

**Stress and psychological wellbeing in British police force officers and staff**

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# Stress and psychological wellbeing in british police force officers and staff

Helen Oliver<sup>1</sup> · Owen Thomas<sup>1</sup> · Rich Neil<sup>1</sup> · Tjerk Moll<sup>1</sup> · Robert James Copeland<sup>2</sup>

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## Abstract

Informed by the Demand Resources and Individual Effects model (DRIVE; Mark & Smith, 2008), we assessed how work and individual characteristics were associated with perceived job stress, and psychological wellbeing outcomes (e.g., anxiety, depression, positive mood) in a cross-sectional study with two British police forces (N = 852 officers and staff). Work characteristics predicted psychological wellbeing outcomes both directly and indirectly through the perception of job stress. Work resources and individual characteristics moderated the relationships between work demands, perception of job stress and psychological wellbeing outcomes. The associations between perception of work demands, job stress and psychological wellbeing outcomes were improved in police officers and staff who reported moderate-high physical activity behavior. This study added new knowledge to the domain as it was the first to test the DRIVE model in its entirety in an occupational setting. It also provided new insight into the multi-dimensional factors associated with psychological wellbeing in policing. Practically, the findings implied a reduction of work demands, or interventions that target appraisals and/or physical activity might improve psychological wellbeing in police workers.

**Keywords** Work-related stress · Police · Psychological wellbeing · Stress appraisal · Physical activity

## Introduction

Across a range of occupational settings, individuals who do not manage stress effectively are prone to negative health outcomes (Cox & Griffiths, 2010; Mark & Smith, 2008). Policing is as a stressful occupation, that places officers and staff at risk of experiencing mental health conditions of anxiety or depression (e.g., Jackman et al., 2020; Nelson & Smith, 2016). Research into the stressors that affect police workers mental health has grown (e.g., Demou et al., 2020), with operational (e.g., working alone at night, attending traumatic events, injury risk) and organizational stressors (e.g., workload, role clarity, co-worker relations) prominent (e.g., McCreary & Thompson 2006). Within the police, stressors that have been associated with ill-health outcomes include: physical disorders (e.g., cardiovascular

disease; Hartley et al., 2011); mental ill-health (e.g., anxiety and depression; Nelson & Smith 2016); and, impaired psychological wellbeing (e.g., Demou et al., 2020; Duran et al., 2018). Psychological wellbeing (PWB) is considered a positive indicator of mental health, represented by quality of life, positive affect, and negative affect (Dodge et al., 2012); with researchers suggesting it is important to consider both PWB and mental health, as the absence of mental ill-health might not indicate the presence of positive functioning, or PWB (Zhang & Chen, 2019).

To understand the relationships between stress, health and psychological wellbeing, various conceptualizations of stress have been developed, with Lazarus and Folkman's (1984) transactional perspective commonly adopted (Cox & Griffiths, 2010). Here, the stress process involves four concepts: the demands an individual experiences; a cognitive evaluation of these demands (primary appraisal); perceived options for coping (secondary appraisal); and, stress-related responses. Individuals play an active role in their stress response, as it is shaped by their appraisals and attempts to cope. This helps explain why two employees might experience the same stressors and yet respond differently (Mark & Smith, 2008).

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Despite the popularity of Lazarus and Folkman’s conceptualization, it has not informed all empirical study. Cox and Griffiths (2010) offered a taxonomy of work-related stress theories comprising two types of models: process models, which stem from Lazarus’ transactional perspective and emphasize an individual’s role in determining health outcomes; and, structural models, grounded in an interactional perspective that emphasize the work characteristics that might determine health outcomes (Cox & Griffiths, 2010). A complete review of the structural models is beyond the scope of our paper (see Cox & Griffiths, 2010). However, in short, researchers differentiate between two broad categories of working conditions; ‘job demands’ refer to aspects of the job requiring sustained effort that are detrimental to health (e.g., workload and time pressure) and ‘job resources’, which are health-protecting factors (e.g., control and support; Demerouti et al., 2001). Structural models have good predictive validity but are too narrow in scope to account for individual differences in the experience of work-related stress (Mark & Smith, 2008).

To measure the complex stress experiences of individuals within the workplace, Mark and Smith (2008) developed

the Demands Resources and Individual Effects (DRIVE) model of work-related stress. The original (simple) DRIVE model included variables that might influence the perception of stress but has subsequently been developed into an enhanced DRIVE model (see Margrove & Smith, 2022, for a review). The enhanced DRIVE model featured 12 relationships for how the variables might interact (see Fig. 1; Table 3). The concept of ‘appraisals’ from transactional theory was included through the mechanism of perceived job stress, which was suggested to mediate the relationships between work demands and health and/or wellbeing outcomes (e.g., anxiety, depression, job satisfaction). Consequently, Mark and Smith proposed that work demands would not be associated, or have a reduced association, with negative health outcomes if the individual does not perceive them to be stressful. The concepts of job demands and resources were also included, situated alongside individual characteristics (personal demands and resources) in a multi-dimensional framework depicting direct and indirect effects with perceived job stress and health outcomes (see Fig. 1). The DRIVE model accounted for the key variables that might influence perceptions of stress and integrated

