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Measuring Burnout Syndrome in Croatia Using the BAT-23: Validation Study and Statistical Norms

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Abstract

This paper validates the Croatian version of a new instrument for assessing burnout syndrome at both the individual and group level – the Burnout Assessment Tool (BAT-23). The Croatian version of the BAT-23 was applied to a representative sample of the Croatian working population (n = 768) with the aim of testing its construct validity and obtaining national statistical norms. The results indicated high internal consistency for the BAT-23 total score as well as its subscales: Exhaustion, Emotional Impairment, Cognitive Impairment, and Mental Distance (coefficients ranged from .81 to .90). Additionally, the subscales demonstrated the expected positive intercorrelations, ranging from .49 to .66. The best-fitting model was a bifactor latent model containing the four factors describing core symptoms, along with a general factor of burnout encompassing all items. Furthermore, the theoretical validity of the model was tested by applying the basic tenets of the *Job Demands-Resources Model.* The results demonstrated a positive association between an individual's level of burnout (total score and four specific dimensions) and perceived job demands, reported secondary symptoms of impaired mental health, and turnover intention, as well as a negative association with self-rated job resources and in-role performance. Statistical norms are provided for the working population of Croatia.

Keywords: BAT-23, burnout, Job Demands-Resources Model, national norms

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Introduction

Burnout – traditionally defined as a work-related state primarily characterized by chronic energy depletion, manifested as overwhelming exhaustion and a lack of work motivation, which in turn is expressed through feelings of cynicism and detachment from the job (Schaufeli et al., 2023; Schaufeli, Desart, & De Witte, 2020) – represents a severe problem for today's employees and organizations. Detrimental effects of this phenomenon have been demonstrated across a broad spectrum of outcomes, including impaired employee physical and mental health (Salvagioni et al., 2017), increased absenteeism and turnover, and reduced job performance (Swider & Zimmerman, 2010). Concurring with this empirical evidence, the World Health Organization (WHO, 2019) has included burnout in the revised International Classification of Diseases, framing it as an occupational phenomenon. EU legislation mandates regular monitoring of psychosocial risks at work which could, among other outcomes, cause employee burnout (Eurostat, 2021).

In order to provide a valid, practical, and freely available tool to address the needs of scholars and practitioners, a group of researchers from the Netherlands and Belgium has offered a new definition and measurement of burnout: the Burnout Assessment Tool (BAT; Schaufeli, Desart & De Witte, 2020; Schaufeli, De Witte, & Desart, 2020). The BAT represents a promising alternative to other well-known measures of burnout such as the Copenhagen Burnout Inventory (CBI; Kristensen et al., 2005) and the Maslach Burnout Inventory (MBI; Maslach et al., 2017). Using a nationally representative sample, this study aims to present the first validation of the long version of the BAT (BAT-23; Schaufeli, De Witte, & Desart, 2020) in the Croatian national context. In addition, our aim is to provide statistical and diagnostic norms for the Croatian working population that would enable practitioners to identify individuals at risk of developing burnout or individuals who already suffer from it.

Burnout Assessment Tool (BAT-23) – a Need for a New Definition and Measurement

One of the most well-known burnout instruments is the MBI developed by Christina Maslach and her colleagues (Maslach & Jackson, 1981a, 1981b; Maslach et al., 2017). These authors define burnout as a psychological syndrome characterized by (emotional) exhaustion (i.e., the experience of chronic fatigue and lack of energy resulting from work effort), depersonalization or cynicism (i.e., feelings of detachment and indifference towards work, which translate into negative and cynical attitudes towards one's work role, as well as the experience of irritability), and a reduced sense of personal accomplishment or professional efficacy (as reflected in lower levels of satisfaction with and evaluations of one's work-related effectiveness; Maslach et al., 2017).

Despite its popularity, research has indicated several limitations of the MBI, addressed by the authors of the BAT (Schaufeli, Desart & De Witte, 2020; Schaufeli, De Witte, & Desart, 2020). First, reduced professional efficacy has been framed as an outcome rather than a constituting component of the burnout syndrome, reflecting the idea that feeling exhausted and detached from one's work causes negative work-related self-evaluations (e.g., de Beer & Bianchi, 2019). Second, more recent research indicates that deteriorated cognitive functioning (i.e., a decline in executive cognitive functions, attention and memory) is inherent to the burnout syndrome (for a review, see Deligkaris et al., 2014). Yet, this symptom is not included in the MBI. Finally, the MBI does not allow for the calculation of a single total burnout score that would accurately reflect burnout conceptualized as a *syndrome* (i.e., a set of related symptoms that co-occur and reflect the same underlying condition; Schaufeli, De Witte, & Desart, 2020).

