study, gig work is defined operationally as income-generating activities mediated by digital platforms that allocate tasks through algorithmic systems and involve short-term, task-based engagements.

Given this broad and flexible understanding, gig work encompasses a wide range of organisational arrangements and occupational contexts, which has prompted scholars to propose various typologies capturing its internal diversity. For example, Watson et al. [4] identified 5 profiles of gig workers:

- gig service providers (e.g., Uber),
- gig goods providers (e.g., Etsy),
- gig data providers (e.g., Prolific),
- agency gig workers (assigned to jobs by third parties, e.g., Model Management),
- traditional gig workers (who find gigs independently, e.g., via OLX).

Similarly, Bérastégui [5] distinguished between on-demand physical services, web-based freelancing, and crowdsourced work based on 4 criteria: type of work, location,

task division, and task complexity. While these frameworks highlight the heterogeneity of platform work, they also converge on a key distinction between work performed remotely and work delivered in physical locations. Building on this shared dimension, and to ensure analytical clarity, the present study adopts a simplified categorisation distinguishing between web-based gig work and on-location gig work. This approach aligns particularly with Bérastégui's differentiation between web-based and on-demand physical services [5] and allows for meaningful comparison of psychosocial working conditions within the job demands-resources (JD-R) framework.

Psychosocial risks and working conditions in platform work

In gig work, classic work-related hazards are combined with new ones arising from the mode of work, the lack of an organisational framework that builds work culture and community, and the dehumanised algorithmic management (AM) [5]. Interest in gig work has grown significantly in the past decade. Few studies directly compare web-based and on-location platform jobs, though both share precariousness and differ in physical and psychosocial risks [4]. Research into psychosocial conditions on digital platforms is relatively recent, with more reports now emerging [6–9].

Platform workers face excessive workload, conflicting demands, role ambiguity, limited involvement in decision-making, lack of control over work, job insecurity, ineffective communication, inadequate support from management or colleagues, discrimination, psychological and sexual harassment, violence and interactions with problematic clients [7]. Their work is characterized by a departure from formalized workplaces and the need to perform tasks independently, often in physical and social isolation [9–11]. Furthermore, the absence of co-worker interaction, the constant need to compete for tasks, and AM contribute to significant stress [5,12].

The increasing body of evidence suggests that the combination of unfavorable psychosocial working conditions and AM can have a detrimental impact on occupational safety, potentially leading to a decline in employee well-being and work ability [13]. These negative effects may be intensified by the type of platform work (web-based or on-location) and the country-specific working conditions in general [14].

The job demands-resources framework and gig work

Psychosocial working conditions can be considered from the perspective of the JD-R model [15,16]. The JD-R model assumes that high job demands are sources of exhaustion, while lack of resources contributes to disengagement from work, and interaction between them has a profound impact on general well-being and job performance. Keith et al. [17] were one of the first researchers who employed the JD-R model to describe psychosocial working conditions of gig workers. In their theoretical conceptualisation of gig work, they list the following demands: lack of job security, alienation, precarious working conditions, underemployment (in this condition at least one of following is present: underutilisation of skills, qualifications or abilities, underpayment and/or number of hours worked below expectations), and emotional labour. On the resources side, they focused on autonomy and skill/task variety. In turn, Watson et al. [4] attempting to identify profiles of gig workers based on the JD-R model, consider the following as job demands: alienation, emotional labour, overqualification, to little hours of work and underemployment. On the side of resources, they list work scheduling and decision-making autonomy, social support and task identity.

The results of other studies, although not directly related to JD-R theory, indicate many psychosocial working conditions on digital platforms which can be conceptualised either as job demands or resources. For example, in the area of demands related to customer contact, gig workers face emotional distress, aggression, violence, harassment [8,18],

and discrimination [9,19]. In some types of on-location platform work, workers experience high workload accompanied by high physical and psychological demands of work [5,20]. Gig work appears to be rather poorly resourced to enable workers to cope effectively with the job demands or reduce the strain related to them [18]. The absence of formal employment contracts, along with unclear and often low pay, risks of fraud, and career-path uncertainty contributes to job insecurity [10]. In addition, AM can lead to a loss of autonomy and control over work [20]. In the context of feedback as a job resource, gig workers depend heavily on customer feedback, which is frequently associated with performance-based penalties or fines [21].

The few but promising attempts to empirically apply the JD-R model in gig work research indicate the need to introduce certain adjustments that would better reflect the intrinsic and extrinsic job demands and resources present in work performed via digital platforms. Given the early stage of research on the psychosocial conditions in the gig economy, it should be noted that the authors are in a phase of theoretical and empirical exploration. Currently, gig work analyses within the JD-R theoretical framework go beyond the demands and resources well known from traditional employment relations, trying to capture the peculiarities of this work model. The present study is part of this trend.

Research gap and contribution

In line with this exploratory direction, the authors also seek to address several gaps that have remained largely unexamined in the current body of research on platform work. First, while research on platform work has grown, direct comparisons between web-based and on-location platform work using large, multi-country samples remain limited. Second, empirical applications of the JD-R framework to gig work are still in early stages, and the field would benefit from studies that examine how specific psychosocial demands and resources, as well as factors related to job security, are associated with health outcomes in this population. Third, the inclusion of factors preventing resource depletion (FPRD) as an analytical category offers a novel perspective on resource protection in precarious work arrangements. Unlike traditional resources that actively facilitate goal attainment and personal growth, FPRD captures conditions that primarily shield workers from eroding their existing resources, a distinction particularly relevant in the volatile gig economy context.

Aim of the study

Against this background, the present study aims to examine some psychosocial working conditions in the European gig economy through the lens of the JD-R model and to explore their associations with gig workers' well-being. Given the exploratory nature of this study, the authors formulate the following research questions (RQ):

- RQ1. What are the prevalence rates of selected psychosocial demands, autonomy resources, and FPRD among web-based versus on-location platform workers, and do these differ significantly between the 2 modalities?
- RQ2. Are selected psychosocial job demands, autonomy resources, and FPRD associated with poor psychological well-being and poor self-rated general health among platform workers?

