A Repeated-Measures Examination of Organizational Stressors, Perceived Psychological and Physical Health, and Perceived Performance in Semi-Elite Athletes

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This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. There are no competing interests to declare. The authors would like to acknowledge Dr Thomas Curran for his assistance with the analyses of the data and resultant manuscript preparation.

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Abstract

Organizational stressors can undermine the psychological well-being and performance of athletes. Less is known, however, about how these relationships unfold over time and whether organizational stressors can impact upon perceived physical health. The current study, therefore, used a repeated-measures design to examine relationships between organizational stressors with components of perceived psychological (anxiety and depression) and physical (illness symptoms and missed training days via illness) ill-health, and perceived performance at the within-person level. Twenty-three semi-elite female rowers completed monthly measures of study variables for six-months. Multilevel models indicated that selection-related stressors positively predicted symptoms of perceived psychological and physical ill-health, and negatively predicted perceived performance. Conversely, coaching stressors negatively predicted symptoms of perceived psychological ill-health. Logistics and operations stressors positively predicted perceived performance, whereas goals and development stressors negatively predicted perceived performance. These findings demonstrate for the first time that, with a repeated-measures design, organizational stressors can predict components of perceived physical and psychological ill-health, and perceived performance at the within-person level in athletes. From a practical perspective, practitioners should incorporate these findings when diagnosing the need for, developing, and optimally implementing primary and secondary stress management interventions.

Keywords**:** acute illnesses, anxiety, depression, repeated-measures, strain, well-being

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Organizational stressors, defined as the "environmental demands associated primarily and directly with the organization within which an individual is operating" (Fletcher, Hanton, & Mellalieu, 2006, p. 329) are encountered by athletes from various sports and competitive levels (Arnold, Fletcher, & Daniels, 2016; Arnold, Wagstaff, Steadman, & Pratt, 2017). Whilst athletes can also encounter various other types of stressors including those of a personal (cf. McKay, Niven, Lavallee, White, 2008) and competitive (cf. Mellalieu, Neil, Hanton, & Fletcher, 2009) nature, it is organizational stressors that tend to be experienced and recalled more frequently (Hanton, Fletcher, & Coughlan, 2005; see also Finekaso & Treharne, 2019). To elaborate, 640 distinct organizational stressors have been identified in sport and categorized into four higher-order factors; (a) leadership and personnel (e.g., performance feedback, external expectations, the coach's behaviors and interactions), (b) cultural and team (e.g., team atmosphere, teammates' behaviors and interactions, communication), (c) logistical and environmental (e.g., selection, structure of training, facilities), and (d) performance and personal (e.g., injuries, career transitions, diet) issues (Arnold & Fletcher, 2012).

Organizational stressors are important as they form one side of a person-environment transaction that can result in considerable strain (Fletcher, Hanton, & Mellalieu, 2006). Supporting these ideas in sport, organizational stressors have been found to have main effects on several undesirable outcomes including negative affect and emotions (Arnold, Fletcher, & Daniels, 2017; Fletcher, Hanton, & Wagstaff, 2012), athlete burnout (Larner, Wagstaff, Thelwell, & Corbett, 2017; Tabei, Fletcher, & Goodger, 2012; Wagstaff, Hings, Larner, & Fletcher, 2018), and performance dissatisfaction (Arnold, Edwards, & Rees, 2018; Didymus & Fletcher, 2017b). According to transactional models of stress (Lazarus & Folkman, 1984;

Lazarus & Launier, 1978; see also Fletcher et al., 2006), the influence of stressors and hassles on the extent of distress is explained by variables such as cognitive appraisal and coping. As an example, threat appraisals (i.e., the possibility of future damage occurring) are typically associated with more maladaptive outcomes, whereas challenge appraisals (i.e., the opportunity for growth, development, or mastery) are associated with more adaptive outcomes (cf. Jones, Meijen, McCarthy, & Sheffield, 2009; Lazarus & Folkman, 1984).

Although being physically active and engaging in sport is believed to serve as a protective factor against psychological ill-health (Hamer, Stamatakis, & Steptoe, 2009), the prevalence of mental health conditions such as anxiety and depression in elite sport appear to be broadly comparable to that of the general population (Gulliver, Griffiths, Mackinnon, Batterham, & Stanimirovic, 2015; Nixdorf, Frank, Hautzinger, & Beckmann, 2013). A more recent study, however, found that adolescent elite athletes were less psychologically distressed than their non-athlete matched controls (Rosenvinge et al., 2018). The ambiguity surrounding the prevalence of mental health conditions in elite sport may be due to numerous lifestyle and environmental risk factors such as encountering organizational stressors. Indeed, a systematic review examining the incidence and nature of psychological ill-health in elite athletes identified approaching retirement and injuries as risk factors for experiencing symptoms of anxiety and depression (Rice et al., 2016). With regards to the definitions underpinning the current study, the American Psychological Association (APA; 2020a) define anxiety as “an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure”, and suggest depression is the most common mental disorder whereby people with depression “may experience a lack of interest and pleasure in daily activities, significant weight loss or gain, insomnia or excessive sleeping, lack of energy, inability to concentrate, feelings of worthlessness or excessive guilt, and recurrent thoughts of death or suicide” (APA, 2020b).

Whilst no research has explicitly investigated the relationship between organizational stressors and broader psychopathology in sport, studies have found links between organizational stressors and negative affect (Arnold et al., 2017), as well as between organizational stressors and athlete burnout (e.g., Larner et al., 2017; Tabei et al., 2012; Wagstaff et al., 2018). Outside of sport, occupational stressors (e.g., family-work conflict, leadership style, organizational roles, and work relationships) have been identified as potential risk factors for psychological distress and having or developing common psychological disorders such as anxiety and depression in doctoral students, employees, and military personnel (e.g., Levecque, Anseel, Beuckelaer, Heyden, & Gisle, 2017; Melchior, Caspi, Milne, & Danese, 2007; Pflanz & Ogle, 2006). Indeed, organizational stressors that are perceived as stressful and exceed the individual's coping abilities may influence the symptomology of anxiety and depression through biological (e.g., alterations in neurotransmitters such as serotonin; cf. van Praag, 2004) and psychological (e.g., rumination; cf. Michl, McLaughlin, Shepherd, & Nolen-Hoeksema, 2014) mechanisms. Thus, organizational stressors encountered in sport settings may also be linked with symptoms of anxiety and depression reported by athletes.

Hypothesis 1: In view of this, we expect that organizational stressors will positively predict symptoms of anxiety and depression.