Representing a new and updated measure of burnout, the BAT resulted from a series of qualitative and quantitative studies conducted on the Belgian and Dutch working population. Schaufeli, De Witte, and Desart (2020) conceptualized the burnout syndrome as a second-order dimension defined by four primary factors (i.e., symptoms): *exhaustion*, *mental distance*, *cognitive impairment*, and *emotional impairment.* Exhaustion refers to a severe loss of energy, resulting in both physical (e.g., tiredness, weakness) and mental (e.g., feeling drained and worn out) fatigue. Mental distance is characterized by withdrawal from work, avoidance of contact with colleagues, customers, and clients, as well as an indifferent and cynical attitude toward one's work role. A depersonalized, autopilot-like mode of functioning at work effectively describes this dimension. Cognitive impairment is indicated by memory problems (e.g., forgetfulness), difficulties with attention and concentration (e.g., trouble staying focused and thinking clearly), and poor cognitive performance (e.g., difficulties in learning new tasks and solving problems at work). Emotional impairment manifests as intense emotional reactions and an overwhelming inability to regulate one's emotions. It includes feelings of anger, frustration, and irritability, often accompanied by emotional overreactions. Accordingly, BAT includes two dimensions that reflect the key features of the burnout syndrome and are included in most burnout instruments, including the MBI (i.e., exhaustion and mental distancing), as well as two dimensions that have been identified as indicative of burnout in more recent research, but have not been included neither in the MBI, nor in most of the other burnout instruments (i.e., emotional and cognitive impairment). Finally, BAT enables data to be summarized at the level of four dimensions, as well as at the overall level of burnout syndrome.

The proposed hierarchical latent structure of the BAT has been supported in most studies. Using Rasch analysis on two representative national samples of the working population in the Netherlands and Flanders (Belgium), Hadžibajramović et al. (2020) supported the proposed factor structure of the BAT-23, as well as its invariance across gender and age, in both countries. In addition, several validation

studies have been conducted in different national contexts: Vinueza-Solórzano et al. (2021) confirmed the latent structure of the BAT-23 in a large sample of highly educated employees in Ecuador; de Beer et al. (2022) in a heterogeneous sample of employees in South Africa; Sinval et al. (2022) in convenience samples of employees from Brazil and Portugal; and Androulakis et al. (2023) in a sample of Greek employees from different sectors.

However, not all studies suggest that a higher-order structure is the best way to model burnout syndrome as measured by the BAT-23. For example, Sakakibara et al. (2020) favored a bifactor solution to a higher-order one using a sample of Japanese survey monitors, and Angelini et al. (2021) found that a model with correlated factors fit the data better than the higher-order model using a sample of Italian teachers. Therefore, more research is needed to test the latent structure of the BAT-23, preferably using representative national samples. As one of the few studies using a representative sample, our study aims to contribute to the knowledge on the latent structure of the BAT-23 hypothesizing that:

H_1: The factorial structure of the Croatian version of the BAT-23 is best represented by a higher-order model consisting of four first-order factors (Exhaustion, Mental Distance, Cognitive Impairment, and Emotional Impairment) loading on one second-order factor (burnout syndrome), when compared to the one-factor, correlated four-factor and bifactor models.

The Relationships Between Burnout and Job Demands, Resources, and Well-Being

The Job Demands-Resources (JD-R) model of burnout (Bakker et al., 2014; Demerouti et al., 2001) defines burnout as a central psychological mechanism explaining the link between high job demands and a lack of job resources with negative employee outcomes. According to the JD-R model, the burnout syndrome results from an imbalance between job demands and job resources. Job demands represent physical, psychosocial, or organizational aspects of work that require effort and, as such, consume employees' energy (e.g., workload, role ambiguity, and job insecurity). In contrast, job resources facilitate dealing with job demands, as well as promote goal achievement, personal growth, learning, and development (Bakker et al., 2014). They can be divided into personal (e.g., knowledge and skills, resilience, innovativeness) and organizational resources (e.g., autonomy, supervisory and peer support). While job demands drain employees' energy and can lead to burnout over time, resources can mitigate this relationship. Lower levels of resources may also directly contribute to the development of burnout. More specifically, when demands exceed resources, the employee experiences this as fatigue, and if the imbalance persists over time, fatigue becomes chronic and leads to burnout. Burnout, on the other hand, predicts unfavorable outcomes for both the individual and the

organization (e.g., reduced well-being, in-role performance, and extra-role work behavior; see Bakker et al., 2023, for a review).

Schaufeli, De Witte, and Desart (2020) even incorporated symptoms of impaired general mental health into the burnout syndrome model. They defined the four dimensions of the BAT-23 as core work-related symptoms but proposed that these are accompanied by a depressed mood, as well as non-specific psychological and psychosomatic symptoms that are general and not directly related to the work domain. They referred to these as secondary symptoms of burnout syndrome and developed brief measures to assess them. These secondary symptoms serve as indicators of an individual's overall psychological well-being and are therefore expected to be positively correlated with the core symptoms of burnout.

