WELL-BEING AND WORK CONDITIONS AMONG EARLY CAREER RESEARCHERS IN CROATIA: BASELINE RESULTS

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Abstract

Early career researchers (ECRs) often face demanding and insecure working conditions that may undermine their well-being. This study among 531 doctoral candidates and postdoctoral researchers presents baseline findings from the first wave of the ECR-WELL longitudinal project, which examines well-being and work conditions among ECRs employed at universities and research institutes in Croatia. Building upon the Job Demands–Resources framework, we examined descriptive levels of overall and work-related well-being and tested associations between work conditions (job resources, hindrance job demands, job insecurity, and weekly work hours), individual characteristics (proactive personality and perfectionism), and two key work-related being outcomes: work engagement and exhaustion. Descriptive results indicated relatively high flourishing and work engagement as well as moderate levels of exhaustion, suggesting both resilience and signs of strain. Hierarchical regression analyses showed that job resources and proactive personality were positively associated with work engagement, whereas hindrance job demands and longer working hours were associated with higher exhaustion. Perfectionism was positively related to ECRs' exhaustion, while proactive personality was had a protective role. These baseline findings highlight the importance of supportive work environments and individual resources for sustaining well-being in early academic careers.

Keywords: early career researchers, work engagement, exhaustion, job demands–resources, well-being

INTRODUCTION

Research topicality and problem. The early stages of a scientific career represent a special period typically characterized by curiosity, enthusiasm, and the desire for a sense of purpose, meaning, and contribution to the knowledge (de Lourdes Machado-Taylor, et al., 2016). At the same time, early career researchers (ECRs, i.e. doctoral candidates and postdoctoral researchers) often experience intense professional demands, heavy workloads, and publication pressure (Boone et al., 2022; Zhang et al., 2022; Kismihók, et al., 2022), set in a competitive work context with short-term contracts and high job insecurity. These work conditions can hinder ECRs' well-being and mental health, because the initial enthusiasm can be difficult to sustain under chronic pressure and instability, especially without sufficient job resources (Bakker et al., 2023; Boone et al., 2022; Byrom et al., 2022). For instance, a recent cross-sectional study conducted among 3101 European researchers within the EU Sustainable Working Conditions in Academia Survey (EU-COST Action CA19117) showed that almost a third of ECRs experience burnout (Nu Noe et al., 2025). Furthermore, existing research demonstrates that ECRs have substantial risk of developing depression and anxiety symptoms, with prevalence rates for depression and anxiety up to three times higher than in the general population (Levecque et al., 2017; Nicholls et al., 2022; Naumann et al., 2022).

ECRs' academic work environment can be understood within the Job Demands–Resources theory (JD–R; Bakker et al., 2023; Li, et al., 2025), which posits that the interplay between job-related factors (i.e. hindrance and challenge job demands and job resources) and individual characteristics (i.e. personal resources and demands) are crucial for ECR's work-related well-being. Within academia, ECRs frequently report different types of demands, but hindrance demands are especially relevant as they can contribute to frustration and a sense of inefficacy, increasing negative emotions and burnout risk (Li et al., 2025; Kismihók, et al., 2022). Moreover, job insecurity, which is typical work condition for ECRs due to short-term contracts and uncertain career prospects, represents an additional source of strain. In contrast, ECRs' job resources, such as mentoring, social support, recognition, and access to learning opportunities, are strong predictors of work-related well-being, motivation, and can buffer negative effects of stress and strain. In addition, JD-R framework also posits the relevance of

personal resources (i.e. traits that are adaptive and supportive, such as proactivity), and personal demands (i.e. traits that hinder individuals' well-being, such as perfectionism) (Bakker et al., 2023; Li et al., 2025).

The existing research within Croatian academic context also showed heavy administrative and teaching loads, limited support, and gendered inequalities that affect women and ECRs in particular; however, existing studies are rare and somewhat dated (Brajdić Vuković & Vignjević, 2017; Ledić & Turk, 2017; Ogresta, 2013; Slišković & Maslić Seršić, 2011). Despite increasing research international attention to ECRs' well-being, Croatia still lacks systematic, longitudinal data on researchers' mental health, well-being, and working conditions.