Based on the JD-R framework and previous research, the authors expect that higher exposure to job demands will be associated with poorer health outcomes, while the presence of resources and FPRD will be associated with better outcomes. However, given the selective nature of the included variables and the exploratory analytical approach, the authors do not formulate specific directional hypotheses.

MATERIAL AND METHODS

Participants and sampling procedure

The authors used cross-sectional data from the GIG-OSH project conducted in 7 European countries (Belgium,

Denmark, Finland, Poland, Spain, Sweden, and the United Kingdom). The data were collected from platform workers in November 2023 – April 2024 using a web-based survey. The survey captured information on demographics, type of work, platform name, employment conditions, workload, physical and psychosocial hazards, algorithmic management, accidents, somatic complaints, and well-being. The instrument was developed through an iterative process combining systematic literature review, the team's prior expertise in non-standard labour research, and a co-creation framework involving researchers, advocacy bodies, and policy stakeholders. Translated via a standardised protocol and pilot-tested in each participating country, the survey was administered through REDCap (Vanderbilt University, Nashville, USA) and covered a comprehensive range of domains – from demographics and work conditions to income instability and occupational health. Embedded attention checks and response-time monitors were employed throughout to ensure data reliability and filter out low-quality responses. Eligible participants were required to be ≥16 years old, currently engaged in income-generating activities through a digital labour platform, and proficient in the language in which the survey was administered. In multilingual countries, surveys were provided in all official national languages. Gig-workers were informed that participation was voluntary, received full disclosure regarding the study's objectives, procedures, and expected outcomes, and were assured of anonymity.

Given the challenges in accessing gig workers, a multi-channel non-probability sampling strategy was employed, tailored to national contexts while maintaining common objectives. Recruitment channels included targeted digital advertising on social media, organic outreach through online worker communities, paid postings on microtask platforms (Prolific and Upwork), in-person fieldwork in urban areas, institutional collaboration with unions and agencies, snowball sampling, external research agency support, and recontacting previous study participants. The specific mix of methods varied across countries depending on local contexts and platform presence, but all followed a standardized survey instrument and informed consent protocol. No financial incentives were offered in most recruitment channels. However, participants recruited through microtask platforms (Prolific and Upwork) received the standard compensation routinely provided by these platforms for completed tasks.

The initial dataset comprised responses from 3945 platform workers. After excluding records with unspecified or inconsistent information on platform type or platform name and cases with declared 0 working hours in past month, the final analytical sample included 3299 participants: 237 from Belgium, 535 from Denmark, 343 from Finland, 745 from Poland, 541 from Spain, 439 from Sweden, and 458 from the United Kingdom. Participants were engaged in on-location (N = 1476, 44.7%) or web-based work (N = 1823, 55%). Web-based workers were slightly older than on-location workers (mean [M] ± standard deviation [SD] 33.3±10.2 years vs. 31.9±10.5 years). However, the composition of the web-based and on-location groups differed substantially across countries, indicating that work modality was not evenly distributed across national cohorts. This imbalance should be taken into account when interpreting comparisons between the 2 modalities, as some observed differences may partly reflect country-specific recruitment patterns, platform structures, labour-market conditions, or regulatory contexts rather than work modality alone. The group of on-location workers was male-dominated, while gender was balanced among web-based workers. Significantly more on-location workers than web-based workers declared that more than half of their income came from platform work (38.3% vs. 17.1%). The number of participants who rated their general health as poor and scored <50 on the *World Health Organization-Five Well-Being Index* (WHO-5) [22] was comparable in both groups (Table 1).

Table 1. Sociodemographic characteristics and health status in the study sample by type of work – data collected online from platform workers, GIG-OSH project conducted in 7 European countries (Belgium, Denmark, Finland, Poland, Spain, Sweden, and the United Kingdom), November 2023 – April 2024

Variable	Participants (N = 3299)	
	web-based (N = 1823, 55.3%)	on-location (N = 1476, 44.7%)
Sociodemographic		
age [years] (M±SD)	33.3±10.2	31.9±10.5
gender (male) [n (%)]	894 (49.0)	984 (66.7)
country cohort [n (%)]		
Poland	209 (11.5)	536 (36.3)
Sweden	317 (17.4)	122 (8.3)
Belgium	153 (8.4)	84 (5.7)
Denmark	123 (6.8)	412 (27.9)
Finland	285 (15.6)	58 (3.9)
Spain	372 (20.4)	169 (11.5)
United Kingdom	363 (19.9)	95 (6.4)
Other	1 (0.1)	0 (0.0)
proportion of income from platform [n (%)]		
<10%	1026 (56.3)	246 (16.7)
10–25%	278 (15.3)	307 (20.8)
26–50%	117 (6.4)	254 (17.2)
51–75%	92 (5.1)	178 (12.1)
76–100%	219 (12.0)	387 (26.2)
I do not know/missing	91 (5.0)	104 (7.1)
Health outcomes [n (%)]		
poor general health	200 (11.0)	156 (10.6)
WHO-5 ≤50 (poor mental well-being)	577 (32.0)	461 (31.6)

WHO-5 – *World Health Organization-Five Well-Being Index*.

Conceptual and analytical approach to data analyses

Drawing on the GIG-OSH data set, the authors conducted an *ex post* categorisation of the psychosocial working conditions assessed in the survey, using the JD-R model [15] as the main theoretical framework linking the selected exposures, outcomes, and analyses. In this framework, the variables included in the study were treated not as isolated risk factors but as indicators of 3 theoretically meaningful domains: job demands, job resources, and factors preventing resource depletion (FPRD). The authors defined job demands as "those physical, psychological, social, or organizational aspects of the job that require sustained physical and/or psychological (i.e., cognitive or emotional) effort and are therefore associated with certain physiological and/or psychological costs" [23, p. 296] and job resources as "those physical, psychological, social, or organizational aspects of the job that either/or (1) reduce job demands and the associated physiological and psychological costs; (2) are functional in achieving work goals; (3) stimulate personal growth, learning and development" [23, p. 296].