A large body of research supports the described path of health impairment assumed by the JD-R model. The frequency or severity of job demands is associated with burnout (e.g., Demerouti et al., 2001; Le Blanc et al., 2001; Li et al., 2022; Van den Broeck et al., 2017). In a meta-analysis of longitudinal studies conducted on 57 independent samples, Lesener et al. (2019) demonstrated that job demands are uniquely related to burnout over time. Although empirical tests of the assumed multiplicative effect of job demands and resources on burnout have not yielded consistent results (Huth & Chung-Yan, 2023), a negative relationship between job resources and burnout has been confirmed (e.g., Lesener et al., 2020; Schaufeli & Bakker, 2004; Schaufeli et al., 2009). Finally, research supports a negative relationship between burnout and both desirable work behaviors and well-being (e.g., Bakker et al., 2008; Peterson et al., 2008; Yates, 2020).

H_2: The BAT-23 core symptoms are positively related to job demands, secondary symptoms of impaired mental health, and turnover intentions, and are negatively related to job resources and in-role performance.

Method

Procedure

The dataset for the study was collected from a representative sample of the Croatian working population in March and April 2023. A professional data collection agency was employed for this purpose, and the data were collected via an online survey. The introduction to the survey included information about the study's purpose, and informed consent was obtained from all respondents. Each respondent received reward points redeemable for vouchers upon completing the survey. The study was approved by the Ethics committee of the first author's institution.

Participants

A total of 804 participants took part in the study during one of the waves of a broader longitudinal project. The sample was representative of the Croatian working population in terms of gender, age, region, and industrial sector, allowing for a deviation of up to 5%. The data collection agency recruited participants to reflect proportions of these characteristics in the most recent data available from the Croatian Bureau of Statistics (2022) to establish the population quota. To identify careless respondents, we employed a combination of criteria suggested by Meade and Craig (2012). These included a series of identical responses in succession (*longstring*), psychometric synonyms, Mahalanobis distance, and reactions to bogus items. The legitimacy of these exclusions was cross-checked with the total time taken to complete the survey. There were no missing data due to mandatory responses. Consequently, 36 respondents were removed due to careless responding, resulting in a final dataset of 768 employees. The sample comprised 56.1% females, with an average age of 43.71 years (*SD* = 9.35). More than half of the participants were highly educated (54.1%), 45.5% had completed only secondary education and 0.4% had completed only primary education. The vast majority of participants (95.6%) were permanently employed, mostly (54.4%) in the private sector. Most participants worked in non-manual jobs (84.2%) and were employed at their current job for an average of 11.8 (*SD* = 9.73 years). Most were employed in education (13%), the trade sector (11.7%), public service (11.5%), and manufacturing (10.5%).

Instruments and Measures

Burnout was measured with the Croatian version of the Burnout Assessment Tool, BAT-23 (Schaufeli, De Witte, & Desart, 2000; in Appendix, Table A2). The final version of the instrument was created through the process of (a) translation and back-translation and (b) preliminary application. To ensure a valid translation (a), we conducted both translation and back-translation. First, the English version of BAT-23 was translated into Croatian language by four researchers (the authors of the current study). Then, a bilingual psychologist translated our Croatian version back into English. The final step consisted of an iterative procedure through which the study authors and the bilingual psychologist compared and harmonized the original and back-translated versions. The preliminary version was applied (b) to a random sample of 1,011 Croatian employees via an online survey in June/July 2022 by a data collection agency. After analyzing these preliminary data, the translation of one item on the Exhaustion scale was further linguistically adjusted due to its high saturation with the Cognitive Impairment factor. The instrument consists of four subscales: Exhaustion (8 items), Mental Distance (5 items), Cognitive Impairment (5 items), and Emotional Impairment (5 items). Respondents rated each item on a scale ranging from 1 (*never*) to 5 (*always*) and (sub)scales scores were calculated as the mean of the respective item scores.

Impaired mental health was assessed by applying the Secondary Symptoms Scale (Schaufeli, De Witte, & Desart, 2020). The scale consists of 10 items measuring two groups of symptoms of impaired mental health (α = .89, ω = .90): Psychological Distress (5 items) and Psychosomatic Complaints (5 items). Both scales underwent the same translation process as the BAT-23 tool. Respondents rated each item on a scale from 1 (*never*) to 5 (*always*), example items being: „I feel tense and stressed." (Psychological Problems) and „I suffer from headaches." (Psychosomatic Complaints).

