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FULL-LENGTH REPORT

The International Work Addiction Scale (IWAS): A screening tool for clinical and organizational applications validated in 85 cultures from six continents

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ABSTRACT

Background and aims: Despite the last decade's significant development in the scientific study of work addiction/workaholism, this area of research is still facing a fundamental challenge, namely the need for a valid and reliable measurement tool that shows cross-cultural invariance and, as such, allows for worldwide studies on this phenomenon. *Methods:* An initial 16-item questionnaire, developed within an addiction framework, was administered alongside job stress, job satisfaction, and self-esteem measures in a total sample of 31,352 employees from six continents and 85 cultures (63.5% females, mean age of 39.24 years). *Results:* Based on theoretical premises and psychometric testing, the International Work Addiction Scale (IWAS) was developed as a short measure representing essential features of work addiction. The seven-item version (IWAS-7), covering all seven components of work addiction, showed partial scalar invariance across 81 cultures, while the five-item version (IWAS-5) showed it across all 85 cultures. Higher levels of work addiction on both versions were associated with higher job stress, lower job satisfaction, and lower self-esteem across cultures. The optimal cut-offs for the IWAS-7 (24 points) and IWAS-5 (18 points) were established with an overall accuracy of 96% for both versions. *Discussion and conclusions:* The IWAS is a valid, reliable, and short screening scale that can be used in different cultures and languages, providing comparative and generalizable results. The scale can be used globally in clinical and organizational settings, with the IWAS-5 being recommended for most practical and clinical situations. This is the first study to provide data supporting the hypothesis that work addiction is a universal phenomenon worldwide.

KEYWORDS

Bergen Work Addiction Scale, compulsive overworking, cross-cultural, validation study, workaholism, work addiction

INTRODUCTION

After a relatively long incubation period spanning over half a century, work addiction research has experienced rapid growth in the last decade, resulting in emerging syntheses based on accumulated empirical evidence in the form of review papers (Andreassen, 2014; Atroszko & Atroszko, 2020; Aziz & Moyer, 2018; Cossin, Thaon, & Lalanne, 2021; Gonçalves, Meneses, Sil, Silva, & Moreira, 2023; Griffiths, Demetrovics, & Atroszko, 2018; Griffiths & Karanika-Murray, 2012; Kim, 2019; Quinones & Griffiths, 2015; Sussman, 2012; Taris & de Jonge, 2024), meta-analytic studies (Andersen, Djugum, Sjåstad, & Pallesen, 2023; Clark, Michel, Zhdanova, Pui, & Baltes, 2016; Di Stefano & Gaudiino, 2019; Kun, Takacs, Richman, Griffiths, & Demetrovics, 2020; Lee, Lee, & Lee, 2022; Morkevičiūtė, Endriulaitienė, & Poškus, 2021; Patel, 2011), and chapters in handbooks on addictive disorders (Andreassen & Pallesen, 2016; Atroszko, 2022a, 2022b; Quinones & Griffiths, 2020). It has led to important conceptual clarifications and delineation of theoretical integrations (Atroszko, Demetrovics, & Griffiths, 2019; Balducci, Spagnoli, & Clark, 2020; Griffiths et al., 2018).

However, despite this dynamic development in the research and literature, this field still faces major challenges. One of the most significant is the fact that work addiction has been investigated in two mostly parallel lines of research and, to some extent, distinct frameworks (Atroszko & Atroszko, 2020; Atroszko et al., 2019, 2020). One is grounded in clinical psychology and addiction research (Andreassen & Pallesen, 2016; Atroszko, 2022a, 2022b; Griffiths, 2011; Sussman, 2012). The other leans on the work and organizational psychology perspective, which often calls compulsive overworking "workaholism" (Aziz & Moyer, 2018; Balducci et al., 2020; Schaef & Fassel, 1988; Schaufeli, Taris, & Bakker, 2006; Spence & Robbins, 1992; Taris & de Jonge, 2024) and frequently analyses it within the Heavy Work Investment framework (Snir & Harpaz, 2012).