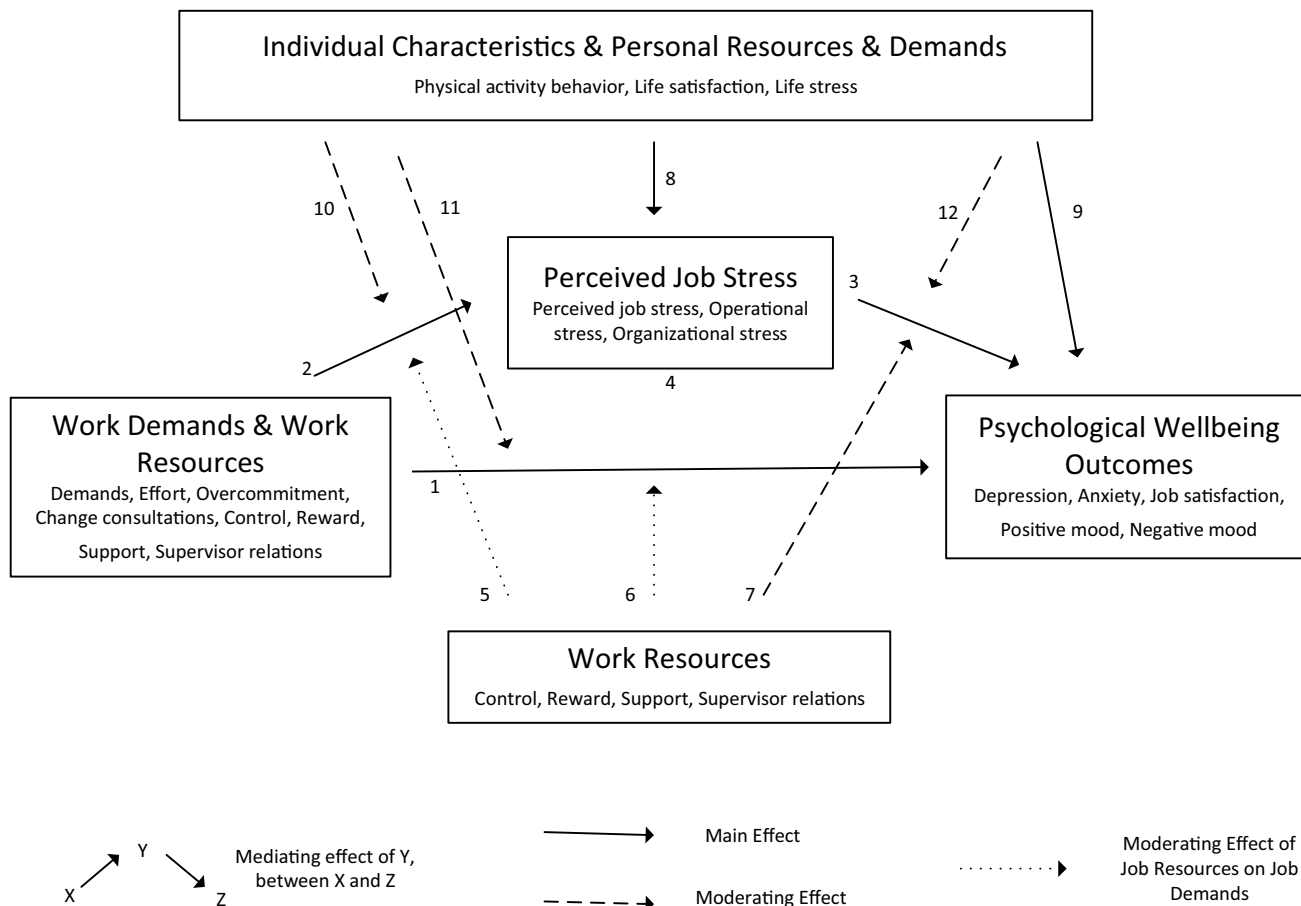


Fig. 1 DRIVE model with study variables

transactional theory within an interactional model, providing a suitable framework to inform research into work-related stress (Williams et al., 2017).

To facilitate exploration of the multi-dimensions of work-related stress and PWB within the DRIVE model, and to overcome some issues (e.g., participant load) of obtaining a holistic assessment of work-related stress, Williams and Smith (2012) developed the single-item Wellbeing Process Questionnaire (WPQ). Mark and Smith (2008) encouraged researchers to include measures for variables relevant to their population and context and introduce them into the DRIVE model under the headings of: work demands; work resources; individual characteristics (personal demands and resources); perceived job stress and health outcomes. Other variables that have been added to the DRIVE model include rumination (Zhang & Smith, 2021), work-life balance, and burnout (Omosehin & Smith, 2019).

Elements of the DRIVE model have been tested with British nurses and university students (Galvin, 2016; Williams et al., 2017), Italian nurses (Zurlo et al., 2018), Eastern European care workers (Capasso et al., 2016), and Jamaican police officers (Nelson & Smith, 2016). There are, however, limited examples where the model has been tested in its entirety (e.g., Galvin, 2016) and research has yet to test the full model with an occupational sample – a limitation for a work-related stress model. For example, Capasso et al. (2016) only considered the direct relationships in the DRIVE model, and Nelson and Smith (2016) did not test for moderation relationships. Galvin (2016) did conduct a full testing of the DRIVE model predictions; but only sampled student nurses and trainee clinical psychologists. Galvin's findings were inconclusive. Specifically, although the mediating effect of perceived job stress on mental health outcomes were supported, results for other indirect effects were less conclusive. The moderation of work resources reducing the negative effects of work demands on mental health outcomes were also not fully supported, although some individual characteristics (e.g., emotion-focused coping) reduced the relationships between work demands and perceived job stress. Given Galvin's findings were equivocal, and researchers are yet to test the full DRIVE model in an occupational sample, new research that explores *all* of the relationships of the model in an occupational setting is required.

Research is also needed to explore the placement of variables within the DRIVE model. Specifically, within the DRIVE model overcommitment is conceptualized as a work demand, but this is debated in the literature. Du Prel et al. (2018) found overcommitment to depend on the work environment (supporting it a 'state', or work-related characteristic), but it was originally conceptualized as intrinsic effort that it is stable over time (suggesting it a 'trait', or individual characteristic; van Vegchel et al., 2005). Nevertheless, the DRIVE model provides a guiding framework

that enables researchers to accurately reflect and assess the stress and wellbeing process beyond a focus on PWB outcomes (Smith, 2021).

Research in a police context has largely focused on interactional models of work-related stress; but there is a scarcity of research which integrates Lazarus' transactional perspective (Brough et al., 2018). Of the research which has provided an empirical application of Lazarus' model of stress, Brough et al. (2018) supported the mediating role of coping between work demands and psychological outcomes in the Australian police, while Nelson and Smith (2016) supported the mediating role of appraisals in their DRIVE model informed research with the Jamaican police. Despite these findings, research from an interactional perspective is needed to provide a conceptually accurate, multi-dimensional approach to understanding work-related stress and wellbeing in the British police. To provide a holistic picture of wellbeing in policing, research needs to consider non-operational 'staff' as well as police officers (Jackman et al., 2020).

One variable that has not been considered within DRIVE model research, despite being proposed as a factor that protects against the negative physical (e.g., Wood et al., 2018) and psychological (e.g., Gerber et al., 2010) effects of stress, and improves PWB (Zhang & Chen, 2019), is physical activity behavior. An in-depth review of models linking stress and physical activity is beyond the scope of our paper, but most research supports a reciprocal relationship (see Stults-Kolehmainen & Sinha, 2014). In one direction, stress has a negative effect on subsequent physical activity (so physical activity could be included as a health outcome in the DRIVE model). Another theoretical view is that physical activity protects against adverse consequences of perceived stress, by helping individuals to cope with stress, for example (see Salmon, 2001). So physical activity could also be included as an individual characteristic in the DRIVE model.