In line with the health-impairment pathway of the JD-R model, the authors expected demands such as emotionally disturbing situations, aggression, violence, discrimination, sexual harassment, and working alone to be associated with poorer psychological well-being and poorer self-rated general health. In line with the motivational and buffering assumptions of the model, autonomy indicators were conceptualized as job resources that may support workers' functioning and reduce strain, which are not commonly included in classical JD-R-based research. This distinction is consistent with the ecological perspective on stress presented by Hobfoll in conservation of resources (COR) theory [24,25], according to which stress should be understood not only as a reaction to immediate demands, but also as a process embedded in a wider resource ecology. From this perspective, individuals strive to obtain, retain, protect, and recover resources, while contextual conditions may either expose them to resource loss or help prevent such loss. Factors preventing resource depletion are therefore neither job demands nor job resources *per se*, but they may shape the conditions under which workers are able to preserve existing resources. This category is particularly relevant in

gig work, where formal employment protection is limited and where platform rules, penalties, fraud risks, and pressure to work while ill may directly affect workers' capacity to conserve resources. For example, the absence of financial penalties for errors is not a job demand or a job resource in the strict JD-R sense, but it protects existing resources: a lower risk of being fined may reduce work-related stress and help preserve both financial and energetic resources. The authors tentatively define FPRD as work context factors that support resource preservation and are positively associated with employee well-being.

In the present analyses, working alone was treated as an intrinsic demand because it reflects the way platform tasks are organized and performed. Emotionally disturbing situations, aggression, violence, discrimination, and sexual harassment were treated as contextual interpersonal demands because they arise from interactions with clients, customers, passengers, or other actors in the platform work environment. Autonomy in service allocation, working-time allocation, and speed of work were treated as job resources because they indicate workers' control over key aspects of task execution and scheduling.

The third category of factors preventing depletion of resources includes contextual work conditions affecting job security. For the reasons mentioned earlier (i.e., the temporary nature of the contract and the lack of a typical employee-employer relationship), the job security in gig work is understood here as such organization of work and procedures which promote recovery during illness, and provide transparent business rules both for workers and customers. The authors therefore treated absence of fines, absence of fraudulent bookings, and not working while ill as FPRD indicators. These variables were included in the analyses because they capture platform-specific mechanisms through which financial, energetic, and recovery-related resources may be preserved, and because such preservation is theoretically relevant for health and well-being within an extended JD-R perspective.

The full list of variables, with the abbreviated survey items and coding, is presented in the Table 2.

All psychosocial working conditions were measured using a single question with predefined response categories. For the purposes of the present analyses, the job demand items and selected FPRD items were dichotomized into yes/no categories, as shown in Table 2. This approach was adopted to facilitate the interpretation of the regression models and to ensure sufficient numbers of observations within each response category for reliable estimation. Job autonomy variables retained their categorical coding reflecting who primarily determined service allocation, work pace, and working time. General health was assessed using a single self-rated item with a 5-category response scale ranging from "poor" to "excellent." Psychological well-being was measured with the WHO-5, a brief self-report instrument assessing subjective well-being over the previous 2 weeks. The WHO-5 raw scores were transformed to a 0–100 scale, with higher scores indicating better well-being; scores of ≤50 were treated as indicating poor well-being [22]. The validation study performed in 36 countries showed that WHO-5 is a highly reliable screening tool. In the present sample, the WHO-5 showed high internal consistency (Cronbach's $\alpha = 0.89$). For more detailed description of the cohort and measures see Belvis et al. [26].

Statistical analysis

The statistical analysis proceeded in 2 stages that corresponded to the conceptual logic of the JD-R framework. First, the authors examined whether the distribution of theoretically defined job demands, job resources, and FPRD differed between web-based and on-location platform workers. This descriptive comparison was used to assess whether the 2 work modalities represent distinct psychosocial configurations of demands and resources. Descriptive statistics were used to summarize the distribution of the study variables, and group differences

Table 2. Categorisation of variables within job demands–resources (JD-R) framework – data collected online from platform workers, GIG-OSH project conducted in 7 European countries (Belgium, Denmark, Finland, Poland, Spain, Sweden, and the United Kingdom), November 2023 – April 2024

JD-R model	Psychosocial working conditions	Abbreviated GIG-OSH survey item
Job demands[a]	exposure to emotionally disturbing situations	being in situations that are emotionally disturbing
	exposure to clients' aggression	receiving threats by customers, clients or others including web-based threats/trolling
	exposure to clients' violence	being at risk of getting attacked
	exposure to discrimination	experiencing discrimination
	exposure to harassment	experiencing any form of sexual harassment
	lone work	working alone (with no or sparse contact with other people)
Job resources[b]	job autonomy: flexibility of service allocation	usual method of service allocation
	job autonomy: flexibility of working time allocation	usual method of scheduling rosters, shifts or working hours
	job autonomy: control over speed of work	work pace setting
Factors preventing resource depletion	job security: lack of fraudulent booking	receiving fraudulent bookings
	job security: lack of fines[c]	being at risks of getting fines
	job security: not working while ill[d]	working through the platform while sick

[a] Response scale used for job demands items 1–6: no; yes, sometimes; yes, frequently. Codes for analyses: yes – 1, no – 0.
[b] Response scale used for job resources items 1–3: set by platform, set by clients, set by me, combination by me/client/platform. Codes for analyses: set by me – 0, combination me/client/platform – 2; set by others (platform/clients) – 1.
[c] Response scale used for job resources items 4–5: no; yes, sometimes; yes, frequently). Codes for analyses: no – 0, yes – 1.
[d] Response scale used for job resources item 6: yes; no. Codes for analyses: no – 0, yes – 1.

in categorical variables were tested with χ^2 tests of independence. To assess the strength of these associations, the authors also report Cramér's V and the contingency coefficient. Second, the authors examined whether the selected JD-R categories were associated with 2 theoretically relevant health-impairment outcomes: poor psychological well-being and poorer self-rated general health. These outcomes were chosen because the JD-R model assumes that exposure to demands, insufficient resources, and depletion of resources may translate into psychological strain and poorer health.