According to transactional stress theory (Lazarus & Folkman, 1984), as well as other stress-related theories such as General Adaptation Syndrome (cf. Selye, 1950), physical symptoms can also manifest from stressors. Upon encountering a stressor, a biological stress response is generated in reaction to psychological stressors through interactions between the nervous, endocrine, and immune system (see, for reviews, Elenkov, Wilder, Chrousos, & Vizi, 2000; Tsigos & Chrousos, 2002). The interaction of these systems leads to the secretion of stress hormones such as glucocorticoids, epinephrine, and norepinephrine (Tsigos &

Chrousos, 2002). However, prolonged elevation of glucocorticoids (e.g., cortisol) due to chronic psychological stress can have profound inhibitory effects on the immune system, potentially leaving the individual more susceptible to acute infections (Dhabhar, 2014).

The relationship between organizational stressors and acute illness is particularly interesting within athletic samples due to the higher incidence of illness symptoms reported during intensified training or around the time of competition (Engebretsen et al., 2013; Gleeson & Pyne, 2016). Although for nearly four decades it has been assumed that exercise could be suppressing the immune system, placing athletes at a greater risk of infection (Nieman & Pedersen, 1999), this idea has been challenged (Campbell & Turner, 2018). Indeed, a recent consensus paper (Simpson et al., 2020) has identified that the most likely explanation is increased exposure to pathogens from crowds of people, or the effects that other factors, such as psychological stress, can have on immune function. Until now, previous work has not examined the relationship between organizational stressors and acute illnesses in sport. However, global perceived psychological stress has been identified as a critical risk factor for developing acute illness symptoms during the build-up to an Olympic Games (Drew et al., 2017). This study, although informative in the sports context, unfortunately did not examine organizational stressors. Studies outside of sport support links between organizational stressors and physical ill-health (e.g., Mohren, Swaen, Borm, Bast, & Galama, 2001; Mohren, Swaen, Kant, van Schayck, & Galama, 2005; Nixon, Mazzola, Bauer, Krueger, & Spector, 2011). For instance, occupational stressors within a business context have been shown to positively predict the incidence of upper respiratory tract infection (URTI) symptoms and sickness absence from work in employees (Mohren et al., 2005; Nixon et al., 2011). Whilst there are many stark differences between, and idiosyncrasies within, business and sports domains, scholars have also discussed the similarities evident in the organizational issues that might arise within both sport and business (e.g.,

teammates/colleagues, coaches/employers, training/work venue, and team processes such as communication; Jones, 2002; see also, Fletcher, 2011). In view of these commonalities and the research in business to date, it is logical and would address the extant lack of knowledge and understanding to investigate the relationship between organizational stressors and acute illness symptoms (and training absence due to illness) in sport.

> *Hypothesis 2:* With the aforementioned research in mind, we expect organizational stressors to be positive predictors of acute illness symptoms and missed training days due to illness in athletes.

Alongside physical and psychological health, organizational stressors can also impact performance. To explain through a theoretical lens, transactional stress theory posits that the imbalance between environmental stressors and an individual's resources to cope with such demands can result in negative behavioral responses such as changes in appetite, substance abuse, pacing, or impaired performance (Lazarus & Folkman, 1984; see also, Englert, 2017; Finekaso & Treharne, 2019; Fletcher et al., 2006). There is ample evidence supporting the detrimental effects organizational stressors can have on work performance in an occupational context (e.g., Jehangir, Kareem, Khan, Jan, & Soherwardi, 2011; Ongori & Agolla, 2008). In sport, however, evidence to support the link between organizational stressors and performance is less clear. For example, organizational stressors related to coaching (Arnold et al., 2018) and selection (Didymus & Fletcher, 2017b) have been associated with lower perceived performance and performance dissatisfaction whereas, stressors related to goals and development have been positively linked with performance satisfaction among athletes from a range of sports and levels (Arnold, Fletcher, & Daniels, 2013). In other research, no relationship has been found between organizational stressors and performance satisfaction (Arnold, Fletcher, et al., 2017). More recently, Rumbold, Fletcher, and Daniels (2020) found that the way in which athletes coped with stressors in sport (including those of an

organizational nature) was associated with minutes played at a senior professional level five years later (i.e. an alternative performance indicator). Against this backdrop and noting the importance of performance to achievement outcomes in sport (cf. Wagstaff, 2019), clarifying the relationship between organizational stressors and performance is a research priority. Moreover, considering that previous research has typically addressed the relationship between organizational stressors and perceived performance using cross-sectional research designs (i.e., by examining between-person differences), a repeated-measures approach focusing on within-person changes is warranted to further develop our understanding of this potential relationship.

> *Hypothesis 3:* Given that organizational strain can cause negative behavioral responses, we expect that organizational stressors will be negative predictors of perceived performance.

Based on the above review, the primary aim of this study is to use a repeated-measures design to examine the relationship of organizational stressors with symptoms of perceived psychological and physical ill-health and perceived performance at the within-person level. As briefly alluded to above, extant research has generally investigated the relationship between organizational stressors and outcomes by examining between-person comparisons using single-scores (i.e., cross-sectional measures) that are assumed to represent a stable property of each individual's perception of organizational stress. Aligned with transactional stress theory (Lazarus & Launier, 1978), this study will instead focus on examining within-person changes across a six-month period in the run up to competition. Such an approach enables tests of how deviations from an individual's typical perception of organizational stressors are contemporaneously related to psychological and physical health, and perceived performance outcomes. With this approach, it is assumed that what matters at a particular time point is not an athlete's overall level of organizational stressors compared to

another athlete, but instead whether the athlete encounters more or less organizational stressors than on previous occasions.

Method

Participants

Twenty-eight semi-elite female rowers who were all members of the same rowing club volunteered to participate in this study. Following drop-out, due to withdrawal from the study or not being selected for the rowing squad (5 participants; 17.86%), a total of 23 participants completed the study (82.14%). Participants' age ranged from 18 to 28 years (M_{age} = 21.25, *SD* = 2.41years) and participants had been competing in rowing for one to 13 years (*M* = 4.57, *SD* =3.28 years). Participants were considered semi-elite and competitive-elite using the expertise criterion proposed by Swann, Moran, and Piggott (2015). Specifically, participants were full-time athletes who trained together daily and competed at the highest (or just below) levels of their sporting structure, with a number of the sample (*n* = 9) representing national rowing squads. The sample were deemed optimal for responding to the aims of this study; specifically: little research has investigated organizational stressors and the relationship with selected dependent variables in rowers; rowing is a team sport which requires interpersonal coordination and intense endurance training periods (risk factors for illness symptoms in athletes; see Gleeson & Pyne, 2016). Linked to this, the sample were also training for one competition meaning there would likely be high competition for places (e.g., selection-related demands) and high importance placed on the competition. Furthermore, in view of the level of the sample, they would likely be encountering higher dimensions of organizational stressors than their lower level counterparts (cf. Arnold et al., 2016; Wagstaff et al., 2018).