Job demands. To measure role ambiguity, we used three items from Bowling et al.'s (2017) Role Ambiguity Scale (e.g., „I am not sure what is expected of me at work.", α = .79, ω = .80). Respondents indicated their answers on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Work overload was measured with a four-item scale (e.g., „Do you have too much work to do?", α = .79, ω = .81) from the Energy Compass, a questionnaire based on the JD-R model (Schaufeli, 2015). Items were rated on a scale ranging from 1 (*never*) to 5 (*always*). Interpersonal conflicts were measured using three items from the Interpersonal Conflicts at Work Scale (ICAWS; Spector & Jex, 1998). These items assessed how often employees experienced arguments and rudeness from their coworkers (e.g., „How often do you get into arguments with others at work?", α = .82, ω = .84). Responses were indicated on a five-point scale ranging from 1 (*less than once per month or never*) to 5 (*several times per day*). To measure emotional demands, we used the respective three items (α = .84, ω = .84) from the third version of the Copenhagen Psychosocial Questionnaire (COPSOQ III; Burr et al., 2019). Items were scored on a five-point scale ranging from 1 (*never*) to 5 (*always*). The sample item is „Does your work put you in emotionally disturbing situations?".

Job resources. Job autonomy was measured using items from the Psychological Climate Questionnaire originally developed by James and James (1989) and adapted by Tomas et al. (2019; α = .80, ω = .80). The sample item is „I have autonomy to make decisions within my own work area." Responses were indicated on a five-point scale (1 = *completely disagree*; 5 = *completely agree*). Supervisor Support and Opportunities for Learning were each measured with three items from the Energy Compass (Schaufeli, 2015; α = .91, ω = .91 and α = .85, ω = .86, respectively). Sample items were: „Can you count on your supervisor for help and support when needed?" (Supervisor Support) and „In my work I always learn new things." (Opportunities for Learning). Items were scored on a five-point scale ranging from 1 (*never*) to 5 (*always*) for Supervisor Support and from 1 (*completely disagree*) to 5 (*completely agree*) for Opportunities for Learning.

Outcomes of burnout. Turnover intention was measured using a three-item scale developed by Irving et al. (1997; e.g., „I will probably be looking for a new job within a year"; α = .92, ω = .92). The items were rated on a five-point scale ranging from 1 (st*rongly disagree*) to 5 (*strongly agree*). To measure in-role performance, we used three items from Williams and Anderson's (1991) scale (e.g., „I fulfill the

responsibilities specified in my job description.", α = .74, ω = .77). Respondents provided responses on a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Data Analysis

The factor structure of the instrument was assessed using confirmatory factor analyses (CFA) with the robust MLR estimator due to deviations from normal distribution (Table S1 (B) in the Supplement 1)[1] with *R* language (R Core Team, 2022) using the *lavaan* (Rosseel, 2012) package. We used the following cut-off criteria to evaluate model fit: CFI values over .95 and RMSEA and SRMR values below .05 indicated good fit; while CFI values over .90 and RMSEA and SRMR below .08 were considered to indicate adequate model fit (Little, 2013). We used the robust versions of the CFI and RMSEA as they have been shown to perform better with non-normal data (Brosseau-Liard et al., 2012; Brosseau-Liard & Savalei, 2014). When comparing nested models, we used the scaled chi-square difference test, which is a function of the standard chi-square statistics, not the robust one presented in the results.

As previously stated, burnout is defined as a higher-order syndrome with core symptoms as first-order factors (Schaufeli, Desart, & De Witte, 2020). To assess the extent to which this hypothetical structure is reflected in the instrument's structure, we followed the guidelines developed by Credé and Harms (2015). On the one hand, we compared the theoretical second-order model (SO) with a more parsimonious model with one general factor (1F), to see if it fits the data better. On the other hand, we compared it to two more complex alternative models – a four correlated factors model (4F) and a bifactor model (BF) – to test whether the SO model fits the data at least as well. The models were specified and compared using the scaled chi-square difference test for the nested models (Satorra & Bentler, 2001). The following models (Supplement 2) were considered:

a. A second-order model (SO) that depicts the theoretical structure with a second-order factor (burnout syndrome) explaining the covariation between the first-order factors (Exhaustion, Mental Distance, Emotional Impairment, and Cognitive Impairment).
b. One-factor model (1F), with all 23 items as manifest variables reflecting the same underlying construct – general burnout. This model focuses exclusively on the general factor, and attributes all covariation between items to that source.
c. A correlated four-factor model (4F), with the four core symptoms as latent dimensions. The model was specified with all items loading only on their respective factors, and the covariances between them were freely estimated. This model focuses on group factors but also allows for their correlation.

[1] Supplements 1 and 2 are available online.

d. A bifactor model (BF), featuring four uncorrelated factors that describe the core symptoms, alongside a general factor that remains uncorrelated with the specific factors. This model allows for explicit decomposition of manifest variances into general and specific parts. It places greater emphasis on the general factor, compared to SO, which gives theoretical precedence to group factors (Dunn & McCray, 2020).

To test the relations of BAT-23 with job demands, resources, and outcomes, we computed Pearson correlations using the *R* language (R Core Team, 2022) and the *psych* (Revelle, 2022) package, as well as *jamovi* (jamovi, 2023).