Associations between job demands, job resources, FPRD, and the 2 outcomes were tested using binary logistic regression. The first outcome was psychological well-being, coded as 1 – "poor well-being" (WHO-5 ≤50) and 0 – "good well-being" (WHO-5 >50). The second outcome was self-rated general health, coded as 1 – "poor/fair" and 0 – "good/very good/excellent" . For each outcome and each psychosocial working condition 3 regression models were estimated: an unadjusted models included the focal predictor only and provided crude odds ratios (models 0), a models adjusted for age, gender, and country (models 1), and a fully adjusted models additionally controlling for work type and perceived income adequacy (models 2). Separate regression models were estimated for each psychosocial working condition because the study aimed to examine the independent association of each theoretically defined demand, resource, and FPRD indicator with health outcomes rather than to construct a multivariable predictive model. A 2-tailed p-value < 0.05 was considered statistically significant. Missing values for gender and income were retained in the adjusted models as separate categories. Because some exposure, outcome, and covariate variables contained missing data, the number of observations varied

slightly across models. Each model was therefore estimated using all non-missing observations for the variables included in that model.

Ethics statement

The study protocol was approved by the Regional Ethics Board of Stockholm with No. 2023-02230-01 and the Drug Research Ethics Committee (CEIm) of Hospital del Mar (ref. No. 2023/11095/I-) for Spain. The other GIG-OSH consortium partners operated under the Swedish ethical approval.

RESULTS

Job demands

The authors examine the prevalence of each demand across work types (on-location vs. web-based) and assess group differences. The results are presented in Table 3.

On-location workers reported markedly higher exposure to emotionally disturbing situations than web-based workers, a difference was statistically significant and moderate in magnitude. A similar pattern was observed for direct exposure to hostile client behavior. Nearly two-thirds of on-location workers reported aggression from customers, clients, or passengers, compared with only one-fifth of web-based workers, representing the largest difference across the demand indicators. Exposure to violence was also far more prevalent in on-location work. Differences were likewise observed for discrimination and sexual harassment. Discrimination was reported by 25.6% of on-location workers and 8.4% of web-based workers, whereas sexual harassment was reported by 15.9% and 4.2%, respectively. Although the effect sizes for these comparisons were smaller than those observed for aggression or violence, both differences remained statistically significant. A different pattern emerged for work alone. Working alone was highly prevalent in both groups but more common among web-based workers than among on-location workers. Thus, while on-location workers were more exposed to interpersonal and emotionally demanding working conditions, web-based workers were more likely to experience social isolation in their work.

Job resources and FPRD

Results are organized into 2 resource domains assessed in this study: job autonomy (control over service allocation, working-time allocation, and speed of work) and job security-related FPRD (absence of fines, fraudulent bookings, and not working while ill). The frequencies of job resources analyzed in the study are presented in Table 3.

Web-based workers reported slightly higher levels of flexibility in service allocation (22.2%) compared to on-location workers (14.6%). Similar differences were found in the case of flexibility in time allocation and speed of work. Across these dimensions, the effect sizes were small. Clearer differences emerged for the FPRD indicators (not getting fines, fraudulent bookings, and working while ill). The absence of fines was reported by 92.4% of web-based workers but only 38.5% of on-location workers, representing a very large and statistically significant difference. Similarly, protection against fraudulent bookings was more common in web-based work than in on-location work. The pattern was reversed for working while ill. A smaller proportion of web-based workers reported not working while sick compared with on-location workers. The descriptive results indicate that on-location platform work is characterized by greater exposure to hostile, emotionally demanding, and potentially unsafe interpersonal conditions, whereas web-based platform work more often involves social isolation but somewhat higher autonomy and greater protection against fines and fraudulent bookings.

Job demands, job resources, FPRD and well-being outcomes

Table 4 presents odds ratios (ORs), 95% confidence intervals (CIs), and model-fit indicators from logistic regression models examining the associations of job demands,

Table 3. Prevalence of job demands, job resources and factors preventing resources depletion (FPRD) by type of work in the study sample – data collected online from platform workers, GIG-OSH project conducted in 7 European countries (Belgium, Denmark, Finland, Poland, Spain, Sweden, and the United Kingdom), November 2023 – April 2024

Psychosocial working conditions	Participants (N = 3299) [n (%)][a]		χ^2	p	Cramér's V	Contingency coefficient
	web-based (N = 1823)	on-location (N = 1476)				
Job demand[a]						
exposure to emotionally disturbing situations	428 (23.7)	759 (52.0)	302.12	≤0.001	0.29	0.28
exposure to aggression	374 (20.6)	939 (64.3)	688.77	≤0.001	0.44	0.40
exposure to violence	187 (10.3)	661 (45.1)	551.03	≤0.001	0.39	0.36
exposure to discrimination	151 (8.4)	368 (25.6)	190.14	≤0.001	0.23	0.23
exposure to harassment	75 (4.2)	229 (15.9)	133.17	≤0.001	0.20	0.19
work alone	1509 (82.8)	1000 (68.1)	101.15	≤0.001	0.17	0.17
Job resource[b]						
autonomy in speed of work			23.38	≤0.001	0.09	0.09
set by the worker	846 (48.8)	591 (43.5)				
set by client/platform	726 (41.9)	678 (49.9)				
set by the worker and client/platform	161 (9.3)	89 (6.6)				
autonomy in service allocation			45.68	≤0.001	0.12	0.12
set by the worker	386 (22.2)	205 (14.6)				
set by client/platform	1170 (67.4)	1085 (77.2)				
set by the worker and client/platform	181 (10.4)	116 (8.3)				
autonomy in working time			19.42	≤0.001	0.08	0.08
set by the worker	1132 (65.3)	795 (57.4)				
set by client/platform	446 (25.7)	456 (33.0)				
set by the worker and client/platform	157 (9.1)	133 (9.6)				
FPRD[c]						
job security						
lack of fines	1677 (92.4)	564 (38.5)	1175.47	≤0.001	0.57	0.50
lack of fraudulent booking	1488 (81.7)	933 (63.7)	144.57	≤0.001	0.20	0.20
not working while sick	779 (43.2)	795 (55.9)	59.80	≤0.001	0.13	0.13