The aim of the research. To gain more detailed insights into the wellbeing and work conditions of ECRs within the Croatian context, the ECR-WELL project, funded by the Croatian Science Foundation (HRZZ, IP-2022-10-3567), aims to fill this gap by conducting a three-year longitudinal monitoring system assessing ECRs' well-being and work-related experiences. The project collects data among ECRs twice a year via a custom online platform, allowing the exploration of both stability and change across six measurement waves.

In this study we present the baseline findings of the ECR-WELL longitudinal project by addressing two main goals. First, the study aims to provide initial evidence on the state of Croatian ECRs' overall well-being, which we operationalise as flourishing, as well as work-related well-being, reflected in work engagement, exhaustion levels, and affective experiences at work. Examining these baseline patterns is important for identifying early protective and risk factors in the academic work environment and for contextualizing the psychosocial work conditions in which Croatian ECRs conduct their work.

Second, building upon the Job Demands–Resources (JD-R) theoretical framework (Bakker & Demerouti, 2017; 2023), the study focuses on the distinction between basic work characteristics, conceptualized as job demands (hindrance job demands, job insecurity, and workload) and job resources, and individual characteristics, conceptualized as personal resources and personal demands (proactive personality and perfectionism). Specifically, the study investigates how these work-related and individual factors are associated with work engagement and exhaustion, while statistically controlling for age and gender.

Taken together and guided by the JD–R theory, we expected job resources to be positively associated with work engagement and negatively associated with exhaustion, whereas hindrance job demands and job insecurity were expected to be associated with lower engagement and higher exhaustion. We further hypothesized that weekly work hours would be positively related to exhaustion. Regarding individual characteristics, we focused on two specific individual characteristics relevant to academic work. Proactive personality reflects a tendency to take initiative, seek opportunities, and effect change in one's environment (Claes, et al., 2005). Conversely, perfectionism, has been associated with self-criticism, heightened stress, and burnout risk (Smith et al., 2016). We expected that proactive personality, conceptualized as a personal resource, to be associated with higher engagement and lower exhaustion, whereas perfectionism, conceptualized as a personal demand, was expected to be associated with higher exhaustion and weaker associations with engagement.

Research methodology. We conducted a quantitative, cross-sectional analysis using baseline data from the "Well-being and Mental Health of Early Career Researchers in Croatia: A Longitudinal Study", a four-year research project funded by the Croatian Science Foundation (grant number: IP-2022-10-3567). The sample consisted of 531 early career researchers, including doctoral candidates and postdoctoral researchers, employed at Croatian universities and public research institutes. Participants represented a broad range of scientific fields, including social sciences, humanities, natural sciences, technical sciences, biomedicine and health, and interdisciplinary areas. We assessed several aspects of well-being and work conditions, as well as individual characteristics using established, validated instruments.

Research results. The results indicate that job resources and proactive personality are positively associated with work engagement, whereas hindrance job demands, job insecurity, longer working hours, and perfectionism are associated with higher exhaustion. Overall, work conditions explain a substantial proportion of variance in both outcomes, with individual characteristics providing additional explanatory value, particularly for exhaustion.

Originality/Value of the article. This study provides the first systematic, large-scale baseline evidence on early career researchers' well-being and work conditions in Croatia using a theory-driven approach. By integrating structural work characteristics and individual dispositions within the Job Demands–Resources framework, the study offers a nuanced understanding of both protective and risk factors relevant to early academic careers. The findings have practical value for institutions and policymakers by identifying modifiable work conditions that support engagement and prevent exhaustion. As the first wave of a six-wave longitudinal design, this study also establishes a foundation for examining changes in researchers' well-being over time and for informing evidence-based interventions aimed at fostering more sustainable academic careers.

RESEARCH METHODOLOGY

Participants. A total of 531 early career researchers working in Croatian academic institutions (i.e. universities and research institutes) participated in the first wave of data collection. In this sample, 182 (35.8%) participants indicated male gender, 326 (64.2%) female, and 23 (4.3%) did not report their gender. Participants' age ranged from 24 to 55 years (M = 31.58, SD = 5.50). Most participants were doctoral candidates employed as research assistants (N=387; 73.2%), and 142 participants (26.8%) were postdoctoral researchers. On average, participants reported M = 4.06 years of experience working in science (SD = 3.72). Large majority of the participants (95.1%) had fixed-term work contracts, whereas only 4.9% held permanent positions. ECRs in the sample worked in various major scientific fields, with most participants being employed within the Social (25.5%) and Technical Sciences (23.0%), followed by Natural Sciences (16.6%), Humanities (13.0%), Biomedical and Health Sciences (9.2%), Biotechnical Sciences (9.1%). The least participants reported working within Interdisciplinary Sciences (3.2%), and Arts (0.4%). Most participants were employed in Zagreb (64.7%), reported working mostly at public universities, primarily at the University of Zagreb (38.2%).