Results

Factor Structure

The fit parameters for the four specified models (Supplement 2) as well as the comparisons between them are presented in Table 1. The one-factor model (1F) shows poor fit to the data in absolute terms, while the rest of the models show adequate or good fit.

Table 1

Fit Parameters and Comparison of the Four Specified Models

	Model	χ^2	*df*	CFI	RMSEA [90% CI]	SRMR
Hierarchical model	Second-order model (SO)	1008.661	226	.906	.073 [.069-.078]	.060
More parsimonious model	One-factor model (1F)	2230.086	230	.757	.117 [.112-.121]	.078
Less parsimonious models	Four correlated factors model (4F)	992.884	224	.908	.073 [.068-.077]	.058
	Bifactor model (BF)	629.652	207	.950	.056 [.051-.061]	.044
	Model comparison	$\Delta\chi^2$	Δdf	ΔCFI	ΔRMSEA	ΔSRMR
	SO - 1F	-804.31***	-4	-.149	-.043	-.018
	SO - 4F	14.96***	2	.002	.000	.002
	SO - BF	333.71***	19	.044	.017	.016

Note. χ^2 = chi-square statistic; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; CI = confidence interval; *df* = degrees of freedom.
*** $p < .001$.

The second-order (SO) model displayed a notable improvement in fit over the simpler 1F model. This indicates that relying on a single dimension is not an appropriate approach to interpreting BAT-23 scores. However, although SO showed an acceptable fit on its own, it exhibited significantly poorer fit compared to both the 4F and the BF models, as detailed in Table 1. This suggests that there are more complex alternatives to SO that fit the data better than the hypothesized second factor structure. For us to endorse the hierarchical model, it should fit the data at least as well, which is not the case. On the other hand, the bifactor model (BF) fits the data significantly better than the SO, and shows an adequate (according to RMSEA) or even good (according to CFI and SRMR) fit in absolute terms. The item loadings with the general factor range from .39 to .85, indicating that all items share some variance with the global burnout factor. For Mental Distance, Emotional Impairment, and Cognitive Impairment, the saturations range from .24 to .71, which is typical for bifactor models, as it indicates that all items are saturated by a specific factor, not just the general one. The situation is more complicated for Exhaustion, where item 5 was not related to the respective specific factor (-.03) and item 6 even showed a negative correlation with it (-.17), after controlling for the general factor.

Reliability

Reliability coefficients for the BAT-23 total score and the four subscales were above .80 (Table 2) and similar to previous studies (e.g., Borreli et al., 2022; de Beer et al., 2022). Arithmetic means and standard deviations for the BAT-23 total score and its subscales, along with Croatian norms in percentiles, are presented in Appendix, Table A1.

Relations with Other Variables

As suggested by H_2, the BAT-23 total and subscale scores were significantly positively related to job demands, turnover intentions and impaired mental health, and negatively related to job resources and in-role performance (Table 2, descriptives in Table A1 in Appendix, and Table S1 (A) in the Supplement 1). Job demands and impaired mental health were most strongly related to Exhaustion, job resources and turnover intention to Mental Distance, and in-role performance to Cognitive Impairment.

Discussion

This study provides the first validation data for the BAT-23 in the Croatian national context, as well as statistical norms for the Croatian working population. We define statistical norms based on descriptive data for the general working population, in accordance with the statistical norms developed by the authors of the questionnaire for the working populations of the Netherlands and the Flemish part of Belgium (Schaufeli, De Witte, & Desart, 2020). These statistical norms allow for the

Table 2

Reliability and Pearson Correlations for the Study Variables

	Reliability		BAT				Job demands				Job resources			Job outcomes		
	α	ω	BRN	EX	MD	CI	WO	RA	WC	ED	JA	SS	OL	TI	IP	IMH
Burnout (BRN)		.936					.424	.52	.545	.298	-.301	-.376	-.366	.348	-.298	.701
Exhaustion (EX)	.901	.901	.918				.492	.433	.513	.358	-.302	-.348	-.304	.328	-.201	.661
Mental Distance (MD)	.814	.815	.800	.644			.227	.505	.441	.10[a]	-.324	-.443	-.546	.410	-.271	.540
Cognitive Impairment (CI)	.887	.890	.795	.637	.490		.300	.408	.408	.208	-.145	-.181	-.155	.197	-.299	.522
Emotional Impairment (EI)	.813	.813	.811	.656	.520	.625	.326	.398	.438	.283	-.190	-.244	-.182	.183	-.273	.598

Note. α was not calculated for the entire BAT-23, as the scale is not unidimensional. ω was calculated on separate models for each subscale. All of the correlations are significant at $p < .001$, except [a] $p < .01$.
WO = Work Overload, RA = Role Ambiguity, WC = Role Conflict, ED = Emotional Demands, JA = Job Autonomy, SS = Supervisor Support, OL = Opportunities for Learning, TI = Turnover Intention, IP = In-role Performance, IMH = Impaired Mental Health.

positioning of individual and group scores on the BAT-23 in relation to the general working population in Croatia. Here, we discuss the results of tests of its factorial structure, convergent validity examined within the framework of the JD-R model, and descriptive statistics for the five scores provided by the BAT-23: a total score and scores on four subscales that quantify the four symptoms (i.e., dimensions) of the burnout syndrome. Finally, we discuss the methodological limitations of the current research and provide some recommendations for future research aimed at improving the measurement of burnout syndrome.