The number of gig workers confirming the presence of [a] exposure in their work, [b] resource in their work, and [c] FPRD in their work.

job resources, and FPRD with poor well-being, defined as a WHO-5 score of ≤50. Across all models, all job demands except exposure to sexual harassment were significantly associated with higher odds of poor well-being. In the fully adjusted model (model 2), the strongest association was observed for emotionally disturbing situations faced during work. The presence of this demand increased the risk of poor well-being almost twice (Table 4). Poor

well-being was also more likely among workers exposed to discrimination, aggression, violence, and working alone. In contrast, exposure to sexual harassment was not significantly associated with poor well-being in any of the estimated models, and the corresponding crude model showed virtually no improvement in model fit, which supports the conclusion that this variable did not contribute meaningfully to explaining poor well-being in the present data. In addition to the size and significance of individual odds ratios, the interpretation of the results should take into account the overall fit of the models. Across predictors, likelihood-ratio tests generally indicated statistically significant improvement over the null model, especially after adjustment for sociodemographic characteristics, work type, and income adequacy. However, the pseudo-R^2 values were consistently low, indicating that the models explained only a small proportion of the variance in poor well-being. Thus, the results should be interpreted as evidence of statistically reliable but modest explanatory associations rather than as strongly predictive models.

Compared with job demands, job resources showed fewer and less consistent associations with mental well-being. Among the 3 autonomy indicators, only autonomy in the speed of work was significantly associated with mental well-being. A complete lack of autonomy in determining work pace was associated with a risk of poorer mental well-being, even after controlling confounders. No significant associations were observed for autonomy in service allocation or time allocation (Table 4).

Among FPRD indicators, receiving fines and working while ill were associated with poorer well-being. In the fully adjusted model, workers exposed to fines had slightly higher odds of poor mental well-being, whereas presenteeism showed a stronger association. Fraudulent bookings were not significantly associated with mental well-being after full adjustment (Table 4). However, all models for job resources and FPRD suffer from low indicators of fit.

Job demands, job resources, FPRD, and general health

Table 4 presents ORs, 95% CIs, and model-fit indicators from logistic regression models examining the associations of job demands, job resources, and FPRD and poorer self-rated general health (poor/fair vs. good/very good/excellent). All job demands except exposure to sexual harassment were significantly associated with poorer general health. In the fully adjusted model 2, the strongest associations were observed for exposure to emotionally disturbing situations and exposure to violence, indicating more than a 2-fold increase in the odds of poorer general health. Exposure to aggression was also strongly associated with poorer health. Smaller but still meaningful associations were found for discrimination and working alone (Table 6).

Autonomy in speed of work was not related to general health, instead the authors found the association between autonomy in time allocation and general health - only shared control over working time was significantly associated with general health. In the fully adjusted model, compared with workers who determined their own working time, those whose working time was jointly determined by the worker and the client/platform had lower odds of poor self-rated health (Table 6). In contrast, having working time determined solely by the client or platform was not significantly associated with poor self-rated health. All FPRD were significantly related to general health across all 3 models. The absence of fines and fraudulent bookings were consistently associated with better self-rated general health. Likewise, not working while sick was related to better health, whereas pressure to work while ill was associated with more than a 2-fold increase in the odds of poorer general health in the fully adjusted model (Table 6). Although several job demands, resources, and FPRD indicators were associated with higher or lower odds of poor/fair general health, the model-fit statistics indicate that these associations had limited explanatory

Table 4. Job demands, job resources, factors preventing resources depletion (FPRD) and psychological well-being and general health – data collected online from platform workers, GIG-OSH project conducted in 7 European countries (Belgium, Denmark, Finland, Poland, Spain, Sweden, and the United Kingdom), November 2023 – April 2024

Variable	Models 0 (crude)				Models 1				Models 2			
	OR (95% CI)	model fit			OR (95 % CI)	model fit			OR (95 % CI)	model fit		
		df	LR χ^2	pseudo-R^2		df	LR χ^2	pseudo-R^2		df	LR χ^2	pseudo-R^2
Psychological well-being (dependent)												
demands (1 = yes)												
exposure to aggression	1.28 (1.10–1.49)***	1	10.32**	0.0025	1.29 (1.11–1.51)***	10	48.19***	0.0119	1.38 (1.16–1.64)***	16	56.68***	0.0140
exposure to emotionally disturbing situations	1.71 (1.46–1.99)***	1	47.58***	0.0118	1.80 (1.54–2.11)***	10	90.67***	0.0224	1.93 (1.63–2.27)***	16	103.45***	0.0256
exposure to violence	1.22 (1.03–1.44)*	1	5.53*	0.0014	1.27 (1.07–1.52)**	10	44.46***	0.0110	1.33 (1.11–1.61)**	16	51.96***	0.0128
exposure to discrimination	1.47 (1.21–1.79)***	1	14.86***	0.0037	1.49 (1.22–1.81)***	10	49.82***	0.0125	1.58 (1.28–1.94)***	16	59.33***	0.0149
exposure to sexual harassment	0.93 (0.72–1.20)	1	0.33.	0.0001	0.90 (0.69–1.17)	10	36.13***	0.0090	0.91 (0.70–1.20)	16	42.09***	0.0105
work alone	1.58 (1.32–1.90)***	1	24.99***	0.0061	1.62 (1.34–1.95)***	10	63.08***	0.0155	1.62 (1.34–1.96)***	16	68.80***	0.0169
resources												
autonomy in speed of work		2	10.73**	0.0028		11	44.28***	0.0116		17	53.26***	0.0140
set by worker	1.00				1.00				1.00			
set by client/platform	1.30 (1.11–1.53)***				1.29 (1.09–1.51) **				1.29 (1.10–1.52) **			
set by worker and client/platform	1.18 (0.88–1.58)				1.20 (0.90–1.61)				1.20 (0.89–1.61)			
autonomy in service allocation		2	1.15	0.0003		11	32.94***	0.0085		17	38.35**	0.0099
set by worker	1.00				1.00				1.00			
set by client/platform	1.11 (0.91–1.35)				1.08 (0.89–1.33)				1.08 (0.88–1.33)			
set by worker and client/platform	1.03 (0.76–1.40)				1.02 (0.75–1.39)				1.02 (0.75–1.39)			
autonomy in time allocation		2	0.73	0.0002		11	32.88***	0.0085		17	38.52**	0.0100
set by worker	1.00				1.00				1.00			
set by client/platform	0.93 (0.79–1.11)				0.92 (0.77–1.09)				0.93 (0.78–1.11)			
set by worker and client/platform	0.94 (0.72–1.23)				0.94 (0.72–1.23)				0.96 (0.73–1.25)			
factors preventing resources depletion												
job security												
lack of fines	1.00	1	2.21	0.0005	1.00	10	40.16***	0.0099	1.00	16	47.67***	0.0118
fines	1.13 (0.96–1.32)				1.19 (1.00–1.41)				1.27 (1.04–1.56) *			