Procedure. Data was collected between March 17 and June 24, 2025, as a part of a larger project "Well-being and Mental Health of Early Career Researchers in Croatia: A Longitudinal Study", a four-year research project funded by the Croatian Science Foundation (grant number: IP-2022-10-3567). The Ethics Committee of the Institute of Social Sciences Ivo Pilar provided Ethics approval for the study. We collected data via an online self-report questionnaire, which included detailed informed consent, measures of well-being, mental health, and work conditions and experiences, as well as questions on sociodemographic and employment characteristics. The survey took approximately 15 minutes to complete.

Measures. We assessed several aspects of well-being and work conditions, as well as individual factor using established, validated instruments.

Flourishing. The 8-item Flourishing Scale (Diener et al., 2010) measures psychological well-being and meaning in life. Items capture positive relationships, competence, engagement, optimism, and purpose. Participants responded on a 7-point Likert scale, where higher scores indicated greater flourishing, and the scale provides a single psychological well-being score. Flourishing scale revealed high reliability (Cronbach α= .85).

Affective Experiences at Work. The Scale of Positive and Negative Affective Experience (SPANE; Diener et al., 2010) consists of six items measuring positive and negative affective experience each, and its adapted version was used to measure work-related well-being.

Response scale ranged from 1 (*very rarely or never*) to 5 (*very often or always*). Cronbach's alpha reliability of PA was .93, and of NA .89.

Work Engagement. The Utrecht Work Engagement Scale (UWES-9; Schaufeli et al., 2002) assesses vigour, dedication, and absorption. Respondents rated items such as "My job inspires me" on a 7-point scale. In line with previous findings, the UWES demonstrated high reliability (Cronbach α= .92).

Burnout. We used the exhaustion subscale of the Oldenburg Burnout Inventory (OLBI; Demerouti et al., 2001) consisting of 8-items assessing feelings of emptiness, a strong need for rest, and a state of physical exhaustion, on a 1 to 7 Likert type response scale. Example item is "After my work, I usually feel worn out and weary". The exhaustion scale showed high reliability within our sample (Cronbach α= .85).

Job Resources. We assessed three aspects of ECRs' job resources: a) three items assessed social support (e.g., "If needed, I can ask my colleagues for help at work."), b) three items assessed performance feedback (e.g., "I receive sufficient information related to work goals."), and c) three items assessed opportunities for development (e.g., "My job provides me with opportunities to learn new things") (Bakker et al., 2004; Tadić, Bakker & Oerlemans, 2014). Job resources scale showed high reliability (Cronbach α= .92)

Job Demands. In assessing job demands, we distinguished between hindrance and challenge demands, in line with the existing literature (O'Brien & Beehr, 2019; Kim, Shin, & Hwang, 2023). To assess the *hindrance demands*-situations or things that interfere with task performance at work for ECRs- we used The Organizational Constraints Scale (OCS; Spector, & Jex, 1998), consisting of 11 items representing different constraints areas. Specifically, participants rated how often it is difficult or impossible for them to do their job because of each constraint. In line with previous studies and theoretical notions (Kim, Shin, & Hwang, 2023; Podsakoff, 2007), we used a workload measure as one aspect of *challenging job demands* conceptualized as one-item measure of weekly work hours.

Job insecurity. We used three items from the Vander, De Witte, & De Cuyper's (2013) Job Insecurity Scale to evaluate the insecurity ECRs have regarding their job. The scale showed high reliability (Cronbach α= .88).

Perfectionism. We assessed ECRs' perfectionistic tendencies using the self-critical perfectionism subscale of the Big Three Perfectionism Scale–Short Form (Smith et al., 2016). This subscale consists of six items and demonstrated good internal consistency in the present study (Cronbach's α = .88).