Procedure

Following institutional ethical approval, opportunity sampling was adopted to recruit

participants from a rowing team via enquiries with the head coach and a subsequent recruitment presentation delivered by the research team. Within this presentation, participants were made fully aware of the purpose of the study, their ethical rights (e.g., confidentiality, anonymity, right to withdraw), and all procedures. If participants were interested in taking part, they were firstly asked to provide informed consent. Following this, in the lead up to a major competition, self-report data were collected longitudinally from the participants using a questionnaire pack once per month for six months (November 2016 to April 2017). The monthly collection decision was guided by what was deemed optimal from an empirical and methodological position (i.e. the stressor measure had been validated over the past month; Arnold et al., 2013), combined with what was deemed feasible by the coach of the club to maximize retention (cf. Caruana, Roman, Hernández-Sánchez, & Solli, 2015). Paper (November, December, February, and March; n = 92) or electronic (January and April; n = 46) versions of the questionnaire pack were completed (and collected if paper, submitted if online) on a scheduled date at the end of each month, with each completion taking approximately 30-45 minutes. Participants were prompted via email when they had an upcoming online collection, and the researcher arranged with the coach to attend the squads' training base for a day when the surveys were completed on paper. The first data collection period (November) captured the initial month of the competitive season with the final data collection period (April) capturing the month prior to their major competition.

Measures

Organizational stressors. The 23-item Organizational Stressor Indicator for Sport Performers (OSI-SP; Arnold et al., 2013) was used to measure the frequency, intensity, and duration of organizational stressors encountered by the athletes over the previous month. It is noted that a monthly recall period was adopted as this recall period has been previously validated for these somewhat extraneous, peripheral, and widely distributed stressors to be

encountered and recalled (Arnold et al., 2013; Hanton et al., 2005). The OSI-SP is comprised of five subscales: Goals and Development (six items), Logistics and Operations (nine items), Team and Culture (four items), Coaching (two items), and Selection (two items). For all items, the stem "In the past month, I have experienced pressure associated with…" is presented, to which participants respond on three six-point Likert scales anchored from zero to five. These scales are: frequency ("how often did this pressure place a demand on you?"; 0 = *never*, 5 = *always*), intensity ("how demanding was this pressure?"; 0 = *no demand*, 5 = *very high*), and duration ("how long did this pressure place a demand on you for?"; 0 = *no time*, 5 = *a very long time*). The OSI-SP has previously demonstrated validity and internal consistency (Arnold et al., 2013), and Cronbach's alpha in the present study ranged from acceptable to excellent (.71 to .92). The intra-class correlation coefficient (ICC) was used as an estimate of test-retest reliability, with values of <.50 indicative of poor reliability, values of 0.50-0.75 indicative of moderate reliability, values of 0.75-0.90 indicative of good reliability, and values >0.90 indicative of excellent reliability (Koo & Li, 2016). The OSI-SP subscale frequency ICC values ranged from .74 to .91, OSI-SP subscale intensity ICC values ranged from .64 to .87, and the OSI-SP subscale duration ICC values ranged from .69 to .88 (see Table 1).

Components of perceived psychological health. The 21-item short-form Depression, Anxiety, and Stress Scale (DASS-21; Antony, Bieling, Cox, Enns, & Swinson, 1998) was administered to measure two components of psychological ill-health (cf. Uphill, Sly, & Swain, 2016): symptoms of depression and anxiety (experienced in the previous week). The DASS-21 has a 4-point Likert response scale (0 = *did not apply to me at all* and 3 = *applied to me very much, or most of the time),* and has previously demonstrated acceptable internal consistency (Antony et al., 1998). Within the present study, Cronbach's alpha demonstrated good (α = .87) and acceptable (α = .73) internal consistency for depression and

anxiety subscales, respectively. The test-retest reliability ICC values were excellent: depression = .92, anxiety = .93 (Koo & Li, 2016; see Table 1).

Perceived physical health. With the help of their training diaries, participants were asked to indicate the number of training sessions they had missed in the preceding month because of illness. To capture illness symptoms, an adapted version of Fricker and colleagues' (2005) illness log was used (which has been validated using the month recall timeframe). In this log, participants indicated which of the 31 days they had experienced described symptoms and their severity relative to the impact it had on training. Specifically, upper respiratory (e.g., sneeze, runny nose, sore throat), chest infection (e.g., cough, sputum, chest congestion), flu (e.g., aching joints, fever, chills), and headache symptoms were assessed. Severity was indicated as being either mild (1 = no change to training), moderate (2 = training modified), or severe (3 = stopped training). A total symptom score was calculated using the total number of days ill (i.e., with URTI, chest infection, flu, or headache) multiplied by the severity.

Perceived performance. Participants were asked to indicate how well they considered their own sporting performances to be over the past week on an 11 point Likert scale, ranging from zero (*very poor*) to ten (*excellent*). Participants also rated how satisfied they were with their performance over the past week by providing a number between "0" (*unsatisfied*) and "100" (*satisfied*). These perceived performance measures have been adopted in previous research (e.g., Arnold et al., 2018; Didymus & Fletcher, 2017a; Levy, Nicholls, & Polman, 2011; Nicholls, Polman, & Levy, 2012; Pensgaard & Duda, 2003). Furthermore, a week was the time-period that this and the measures of psychological health adopted in this study, since this is how they have typically been originally used/validated and is according to what was deemed most appropriate for participant recall. The test-retest reliability ICC values for the performance items (.73 and .67 respectively) demonstrated moderate reliability (Koo

& Li, 2016; see Table 1).

Data Analysis

Multilevel models (MLMs) with restricted maximum likelihood applied were tested using IBM SPSS Statistics Version 22.0. SPSS 22 was used to screen data for missing values, unengaged responses, univariate and multivariate outliers, multicollinearity, and to generate descriptive statistics. In accordance with Tabachnick and Fidell's (2014) recommendations, multivariate outliers were identified using Mahalanobis distance with $p < .001$; however, none were identified. Missing data were determined as missing completely at random (MCAR) using Little's MCAR test ($\chi^2 = 296.63$, $p > .05$; Little, 1988). Data were transposed so that each person was represented by six rows (one for each time point). One hundred and thirty-two (4% missing cells) observations were collected out of a possible 138 (23 participants × 6 time points). MLMs were constructed to estimate the fixed effects of the predictor variables on the outcome variables at both the within- and between-person levels. To make the multilevel models more stable and combat any multicollinearity (cf. Tabachnick & Fidell, 2014), centring was used after considering theoretical justifications (cf. Lazarus & Folkman, 1984). For within-person effects, predictor variables were person-mean centered (i.e., scores subtracted from the mean within-person score across the six time points to examine how deviations from an individuals' typical perception of stressors encountered relate to the outcomes measured). For between-person effects, predictor variables were grand-mean centered (i.e., mean score across the six-time points subtracted from the overall mean of the sample to examine how deviations from an individual's typical perception of stressors encountered from the group mean relate to the outcomes measured). Models were built in a stepwise fashion for each of the study variables. First, intercept-only models (i.e., no predictor variables included) were built for each outcome variable to calculate the variance attributable to the within- and between-person differences. Predictor variables were

subsequently added to the models to assess whether they explained variance in the outcome variables. The predictor variables comprised all the organizational stressor dimensions and subscales. The outcome variables included symptoms of anxiety and depression (perceived psychological ill-health), acute illness symptoms and missed training days due to illness (perceived physical ill-health), and performance rating and satisfaction (perceived performance). The R_1^2 and R_2^2 percentiles were calculated for each dependent variable using the intercept-only and conditional models. These Pseudo R-squared values indicate the amount by which the conditional model reduces the errors in predicting outcomes when compared to the intercept-only model at the within- (R_1^2) and between-person (R_2^2) levels.