This apparent dissonance is reflected in methodological issues, such as different (to some extent) study instruments of varying quality used in these frameworks (Acosta-Prado, Tafur-Mendoza, Zárate-Torres, & Ramírez-Ospina, 2021; Atroszko, 2022a; Gonçalves et al., 2023; Kun et al., 2020; Morkevičiūtė & Endriulaitienė, 2023). Moreover, apart from an array of compulsive overworking scales, there are very limited data on their cross-cultural invariance (Hu et al., 2014), which further affects potential integrations and generalizability of results (Andersen et al., 2023; Kun et al., 2020). Measurement of addictive disorders has significant implications for understanding them, their prevention, and treatment. This is because studies show that their associations with other variables and up to almost 80% of the variance in prevalence estimates depend on the assessment instrument used (Andersen et al., 2023; Kun et al., 2020; Stevens, Dorstyn, Delfabbro, & King, 2021).

To overcome these challenges, the present study aims to develop a short cross-culturally invariant work addiction scale (International Work Addiction Scale – IWAS) that can

be freely utilized globally, providing valid, reliable, and comparative results that allow for broad generalizations and investigation of the phenomenon worldwide. Such a measure may enable researching macro-level factors (across cultures) affecting work addiction and its consequences, such as socioeconomic development variables (e.g., average wages, GDP per capita) and cultural values. Moreover, as a brief and convenient screening measure, it may be employed in large epidemiological studies, including longitudinal research, and in any other designs requiring a valid and quick estimation of work addiction risk. While grounded in the addiction framework and congruent with current conceptualizations of compulsive overworking as a potential behavioral addiction, it may be used in organizational settings analogously to currently used workaholism measures.

Work addiction conceptualization

Both clinical and organizational frameworks currently define compulsive overworking as a pathological phenomenon with a core feature of an uncontrollable urge to work (compulsion), leading to harm and functional impairments (Atroszko, 2022a, 2022b; Balducci et al., 2020; Clark et al., 2016; Griffiths et al., 2018; Kun et al., 2020; Sussman, 2012; Taris & de Jonge, 2024). The clinical framework provides theoretical and methodological background with rapid advancements in the addiction field, including phenomenological, genetic, neurobiological, social, and cultural models, as well as practical frameworks structured by health institutions within broader social institutions that regulate diagnosis, prevention, and treatment of addictive disorders (Brand et al., 2022; World Health Organization [WHO], 2019). On the other hand, the organizational framework provides background and tools developed in work-related environments and institutions, including theoretical models (e.g., job demands-resources [JD-R] theory; Bakker, Demerouti, & Sanz-Vergel, 2023) and organizational perspectives on prevention and management of adverse work-related phenomena such as workaholism and associated job burnout (Cossin et al., 2021).

Therefore, integrating these frameworks may result in a more comprehensive understanding of the phenomenon and improved prevention and intervention programs that account both for the clinical aspects of work addiction and its status within work environments and the labor market. A general definition of work addiction grounded in an addiction framework and measurement consistent with this conceptualization will enable investigation of whether the construct assessed in such a way is universally (cross-culturally) valid. In other words, it will allow researchers to leverage cross-cultural research by testing the contention that work addiction has the same underlying structure and presentation globally and is a universal construct worldwide. This could provide the basis for subsequent clinically and organizationally oriented studies on the nature of this phenomenon, its micro-, meso-, and macro-level risk factors, regulatory mechanisms, and a broad range of consequences, including estimation of its global health, social, and economic costs. Also, such studies may lay the foundations for identifying cross-culturally valid diagnostic criteria that health institutions could use. In Supplementary Material 1, a more detailed history of the conceptualization of work addiction is reviewed.