When discussing the results of testing the latent structure of BAT-23 scores (H_1), two findings need to be highlighted: (1) the bifactor model fits the data significantly better than the second-order model; (2) two items on the Exhaustion scale do not show the expected factor loadings. Although several studies using CFA have confirmed that the hierarchical latent model fits the data better than the four-dimensional model, thus supporting the burnout syndrome hypothesis (Consiglio et al., 2021; de Beer et al., 2020; Sinval et al., 2022; Vinueza-Solórzano et al., 2021), to our knowledge, no study has confirmed a better fit of the second-order model compared to the bifactor model. The bifactor model showed a better fit than the higher-order model in South African (BAT-23, de Beer et al., 2022), Japanese (BAT-23, Sakakibara et al., 2020), Italian (BAT-12, Mazzetti et al., 2022) as well as Croatian sample (BAT-12, Tomas et al., 2023). What consequences does this have for the definition of the burnout construct and the use of the BAT-23? As Schaufeli and De Witte (2023) recently stated, both models support the idea of burnout syndrome as an overlaying construct bridging specific dimensions. The higher-order model assumes the contribution of the four first-order dimensions to a common burnout factor as a second-order dimension, and the bifactor model assumes the relative contribution of each item to the common burnout factor. The bifactor model relaxes the assumption that the contribution of the item to the general factor must be proportional to its contribution to the specific factor, as is implied by the second-order model (Gignac, 2016). The better fit of the bifactor model implies that BAT items differ in how much they are related to general burnout as compared to their relation to specific dimensions. Practically, both models lead to the same conclusions regarding score calculations, although theoretically the bifactor model implies that items, and therefore subscales, differ more in how much they reflect the specific and general factors compared to the second-order model. To conclude, both models support the use of the BAT-23 total score as a quantification of the burnout syndrome, as well as the use of subscale scores as indicators of the level of a specific symptom cluster. This is further supported by results showing high reliability in terms of internal consistency for both the total score and individual dimensions of the BAT-23.

However, when the focus is on first-order factors, as in situations where we are interested in levels of the core burnout symptoms, the model showed some shortcomings. Two items, both on the Exhaustion subscale, showed deviations from

this model. Item 5 „When I get up in the morning, I lack the energy to start a new day at work" was not related to the respective specific factor, and item 6, „I want to be active at work, but somehow I am unable to manage", showed a negative correlation with it. A similar result for item 6 was reported by de Beer et al. (2022). In addition, our preliminary studies revealed a low correlation between item 6 and the corresponding Exhaustion factor. Consequently, we modified the wording of the item for the current study, but this still did not improve its validity. Therefore, we recommend that future research include different versions of item 6 to enable a comparative analysis of their factor loadings. The same procedure is recommended for item 5. These items were still related to the general burnout factor, indicating that they might reflect burnout in general but do not reflect exhaustion as directly as other items in this subscale, whose content includes exhaustion and tiredness more directly (Appendix, Table A2).

In summary, although our first hypothesis regarding the second-order factor (H_1) was not supported, our results demonstrated that a model incorporating a common factor (i.e., the bifactor model) fits the data better than both a one-factor model and a correlated four-factor model. This finding implies that burnout is a syndrome inherently defined by four assumed groups of symptoms. Consequently, it can be measured as both general burnout and as four specific burnout dimensions.

With regard to the nomological network of the burnout construct delineated from the JD-R model, our results showed positive correlations between the BAT-23 and job demands and turnover intention, and negative correlations between the BAT-23 and job resources and in-role performance (supporting H_2). In a recent review of findings on the validity and reliability of the BAT, Schaufeli and De Witte (2023) concluded that the observed correlations ranged from .30 to .45, similar to the ranges found in our study. The highest correlation observed was between Exhaustion and work overload (.49), while the lowest was between Mental Distance and emotional job demands (.10). In addition, the core symptoms of burnout syndrome (as measured by BAT-23 scores) were positively related to the secondary symptoms of burnout, as defined in the model by Schaufeli, De Witte, and Desart (2020). These correlations were within a higher range, as expected for proxy measures. The total score on the secondary symptoms scale (i.e., the Impairment of Mental Health score, IMH) showed the highest correlation with the total BAT-23 score (.70) and the lowest with the Cognitive Impairment subscale score (.52). Accordingly, we conclude that the Croatian version of the BAT-23 demonstrated theoretical validity and paves the way for future research focusing on the temporal relationships between these variables. In this respect, a longitudinal methodology should be employed.