lack of fraud	1.00	1	1.31	0.0003	1.00	10	39.53***	0.0097	1.00	16	46.12***	0.0113
fraud	1.10 (0.93–1.30)				1.13 (0.95–1.35)				1.15 (0.97–1.39)			
not working while ill	1.00	1	54.59***	0.0137	1.00	10	85.89***	0.0216	1.00	16	93.18***	0.0234
presenteeism	1.76 (1.52–2.05)***				1.75 (1.50–2.04) ***				1.77 (1.51–2.07) ***			
General health (dependent)												
demands (1 = yes)												
exposure to aggression	1.74 (1.40–2.17)***	1	24.06*	0.0107	1.97 (1.56–2.50)***	10	64.36*	0.0287	2.12 (1.64–2.74)***	16	86.35*	0.0385
exposure to emotionally disturbing situations	2.21 (1.77–2.76)***	1	48.47*	.0217	2.35 (1.87–3.00)***	10	85.30*	0.0381	2.44 (1.91–3.11)***	16	105.99*	0.0474
exposure to violence	1.98 (1.59–2.47)***	1	34.10*	0.0152	2.17 (1.71–2.73)***	10	71.52*	0.0320	2.46 (1.88–3.23) ***	16	95.20*	0.0426
exposure to discrimination	1.55 (1.19–2.01)**	1	11.10*	0.0050	1.61 (1.23–2.09)***	10	46.28*	0.0210	1.69 (1.26–2.26)***	16	67.07*	0.0304
exposure to sexual harassment	1.26 (0.90–1.77)	1	1.56	0.0007	1.30 (0.92–1.83)	10	35.88*	0.0163	1.23 (0.85–1.79)	16	55.65*	0.0253
work alone	1.65 (1.25–2.19)***	1	13.80*	0.0061	1.70 (1.28–2.27)**	10	48.77*	0.0217	1.67 (1.23–2.27)**	16	66.96*	0.0298
resources												
autonomy in speed of work		2	0.18	0.0001		11	30.36*	0.0143		17	54.31*	0.0257
set by worker	1.00				1.00				1.00			
set by client/platform	1.01 (0.80–1.29)				1.04 (0.82–1.31)				1.01 (0.79–1.29)			
set by worker and client/platform	1.22 (0.82–1.80)				1.15 (0.77–1.70)				1.01 (0.67–1.54)			
autonomy in service allocation		2	0.85	0.0004		11	35.65*	0.0166		17	56.57*	0.0264
set by worker	1.00				1.00				1.00			
set by client/platform	0.87 (0.66–1.14)				0.90 (0.68–1.19)				0.92 (0.68–1.23)			
set by worker and client/platform	0.76 (0.48–1.20)				0.74 (0.47–1.17)				0.78 (0.49–1.25)			
autonomy in time allocation		2	8.44	0.0039		11	44.07*	0.0206		17	64.71*	0.0302
set by worker	1.00				1.00				1.00			
set by client/platform	0.86 (0.67–1.10)				0.90 (0.69–1.16)				0.90 (0.69–1.18)			
set by worker and client/platform	0.52 (0.33–0.84)**				0.50 (0.31–0.80)**				0.49 (0.30–0.81)**			
factors preventing resources depletion												
job security												
lack of fines	1.00	1	11.41*	0.0051	1.00	10	47.54*	0.0211	1.00	16	70.85*	0.0315
fines	1.54 (1.24–1.91)***				1.66 (1.31–2.11)***				1.85 (1.37–2.51)***			
lack of fraud	1.00	1	8.07	0.0036	1.00	10	41.61*	0.0185	1.00	16	61.42*	0.0274
fraud	1.44 (1.15–1.81)**				1.52 (1.20–1.92)**				1.47 (1.14–1.90)**			

Table 4. Job demands, job resources, factors preventing resources depletion (FPRD) and psychological well-being and general health – data collected online from platform workers, GIG-OSH project conducted in 7 European countries (Belgium, Denmark, Finland, Poland, Spain, Sweden, and United Kingdom), November 2023 – April 2024 – cont.