Work addiction definition

Throughout the past five decades, gradual clarifications have emerged from theoretical debates and empirical data, and currently, most of the existing definitions of work addiction/workaholism include the elements of preoccupation with work/compulsion or addiction to work and negative consequences of excessive work (for an overview, see Andreassen, 2014; Atroszko, 2022a, 2022b; Griffiths & Karanika-Murray, 2012; Quinones & Griffiths, 2015; Sussman, 2012). In the present paper, the terms "work addiction" and "workaholism" are used as synonyms denoting the construct of compulsive overworking (see Atroszko, 2024), congruently with long-established usage of these terms both in clinical and organizational literature (Andreassen, 2014; Andreassen & Pallesen, 2016; Atroszko, 2022a, 2022b; Atroszko & Atroszko, 2020; Aziz & Moyer, 2018; Balducci et al., 2020; Griffiths et al., 2018; Griffiths & Karanika-Murray, 2012; Oates, 1971; Quinones & Griffiths, 2015; Sussman, 2012), and reflected in meta-analytic syntheses (Andersen et al., 2023; Clark et al., 2016; Di Stefano & Gaudiino, 2019; Kun et al., 2020; Lee et al., 2022; Patel, 2011). At the same time, it needs to be acknowledged that some scholars view the two constructs as overlapping but distinct (Griffiths et al., 2018). They use the term 'workaholism' to refer to their specific theory postulating such distinction (Clark, Smith, & Haynes, 2020), while others suggest that it may be more "fuzzy" than 'work addiction' (Morkevičiūtė & Endriulaitienė, 2023), or define workaholism not as an addictive disorder (Loscalzo & Giannini, 2018).

Recently, a general definition of work addiction (see Table 1), understood as a behavioral addiction, was suggested to initiate integrations of clinical and organizational frameworks (Atroszko et al., 2019). It is congruent with (i) the existing conceptualizations of work addiction/workaholism in the organizational literature (Balducci et al., 2020; Schaufeli et al., 2006; Spence & Robbins, 1992), (ii) previous clinical definitions of work addiction (Andreassen, Griffiths, Hetland, & Pallesen, 2012; Andreassen & Pallesen, 2016; Griffiths, 2011; Oates, 1971; Robinson, 2014), (iii) broadly recognized definitions of behavioral addiction and biopsychosocial addiction components model (Grant, Potenza, Weinstein, & Gorelick, 2010; Griffiths, 2005; Shaffer et al., 2004), (iv) descriptions of addictive disorders categories (both substance dependence and disorders due to addictive behaviors) in official classifications of diseases and disorders (WHO, 2019), and (v) common elements of most of the definitions of addictions (Sussman & Sussman, 2011). This definition is reflected in the items measuring work addiction by the measure being developed in the present study (see Table 1 and Table S1 in the Supplementary Material).

Table 1. Comparison of essential features of addictive disorders in ICD-11, addiction components model, common components of addiction definitions, and work addiction definition

ICD-11 Disorders due to addictive behaviors or substance dependence	Common addiction components	Common addiction components in work addiction	Common components of addiction definitions	Work addiction definition
WHO (2019)	Griffiths (2005)	Griffiths (2011)	Sussman and Sussman (2011)	Atroszko et al. (2019, p. 9)
A persistent pattern of behavior manifested by all three: (A), (B) and (C).				"Work addiction is characterized by a compulsion to work
(A) Increasing priority given to the behavior to the extent that the behavior takes precedence over other life interests and daily activities.	Salience	Work dominates thinking and behavior.	Total preoccupation with the behavior	and preoccupation with work activities
The pattern of the behavior results in significant distress or in significant impairment in personal, family, social, educational, occupational or other important areas of functioning.	Conflict	Work causes conflicts in social relationships and other activities.	Suffering negative consequences	leading to significant harm and distress of a functionally impairing nature to the individual and/or other significantly relevant relationships (friends and family).
(B) Continuation or escalation of the behavior despite the occurrence of negative consequences.	Problems	Negative outcomes of excessive working.		
The pattern of the behavior may be continuous or episodic and recurrent but is manifested over an extended time (e.g., 12 months).				The behavior is characterized by the loss of control over the working activity and persists over a significant period of time. This problematic work-related behavior can have varying intensity from mild to severe.
(C) Impaired control over the behavior (e.g., onset, frequency, intensity, duration, termination, context).	Relapse	A tendency for reversion to earlier patterns of work activity after abstinence or control.	Loss of control	Loss of control over the working activity involves working more than planned, despite the negative consequence and/or unsuccessful attempts to reduce the activity
Physiological features indicative of neuroadaptation to the behavior, including: (i) tolerance to the effects of behavior or a need to increase the amount of behavior to achieve the same effect; (ii) withdrawal symptoms following cessation or reduction in behavior or (iii) repeated use of behavior to prevent or alleviate withdrawal symptoms.	*Tolerance*	*Increasing amounts of work are required to achieve initial effects.*		*and/or progressive increase in time spent on working.*
	Withdrawal	*Occurrence of unpleasant feelings when work is discontinued or suddenly reduced.*		*Withdrawal symptoms (including irritability, negative feelings, sleep problems, etc.) are frequent if the planned/desired amount of work is hindered or appear when attempts at reduction of the amount of work are undertaken.*
–	Mood modification	Work modifies/improves mood.	Engagement in the behavior to achieve appetitive effects (e.g.,	The work activity often serves to reduce negative feelings and/or avoid interpersonal