The presented statistical norms (Appendix, Table A1) provide quantitative criteria for classifying Croatian employees as reporting „very low" (10th percentile), „low" (25th percentile), „average" (50th percentile), „high" (75th percentile), and „very high" (90th percentile) levels of burnout symptoms compared to the national representative sample. Statistical norms assist occupational medicine experts in

screening for burnout syndrome at the individual level. They could be used to identify individuals with high or very high levels of burnout complaints, either in the global dimension or its sub-dimensions. However, statistical norms describe groups and individuals with high scores relative to the population (e.g., those in the top 10%), but they do not provide crucial information about the diagnostic significance of the result. To establish such cutoff values, the BAT-23 should be administered to clinical groups (individuals on sick leave due to burnout syndrome), and the results should be compared with those of a representative non-clinical sample. ROC curve analysis should be applied to determine the optimal cut-off value as a quantitative criterion for burnout syndrome (see Schaufeli & De Witte, 2023).

Study Limitations and Future Recommendations

Although the current study contributes to the international validation of the BAT-23 and supports the theoretical validity of the new definition of burnout syndrome, it has several limitations that should be taken into account when interpreting the results. Below, we discuss the three most significant ones.

First, the second-order hierarchical model of burnout syndrome was not confirmed, and two items on the Exhaustion scale did not load onto the specific factor, although they were related to the general factor. These items should be re-examined in future research. Second, although special efforts were made to collect a nationally representative sample of the working population, employees with higher education levels were overrepresented, while semiskilled and unskilled blue-collar workers were underrepresented. This subgroup should be of particular interest in future research, and field data collection should replace or supplement the online survey method to better reach this population. Finally, the presented statistical norms are based on descriptive statistics for the entire sample and do not provide information about group differences. Future research should examine differences between various groups of employees based on demographics (e.g., gender, age, education) and job characteristics (e.g., sector, manual vs. non-manual work).

Conclusion

At a time when mental health is a central concern of public health and social policy, and burnout syndrome - as a work-related, reactive form of impaired mental health - is officially recognized and diagnosable, the availability of valid diagnostic tools has become critically important for researchers and professionals in the field of Occupational Health Psychology. The present study addressed this need by validating a new instrument in the field - the Burnout Assessment Tool (Schaufeli, De Witte, & Desart, 2020). Specifically, this study examined the theoretical, convergent, and discriminant validity of the Croatian version of the Burnout Assessment Tool (BAT-23) on a nationally representative sample of the working population. The results support BAT-23 as a psychometrically sound measure of

self-reported symptoms of job burnout. The instrument effectively assesses both general burnout and its four core dimensions: exhaustion, mental distance, cognitive impairment, and emotional impairment.

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Mjerenje sindroma sagorijevanja u Hrvatskoj upitnikom BAT-23: validacijsko istraživanje i statističke norme

Sažetak

Rad predstavlja empirijsku validaciju hrvatske verzije novoga instrumenta za procjenu sindroma sagorijevanja na individualnoj i grupnoj razini – Burnout Assessment Tool (BAT-23). Hrvatska verzija upitnika BAT-23 primijenjena je na reprezentativnome uzorku radno aktivnoga stanovništva u Hrvatskoj (N = 768) s ciljem testiranja njezine konstruktne valjanosti i utvrđivanja nacionalnih statističkih normi. Rezultati su pokazali visoku unutarnju konzistentnost ukupnoga rezultata na upitniku BAT-23, kao i rezultata na podljestivcama Iscrpljenosti, Emocionalnih poteškoća, Kognitivnih poteškoća i Psihološke distanciranosti od vlastitoga posla (koeficijenti u rasponu od .81 do .90). Također, rezultati pokazuju očekivane pozitivne korelacije među navedenim podljestvicama upitnika, u rasponu od .49 do .66. Bifaktorski latentni model koji sadrži četiri faktora koji opisuju primarne simptome, uz generalni faktor sagorijevanja koji najbolje pristaje podacima. Teorijska valjanost modela testirana je primjenom temeljnih pretpostavki Modela zahtjeva i resursa na poslu. Rezultati su pokazali pozitivnu povezanost individualne razine sagorijevanja (ukupnog rezultata i četiri specifične dimenzije) s percipiranim zahtjevima na poslu, samoprocijenjenim sekundarnim simptomima narušenoga mentalnog zdravlja i namjerom napuštanja posla te negativnu povezanost sa samoprocijenjenim resursima na poslu i radnom uspješnošću. Statističke norme prikazane su za radno aktivno stanovništvo u Hrvatskoj.