Results

Descriptive statistics of the measured variables (e.g., ICC, alpha values, means, standard deviations, and correlations) are shown in Table 1. To address the aims of the study, MLMs were tested to examine whether organizational stressors predicted symptoms of perceived psychological and physical ill-health, and perceived performance (see Tables 2-4; with unstandardized beta values provided). Although the focus of this study is on the relationships at the within-person level in line with the purpose, the findings at the between-person level are also briefly presented for the interested reader. Taking first the relationship between organizational stressors and perceived psychological ill-health, the frequency (B =1.01, SE = 0.38, t = 2.65, p < .05) and intensity (B = 0.76, SE = 0.34, t = 2.22, p < .05) of selection stressors and the duration of logistics and operations stressors (B = 1.15, SE = 0.75, t = 1.95, p < .05) were found to be positive predictors of symptoms of anxiety at the within-person level, whereas all dimensions of coaching stressors were significant negative predictors (frequency, B = −1.38, SE = 0.49, t = −2.78, p < .05; intensity, B = −0.86, SE = 0.42, t = −2.04, p < .05; duration, B = −1.64, SE = 0.36, t = −4.52, p < .05). At the within-person level, the frequency (B = −3.48, SE = 1.44, t = −2.42, p < .05) and duration (B =

−2.38, *SE* = 1.11, *t* = −2.15, *p* < .05) of logistics and operations, and duration of coaching (approaching significance; *B* = −1.00, *SE* = 0.55, *t* = −1.86, *p* < .07) stressors negatively predicted symptoms of depression, whereas the frequency (*B* = 1.72, *SE* = 0.55, *t* = 3.10, *p* < .05) and duration (*B* = 2.20, *SE* = 0.55, *t* = 4.00, *p* < .05) of selection stressors positively predicted symptoms of depression . In addition, the frequency (approaching significance; *B* = 4.38, *SE* = 2.22, *t* = 1.98, *p* < .07), intensity (*B* = 4.53, *SE* = 1.56, *t* = 2.90, *p* < .05) and duration (*B* = 5.00, *SE* = 1.98, *t* = 2.52, *p* < .05) of coaching stressors were found to be positive predictors of symptoms of depression at the between-person level (see Tables 2-4).

No significant within-person variance was found for illness symptoms, suggesting that each participant experienced similar patterns of illness over the study period. Nonetheless, selection intensity (*B* = 6.61, *SE* = 2.11, *t* = 3.13, *p* < .05) at the within-person level was found to be a significant positive predictor of acute illness symptoms across the six-month period. Similar to illness symptoms, no within-person variance was found for missed training days over the study period. All three dimensions of selection stressors were found to be significant positive predictors of missed training days at the within-person level (frequency, *B* = 1.06, *SE* = 0.37, *t* = 2.88, *p* < .05; intensity, *B* = 0.90, *SE* = 0.33, *t* = 2.74, *p* < .05; duration, *B* = 0.94, *SE* = 0.38, *t* = 2.50, *p* < .05). Additionally, the intensity of goals and development stressors at the between-person level was found to be a positive predictor of missed training days (approaching significance; *B* = 1.67, *SE* = 0.86, *t* = 1.94, *p* < .07), whereas the frequency of team and culture stressors was found to be a negative predictor (approaching significance; *B* = −1.98, *SE* = 1.01, *t* = −1.96, *p* < .07) (see Tables 2-4).

Turning to performance, the frequency (*B* = −9.71, *SE* = 4.76, *t* = −2.04, *p* < .05) and duration (*B* = −9.27, *SE* = 4.13, *t* = −2.25, *p* < .05) of goals and development, and all dimensions of selection (frequency, *B* = −5.69, *SE* = 1.97, *t* = −2,89, *p* < .05; intensity, *B* = −4.73, *SE* = 1.79, *t* = −2.64, *p* < 0.5; duration, *B* = −5.51, *SE* = 2.02, *t* = −2.72, *p* < .05)

stressors were found to be significant negative predictors of performance satisfaction at the within-person level. In contrast, all three dimensions of logistics and operations stressors were found to be significant positive predictors of performance satisfaction (frequency, B = 16.29, SE = 5.11, t = 3.19, p <.05; intensity, B = 10.88, SE = 3.86, t = 2.82, p < .05; duration, B = 12.72, SE = 4.07, t = 3.13, p < .05). At the between-person level, all dimensions of coaching stressors negatively predicted performance satisfaction (frequency, B = −10.40, SE = 4.11, t = −2.53, p <.05; intensity, B = −6.95, SE = 2.91, t = −2.38, p < .05; duration, B = −11.54, SE = 3.61, t = −3.20, p < .05), whereas the duration of logistics and operations stressors positively predicted performance satisfaction (approaching significance; B = 18.32, SE = 9.15, t = 2.00, p < .07). Regarding perceived performance rating, all dimensions of selection stressors were found to be significant negative predictors at the within-person level (frequency, B = −0.53, SE = 0.17, t = −3.06, p < .05; intensity, B = −0.43, SE = 0.16, t = −2.77, p < .05; duration, B = −0.52, SE = 0.18, t = −2.92, p < .05), whereas the frequency (B = 1.02, SE = 1.02, t = 2.29, p < .05), intensity (approaching significance; B = 0.64, SE = 0.34, t = 1.89, p < .07), and duration (B = 0.71, SE = 0.36, t = 1.98, p < .05) of logistics and operations stressors were found to be positive predictors. At the between-person level, the intensity (approaching significance; B = −0.52, SE = 0.26, t = −1.98, p < .07) and duration (B = −0.74, SE = 0.35, t = −2.08, p < .05) of coaching stressors was found to be a significant negative predictor of performance rating (see Tables 2-4).