Research into physical activity in police populations has tended to focus on the physical fitness required by police officers (e.g., Lagestad & van den Tillaar, 2014), with few studies exploring the health-protecting relationship between physical activity and psychological outcomes. Exceptions include Gerber et al.'s (2010) findings that moderate-intensity exercise protected against stress-related complaints (physical and psychological) in Swiss police officers; and, Acquadro Maran et al. (2018) noting that following a physical activity intervention perceived distress decreased, perception of wellbeing increased, and use of adaptive coping strategies increased, in Italian police officers. There is a need to better understand the interplay between physical activity, work-related stress and PWB outcomes (Häusser & Mojzisch, 2017), and apply the knowledge to policing, as there is some evidence to suggest physical activity behavior

can be a resource for coping with stress in this context (e.g., Acquadro Maran et al., 2018; Gerber et al., 2010). We therefore conceptualized physical activity as an individual characteristic within the DRIVE model.

Informed by the DRIVE model, we aimed to assess factors associated with stress and PWB outcomes in British police force officers and staff. As the first study to test all DRIVE model relationships in an occupational setting, this cross-sectional research provides new knowledge about the work characteristics (e.g., work demands, work resources) and individual characteristics (e.g., physical activity) that are significant in the experience of stress in the police. We set three objectives to address our aim:

1. Assess the factors directly predicting PWB outcomes in police officers and staff (*direct* relationships);
2. Assess the mediating role of perceived job stress through the indirect relationships between work characteristics and PWB outcomes (*indirect* relationship);
3. Assess which factors moderate the relationships between work demands, perceived job stress and PWB outcomes (*moderation*).

## Method

### Participants

Employees at two British police forces (Force A and B) were invited via email to complete a survey about their work and wellbeing. There were 852 respondents, a completion rate of 11.94% (Force A:  $N=658$ , 12.88% completion rate; Force B:  $N=194$ ; 9.57% completion rate). There were 428 male and 413 female respondents ( $M_{age} = 41.66$  years,  $SD=8.69$ ). Participants were police officers (54.6%,  $N=465$ ), staff (37.3%,  $N=318$ ), and police community support officers (7.4%,  $N=63$ ), with a mean of 4.15 years of service ( $SD=1.68$ ). A post-hoc G\*Power (Faul et al., 2009) statistical power analysis indicated that with a sample size of  $N=852$ , 14 predictor variables, and a 0.05 criterion alpha level, the power exceeded 0.99. Therefore, the sample was sufficient to detect small ( $f^2=0.02$ ) effect sizes in multiple linear regressions (see Cohen, 1988).

### Measures

We next provide a justification for the variable selection in our research and detail the items and measures selected (see Fig. 1 for selected variables). For work demands, we included: demands; effort; change consultations and overcommitment. For work resources, we used: reward; control; support and supervisor relations. These demands and resources are recognized as

key work-related stress factors across multiple occupations (see Cox & Griffiths, 2010), with change practices and supervisor relationships deemed central to police wellbeing (Hesketh, 2015). Nelson and Smith (2016) suggested that research on work-related stress should consider the work-life interface. Therefore, perceived life satisfaction and life stress were measured as variables which individuals bring with them to work that potentially influence their workplace wellbeing. Physical activity behavior was included as an individual characteristic that benefits PWB (Zhang & Chen, 2019) and might influence the experience of work-related stress (Häusser & Mojzisch, 2017).

### Work-related stress and wellbeing process

The WPQ was used to measure work demands (demands, effort, overcommitment, change consultations), work resources (control, reward, support, supervisor relations), perceived job stress, life satisfaction, life stress, and PWB outcomes (anxiety, depression, job satisfaction, negative mood, positive mood). Williams (2014) demonstrated reliability using the Wanous method, and discriminant and concurrent validity against multi-item measures for all items of the WPQ. Participants rated their WPQ responses on an 11-point Likert scale, ranging from 0 (*strongly disagree*) to 10 (*strongly agree*) for items worded as statements. For example, for overcommitment: “I find it difficult to withdraw from my work obligations (*for example: work is always on my mind, I find it difficult to relax when I get home from work, people close to me say I sacrifice too much for my job*)”. Items formed as questions had response scales ranging from 0 (*not at all*) to 10 (*extremely*). For example, for depression: “How depressed would you say you are in general? (*for example: feeling ‘down’, no longer looking forward to things or enjoying things that you used to*)”. No items were reverse scored, so a high score reflected a presence of the relevant construct.

### Physical activity behavior

The International Physical Activity Questionnaire-Long (IPAQ; Booth, 2000) was used to measure physical activity behavior. The IPAQ has demonstrated high repeatability, concurrent, and criterion validity (e.g., Craig et al., 2003). Over 27 questions, five physical activity domains were assessed using metabolic equivalent minutes (MET): leisure; domestic and gardening; work-related; transport-related; and sitting. To calculate MET minutes, participants were asked on how many days per week and how much time per day, they performed at least 10 continuous minutes of walking, moderate, or vigorous physical activity over the last seven days. In line with previous research (e.g., Craig et al., 2003), and National Health Service guidance (NHS, 2015), total

MET minute scores were used to categorize the sample into low (< 600 MET minutes/week), moderate (600 to 3000 MET minutes/week), and high physical activity (3000 MET minutes/week) groups.

### Police specific stress

The Police Stress Questionnaire (McCreary & Thompson, 2006) assessed participants' perception of police specific stressors as some police specific contextual factors were not captured in the WPQ (cf. Mark & Smith, 2008). McCreary and Thompson (2006) reported high reliability and discriminant validity with general stress measures and two measures of police specific stress; the Police Stress Questionnaire – Operational (PSQ-Op), and the Police Stress Questionnaire – Organizational (PSQ-Org). The PSQ-Op includes 20 items describing different work stressors specific to operational policing (e.g., “Working alone at night”;  $\alpha = 0.95$ ). The PSQ-Org consists of 20 items describing different organizational stressors relevant to policing (e.g., “Inconsistent leadership style”;  $\alpha = 0.96$ ). Participants indicated how much stress each factor had caused them over the past six months on a 7-point Likert scale ranging from 1 (*no stress at all*) to 7 (*a lot of stress*). A mean was calculated for overall operational and organizational stress scores.

### Procedure

Ethical approval was granted by the lead author's University's Research Ethics Committee (reference: 16.10.O3S) and informed consent was obtained from all participants. Data were collected through online surveys.

### Data analysis

Analyses were conducted using the IBM SPSS 27 package. First, correlational analyses were used to examine the relationships between variables for assumption checking. Linear regression analyses were then used to test the direct relationships in the DRIVE model to determine which factors were contributing to police PWB (objective 1). For example, relationship 1 predicts work demands and work resources significantly relate to PWB outcomes. Prior to running any regression analyses, data were screened for outliers, multicollinearity, linearity, homoscedasticity, and normal distribution of residuals (Tabachnick & Fidell, 2014). The physical activity behavior variable was re-coded into a dummy variable (low, moderate, high) for inclusion in the regression models (Field, 2009).