Proactive personality. We measured proactive personality using the abbreviated unidimensional Proactive Personality Scale (Claes et al., 2005). The scale consists of seven items rated on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) and showed good internal consistency in the present study (Cronbach's α = .86).

RESEARCH RESULTS AND DATA ANALYSIS

Data Analysis. We analyzed the data using IBM SPSS Statistics, Version 24 (IBM Corp., 2016). First, we calculated descriptive statistics (means, standard deviations, and ranges) for all study variables to summarize early career researchers' well-being, work conditions, and individual characteristics. Next, we computed bivariate Pearson correlations to examine initial associations among well-being indicators, job demands, job resources, weekly work hours, and personal dispositions. Thereafter, we conducted hierarchical multiple regression analyses to examine predictors of work-related well-being outcomes, namely, work engagement and exhaustion. We entered predictors in three sequential blocks to assess their incremental contribution. In the first block, we entered demographic variables as control variables (age and gender). In the second block, we added work-condition variables, (hindrance and challenge job demands, job insecurity, and job resources) to evaluate their explanatory value beyond

demographics. In the final, third block, we entered individual characteristics (proactive personality and perfectionism) to assess their unique contributions after accounting for work conditions. For each regression model, we examined unstandardized coefficients, standardized coefficients, t values, significance levels, and changes in explained variance (ΔR^2).

Descriptive results. We analysed cross-sectional data from the first wave of the ECR-WELL project. The descriptive analyses showed that Croatian ECRs reported generally positive levels of overall well-being. More concretely, as can be seen in Table 1, ECRs relatively high levels of flourishing (M = 5.80; SD = 0.80) on the Flourishing Scale, indicating high psychological functioning, strong sense of purpose, and social connectedness. This means that most of ECRs in our sample have a sense of engagement and capacity in their daily activities and are typically optimistic about their future.

Regarding work-related well-being indicators, ECRs reported having relatively high work engagement (M = 5.16, SD = 1.06), with the highest average scores on subscale of dedication (M = 5.31, SD = 1.06) and absorption (M = 5.71, SD = 1.06), while average scores on vigor subscale was somewhat lower (M = 4.46, SD = 1.27). These findings suggest that ECRs in Croatia tend to feel committed and inspired by their work, though they may experience less physical energy, possibly reflecting workload fatigue.

Table 1. Descriptive results of the variables included in the analysis

	N	Min	Max	Mean	SD
Flourishing	530	2.88	7.00	5.80	.80
Work engagement	531	1.00	7.00	5.16	1.06
Vigor	531	1.00	7.00	4.46	1.27
Dedication	531	1.00	7.00	5.32	1.22
Absorption	531	1.00	7.00	5.71	1.06
Positive affect at work	529	1.00	7.00	5.00	1.12
Negative affect at work	529	1.00	7.00	3.14	1.31
Exhaustion	531	1.00	6.75	3.83	1.16
Job resources total	515	1.00	7.00	5.25	1.19
Social job resources	515	1.00	7.00	5.68	1.26
Feedback	515	1.00	7.00	4.73	1.61
Growth and opportunities	515	1.00	7.00	5.32	1.39
Weekly work hours	515	20	80	41.69	10.36
Hindrance job demands	515	1.00	5.00	2.53	.87
Job insecurity	514	1.00	7.00	3.04	1.84
Perfectionism	509	1.00	5.00	3.19	.93
Proactive personality	509	2.00	7.00	5.32	.92

Source: compiled by the authors according to the conducted research

ECRs reported moderate strain, i.e., burnout levels on average, as assessed by the exhaustion subscale of the Oldenburg burnout inventory (Reis, Xanthopoulou, & Tsaousis, 2015) (M = 3.83, SD = 1.16), showing that while they experience exhaustion, it does not seem to be overwhelming for most participants. Furthermore, ECRs frequently reported needing more time to recover after work and feeling emotionally drained, but they still seem to have maintained motivation and sense of meaning in their work. Affect at work among seems to be predominately positive (M = 5.01) for ECRs; however, ECRs still reported experiencing negative affect in moderate frequency (M = 3.14). Participants relatively often experienced joy, satisfaction, and contentment, while negative affect such as sadness or fear appeared relatively infrequent. This pattern indicates that, despite structural job pressures, many researchers still derive emotional fulfilment from their work.