(continued)

Table 1. Continued

ICD-11 Disorders due to addictive behaviors or substance dependence	Common addiction components	Common addiction components in work addiction	Common components of addiction definitions	Work addiction definition
			pain reduction, affect enhancement, arousal manipulation, and/or fantasy)	and/or intrapersonal conflicts."

Note. Physiological features indicative of neuroadaptation are based on analogous criteria for substance dependence in the ICD-11, where these features do not characterize officially recognized disorders due to addictive behaviors (gambling and gaming). These are italicized because they are not considered indispensable in diagnosing an addictive disorder.
Common components of addiction definitions do not include temporary satiation as it is not considered an essential feature of addiction (Sussman & Sussman, 2011).
The ICD-11 also includes the following diagnostic feature: the behavior is not better accounted for by another mental disorder (e.g., manic episode) and is not due to the effects of a substance or medication.
Loss of control and tolerance overlap to the extent that an increase in the amount of work may result from loss of control over the behavior and coping with growing tolerance to its effects.
Withdrawal and mood modification overlap in the sense that coping with withdrawal symptoms, by definition, is a way to regulate mood through work.

This definition explicitly addresses the appetitive function of the behavior (Atroszko et al., 2019), which is consistent with the notion that compulsive overworking may be regulated by pleasure (work enjoyment) as well as by an avoidance of or relief from difficult emotions and sensations (Volkow, Michaelides, & Baler, 2019). This aspect reflects both mood modification and withdrawal symptoms components since they overlap to the extent that negative emotions may regulate the behavior. On the role of pleasure and enjoyment in work addiction and the so-called "enthusiastic workaholics," see Supplementary Material 1.

Work addiction measures

Work addiction/workaholism measures have been developed and used for over 30 years. Their more comprehensive overview and analysis can be found in recent review studies (Acosta-Prado et al., 2021; Gonçalves et al., 2023; Morkevičiūtė & Endriulaitienė, 2023), meta-analyses (Andersen et al., 2023; Kun et al., 2020), and book chapters (Andreassen & Pallesen, 2016; Atroszko, 2022b). Almost all psychometric measures of work addiction either lack explicit grounding in established addiction theory or adequate empirical validation (often no psychometric evaluation), and most tools present both problems simultaneously (Atroszko, 2022b). The most commonly used instruments include the Workaholism Battery (WorkBAT; Spence & Robbins, 1992), the Work Addiction Risk Test (WART; Robinson, 1999), the Dutch Work Addiction Scale (DUWAS), based on the two previous scales (Schaufeli, Bakker, Van der Heijden, & Prins, 2009), and the Bergen Work Addiction Scale (BWAS; Andreassen et al., 2012). The former two measures generally show an unstable structure, which varies from sample to sample (Atroszko, 2022b; Gonçalves et al., 2023). The latter two scales are explicitly based on understanding workaholism as an addictive problem and show better replicability and good criterion validity. However, they have limitations, like the impossibility of empirically testing the higher-order structure of the DUWAS or the limited diagnostic utility of some of the items of the BWAS, which are analyzed in more detail in Supplementary Material 2.