Discussion

The present study examined whether organizational stressors predicted symptoms of perceived psychological and physical ill-health, and perceived performance at the within-person level in a sample of semi-elite rowers. Results somewhat supported our expectations in that some dimensions and types of organizational stressors positively predicted perceived symptoms of anxiety and depression, acute illness symptoms and missed training days due to

illness, and negatively predicted perceived performance. There were, however, some findings in contrast to initial hypotheses.

Taking perceived psychological health first, a possible explanation as to why selection-related stressors positively predicted symptoms of anxiety and depression at the within-person level could have been the way in which athletes appraised such stressors. Specifically, previous research has found that the intensity of selection-related stressors were significant predictors of both challenge and threat appraisals for high level athletes (Bartholomew, Arnold, Hampson, & Fletcher, 2017), with the latter having the potential to lead to feelings of anxiety and depression. Indeed, recent research examining the organizational stress process found that within-person threat appraisals were strongly associated with negative affect (Rumbold et al., 2020). Moreover, the relationship between threat appraisal and anxiety has been well established in previous research (Skinner & Brewer, 2002). Lending further support, the outcome of selection will likely be of high importance to the athlete (e.g., in terms of their career development), and task importance has been associated with forms of anxiety (Nie, Lau, & Liau, 2011). Notwithstanding these observations, future research should examine additional mediators (e.g., coping) of the stressor and psychological health relationship, given that some qualitative organizational stress research has found athletes to appraise selection related stressors with more positive evaluations (Didymus & Fletcher, 2012). The duration of logistics and operations stressors were also found to be positive predictors of anxiety at the within-person level. A potential explanation for this finding relates to the limited control athletes often have over these types of stressors (cf. Arnold, et al., 2013; see also Finekaso & Treharne, 2019), and how their lasting duration could lead athletes to develop a state of learned helplessness whereby they believe they are unable to control or change the stressor, so they do not attempt to even when opportunities for such change become available (cf. Maier & Watkins, 2005). This perceived

lack of control and learned helplessness has been shown to be associated with anxiety (Endler, Speer, Johnson, & Flett, 2000; see also, Dweck & Wortman, 1982).

Counter-intuitively, coaching stressors were found to be negative predictors of depression and anxiety symptoms at the within-person level (all dimensions for anxiety, and duration for depression). Whilst it is unclear as to why this was found, a possible explanation may be related to the social support the athletes attained through regular interactions with their coaches – especially given their full-time athletic status – which could have served as a protective factor against such symptoms (Rees & Freeman, 2009). Therefore, whilst an athlete may perceive the interactions between themselves and their entourage demanding, the support attained through these sources could have simultaneously buffered some of the symptoms associated with psychological ill-health (e.g., self-isolation). Interestingly, however, previous research has also illustrated that, at times, the sources of support may also exacerbate stressors (Mayo, Sanchez, Pastor, & Rodriguez, 2012; see also Arnold et al., 2018). The frequency and duration of logistics and operations-related stressors were also found to be negative predictors of depression symptoms. To explain these findings, research has indicated that some athletes cope with logistical and environmental stressors (e.g., travel, competition format) using strategies from the problem-solving family of coping (Didymus & Fletcher, 2017b). Indeed, directly adjusting cognitive and behavioral efforts to deal with a stressor (e.g., problem-focused coping) has been linked with positive psychological health (e.g., positive affect and emotions) (Arnold, Fletcher et al., 2017; Crocker & Graham, 1995).

In addition to predicting symptoms of perceived psychological ill-health, selection-related stressors were found to be positive predictors of illness symptoms and missed training days due to illness at the within-person level. This finding lends support to previous occupational stress research whereby perceived job stress has been found to be associated with URTI symptoms and sickness absence days in employees (Mohren et al., 2005; Nixon et

al., 2011). This finding also supports and extends other sport-related research whereby global perceived psychological stress was identified as a risk factor for acute illnesses among elite athletes nine months before the 2016 Rio Olympic Games – a period where intense selection-related stressors will likely be experienced (Drew et al., 2017). The extent of control the athlete perceives to have over such stressors may provide a possible explanation for the relationship between selection stressors and perceived physical ill-health. To elaborate, recent research has shown that greater perceived control when exposed to a stressor can cause a reduction in the production of cortisol (Mayer et al., 2017; Salzmann et al., 2018). Therefore, it may be that the athletes in the present study perceived themselves as having little or no control over the selection-related stressors (i.e. ultimate selection decided by coaching team) causing cortisol levels to remain high or even rise; which in turn, may have induced greater inhibitory responses on the immune system making the individual more vulnerable to acute infections (Dhabhar, 2014; Tsigos & Chrousos, 2002).

Turning attention to perceived performance, selection (all dimensions) and goals and development (frequency and duration) stressors negatively predicted perceived performance and/or satisfaction, whereas logistics and operations stressors (all dimensions) were found to be positive predictors at the within person level. These findings contrast with previous cross-sectional research where no significant relationships were found between organizational stressors and performance satisfaction (Arnold et al., 2017); thus, reinforcing the importance of using a repeated-measures design to examine organizational stressors at the within-person level. Nonetheless, the relationship observed between selection stressors and reduced performance satisfaction is in agreement with previous qualitative research (Didymus & Fletcher, 2017b). From a bidirectional perspective, the finding between selection and performance satisfaction is plausible given that athletes perceiving their performance to be lower will likely be more concerned about selection (thus heightened dimensions of selection

stressors); however, future research should look to examine the temporal ordering of such variables (cf. Lazarus & Launier, 1978). A potential explanation as to why the frequency and duration of goals and development stressors were negatively associated with performance satisfaction could relate to the specific stressors measured. To explain, the goals and development subscale contain items relating to goals, training, and injuries (cf. Arnold et al., 2013); therefore, if athletes are experiencing these stressors often and intensely (e.g., not achieving their goals, struggling with their training schedule, and/or are injured), it is likely that they will subsequently be less satisfied with their performances.

The finding that logistics and operations stressors (all dimensions) positively predicted perceived performance is in contrast to previous research whereby logistical and environmental stressors were most often linked with performance dissatisfaction (Didymus & Fletcher, 2017b). However, Didymus and Fletcher (2017b) also reported that participants were most likely to be satisfied with their performance when they appraised these types of stressors as a challenge and employed ways of coping within the support seeking family. Thus, it could be argued that athletes within the present study perceived these demands as a challenge and/or sought support from appropriate resources when coping with such issues. Furthermore, considering these athletes were competing amongst themselves to be selected for competition and these types of stressors are primarily associated with training and competition (e.g., ‘the organization of the competition that I perform in’; cf. Arnold et al., 2013), the athletes may have perceived these types of stressors as an opportunity for growth and development (i.e., to prove themselves). Indeed, challenge appraisals have been found to be positive predictors of performance (Skinner & Brewer, 2002).