Descriptive analyses further revealed that ECRs reported moderate levels of hindrance job demands (M = 2.53, SD = 0.87) and moderate job insecurity (M = 3.04, SD = 1.84). On average, ECRs' workload was moderate: participants worked approximately 42 hours per week (M = 41.69, SD = 10.36); however, we found substantial variability in working time. Proactive tendencies, an aspect of personal resources, were relatively high (M = 5.32, SD = 0.92), whereas perfectionism was reported at a moderate level (M = 3.19, SD = 0.93).

Table 2. Intercorrelations Between the Variables Included in the Analysis

	2.	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**	**9.**	**10.**	**11.**
1.Flourishing	.50**	-.40**	.46**	-.32**	.35**	-.09	-.22**	-.23**	-.32**	.43**
2.WE		-.53**	.73**	-.46**	.49**	.02	-.39**	-.21**	-.13**	.38**
3.Exhaustion			-.58**	.58**	-.43**	.27**	.48**	.34**	.38**	-.28**
4.PA at work				-.64**	.62**	-.12*	-.48**	-.26**	-.15**	.23**
5.NA at work					-.55**	.22**	.55**	.37**	.26**	-.12**
6.Job resources						-.15**	-.61**	-.38**	-.15**	.12**
7.Work hours							.15**	.09	.08	.03
8.Hindrance								.37**	.17**	-.05
9.Job insecurity									.24**	-.03
10.Perfectionism										-.27**
11.Proactivity										

WE= work engagement. PA= Positive affect. NA= Negative affect. ** Correlation is significant at the 0.01 level; * Correlation is significant at the 0.05 level.

Source: compiled by the authors according to the conducted research

As can be seen in Table 2., the correlational analyses confirmed our expectation and showed patterns consistent with the job demands-resources theoretical framework (JD–R; Bakker & Demrouit, 2023). Our findings revealed strong and positive associations between positive well-being indicators, namely, between work engagement and flourishing, and positive affect at work, and strong negative association with negative well-being indicators, i.e. exhaustion and negative affect at work. Job and personal resources (i.e. proactive personality) were positively correlated positive well-being indicators and were negatively associated with exhaustion and hindrance job demands. In contrast, hindrance job demands and job insecurity were strongly and negatively associated with poorer well-being, showing higher exhaustion and negative affect and lower engagement and flourishing when hindrance demands were high. Personal demands (i.e. perfectionism) were associated with higher exhaustion and negative affect, and lower positive affect and work engagement and flourishing. Weekly work hours showed small but meaningful associations, relating positively to exhaustion and negative affect. Overall, the correlations support the proposed relationships between job demands, job resources, individual characteristics, and well-being indicators.

Hypotheses testing. To examine the hypothesized associations between work-related well-being and job and personal demands and resources, we conducted hierarchical multiple regressions, while controlling for basic demographic factors (i.e. age and gender). In these analyses, we focused on work engagement and exhaustion as work-related well-being indicators, as dependent variables.

Work Engagement. Hierarchical multiple regression analysis showen in the Table 3. demonstrated that the first block, which included age and gender, did not account for a significant proportion of variance in work engagement, $F(2, 403) = 1.21$, $p = .300$, explaining less than 1% of the variance. When work-condition variables (hindrance job demands, job insecurity, job resources, and weekly work hours) were entered in the second block, there was

a significant increase in explained variance, $F(6, 399) = 25.89$, $p < .001$, with the model accounting for 28% of the variance in work engagement. In line with the theoretical notions, the more job resources ECRs had, the more work engagement they reported ($\beta = .43$, $p < .001$), whereas the more hindrance job demands ECR reported, the lower their engagement was ($\beta = -.16$, $p = .006$). Weekly work hours showed a small but significant positive association with engagement ($\beta = .11$, $p = .013$), while job insecurity was not significant predictor. The inclusion of proactive personality and perfectionism in the final block resulted in a further significant increase in explained variance, $F(8, 397) = 31.28$, $p < .001$, with the full model explaining 39% of the variance. Proactive personality was a strong positive predictor of work engagement ($\beta = .34$, $p < .001$), while job resources remained the strongest predictor overall ($\beta = .38$, $p < .001$). Hindrance job demands continued to negatively predict engagement ($\beta = -.17$, $p = .001$), and weekly work hours remained a small, but significant predictor ($\beta = .09$, $p = .028$). Perfectionism and job insecurity were not significant predictors in the final model.