Currently, other distinctive measures are being developed (e.g., Clark et al., 2020; Shkoler, Rabenu, Vasiliu, Sharoni, & Tziner, 2017). They are empirically validated to some extent. However, these tools are typically based on idiosyncratic workaholism theories (not based on a general addiction framework) and often have overly complex and difficult-to-replicate structures, which makes them of limited utility in most research contexts, especially in large-scale international studies in which a multitude of other variables are assessed.

While rare studies on cross-cultural measurement invariance are limited to only a few cultures (Hu et al., 2014), none of the scales have been extensively cross-culturally validated for measurement invariance. Based on the analyses of the existing measures, particularly considering their specific limitations, it is paramount to develop a valid, reliable, and cross-culturally invariant measure that allows for meaningful cross-cultural comparisons and worldwide studies on work addiction. Such a scale should (i) be grounded in general addiction theory as a conceptual model congruent with accumulated empirical data and explaining compulsive overworking behaviors, (ii) be in line with current work addiction definition and represent core addiction criteria (loss of control, priority given to work at the expense of other activities, negative consequences), (iii) show replicable structure across cultures and languages, (iv) be brief and convenient to use, (v) be applicable in clinical and organizational studies and settings and beyond (e.g., social and cognitive psychology, sociological or cultural studies), and (vi) have a cut-off value that can be used to identify individuals who fall into the high-risk, work-dependent category.

Item generation and selection

Current scale development reflects over ten years of investigation into a common component model-based assessment of work addiction (Andreassen et al., 2012; Atroszko, 2022a, 2022b; Bereznowski & Konarski, 2020) and over 30 years of measurement of workaholism (Spence & Robbins, 1992), theoretical clarifications of the construct (Atroszko et al., 2019), and in-depth analyses of different items functioning (Bereznowski & Konarski, 2020; Orosz, Dombi, Andreassen, Griffiths, & Demetrovics, 2016). When developing the IWAS, it was assumed that the items should cover the fundamental components of addiction definition (Sussman & Sussman, 2011) and map onto the common components of addiction (Griffiths, 2005, 2011). Moreover, items should reflect essential (required) features for diagnosing disorders due to addictive behaviors (as they are currently defined in ICD-11 for other behavioral addictions such as gambling disorder and gaming disorder; WHO, 2019), including that the pattern of compulsive overworking behavior should be manifested over an extended period (e.g., 12 months).

Hypotheses

Based on the theoretical framework of work addiction and previous empirical studies, it is hypothesized that (i) a single latent factor of work addiction would be supported, showing measurement invariance across cultures and acceptable reliability (H_1); (ii) work addiction would be associated in an expected manner to criterion variables with well-established theoretical and empirical relationships to workaholism – work addiction would be positively related to job stress, and negatively to job satisfaction and self-esteem (Clark et al., 2016; Kun et al., 2020) across cultures (H_2); (iii) work addiction would exhibit the same symptom structure across cultures indicating that it is a universal construct worldwide (H_3); and (iv) an empirical cut-off for the IWAS with satisfying test accuracy would be possible to be established (H_4).

METHODS

Participants

The study was conducted in 92 cultures across six continents. In the present paper, data from 85 cultures were used, as seven cultures were excluded due to low sample sizes (<100 participants; for a detailed rationale, see Supplementary Material 3). The final sample comprised 31,352 participants. The average number of participants across all the cultures was 368.85 (SD = 281.47), ranging from 102 for North Macedonia to 1,487 for Finland (for details, see Table S2).