Although not the primary purpose of the study, it was interesting to note that between-person comparisons revealed that all dimensions of coaching-related stressors were positively associated with symptoms of depression and negatively associated with perceived

performance. These findings, coupled with the finding that the duration of coaching-related stressors negatively predicted symptoms of depression at the within-person level, reiterates the notion that within-person changes and between-person differences can yield very different conclusions and therefore, should be considered in future organizational stress research. MLMs also indicated that the intensity of goals and development stressors were positive predictors for missed training days due to illness, whereas the frequency of team and culture stressors were negative predictors at the between-person level. However, caution should be taken when interpreting these findings given the small sample size at the between-person level of the analyses, particularly in view of the unstandardized beta and standard errors values reported (cf. Maas & Hox, 2005).

A key strength of this study is that it provides the first comprehensive examination of whether organizational stressors can predict components of perceived psychological and physical ill-health, and perceived performance at the within-person level in sport. The use of MLM to examine variables at the within-person level significantly advances our understanding of the dynamic and ongoing transactional stress process (Fletcher et al., 2006; Lazarus & Launier, 1978). Notwithstanding these strengths, it is important to consider the limitations. First, this study assessed all variables using self-report measures which may be influenced by psychological factors including social desirability and response biases (cf. van de Mortel, 2008). To mitigate such concerns, scholars should aim to triangulate self-report assessments with objective measures of stress (e.g., stress hormones), immune function (e.g., biological markers) and performance (e.g., power output, stroke rate, completion time/achieved distance, and success rates; see, e.g., Mäestu, Jürimäe, & Jürimäe, 2005; Smith & Hopkins, 2012); this would also allow for a more comprehensive understanding of the potential outcomes associated with organizational stressors to be acquired. Furthermore, although not feasible in this study, scholars should consider more regular data collections and

continuing the data collection during competition and also immediately post, to observe if there are any changes to the findings for these time-points.

Second, the present study only examined two components of the organizational stress process (i.e., the direct relationships between the organizational stressors encountered and the outcomes experienced). This decision was made based on empirical (i.e. first ascertaining which relationships existed between stressors and outcomes, before attempting in future to explain why this might be the case), methodological (i.e. balancing a desire to measure multiple stress process components with feasibility and participant burden/retention), and analytical grounds (i.e. ensuring there are not too many predictors in a model). That said, considering that transactional stress theory postulates that the outcome of a stressor is influenced by the mediating processes of cognitive appraisals and coping (Lazarus & Folkman, 1984; see also, Fletcher et al., 2006), it is important that scholars include appropriate measures to assess these constructs in future research to better understand the overall organizational stress process and relationships found therein. Moreover, only two components of psychological health were measured in this study and performance was assessed with two items; therefore, future research should consider measuring psychological health and performance more broadly (cf. Uphill et al., 2016) – developing reliable and valid scales where necessary to achieve this. Third, although the size of the sample could be deemed sufficient to detect fixed effects at a given time-point at the within-person level of the analyses when using restricted maximum likelihood, Maas and Hox (2005) recommend a minimum sample of 30 at the between-person level of the analysis with a minimum of five observations for a longitudinal MLM. Although Maas and Hox (2005) suggest that standard error bias is in practice, probably acceptable just under this criterion, the sample in this study is slightly under this recommendation for the between-person level (N = 23). In view of this and Mathieu and colleagues' (2012) more recent guidance on power requirements to detect

effects in multilevel modeling, the sample size adopted should be viewed as a limitation when interpreting the between person findings. Additionally, future research should look to replicate this study with a larger sample to strengthen the current findings and permit additional and more apt longitudinal analyses such as structuring the data in “long format”, running growth curve modelling etc. (see, e.g., Roberts, Arnold, Turner, Colclough, & Bilzon, 2019). Fourth, given the sample were all female rowers, there is a lack of generalizability to other sports and male athletes. Therefore, future research should aim to examine these relationships in various other sports using both male and female athletes. Finally, given that the current study found that organizational stressor dimensions demonstrated consistent findings for each subscale, future research could examine the interactive effects of specific organizational stressor subscales by dimension (e.g., selection intensity × duration; coaching frequency × intensity).

The findings from this study have potential implications for applied practice. Whilst research already suggests that practitioners wanting to reduce the risk of athletes experiencing symptoms of perceived physical and components of psychological ill-health and lower perceived performance should develop stress management interventions, this study and its findings provide specific and novel guidance for such endeavors. Team selection for competition is an integral and often unavoidable process within elite sport and, whilst athletes have control over their own performances, the selection process itself is often decided upon by coaches and performance directors. Therefore, based on the findings linked to the negative impact of selection stressors, practitioners could consider both a primary-level intervention (e.g., reducing the dimensions of selection stressors by working with coaches and performance directors to produce an optimal selection process and policy) and/or secondary-level stress management interventions (e.g., helping athletes to better appraise and cope with selection stressors; Blakelock, Chen, & Prescott, 2019; Neely, McHugh, Dunn, & Holt,

2017). Lending further support to secondary-level interventions, other main effects indicated that certain types and dimensions of organizational stressors were associated with positive outcomes (e.g., coaching stressors and lower symptoms of anxiety and depression, and logistics stressors and higher perceived performance). This suggests that although stressors may be encountered, the ability of the athlete to comprehend and cope with these stressors effectively is likely to be fundamental (cf. Lazarus & Folkman, 1984). Using a multimodal intervention to make changes to the environment (e.g., modifying processes and policies, create a mastery climate), modify negative appraisals (e.g., through cognitive restructuring techniques) and improve the effectiveness of coping behaviors may, therefore, assist practitioners in mitigating the negative outcomes that may arise for athletes in response to organizational stressors (cf. Didymus & Fletcher, 2017a; Kristiansen, Ivarsson, Solstad, & Roberts, 2019; Randall, Nielsen, & Houdmont, 2018; Rumbold, Fletcher, & Daniels, 2012, 2018; Wagstaff et al., 2018). Furthermore, a key implication of these within-person findings is how a need for stress management interventions can be diagnosed by firstly assessing fluctuations in stressors and outcomes (e.g., psychological and physical ill-health, performance) over time to clarify the impact of particular stressors and dimensions (cf. Bowling, Beehr, & Grebner, 2012; Rumbold et al., 2018). Additionally, these observations would enable insight into the timing of such impact in a sporting calendar; therefore ensuring that the intervention format and implementation are most appropriate (e.g., shorter ‘booster’ shots of stress education at specific time-points may be more effective than longer, season-long interventions; cf. Richardson & Rothstein, 2008).