The indirect relationships in the DRIVE model were tested using the PROCESS SPSS custom dialog (Hayes, 2018). Mediation analyses were conducted to test the mediating role of perceived job stress through the indirect

relationships between work characteristics and PWB outcomes (relationship 4; objective 2). Parallel multiple mediation was used to simultaneously assess the role of the three work stress variables (perceived job stress, operational stress, organizational stress) as mediators. To estimate the significance of the indirect relationships, we used percentile bootstrap confidence intervals (based on 5000 samples and PROCESS model 4; Hayes, 2018), with seed 5235 for the random number generator. To estimate effect sizes of the indirect relationship, completely standardized effects  $c'_{cs}$  were used (Hayes, 2018). These are reported in tables only, as there are not yet appropriate benchmarks to interpret the size of effect (Lachowicz et al., 2018).

Moderation analyses were conducted to test objective 3. For example, DRIVE model relationship 10 predicted that individual characteristics would moderate the relationships between work demands and perceived job stress. To test these relationships, work resources and individual characteristics (personal demands and resources) were included as potential moderators in separate moderation analyses (based on 5000 samples and PROCESS model 1; Hayes, 2018), as depicted in the DRIVE model. To understand the interaction for any significant moderators, we probed the interaction at low, medium, and high levels of the moderator. Levels were determined by 16th, 50th and 84th percentiles, except for the categorical physical activity behavior variable (see measures). To estimate effect sizes of the linear regression analyses and moderation analyses,  $R^2$  were reported in the main findings (small = 0.14; medium = 0.39; large = 0.59; Cohen, 1988).

## Results

### Assumption checking, descriptive statistics and correlational analyses

All predictor variables demonstrated acceptable tolerance (> 0.1) and VIF (< 10) values, and correlation values below 0.80 indicating no multicollinearity (Field, 2009). Linearity and homoscedasticity were assessed through visual inspection of scatterplots and did not show curvilinear relationships. Boxplots indicated that the independence of errors assumption had not been violated, but that there were four significant outliers on the support variable. As the outliers came from the intended sample population, they were retained (Tabachnick & Fidell, 2014). The Shapiro-Wilks test of normality indicated some variables were not normally distributed, mainly due to high kurtosis. No corrections were made as kurtosis effects are diminished in samples of over 200 (Tabachnick & Fidell, 2014). As significant differences emerged across PWB outcomes for: age,  $F(24,2430) = 3.47$ ,  $p < .001$ ; gender,  $F(8,810) = 8.07$ ,  $p < .001$ ; and role,  $F(24,2451) = 2.90$ ,  $p < .001$  these demographic variables were

entered into all analyses as covariates. Descriptive statistics of, and Pearson's correlations between, continuous variables are provided in Table 1.

### Direct relationships

All direct relationships were supported (see Table 3 and supplement file 1).

#### Direct relationships of work characteristics

Work characteristics were significant predictors of PWB outcomes ( $R^2 = .21 - .40$ ,  $ps < .01$ ; relationship 1) and perceived job stress ( $R^2 = .05 - .40$ ,  $ps < .05$ ; relationship 2). Specifically, when perceived work demands (demands, effort, change consultations, overcommitment) increased, PWB outcomes deteriorated and perceived job stress increased. When perceived work resources (reward, control, support, supervisor relations) increased, PWB outcomes improved and perceived job stress decreased. Overall, change consultations and reward were significant predictors of all PWB outcomes (relationship 1). For example, when perceived change consultations increased, anxiety increased ( $\beta = .11$ ,  $p < .01$ ), while increased perception of reward decreased the anxiety experienced ( $\beta = -.13$ ,  $p < .01$ ). Perception of work demands ( $\beta = .15$ ,  $p < .01$ ), and overcommitment ( $\beta = .29$ ,  $p < .01$ ) were also significant predictors of anxiety.

For relationship 2, overcommitment was the only work characteristic that was a significant predictor of perceived job stress and organizational stress. For example, when perceived overcommitment increased, perceived organizational stress increased ( $\beta = .08$ ,  $p < .05$ ). Perceived control was the only work resource that was a significant predictor of perceived job stress; increased perceptions of control decreased the stress experienced. No work characteristics significantly predicted operational stress (see supplement file 1).

#### Direct relationships of individual characteristics

Individual characteristics (physical activity behavior, life satisfaction, life stress) accounted for more variance in the prediction of PWB outcomes ( $R^2 = .20 - .30$ ,  $ps < .01$ ; relationship 9), than in the prediction of perceived job stress ( $R^2 = .06 - .10$ ,  $ps < .05$ ; relationship 8). Perceived life satisfaction and life stress significantly predicted of PWB outcomes (relationship 9). Specifically, when perceived life satisfaction increased, PWB outcomes improved, but when perceived life stress increased, PWB outcomes deteriorated. Physical activity was also a significant predictor of positive mood, as highly physically active individuals perceived higher positive mood than those low in physical activity (see supplement file 1). No individual characteristics significantly predicted organizational stress or operational stress (relationship 8).

### Direct relationships of stress

Perceived job stress and organizational stress were significant predictors of PWB outcomes ( $R^2 = .11 - .16$ ,  $ps < .01$ ; relationship 3). When perceived job stress and organizational stress increased, PWB deteriorated. Operational stress did not significantly predict PWB outcomes (see supplement file 1).

#### Indirect relationship

A series of parallel multiple mediation analyses were conducted (see supplement file 2). Perceived job stress significantly mediated the relationships between work demands (demands, effort, overcommitment) and PWB outcomes, and supported the DRIVE model mediation relationship (relationship 4). For mediation to be observed, work characteristics must be found to indirectly relate to PWB outcomes through the perception of job stress, although work characteristics can still directly relate to PWB outcomes. For example, the direct relationship between overcommitment and anxiety was significant; when perceived overcommitment increased, anxiety increased ( $c' = .24$ , 95% CI [.18, .32]; see Table 2). However, the indirect relationship from overcommitment to anxiety via perceived job stress was also significant ( $a_1b_1 = .04$ , 95% CI [.02, .06]). When perceived overcommitment increased, perceived job stress increased ( $a_1$ ), which increased the anxiety experienced ( $b_1$ ). Therefore, as the perception of overcommitment increased, anxiety increased both directly, and indirectly through the increased perception of job stress. Change consultations was the only work demand which was not significantly indirectly related to PWB outcomes through perceived job stress (all 95% CI included zero). In comparison, control was the only work resource which was significantly indirectly related to PWB outcomes through perceived job stress. When perceived control increased, perceived job stress decreased ( $a_1$ ), which improved PWB outcomes ( $b_1$ ). All 95% CI did not include zero. Therefore, perceived job stress significantly mediated the relationships between demands, effort, overcommitment, and control, and PWB outcomes.