Variables	Models 0 (crude)				Models 1				Models 2			
	OR (95% CI)	model fit			OR (95 % CI)	model fit			OR (95 % CI)	model fit		
		df	LR χ^2	pseudo-R^2		df	LR χ^2	pseudo-R^2		df	LR χ^2	pseudo-R^2
General health (dependent) – cont.												
factors preventing resources depletion – cont.												
job security – cont.												
not working while ill	1.00	1	35.20*	0.0160	1.00	10	75.33*	0.0342	1.00	16	89.34*	0.0406
presenteeism	2.04 (1.63–2.55)***				2.24 (1.78–2.81)***				2.11 (1.66–2.70)***			

Models 0 were unadjusted. Models 1 were adjusted for age, gender, and country cohort. Models 2 were additionally adjusted for work type and perceived income adequacy.
Values are presented as odds ratios (ORs) with 95% confidence intervals (95% CIs) for poor psychological well-being, defined as a WHO-5 score of ≤50 and for poor/fair self-rated general health.
The number of observations varied slightly across models due to missing data. Model-fit statistics are reported as likelihood-ratio χ^2 tests, comparing each fitted model with the intercept-only model, and McFadden's pseudo-R^2.
Likelihood-ratio χ^2 (LR χ^2) tests denotes the likelihood-ratio χ^2 statistic comparing each fitted model with the intercept-only model.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

power. The likelihood-ratio tests generally suggested that the adjusted models fitted the data better than the corresponding null models, especially after controlling for age, gender, country cohort, work type, and income adequacy. At the same time, the pseudo-R^2 values remained low, showing that the analyzed psychosocial working conditions explained only a small proportion of variation in self-rated general health.

DISCSUSSION

Interpreted through the JD-R framework, the results indicate that web-based and on-location platform work represent distinct configurations of demands, resources, and factors preventing resource depletion. This distinction is important because the JD-R model assumes that every occupational context may involve its own specific risk factors, while these factors can still be meaningfully grouped into demands and resources [15,16]. In the present study, on-location work was characterized by a stronger health-impairment profile, with higher exposure to interpersonal and emotionally demanding conditions such as emotional distress, aggression, violence, discrimination, and sexual harassment. In contrast, web-based work was less exposed to these interpersonal demands, was more secure in terms of fines and fraudulent bookings, and offered somewhat greater autonomy in service and time allocation. However, web-based workers were more likely to work alone and to report presenteeism, suggesting that this modality is not simply "less demanding" but rather involves a different pattern of psychosocial strain. Working alone in platform work has also been documented in other studies [27,28], although findings are inconsistent: some studies indicate greater isolation in web-based work, whereas others point to isolation in on-location work, particularly among delivery workers [27,29]. Presenteeism, conversely, has received comparatively little attention in the gig economy, although there are indications that de-

pendence on the platform and low and uncertain income may favour its occurrence [30].

The elevated level of emotionally disturbing situations, aggression, and violence among on-location workers is consistent with the JD-R health-impairment pathway, according to which chronic exposure to demands requiring sustained emotional or psychological effort may deplete workers' energetic and psychological resources and translate into poorer well-being and health [15,16]. These findings are also consistent with other reports on platform work [5,6]. From this perspective, hostile customer or passenger interactions are not only isolated adverse events but recurring interpersonal demands that may accumulate over time and contribute to strain. Surprisingly, although sexual harassment was reported more frequently by on-location workers, it was not significantly associated with either mental well-being or self-rated general health in the adjusted models. This does not necessarily imply that sexual harassment is harmless; rather, the lack of statistical significance may reflect lower prevalence, underreporting, limited statistical power, or the crude measurement of this exposure in the present study. Job-security-related FPRD, understood here as protection from fraudulent activity, fines, and pressure to work while ill, was particularly problematic for on-location workers and may intensify the health-impairment process by limiting recovery and increasing financial insecurity.

The comparison of selected job demands, resources, and FPRD in web-based and on-location platform work therefore suggests that these are separate psychosocial work environments with only a limited number of common elements. This finding supports Watson et al. [4], who argued for a more precise categorization of platform work in order to better understand its specific nature and the requirements associated with it. Within the JD-R framework, such differentiation is particularly important because the balance between demands and resources may differ substantially across platform-work modalities. For on-location workers, the central imbalance appears to involve high interpersonal and emotional demands combined with weaker protection against resource loss. For web-based workers, the imbalance appears less related to direct client hostility and more related to social isolation, work while ill, and platform-dependent income insecurity.

The final research objective was to determine the extent to which the analyzed psychosocial job demands, resources, and FPRD were related to subjective measures of general health and well-being. Unfortunately, due to the size of the sample, the authors were unable to conduct separate analyses for web-based and on-location workers, but they included work mode as a confounding variable in the statistical models. Overall, the results indicate that job demands played a more prominent and consistent role than job resources in shaping gig workers' well-being and general health. This observation is in line with the JD-R health-impairment pathway, which assumes that excessive or chronic demands are associated with psychological strain and poorer health [15,16].

In the authors' study, emotionally disturbing situations, aggression, violence, discrimination, and working alone were generally associated with poorer outcomes, suggesting that both interpersonal hostility and social isolation may operate as strain-producing demands in platform work. Job resources, operationalised as autonomy in deciding on the pace of work, time allocation, and service allocation, contributed more weakly and less consistently to explaining well-being and general health. This may mean that autonomy in platform work does not always function as a fully protective resource, particularly when it is constrained by algorithmic management, income insecurity, or dependence on customer ratings. In particular, the findings for autonomy in time allocation did not indicate a general protective effect of reduced worker control. Rather, only jointly determined working time was associated with lower odds of poor self-rated

general health, whereas working time determined solely by the client or platform was not significantly related to health. This pattern may suggest that shared control over scheduling, rather than external or internal control alone, is relevant for workers' health. The authors also included factors extrinsic to the job that may serve as protections against resource depletion and that, in the authors' view, can be treated as indirect indicators of job security. Work environment free of fines and fraud was associated with better general health, while not working during illness was significantly associated with both better mental well-being and better general health, highlighting the importance of rest and recovery. Within an extended JD-R interpretation, FPRD may therefore be understood as mechanisms that prevent the loss of financial, energetic, and recovery-related resources but this hypothesis demand future studies. The authors' findings are supported by studiesshowing that presenteeism serves as an independent risk factor for future poor general health and physical complaints and is also associated with mental health problems, exhaustion, and burnout [31].