These results indicate that work engagement among ECRs is largely related with structural work conditions, which is aligned with the existing literature. The findings also show that personal resources have substantial relevance for ECRs work engagement, with proactive tendencies being strongly positively related to it (rather than demographics). Job resources and proactive personality appear to be key drivers of engagement, whereas hindrance job demands and longer working hours highlight how engagement may coexist with increased workload, underscoring the importance of supportive and enabling work environments.

Table 3. Hierarchical Regression Predicting Work Engagement (N = 507)

Predictor	Model 1 β (SE)	Model 2 β (SE)	Model 3 β (SE)
Age	.08 (.01)	.14 (.01)**	.13 (.01)**
Gender	.00 (.10)**	.02 (.09)	.02 (.09)
Workload/Workhours		.11 (.01)*	.09 (.01)*
Hindrance job demands	—	-.16 (.07)**	-.17 (.06)**
Job insecurity	—	.01 (.03)	-.03 (.03)
Job resources	—	.43 (.05)**	.36 (.05)**
Perfectionism	—	—	.06 (.05)
Proactive personality	—	—	.34 (.05)**
Adj. R^2	.01	.27	.37
ΔR^2	—	.27**	.10**

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

Source: compiled by the authors according to the conducted research

Exhaustion. As shown in Table 4., hierarchical multiple regression analysis indicated that the first block, including age and gender, did not account for a significant proportion of variance in exhaustion. Entering work-condition variables in the second block resulted in a significant increase in explained variance, $F(6, 399) = 37.14$, $p < .001$, with the model accounting for 36% of the variance. Higher hindrance job demands ($\beta = .32$, $p < .001$), greater job insecurity ($\beta = .13$, $p = .004$), and longer weekly work hours ($\beta = .18$, $p < .001$) were associated with higher exhaustion, whereas job resources were associated with lower exhaustion ($\beta = -.21$, $p < .001$).

Table 4. Hierarchical Regression Predicting Exhaustion (N = 507)

Predictor	Model 1 β (SE)	Model 2 β (SE)	Model 3 β (SE)
Age	.01 (.01)	-.09 (.01)*	-.05 (.01)

Gender	.11 (.12)*	.08 (.09)	.06 (.09)
Workload/Workhours		.18 (.01)**	.18 (.01)**
Hindrance job demands	—	.32 (.07)**	.30 (.06)**
Job insecurity	—	.13 (.03)**	.10 (.03)*
Job resources	—	-.21 (.05)**	-.18 (.05)**
Perfectionism	—	—	-.19 (.05)**
Proactive personality	—	—	.34 (.05)**
Adj. R^2	.01	.35	.42
ΔR^2	—	.35**	.07**

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

Source: compiled by the authors according to the conducted research

The inclusion of proactive personality and perfectionism in the final block produced a further significant increase in explained variance, $F(8, 397) = 37.84$, $p < .001$, with the full model explaining 43% of the variance. In the final model, perfectionism predicted higher exhaustion ($\beta = .17$, $p < .001$), whereas proactive personality predicted lower exhaustion ($\beta = -.19$, $p < .001$). Hindrance job demands, job insecurity, and weekly work hours remained significant positive predictors, and job resources continued to show a protective association; age and gender were not significant. These findings indicate that ECRs' exhaustion levels are associated with adverse work conditions and workload intensity. Furthermore, individual characteristics of ECRs also play a role, as the higher the perfections, the higher the exhaustion levels are reported. In contrast, proactive tendencies are negatively related to exhaustion and might be conserved as a protective factor in this context. In the overall, hindrance demands, job insecurity, and long working hours represent key risk factors for exhaustion, whereas job resources and proactive personality appear to play a protective role.