#### Moderation

A series of moderation analysis were conducted (see supplement file 3). Although all moderation relationships in the DRIVE model were supported to some extent, most examples of significant moderation involved work resources moderating the relationships between work demands and perceived job stress (relationship 5), and individual characteristics moderating the relationships between work demands and PWB outcomes (relationship

**Table 1** Descriptive statistics and correlations between work characteristics, individual characteristics, perceived job stress and psychological wellbeing outcomes

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Demands	5.04	2.78	-																	
2. Effort	5.38	2.73	.63 <sup>b</sup>	-																
3. Changes	5.93	2.88	.29 <sup>b</sup>	.29 <sup>b</sup>	-															
4. Overcommitment	4.90	3.03	.43 <sup>b</sup>	.17 <sup>b</sup>	.43 <sup>b</sup>	-														
5. Reward	4.65	2.55	-.19 <sup>b</sup>	-.15 <sup>b</sup>	-.34 <sup>b</sup>	-.08 <sup>a</sup>	-													
6. Control	5.61	2.59	-.22 <sup>b</sup>	-.20 <sup>b</sup>	-.23 <sup>b</sup>	-.13 <sup>b</sup>	.50 <sup>b</sup>	-												
7. Support	7.11	2.40	-.05	-.05	-.06	-.11 <sup>b</sup>	.33 <sup>b</sup>	.29 <sup>b</sup>	-											
8. Supervisor rels.	7.20	2.61	-.08 <sup>a</sup>	-.07 <sup>a</sup>	-.15 <sup>b</sup>	-.04	.43 <sup>b</sup>	.30 <sup>b</sup>	.46 <sup>b</sup>	-										
9. Life satisfaction	6.55	2.55	-.10 <sup>b</sup>	-.13 <sup>b</sup>	-.10 <sup>b</sup>	-.13 <sup>b</sup>	.30 <sup>b</sup>	.27 <sup>b</sup>	.26 <sup>b</sup>	.20 <sup>b</sup>	-									
10. Life stress	4.97	2.74	.16 <sup>b</sup>	.13 <sup>b</sup>	.08 <sup>a</sup>	.20 <sup>b</sup>	-.04	.04	-.01	.02	-.20 <sup>b</sup>	-								
11. Job stress	5.84	2.37	.56 <sup>b</sup>	.49 <sup>b</sup>	.27 <sup>b</sup>	.46 <sup>b</sup>	-.17 <sup>b</sup>	-.26 <sup>b</sup>	-.07 <sup>a</sup>	-.07	-.16 <sup>b</sup>	.20 <sup>b</sup>	-							
12. Op. stress	2.63	1.54	.09 <sup>a</sup>	.13 <sup>b</sup>	.07 <sup>a</sup>	.12 <sup>b</sup>	-.07 <sup>a</sup>	-.11 <sup>b</sup>	.01	.01	.22 <sup>b</sup>	-.03	.10 <sup>b</sup>	-						
13. Org. stress	3.39	1.54	.10 <sup>b</sup>	.12 <sup>b</sup>	.02	.13 <sup>b</sup>	-.10 <sup>b</sup>	-.09 <sup>b</sup>	-.04	-.02	-.05	-.03	.09 <sup>b</sup>	.76 <sup>b</sup>	-					
14. Depression	3.93	2.81	.34 <sup>b</sup>	.32 <sup>b</sup>	.24 <sup>b</sup>	.36 <sup>b</sup>	-.21 <sup>b</sup>	-.15 <sup>b</sup>	-.18 <sup>b</sup>	-.16 <sup>b</sup>	-.41 <sup>b</sup>	.42 <sup>b</sup>	.34 <sup>b</sup>	.05	.07 <sup>a</sup>	-				
15. Anxiety	4.45	2.88	.34 <sup>b</sup>	.27 <sup>b</sup>	.25 <sup>b</sup>	.40 <sup>b</sup>	-.23 <sup>b</sup>	-.17 <sup>b</sup>	-.11 <sup>b</sup>	-.14 <sup>b</sup>	-.32 <sup>b</sup>	-.32 <sup>b</sup>	.39 <sup>b</sup>	.04	.07 <sup>a</sup>	.69 <sup>b</sup>	-			
16. Job satisfaction	6.20	2.55	-.24 <sup>b</sup>	.19 <sup>b</sup>	-.30 <sup>b</sup>	-.17 <sup>b</sup>	.51 <sup>b</sup>	.46 <sup>b</sup>	.38 <sup>b</sup>	.40 <sup>b</sup>	.46 <sup>b</sup>	-.08 <sup>a</sup>	-.30 <sup>b</sup>	-.10 <sup>b</sup>	-.16 <sup>b</sup>	-.38 <sup>b</sup>	-.35 <sup>b</sup>	-		
17. Positive mood	6.28	2.48	-.21 <sup>b</sup>	-.15 <sup>b</sup>	-.20 <sup>b</sup>	-.27 <sup>b</sup>	.33 <sup>b</sup>	.27 <sup>b</sup>	.30 <sup>b</sup>	.20 <sup>b</sup>	.51 <sup>b</sup>	-.29 <sup>b</sup>	-.28 <sup>b</sup>	-.08 <sup>a</sup>	-.11 <sup>b</sup>	-.51 <sup>b</sup>	-.46 <sup>b</sup>	.45 <sup>b</sup>	-	
18. Negative mood	4.27	2.80	.34 <sup>b</sup>	.26 <sup>b</sup>	.29 <sup>b</sup>	.33 <sup>b</sup>	-.23 <sup>b</sup>	-.17 <sup>b</sup>	-.15 <sup>b</sup>	-.14 <sup>b</sup>	-.35 <sup>b</sup>	.35 <sup>b</sup>	.30 <sup>b</sup>	.04	.07	.60 <sup>b</sup>	.56 <sup>b</sup>	-.31 <sup>b</sup>	-.59 <sup>b</sup>	-

<sup>a</sup>*p* < .05. <sup>b</sup> *p* < .01

Changes = Change consultations. Supervisor rels. = Supervisor relations. Op.stress = Operational stress. Org.stress = Organizational stress