Taken together, the authors' findings support the usefulness of the JD-R model for analysing working conditions in the gig economy, but they also suggest that the model should be applied with attention to platform-specific mechanisms. On the one hand, gig workers face a constellation of psychosocial demands, including emotional stress, aggression, violence, discrimination, working alone, limited autonomy, and insufficient protection against financial or recovery-related resource loss. On the other hand, the findings point to the general relevance of JD-R assumptions across non-standard forms of work: demands were consistently linked with poorer outcomes, while resources and resource-protection mechanisms showed more selective but theoretically meaningful associations. The study therefore extends JD-R reasoning to platform-mediated work by showing that, in addition to classical demands and resources, factors preventing resource depletion may be especially important in precarious work arrangements where income, recovery, and job security are weakly institutionalised.

At the same time, the interpretation of the regression findings should take into account the weak model-fit indicators reported in the results tables. Although many likelihood-ratio tests showed statistically significant improvement over the null models, the pseudo-R^2 values were consistently low. This means that the analysed demands, resources, and FPRD explained only a small proportion of variance in psychological well-being and self-rated general health. Therefore, the regression results should not be read as strong predictive models of gig workers' health. Rather, they should be understood as identifying modest but theoretically meaningful associations that are consistent with the JD-R framework. In this sense, the weak fit indicators temper the strength of the conclusions but do not undermine the value of the study: the findings still show that selected platform-specific demands and mechanisms of resource protection are systematically related to health and well-being outcomes and can inform future, more comprehensive JD-R models of platform work.

Limitations and future directions

Despite the collection of relevant data on psychosocial working conditions in platform-mediated work, the present study has several limitations. First, substantial challenges in accessing gig workers led to several non-probabilistic sampling strategies. As a result, the study is subject to selection bias and uneven representation of worker subgroups, reflected in varying proportions of on-location and web-based respondents across countries and different representation of occupations. Moreover, the country composition of the 2 work-modality groups was unequal, which limits direct comparisons between web-based and on-location platform workers and may partly reflect country-specific recruitment patterns rather than modality-related differences alone.

Second, the study relied on a broad binary classification of platform work into web-based and on-site modes. In addition, several study variables were dichotomized for the purposes of logistic regression analyses. Although these decisions facilitated the interpretation of results, they may have reduced variability and obscured more subtle differences between groups. In particular, combining the response categories "sometimes" and "frequently" into a single category may have obscured differences in exposure frequency and reduced the sensitivity of the analyses to potential dose–response relationships. Although the authors collected the necessary data, the authors were unable to incorporate this information into more complex analyses due to insufficient sample size. The authors are fully aware that while binary classification of platform work is useful as an initial distinction, this categorization likely obscures important heterogeneity within each group (e.g., delivery vs. care, microtasks vs. freelancing), which may have distinct psychosocial risk profiles.

Third, the study employed a cross-sectional, self-report design. This precludes causal inference and raises the possibility of reverse causality as well as common method variance stemming from the single-source measurement of both predictors and outcomes. In addition, the use of several single-item indicators and slight variation in sample size across models due to missing data should be considered when interpreting the finding. Longitudinal and multi-source designs would strengthen causal claims and reduce shared method bias. Nevertheless, large-scale, cross-national surveys providing such comprehensive information on psychosocial conditions in platform work remain scarce and the authors' study contributes to expanding knowledge about the psychosocial working conditions in the gig economy and their relationship to health and well-being.

Taken together, these limitations suggest that the present results should be interpreted primarily as cross-sectional associations and descriptive patterns that highlight potentially important psychosocial risk domains in platform work. Addressing the methodological constraints outlined above – particularly improved measurement (as using multiple items, reliable questionnaires to test psychosocial working conditions and general health outcomes,) finer-grained occupational classification, a broader assessment of job demands and job resources and stronger designs for cross-country comparability – will be essential for refining evidence-based recommendations for psychosocial working conditions on digital platforms.

Despite of indicated limitations, future research would build on these findings in several directions. First, longitudinal studies are needed to examine whether exposure to platform-specific job demands precedes changes in well-being and health over time, and whether job resources and FPRD buffer or delay such negative effects. This would allow future studies to test the health-impairment and resource-protection pathways of the JD-R model more directly. Second, future research should aim for more representative sampling strategies or combine survey data (preferably validated questionnaires) with platform data where possible. Such approaches would improve external validity and help determine whether the patterns observed in this study are generalizable to broader populations of gig workers. Third, in future research, it would be worthwhile to focus on further testing the JD-R model, considering the role of gig workers' personal resources as important factors that limit the psychological and physiological strain resulting from the demands of this work [32,33]. For example, job crafting [34] and psychological capital [33] are particularly worth consideration in the context of platform-mediated work. Job crafting can serve as a proactive mechanism through which gig workers reshape aspects of their work to better align job demands and resources with their skills, preferences, and capacities. Similarly, psychological capital, comprising hope, efficacy, resilience, and optimism, may help workers

cope with the instability and unpredictability typical for platform work. Consequently, incorporating these personal resources into future research may provide a deeper understanding of individual differences in health and well-being outcomes among gig workers and help to identify potential intervention targets aimed at strengthening workers' adaptive capacities in platform-based labour markets.

CONCLUSIONS

The findings indicate that psychosocial working conditions in platform work differ substantially by work modality, with on-location workers facing higher exposure to emotionally demanding and hostile client interactions, while web-based workers experience greater social isolation. These findings underscore that platform work is not a homogeneous work environment and that psychosocial demands were consistently associated with workers' health and well-being across modalities. The results also support the usefulness of the JD-R framework for organizing research on psychosocial working conditions in the gig economy. Expanding the JD-R model to include a new category of factors that prevent resource depletion also appears to be a promising direction, particularly in the context of precarious work, although the status of this category demands further theoretical development and research.

AI USE

AI was used to check spelling and editing references in Vancouver style.

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