Ključne riječi: BAT-23, sagorijevanje, model zahtjeva i resursa na poslu, nacionalne norme

Primljeno: 14. 2. 2025.

Appendix

Table A1

BAT-23 Descriptive Statistics and Croatian National Norms (N = 767)

Statistic	Scale				
	Burnout	Exhaustion	Mental Distance	Emotional Impairment	Cognitive Impairment
M (*SD*)	2.18 (0.577)	2.46 (0.717)	2.17 (0.76)	1.91 (0.616)	2.02 (0.624)
Range	1-4.57	1-5	1-4.8	1-4.4	1-5
Skewness/ kurtosis [a]	0.505/ 0.35	0.523/ 0.22	0.684/ 0.257	0.727/ 0.373	0.525/ 0.853
Percentiles:					
10th	1.48	1.63	1.2	1.2	1.2
25th	1.78	2	1.6	1.4	1.6
50th	2.13	2.38	2.2	1.8	2
75th	2.52	2.88	2.6	2.2	2.4
90th	2.96	3.5	3.2	2.8	2.8

[a] Standard error of skewness is 0.088, and of kurtosis is 0.176.

Table A2

BAT-23: English and Croatian Version

Instruction:

ENG: The following statements are related to your work situation and how you experience this situation. Please state how often each statement applies to you.

CRO: Sljedeće tvrdnje odnose se na Vašu radnu situaciju i način na koji ju doživljavate. Molimo Vas da za svaku tvrdnju procijenite koliko često se ona odnosi na Vas.

Response scale / Skala odgovora:

1 = Never/Nikada, 2 = Rarely/Rijetko, 3 = Sometimes/Ponekad,
4 = Often/Često, 5 = Always/Uvijek

Exhaustion	**Iscrpljenost (ISC)**
1. At work, I feel mentally exhausted*	Na svom se poslu osjećam psihički iscrpljeno.*
2. Everything I do at work requires a great deal of effort.	Na poslu mi je sve naporno.
3. After a day at work, I find it hard to recover my energy.*	Nakon radnog dana teško mi je obnoviti energiju.*
4. At work, I feel physically exhausted*	Na svom se poslu osjećam fizički iscrpljeno.*
5. When I get up in the morning, I lack the energy to start a new day at work.	Kada se ujutro probudim, nedostaje mi energije za započeti novi radni dan.
6. I want to be active at work, but somehow I am unable to manage.	Želim biti aktivan/na na poslu, ali nedostaje mi energije. Želim biti aktivan/na na poslu, ali nisam u stanju to i provesti.
7. When I exert myself at work, I quickly get tired.	Kad se trudim na poslu, brzo se umorim.
8. At the end of my working day, I feel mentally exhausted and drained.	Nakon radnog dana, osjećam se potpuno psihički iscrpljeno.
Mental Distance	**Psihološka distanciranost (PD)**
9. I struggle to find any enthusiasm for my work.*	Teško mi je pronaći bilo kakav entuzijazam za posao.*
10. At work, I do not think much about what I am doing and I function on autopilot.	Na poslu ne razmišljam puno o tome što radim, već zadatke izvršavam automatski.
11. I feel a strong aversion towards my job*	Osjećam snažnu odbojnost prema svom poslu.
12. I feel indifferent about my job.	Ravnodušan/na sam prema poslu koji radim.
13. I'm cynical about what my work means to others*	Sumnjam da moj posao drugima išta znači.

Cognitive Impairment	**Narušeno kognitivno funkcioniranje (NKF)**
14. At work, I have trouble staying focused*	Teško mi je zadržati koncentraciju na poslu.
15. At work I struggle to think clearly.	Na poslu mi je teško zadržati jasan tok misli.
16. I'm forgetful and distracted at work.	Na poslu sam zaboravan/na i lako izgubim koncentraciju.
17. When I'm working, I have trouble concentrating*	Teško se koncentriram na posao.*
18. I make mistakes in my work because I have my mind on other things*	Na poslu radim greške jer mi je pažnja usmjerena na druge stvari.*
Emotional Impairment	**Narušeno emocionalno funkcioniranje (NEF)**
19. At work, I feel unable to control my emotions*	Na poslu imam poteškoća s kontrolom emocija.*
20. I do not recognize myself in the way I react emotionally at work*	Kada na poslu reagiram emocionalno, ne mogu prepoznati samog/u sebe.*
21. During my work I become irritable when things don't go my way.	Postajem razdražljiv/a kada stvari na poslu ne idu onako kako sam isplanirao/la.
22. I get upset or sad at work without knowing why.	Na poslu se uzrujam ili rastužim, a da ni sam/a ne znam zašto.
23. At work I may overreact unintentionally*	Dogodi se da na poslu nekontrolirano dramatiziram.

Note: * = Short version, BAT-12