**Table 2** Parallel multiple mediator model for overcommitment and anxiety

Consequent	MI (Job stress)			M2 (Op. stress)			M3 (Org. stress)			Y (Anxiety)										
	B	SE B	LLCI	ULCI	B	SE B	LLCI	ULCI	B	SE B	LLCI	ULCI	B	SE B	LLCI	ULCI				
X (Overcomm.)	a <sub>1</sub>	.18**	.03	.13	.23	a <sub>2</sub>	.02	-.00	.07	a <sub>3</sub>	.02*	.02	.00	.09	c'	.24**	.04	.18	.32	
MI (Job stress)		-	-	-	-		-	-	-		-	-	-	-	b <sub>1</sub>	.23**	.05	.14	.33	
M2 (Op. stress)		-	-	-	-		-	-	-		-	-	-	-	b <sub>2</sub>	-.16	.10	-.35	.02	
M3 (Org. stress)		-	-	-	-		-	-	-		-	-	-	-	b <sub>3</sub>	.12	.09	-.06	.31	
Constant		3.65**	.52	2.63	4.68		1.73**	.41	.92	2.53		2.32**	.42	1.49	3.15		2.39**	.74	.94	3.84
R <sup>2</sup>		.42					.12					.06					.25			
F		47.88**					9.02**					4.30**					18.07**			
Bootstrap indirect effects	a <sub>1</sub> b <sub>1</sub>	.04 <sup>1</sup>	.01	.02	.06	a <sub>2</sub> b <sub>2</sub>	-.01	.00	-.02	.00	a <sub>3</sub> b <sub>3</sub>	.01	.01	-.00	.02		.01	-.00	.02	

\*p < .05. \*\*p < .01

<sup>1</sup>Indirect effect CI did not include zero

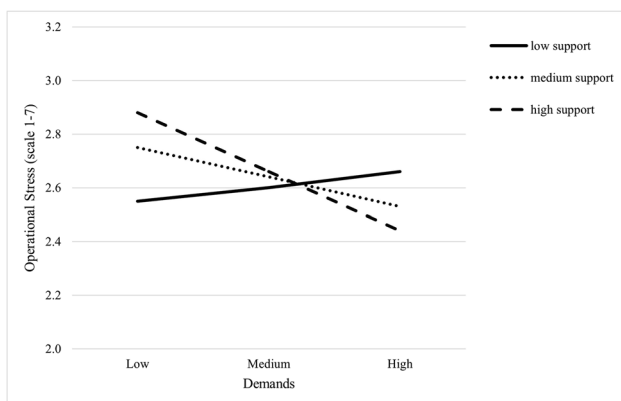
c'<sub>cs</sub> = Completely standardized effects

Overcomm. = Overcommitment. CI = Confidence interval. Op.stress = Operational stress. Org.stress = Organizational stress

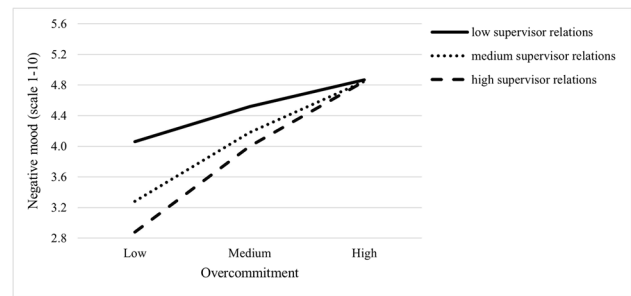
11). The largest effect sizes observed in the moderation analyses were through individual characteristics moderating the relationships between work demands and PWB outcomes ( $R^2 = .25 - .46, ps < .01$ ; relationship 11).

**Work resources as moderators**

Work resources (reward, control, support, supervisor relations) significantly moderated the relationships between work demands and perceived job stress (relationship 5). For example, perceived support was a significant moderator of the relationship between demands and operational stress ( $R^2 = .12$ ; see Fig. 2). At low perceived support, the relationship between perceived demands and operational stress was not significant. At high perceived support, the relationship between perceived demands and operational stress was significant. Specifically, as perception of demands increased, operational stress decreased ( $\beta = -.07, t = -2.12, p < .05$ ). This suggests that higher levels of perceived social support from colleagues improved the relationship between demands and operational stress. Work resources did not significantly moderate any relationships between work demands and organizational stress (relationship 5) or between organizational stress and PWB outcomes (relationship 7). Supervisor relations was the only work resource that significantly moderated the relationships between overcommitment and PWB outcomes ( $R^2 = .20$ ; relationship 6, see Fig. 3). The positive relationship between perceived overcommitment and negative mood was significant at all levels of perceived supervisor relations, but greater at higher supervisor relations. Specifically, as perception of overcommitment increased, negative mood increased (high:  $\beta = .26, t = 5.97, p < .01$ ; medium:  $\beta = .20, t = 5.87, p < .01$ ; low:  $\beta = .14, t = 3.01, p < .01$ ). Therefore, perceiving higher work resource (supervisor relations) did not improve the relationship between work demands (overcommitment) and negative mood.



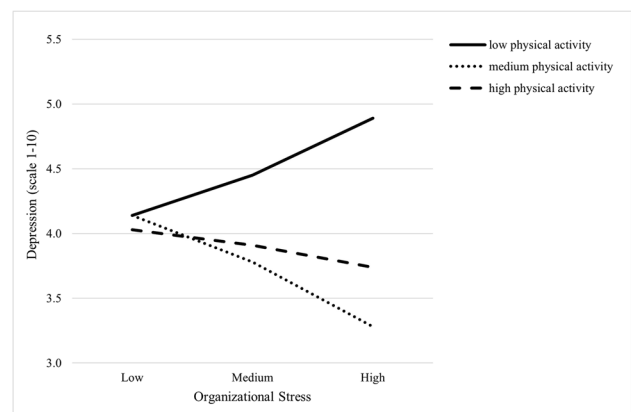
**Fig. 2** Support as a moderator of the relationship between demands and operational stress



**Fig. 3** Supervisor relations as a moderator of the relationship between overcommitment and negative mood

**Individual characteristics as moderators**

Individual characteristics (physical activity behavior, perceived life stress) significantly moderated the relationships between work demands and PWB outcomes (relationship 11, see supplement file 3). Specifically, where physical activity was high, perception of demands decreased and PWB outcomes improved. In comparison, where perceived life stress was high, perception of demands increased and PWB outcomes deteriorated. Perceived life satisfaction was not significant in any moderation relationships, but physical activity behavior and perceived life stress significantly moderated all DRIVE model relationships (relationships 10, 11 and 12, see supplement file 3). For example, physical activity significantly moderated the relationship between organizational stress and depression ( $R^2 = .13$ ; relationship 12, see Fig. 4). At low physical activity, there was a significant positive relationship between organizational stress and depression; as perception of organizational stress increased, depression increased ( $\beta = .51, t = 2.81, p < .01$ ). At moderate and high physical activity, the relationship between organizational stress and depression was not significant. Therefore, higher physical activity reduced the relationship between organizational stress and depression.