CONCLUSIONS

1. The first-wave findings of the ECR-WELL project present a nuanced picture of early career researchers' well-being in Croatia. While most participants reported relatively high flourishing, strong work engagement, and frequent positive emotional experiences—indicating resilience and intrinsic motivation—moderate levels of exhaustion and lower vigor suggest early signs of fatigue and energy depletion. This pattern points to a coexistence of engagement and strain at the early stages of academic careers.
2. Across all analyses, job resources emerged as the most consistent and robust protective factor for work-related well-being. Higher levels of social support, feedback, and opportunities for growth were associated with higher engagement and lower exhaustion, confirming the central role of supportive academic environments in sustaining ECRs' well-being, as proposed by the Job Demands–Resources framework.
3. In contrast, hindrance job demands consistently predicted poorer well-being outcomes, including lower engagement and higher exhaustion. These findings indicate that obstructive and bureaucratic aspects of academic work represent a key structural mechanism through which the academic environment undermines ECRs' well-being, beyond individual characteristics.
4. Weekly work hours showed an ambivalent pattern of associations. Longer working hours were modestly associated with higher engagement, suggesting greater involvement or commitment to academic work, but they were also strongly associated with higher exhaustion. This finding highlights the dual nature of academic work intensity, which may enhance motivation while simultaneously increasing vulnerability to strain and depletion.
5. Individual characteristics, conceptualized as personal resources and personal demands, contributed asymmetrically to well-being outcomes. Proactive personality functioned as a personal resource, predicting higher engagement and lower exhaustion, whereas

perfectionism functioned as a personal demand, predicting higher exhaustion without benefits for engagement. These results suggest that individual traits influence how ECRs experience their work but cannot compensate for inadequate structural conditions.

6. By integrating descriptive findings with theory-driven regression analyses grounded in the JD–R framework, this study provides the first systematic baseline evidence on ECRs' well-being in Croatia and establishes a foundation for the longitudinal ECR-WELL project. Future waves will enable examination of changes in well-being and work conditions over time and support the development of evidence-based institutional policies aimed at fostering healthier and more sustainable academic careers.

LITERATURE

1. Bakker, A. B., Demerouti, E., & Sanz-Vergel, A. (2023). Job demands–resources theory: Ten years later. *Annual Review of Organizational Psychology and Organizational Behavior, 10,* 25–53. https://doi.org/10.1146/annurev-orgpsych-120920-053933
2. Bakker, A. B., Demerouti, E., & Verbeke, W. (2004). Using the job demands–resources model to predict burnout and performance. *Human Resource Management, 43*(1), 83–104. doi:10.1002/hrm.20004
3. Boone, A., Elst, T., Vandenbroeck, S., & Godderis, L. (2022). Burnout Profiles Among Young Researchers: A Latent Profile Analysis. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.839728
4. Brajdić Vuković, V., & Vignjević, M. (2017). *Istraživački rad i akademski kontekst: iskustva znanstvenika u Hrvatskoj*. Zagreb: Institut Ivo Pilar.
5. Byrom, N. C., Dinu, L., Kirkman, A., & Hughes, G. (2022). Predicting stress and mental wellbeing among doctoral researchers. *Journal of Mental Health*, *31*(6), 783–791. https://doi.org/10.1080/09638237.2020.1818196
6. Cahill et al. (2023). Towards the creation of healthier academic environments in the European Research Area: mental health and well-being among early-stage researchers. In A. Muro-Rodriguez & M.P. Jiménez-Villamizar (Eds.) *The Third Half: Toward the Creation of Healthier Research Careers* (pp.10-14). https://doi.org/10.5281/zenodo.10005921
7. Claes, R., Beheydt, C., & Lemmens, B. (2005). *Unidimensionality of Abbreviated Proactive Personality Scales across Cultures. Applied Psychology, 54(4),* 476–489. doi:10.1111/j.1464-0597.2005.00221.x
8. Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Lawrence Erlbaum Associates.
9. de Lourdes Machado-Taylor, M., Meira Soares, V., Brites, R., Brites Ferreira, J., Farhangmehr, M., Gouveia, O. M. R., & Peterson, M. (2016). Academic job satisfaction and motivation: findings from a nationwide study in Portuguese higher education. *Studies in Higher Education*, *41*(3), 541–559. https://doi.org/10.1080/03075079.2014.942265
10. Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands–resources model of burnout. *Journal of Applied Psychology, 86*(3), 499–512.
11. Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D. W., Oishi, S., & Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research, 97*, 143–156.
12. IBM Corp. (2016). *IBM SPSS Statistics* (Version 24.0) [Computer software]. IBM Corp.
13. Kim, H., Shin, K., & Hwang, J. (2023). Too much may be a bad thing: the difference between challenge and hindrance job demands. *Current psychology (New Brunswick, N.J.)*, 1–13. Advance online publication. https://doi.org/10.1007/s12144-023-04790-z
14. Kismihók, G., McCashin, D., Mol, S. T., & Cahill, B. (2022). The well-being and mental health of doctoral candidates. *European Journal of Education, 57*(3), 410–423. https://doi.org/10.1111/ejed.12519
15. Ledić, J., & Turk, M. (2017). *Mladi istraživači i karijera u znanosti*. Rijeka: Filozofski fakultet Sveučilišta u Rijeci.
16. Levecque, K., Anseel, F., Beuckelaer, A., Heyden, J., & Gisle, L. (2017). Work organization and mental health problems in PhD students. *Research Policy*, 46, 868-879. https://doi.org/10.1016/j.respol.2017.02.008
17. Li, Y., King, R. B., Chen, J., & Xu, W. (2025). PhD students' well-being and its antecedents and consequences: a perspective of the Job Demands-Resources model. *Higher Education Research & Development*, 1–17. https://doi.org/10.1080/07294360.2025.2482204
18. Mackie, S. A., & Bates, G. W. (2019). Contribution of the doctoral education environment to PhD candidates' mental health problems: a scoping review. *Higher Education Research & Development*, *38*(3), 565–578. https://doi.org/10.1080/07294360.2018.1556620