To conclude, this study provides the first comprehensive examination of whether organizational stressors encountered by athletes can predict components of perceived psychological and physical ill-health, and perceived performance at the within-person level in sport. Organizational stressors were associated with both positive and negative outcomes

depending on their type and dimension. Notably, selection-related stressors were consistently associated with negative consequences (i.e., anxiety and depression, acute illness, missed training days, lower perceived performance). The repeated-measures design of the study combined with analyzing data at the within-person level significantly advances our understanding of the dynamic transactional stress process. From a practical perspective, it is advised that practitioners incorporate these findings when developing stress management interventions to both address the dimensions of organizational stressors and how athletes appraise and respond to such encounters to, ultimately, enable them to thrive in sport.

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Table 1. Means, standard deviations, internal consistencies, and correlations of the variables.

Variable	ICC	α	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. GD F	.91	.74	2.00	0.78																				
2. LO F	.74	.83	0.70	0.60	.66																			
3. TC F	.82	.72	1.89	0.87	.52	.65																		
4. CO F	.85	.88	1.78	1.13	.10	.27	.49																	
5. SE F	.77	.82	2.26	1.32	.48	.36	.52	.47																
6. GD I	.84	.71	2.16	0.84	.85	.64	.52	*.19*	.49															
7. LO I	.64	.87	0.80	0.79	.63	.95	.65	.31	.36	.66														
8. TC I	.86	.71	2.15	0.93	.48	.60	.86	.49	.51	.58	.62													
9. CO I	.87	.86	2.07	1.32	.09	.23	.44	.87	.42	.25	.27	.52												
10. SE I	.81	.81	2.69	1.50	.41	.29	.44	.42	.87	.52	.32	.52	.43											
11. GD D	.88	.73	2.09	0.89	.85	.62	.51	.17	.46	.88	.64	.53	*.19*	.46										
12. LO D	.69	.85	0.76	0.75	.66	.93	.61	.26	.36	.69	.94	.61	24	.32	.71									
13. TC D	.85	.82	2.02	1.05	.51	.62	.85	.40	.46	.60	.62	.89	.42	.45	.63	.65								
14. CO D	.78	.92	1.92	1.33	*.22*	.39	.50	.76	.42	.35	.44	.52	.77	.42	.39	.46	.58							
15. SE D	.86	.87	2.36	1,40	.43	.38	.51	.39	.81	.53	.39	.53	.42	.82	.56	.41	.60	.50						
16. DEP	.92	.87	8.61	8.84	.05	−.03	.03	.31	.37	.10	−.04	.14	.44	.40	.14	−.03	.13	.28	.40					
17. ANX	.93	.73	6.23	6.19	.26	.26	.15	.07	.33	.25	*.19*	.25	.16	.37	*.22*	.23	.15	.02	.26	.48				
18. ILL	.30	/	14.11	22.76	.08	.07	.02	.08	.07	.04	.05	.02	.09	.14	.06	.06	−.05	−.06	−.01	−.03	.25			
19. MDI	.39	/	1.60	3.40	.10	.04	−.03	−.05	.13	.12	.02	−.02	.02	.15	.05	.04	−.03	−.03	.13	.10	.15	.39		
20. PR	.73	/	6.35	1.93	.03	.11	−.03	−.33	−.35	−.10	.08	−.13	−.36	−.42	−.06	.07	−.08	−.24	−.32	−.53	*−.19*	−.03	−.02	
21. PS	.67	/	65.29	22.10	−.04	.14	−.03	−.30	−.32	−.11	.13	−.07	−.30	−.39	−.11	.12	−.05	*−.28*	−.28	−.51	*−.18*	−.05	−.03	.88

Note. Pearson correlation coefficients appear below the matrix diagonal (underlined values significant at $P < .01$; italicized values significant at $P < .05$). ICC: intraclass correlation coefficients; α: median Cronbach's alpha coefficients across the six measurement periods; GD: goals and development; LO: logistics and operations; TC: team and culture; CO: coaching; SE: selection; F: frequency; I: intensity; D: duration; DEP: symptoms of depression; ANX: symptoms of anxiety; ILL: illness symptoms; MDI: missed training days via illness; PR: performance rating; PS: performance satisfaction.

Table 2. Multilevel models examining the within- and between-person variability in organizational stressor frequency as predictor variables of perceived psychological and physical ill-health, and perceived performance.

	Perceived Psychological Health				**Perceived Physical Health**				**Perceived Performance**			
	Anxiety Symptoms		**Depressive Symptoms**		**Illness Symptoms**		**Missed Training Days (Illness)**		**Performance Satisfaction**		**Performance Rating**	
	M1	**M2**	**M1**	**M2**	**M1**	**M2**	**M1**	**M2**	**M1**	**M2**	**M1**	**M2**
Parameter	***B***	***B***	***B***	***B***	***B***	***B***	***B***	***B***	***B***	***B***	***B***	***B***
Fixed Effects												
Intercept	6.17*	3.98	8.51*	3.96	14.11*	9.92	1.60*	1.64	65.45*	80.98*	6.36*	6.60*
Within-Person Changes												
GD Frequency		−1.06		2.08		−4.05		−0.93		−9.71*		−0.41
LO Frequency		1.39		−3.48*		7.24		0.41		16.29*		1.02*
TC Frequency		0.23		−0.94		4.78		0.65		0.65		0.11
CO Frequency		−1.38*		−1.06		1.43		−0.55		−1.36		−0.28
SE Frequency		1.01*		1.72*		3.82		1.06*		−5.69*		−0.53*
Between-Person Differences												
Mean GD Frequency		0.36		0.75		6.93		0.88		−6.03		0.35
Mean LO Frequency		5.74		0.66		2.97		1.37		11.25		−0.15
Mean TC Frequency		−5.48		−7.45		−9.03		−1.98†		6.15		0.90
Mean CO Frequency		−0.17		4.38†		5.25		0.36		−10.40*		−0.57
Mean SE Frequency		3.55		3.91		−1.81		0.15		−1.96		−0.66
Variance Components												
Residual Variance	12.41*	11.45*	28.44*	24.21*	495.21*	494.75*	11.04*	10.65	371.75*	306.16*	2.73*	2.33*
Intercept Variance	26.69*	23.83*	51.24*	37.27*	23.79	28.10	0.57	0.53	119.05*	87.14	1.03*	0.75†
R_1^2 (%)		7.70		14.87		0.09		3.53		17.64		14.65
R_2^2 (%)		10.72		27.26				7.02		26.80		27.18
Fit Indices												
-2LL	763.48	721.48	868.56	807.36	1194.85	1138.38	696.94	673.41	1174.85	1091.99	533.40	503.22
AIC	767.48	725.48	872.56	811.36	1198.85	1142.38	700.94	677.41	1178.85	1095.99	537.40	507.22

Note. B = unstandardized beta; GD = Goals and Development Stressors; LO = Logistics and Operations Stressors; TC = Team and Culture Stressors; CO = Coaching Stressors; SE = Selection Stressors; M = Model; −2LL = −2 Restricted Log Likelihood; AIC = Akaike's Information Criterion. Pseudo R_1^2 and R_2^2 values indicate the percentage in which the conditional models (M2) reduce errors in predicting the outcome variables when compared to the intercept-only model (M1) at the within- (R_1^2) and between-person (R_2^2) levels. Those with no R_2^2 values found negative variance . *$p \leq .05$, † $\leq .07$

Table 3. Multilevel models examining the within- and between-person variability in organizational stressor intensity as predictor variables of perceived psychological and physical ill-health, and perceived performance.