**Fig. 4** Physical activity as a moderator of the relationship between organizational stress and depression

## Discussion

We used the DRIVE model to assess: factors that directly predicted PWB outcomes (objective 1); the indirect relationships between work characteristics and PWB outcomes through perceived job stress (objective 2); which variables moderated the relationships between work demands, perceived job stress and PWB outcomes (objective 3) in a police context. All direct relationships, and some indirect and moderation relationships were supported, evidencing the utility of the DRIVE model to inform work-related stress inquiry (see Table 3).

Parallel multiple mediation analyses supported the explanatory mechanism in the DRIVE model, as the relationships between work demands and PWB outcomes were indirectly related through perceived job stress. This evidenced how appraisals play a critical role within the experience of work-related stress (Mark & Smith, 2008). Moderations were mostly due to work resources moderating the relationships between work demands and perceived job stress, and individual characteristics (physical activity behavior and perceived life stress) moderating the relationships between work demands and PWB outcomes. This supported the multi-dimensional approach to workplace

**Table 3** Summary of findings in relation to the DRIVE model relationships

DRIVE relationship	Summary
1 Work characteristics relate to PWB outcomes	All work characteristics, except for effort, significantly predicted PWB outcomes. Work demands significantly predicted decreased PWB, and work resources significantly predicted improved PWB.
2 Work characteristics relate to job stress	All work demands, except for change consultations, significantly predicted increased job stress. Control was the only work resource to significantly predict decreased job stress.
3 Job stress relates to PWB outcomes	Perceived job stress significantly predicted decreased PWB outcomes.
4 Job stress mediates the relationships between work characteristics and PWB outcomes	Perceived job stress significantly mediated the relationships between work demands, effort, overcommitment, control and PWB outcomes. Change consultations was the only work demand that was not mediated by job stress. Demands, effort and control mediations were explained through indirect effects only; overcommitment mediations had significant indirect and direct effects.
5 Work resources moderate work demands and job stress	All work resources significantly moderated the relationships between work demands and job stress. The moderations improved the relationships. No evidence for moderation in relationships with overcommitment or organizational stress.
6 Work resources moderate work demands and PWB outcomes	Support and supervisor relations significantly moderated the relationships between job stress and PWB outcomes, however the moderations did not always improve the relationships. No evidence for moderation in relationships with effort or anxiety.
7 Work resources moderate job stress and PWB outcomes	Reward and control significantly moderated the relationships between job stress and job satisfaction.
8 Individual characteristics relate to job stress	Life satisfaction significantly predicted decreased perceived job stress. Life stress significantly predicted increased perceived job stress.
9 Individual characteristics relate to PWB outcomes	Life satisfaction significantly predicted increased PWB outcomes. Life stress predicted decreased PWB outcomes. High physical activity significantly predicted increased positive mood.
10 Individual characteristics moderate work demands and job stress	Physical activity and life stress significantly moderated the relationships between work demands and change consultations, and perceived job stress. Physical activity moderated to improve the relationships, and life stress decreased the relationships.
11 Individual characteristics moderate work demands and PWB outcomes	Physical activity significantly moderated to improve the relationships between work demands and PWB outcomes. Life stress significantly moderated to decrease the relationships.
12 Individual characteristics moderate job stress and PWB outcomes	Physical activity significantly moderated to improve the relationships between perceived job stress and PWB outcomes. Life stress significantly moderated to decrease two relationships, and to improve one relationship.

PWB = psychological wellbeing. Job stress = perceived job stress. Work demands = perception of work demands. Work resources = perception of work resources

wellbeing advocated by Mark and Smith (2008), as work and individual characteristics (direct relationships, moderation), and perceived job stress (indirect relationships) were all significant in the experience of work-related stress. Small to large effect sizes were observed in all of the DRIVE model relationships. The largest effect sizes observed were for individual characteristics as moderators of the relationships between work demands and PWB outcomes (relationship 11). The smallest effect sizes were for work resources as moderators of the relationships between work demands and perceived job stress (relationship 5). Research with small sample sizes might not detect these relationships, which might explain why previous DRIVE model research has not supported these relationships (Margrove & Smith, 2022). However, our sample was large, and supports the consideration of individual characteristics in workplace wellbeing – which is often overlooked. Holistically, our findings illustrate the importance of integrating multiple factors and interactional relationships between variables to represent the complex real-life situation in work-related stress (Brough et al., 2018; Galvin, 2016).

### Conceptual implications

Our research was the first to test all 12 DRIVE model relationships within any occupational context, and the first to do so within a policing context. Previous research has applied the model in other student or trainee groups (e.g., Galvin, 2016), or only focused on the direct and mediation relationships in a police context (Nelson & Smith, 2016). Our research adds new knowledge by providing information on the contribution of different work and individual characteristics in the prediction of perceived job stress and PWB outcomes. We found that increased perception of all work demands increased perceived stress, but increased perception of control was the only work resource which significantly decreased the perception of stress (relationship 2). These findings add further support to the positive association of perception of control within stressful contexts (see Schaufeli & Taris, 2014).

The finding that work characteristics and PWB outcomes were indirectly related through perceived job stress (relationship 4) evidences the central tenet of transactional work-related stress theories and emphasizes how cognitive appraisals act as an underlying mechanism between work characteristics and PWB outcomes (Nelson & Smith, 2016). Specifically, if work demands are present and perceived as stressful then they can be detrimental to PWB outcomes. This provides an initial explanation for why work characteristics are related to PWB, supporting calls to explore underlying mechanisms and go beyond only assessing work characteristics (Brough et al., 2018).

We found some support for work resources as moderators (objective 3); mostly in relation to improving the relationships between work demands and perceived job stress (relationship 5). For example, high perceived support reduced the negative relationship between work demands and operational stress (see Fig. 2) with similar findings observed for reward and control as moderators. Research in a nursing context has also indicated social support can reduce the relationship between work demands and anxiety (Zurlo et al., 2018). Collectively, such findings indicate social support is a fundamental dimension for keeping mental health stable; and in line with Lazarus' stress and coping perspective, we suggest that if social support is perceived to be available, then demands might not be perceived as stressful (see Lakey & Cohen, 2000). Individual characteristics also moderated the relationships between work demands and PWB outcomes (relationship 11). Higher physical activity improved PWB outcomes whereas, higher perceived life stress deteriorated PWB outcomes. Ours is one of only a few studies to consider and support the inclusion of physical activity as a moderator variable in the study of work-related stress and PWB (Häusser & Mojzich, 2017).