19. Naumann, S., Matyjek, M., Bögl, K., & Dziobek, I. (2022). Doctoral researchers' mental health and PhD training satisfaction during the German COVID-19 lockdown: results from an international research sample. *Scientific Reports*, *12*. https://doi.org/10.1038/s41598-022-26601-4
20. Nicholls, H., Nicholls, M., Tekin, S., Lamb, D., & Billings, J. (2022). The impact of working in academia on researchers' mental health and well-being: A systematic review and qualitative meta-synthesis. *PLoS ONE*, *17*. https://doi.org/10.1371/journal.pone.0268890
21. O'Brien, K. E., & Beehr, T. A. (2019). So far, so good: Up to now, the challenge–hindrance framework describes a practical and accurate distinction. *Journal of Organizational Behavior, 40*(8), 962–972. https://doi.org/10.1002/job.2405
22. Ogresta, J. (2013). *Stres na radu i mentalno zdravlje nastavnika i istraživača u visokom obrazovanju*. Zagreb: Filozofski fakultet.
23. Reis, D., Xanthopoulou, D., & Tsaousis, I. (2015). Measuring job and academic burnout with the Oldenburg Burnout Inventory (OLBI): Factorial invariance across samples and countries. *Burnout Research, 2*(1), 8–18. https://doi.org/10.1016/j.burn.2014.11.001
24. Schaufeli, W. B., Salanova, M., González-Romá, V., & Bakker, A. B. (2002). The measurement of engagement and burnout: A two sample confirmatory factor analytic approach. *Journal of Happiness Studies, 3*, 71–92.
25. Slišković, A., & Maslić Seršić, D. (2011). Work stress among university teachers: Gender and position differences. *Archives of Industrial Hygiene and Toxicology, 62*(4), 299–307.
26. Smith, M. M., Saklofske, D. H., Stoeber, J., & Sherry, S. B. (2016). The Big Three Perfectionism Scale: A new measure of perfectionism. *Journal of Psychoeducational Assessment, 34(7),* 670–687. https://doi.org/10.1177/0734282916651539
27. Spector, P. E., & Jex, S. M. (1998). Development of Four Self-Report Measures of Job Stressors and Strain: Interpersonal Conflict at Work Scale, Organizational Constraints Scale, Quantitative Workload Inventory, and Physical Symptoms Inventory. *Journal of Occupational Health Psychology, 3,* 356-367.
28. van der Weijden, I., & Teelken, C. (2023). Precarious careers: Postdoctoral researchers and wellbeing at work. *Studies in Higher Education, 48*(10), 1595–1607. https://doi.org/10.1080/03075079.2023.2253833
29. Vander Elst, T., De Witte, H., & De Cuyper, N. (2013). The Job Insecurity Scale: A psychometric evaluation across five European countries. *European Journal of Work and Organizational Psychology, 23(3)*, 364–380. doi:10.1080/1359432x.2012.745989
30. Zhang, F., Litson, K., & Feldon, D. (2022). Social predictors of doctoral student mental health and well-being. *PLoS ONE*, *17*. https://doi.org/10.1371/journal.pone.0274273