	Perceived Psychological Health				**Perceived Physical Health**				**Perceived Performance**			
	Anxiety Symptoms		**Depressive Symptoms**		**Illness Symptoms**		**Missed Training Days (Illness)**		**Performance Satisfaction**		**Performance Rating**	
	M1	**M2**	**M1**	**M2**	**M1**	**M2**	**M1**	**M2**	**M1**	**M2**	**M1**	**M2**
Parameter	***B***	***B***	***B***	***B***	***B***	***B***	***B***	***B***	***B***	***B***	***B***	***B***
Fixed Effects												
Intercept	6.17*	−1.60	8.51*	−1.47	14.11*	20.08	1.60*	0.30	65.45*	86.43*	6.36*	7.98*
Within-Person Changes												
GD Intensity		−0.19		1.68		−3.29		−0.11		−6.65		−0.38
LO Intensity		0.86		−2.00		5.94		0.18		10.88*		0.64†
TC Intensity		−0.21		−1.49		3.68		0.18		3.24		0.19
CO Intensity		−0.86*		0.47		3.97		−0.14		−0.77		−0.22
SE Intensity		0.76*		0.92		6.61*		0.90*		−4.73*		−0.43*
Between-Person Differences												
Mean GD Intensity		1.44		1.28		−0.12		1.67†		−4.70		−0.02
Mean LO Intensity		−1.68		−4.28		3.17		−0.69		11.31		0.76
Mean TC Intensity		0.71		−1.82		−5.46		−0.96		2.44		0.12
Mean CO Intensity		0.24		4.53*		1.60		0.63		−6.95*		−0.52†
Mean SE Intensity		1.49		1.96		0.05		−0.36		−4.06		−0.51
Variance Components												
Residual Variance	12.41*	11.67*	28.44*	26.58*	495.21*	444.48*	11.04*	10.67*	371.75*	320.42*	2.73*	2.44*
Intercept Variance	26.69*	27.06*	51.24*	28.54*	23.79	54.04	0.57	0.55	119.05*	57.66	1.03*	0.48
R_1^2 (%)		5.96		6.65		10.24		3.35		13.81		10.62
R_2^2 (%)				44.30				3.51		51.57		53.40
Fit Indices												
-2LL	763.48	728.54	868.56	816.40	1194.85	1132.73	696.94	676.88	1174.85	1096.20	533.40	506.58
AIC	767.48	732.54	872.56	820.40	1198.85	1136.73	700.94	680.88	1178.85	1100.20	537.40	510.58

Note. B = unstandardized beta; GD = Goals and Development Stressors; LO = Logistics and Operations Stressors; TC = Team and Culture Stressors; CO = Coaching Stressors; SE = Selection Stressors; M = Model; −2LL = −2 Restricted Log Likelihood; AIC = Akaike's Information Criterion. Pseudo R_1^2 and R_2^2 values indicate the percentage in which the conditional models (M2) reduce errors in predicting the outcome variables when compared to the intercept-only model (M1) at the within- (R_1^2) and between-person (R_2^2) levels. Those with no R_2^2 values found negative variance. *$p \leq .05$, † $\leq .07$

Table 4. Multilevel models examining the within- and between-person variability in organizational stressor duration as predictor variables of perceived psychological and physical ill-health, and perceived performance.

	Perceived Psychological Health				Perceived Physical Health				Perceived Performance			
	Anxiety Symptoms		Depressive Symptoms		Illness Symptoms		Missed Training Days (Illness)		Performance Satisfaction		Performance Rating	
	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2
Parameter	***B***	***B***	***B***	***B***	***B***	***B***	***B***	***B***	***B***	***B***	***B***	***B***
Fixed Effects												
Intercept	6.17*	3.41	8.51*	−0.99	14.11*	18.12†	1.60*	1.46	65.45*	84.40*	6.36*	7.37*
Within-Person Changes												
GD Duration		−0.23		1.02		2.74		−0.94		−9.27*		−0.39
LO Duration		1.15*		−2.38*		5.99		0.75		12.72*		0.71*
TC Duration		0.17		0.63		2.14		−0.13		0.85		0.02
CO Duration		−1.64*		−1.00†		−3.14		−0.16		0.40		−0.01
SE Duration		0.56		2.20*		3.34		0.94*		−5.51*		−0.52*
Between-Person Differences												
Mean GD Duration		0.63		3.24		3.54		0.64		−8.19		−0.02
Mean LO Duration		3.05		−6.09		2.97		0.72		18.32†		0.84
Mean TC Duration		−3.25		−4.12		−6.15		−1.42		1.49		0.27
Mean CO Duration		−0.43		5.00*		2.63		−0.06		−11.54*		−0.74*
Mean SE Duration		2.74		2.58		−2.66		0.53		1.42		−0.31
Variance Components												
Residual Variance	12.41*	10.53*	28.44*	23.32*	495.21*	487.36	11.04*	10.90*	371.75*	313.92*	2.73*	2.46*
Intercept Variance	26.69*	28.91*	51.24*	35.10*	23.79	32.32	0.57	0.86	119.05*	72.85	1.03*	0.80†
R_1^2 (%)		15.15		18.00		1.56		1.27		15.56		9.89
R_2^2 (%)				31.50						38.81		2.23
Fit Indices												
-2LL	763.48	718.13	868.56	804.90	1194.85	1139.67	696.94	680.64	1174.85	1095.37	533.40	512.29
AIC	767.48	722.13	872.56	808.90	1198.85	1143.77	700.94	684.64	1178.85	1099.37	537.40	516.29

Note. B = unstandardized beta; GD = Goals and Development Stressors; LO = Logistics and Operations Stressors; TC = Team and Culture Stressors; CO = Coaching Stressors; SE = Selection Stressors; M = Model; −2LL = −2 Restricted Log Likelihood; AIC = Akaike's Information Criterion. Pseudo R_1^2 and R_2^2 values indicate the percentage in which the conditional models (M2) reduce errors in predicting the outcome variables when compared to the intercept-only model (M1) at the within- (R_1^2) and between-person (R_2^2) levels. Those with no R_2^2 values found negative variance. *$p \leq .05$, † $\leq .07$