### Practical implications

Using the DRIVE model allowed identification of the individual (personal) and organizational (work) characteristics that directly predicted perceived job stress and PWB outcomes, which, in turn, informs options for intervention. Of the work demands considered, perceptions of overcommitment were a significant predictor of increased perceived job stress and organizational stress. Therefore, police forces could develop practices aimed at reducing perceptions of overcommitment. Overcommitment relates to the need for approval and perceived ability to withdraw from work (see van Vegchel et al., 2005). Consequently, supervisors could be coached to monitor staff efforts, provide positive feedback and offer reassurance that they are allowed to 'switch off'. Of the work resources, perceived reward was a significant predictor across all PWB outcomes, and perceived control was a significant predictor of decreased perceived job stress. Research in US policing has suggested organizational practices that increase reward help reduce overcommitment (Violanti et al., 2018). People typically join the police to fulfil a lifetime aspiration, and to make a difference to those in need (Duran et al., 2018). Therefore, in a demanding and stressful job, social reward or recognition might help police feel valued for their work and avoid over-working in the search for recognition. Social reward could come from the organization acknowledging individual and/or team accomplishments (Violanti et al., 2018), or from the public informing police

workers when they have had positive outcomes following engagement with the police (Carlson-Johnson et al., 2020).

Our research supported the proposition within the DRIVE model that perceived job stress is one way by which work characteristics were related to health outcomes. Therefore, where work characteristics cannot be changed it might be worthwhile targeting perceptions of stress to indirectly improve health outcomes. Most interventions within the police sector are aimed at modifying an individual's stress responses through targeting appraisals, rather than reducing the stressors encountered (LaMontagne et al., 2016). For example, mindfulness-based interventions that focus on restructuring appraisals could be of benefit; especially given that such interventions have been previously reported to significantly reduce operational and organizational stress in the police (Bergman et al., 2016). Within our research, change consultations was the only work demand not mediated by perceived job stress, and only had a direct relationship with PWB outcomes. Irrespective of whether individuals' perceived the organizational changes as stressful, it was negatively related to PWB. Consequently, primary interventions aimed at developing a suitable communication strategy might be most appropriate in addressing organizational change. It is important that workers understand the impact of new work arrangements, and that there is open communication regarding the changes, in order to combat the wellbeing risks (Weinberg & Doyle, 2017).

Our findings indicated that when individuals perceived high social support, perception of work demands decreased. These findings, coupled with other social support research in a police context (e.g., Jackman et al., 2020), imply that police forces should promote support seeking cultures and increase awareness of the support systems available. Although we reinforce these implications, our findings showed that perceiving higher supervisor relations did not improve the relationship between overcommitment and negative mood. Based on all of the recommendations, a tailored supervisor training package seems appropriate. Supervisors could receive specific training to help understand the complexities of social support, monitoring overcommitment and offering reward, before police forces encourage a support seeking culture that they are not ready to provide.

For individuals who met or exceeded NHS (2015) guidelines for physical activity (i.e., moderate and high physical activity), no significant relationship between organizational stress and depression was found. However, for those low in physical activity, as perception of organizational stress increased depression also increased. Therefore, meeting the daily guidelines for physical activity was a protective factor against work-related stress experiences (cf., Gerber et al., 2010). These results suggest interventions that increase physical activity could be useful in improving PWB within a police context.

## Strengths, Limitations and future directions

Our study has considered a multi-dimensional approach to understanding work-related stress in policing, providing insight into the work and individual characteristics that were associated with PWB. Underpinned by the DRIVE model, we provided a conceptually accurate assessment of work-related stress with a rare integration of interactional and transactional perspectives using a large-scale and rigorous statistical analysis that tested the DRIVE model in its entirety. The study was the first to do so in an occupational setting. Our novel sample and holistic approach enabled us to highlight the role perception of job stress plays as an underlying mechanism for stress, answering calls for research that is designed to cater for the complexities of the stress process and thus advance the field (Brough et al., 2018). Our inclusion of physical activity, and our finding that physical activity acted as a moderator within the analyses provides new knowledge that helps to further connect the physical activity and occupational health psychology bodies of research.

Although implications for the work-related stress literature and police forces are evident, there are limitations to our research. The use of cross-sectional data limits our ability to infer causation and test the causal aspects of the DRIVE model. Further research using longitudinal studies could advance our work by informing whether work characteristics, perceived job stress and PWB outcomes mutually influence each other, or have unidirectional causal relationships. Other modelling approaches (e.g., structural equation modelling) could be used in future research to test more complex relationships (e.g., reciprocal and causal) between variables in the DRIVE model and overcome some of the limitations of our regression-based approach.

We used the DRIVE model to assess relationships between variables in the experience of work-related stress. In line with some studies that have utilized the DRIVE model, future research could build on our findings and use a combined effects approach. Studies have used the combined effects approach to compare the predictive power of DRIVE model variables (see Smith 2021). However, this approach did not align with our research aim and objectives to assess individual relationships, and our findings supported the notion that individual work-related stress variables had different relationships with PWB outcomes. As another future direction, a qualitative approach could provide greater clarity on the role of physical activity. The measures we used provided limited insight into why physical activity protected against some of the negative effects of stress. Given the physical activity findings, it will be important to explore these relationships further to inform practical implications and help police forces to foster a proactive and preventative approach to stress (Gerber et al., 2010).

## Conclusion

Using the DRIVE model of work-related stress to inform our enquiry, we assessed the factors influencing PWB in two British police forces. Increased perception of reward and control directly predicted decreased perception of job stress and improved PWB outcomes, whereas increased perception of overcommitment directly predicted increased perception of job stress and deteriorated PWB outcomes. Work characteristics and PWB outcomes were found to be indirectly related through perceived job stress, supporting that appraisals are an underlying mechanism in the experience of work-related stress. The perception of reward, control, support and moderate-high physical activity moderated the relationships between work demands, perceived job stress and PWB outcomes and protect against the negative effects of stress. These findings provided useful implications; specifically, police forces could aim to: change perceptions of stress; offer training packages for supervisors to support PWB; and/or use physical activity to foster a preventative approach to work-related stress. Future research should explore qualitative enquiry and conduct longitudinal research to inform the direction of causality in the relationships identified.

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**Data availability** The codebook and dataset are openly available on Figshare: Oliver, Helen (2022): Dataset Study 1 (Stress and psychological wellbeing in British police force officers and staff). Cardiff Metropolitan University. Dataset. <https://doi.org/10.25401/cardiffmet.19123148.v2>.

## Declarations

**Ethical approval** Approval was obtained from the ethics committee of Cardiff Metropolitan University. The procedures in this study adhere to the tenets of the Declaration of Helsinki.

**Informed consent** Informed consent was obtained from all individual participants.

**Competing interest** The authors have no competing interests to declare that are relevant to the content of this article.

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