The survey inclusion criteria for participants to be involved were (i) living in a given country/territory and being its citizen, (ii) being an adult (according to the applicable laws), (iii) working in an organization with at least ten employees in total, (iv) working for the present employer for at least a year, and (v) being full-time employed. The characteristics of the sample are presented in Tables S2–S4. The percentage of females in the entire sample was 63.5%. The mean age was 39.24 years (SD = 11.32). Nearly half of the sample (47.8%) was in a formal relationship (in a marriage or civil union), 19.1% had an informal relationship, and 28.5% were single. On average, participants had one child (M = 1.17, SD = 1.36), one or two dependents (M = 1.54, SD = 1.81), and lived in a household comprising three or four people (M = 3.45; SD = 2.02). Most participants in the entire sample had a tertiary (81.9%) or secondary (17.3%) education.

The average total work experience for the entire sample was nearly 15 years (M = 14.97, SD = 10.88), whereas the average duration of work for their present employer was almost nine years (M = 8.67, SD = 8.35). The average actual number of hours worked per week, including all workplaces, was 38.20 h (SD = 16.39). Approximately half of the sample worked in the private sector (50.4%), and the other half worked in the public sector (49.6%). More than half of the participants (54.7%) worked in small to medium-sized organizations (10–249 employees), whereas the remaining participants worked for large organizations (250 or more employees). Approximately two-fifths of the sample (39.5%) had a managerial position; among them, 35.6% worked as lower managers, 42.0% as middle managers, and 22.4% as top managers.

Measures

Work addiction. Work addiction was assessed with the initial version of the IWAS, which consists of 16 items (see Table S1). The items are based on: (i) seven items of the BWAS (Items 1–7; Andreassen et al., 2012), (ii) four items from the alternative version of the BWAS (Items 11–13 and 15; Orosz et al., 2016), and (iii) five new items generated to capture more clinical and diagnostic representations of salience (Items 8–10), problems (Item 14), and conflict (Item 16) components, aligning with previous recommendations (Bereznowski & Konarski, 2020). Adding new items was also necessary due to the somewhat problematic psychometric properties of some of the BWAS items, particularly from the point of view of developing an internationally invariant measure (for varying residuals' correlations across countries, see Table 1 in Bereznowski, Atroszko, & Konarski, 2024). Detailed rationales for the item selection process are described in Supplementary Material 4.

To respond to the IWAS items, participants were asked to think about the last 12 months, aligning with how addictive disorders are diagnosed (WHO, 2019). Responses were scored on a five-point Likert scale (1 = "never," 2 = "rarely," 3 = "sometimes," 4 = "often," and 5 = "always").

Job stress. To assess job stress, the single-item measure developed by Houdmont et al. (2021) was used: "In general, how do you find your job?" The item was rated using a seven-point Likert scale (1 = "not stressful at all" to 7 = "very stressful"). This item was commonly used in the field of occupational psychology, and its reliability and validity have

been supported in many studies (see Houdmont et al., 2019, 2021).

Job satisfaction. To assess overall job satisfaction, the single-item measure developed by Dolbier, Webster, McCalister, Mallon, and Steinhardt (2005) was used: "Taking everything into consideration, how do you feel about your job as a whole?". The item was rated using a seven-item Likert scale (1 = "not at all satisfied" to 7 = "very satisfied"). The measure has shown high reliability and validity in previous studies (see Dolbier et al., 2005).

Self-esteem. To assess global self-esteem, a single-item measure based on the WHOQOL Bref Scale (Atroszko, Sawicki, Sendal, & Atroszko, 2017; Skevington, Lotfy, & O'Connell, 2004) was used: "Overall, how satisfied are you with yourself?" The item was rated using a nine-point Likert scale (1 = "very dissatisfied" to 9 = "very satisfied"). Adequate psychometric properties of the measure have been shown in several studies (Atroszko et al., 2018; Koryczan, Piotrowski, Roj, Czerwiński, & Atroszko, 2020).

Procedure

The study was part of a preregistered project, the details of which are available on OSF Preprints [https://osf.io/8asnm]. Data were collected online between autumn 2022 and autumn 2023. Before starting data collection, the project leaders e-mailed potential partners worldwide and offered them collaboration in the project. Most collaborators were asked to prepare the language version of the survey using the guidelines prepared by the leaders. More details on the preparation of the survey translation and the language of the survey used in each culture can be found in Supplementary Material 5 and Table S5, respectively. A minority of collaborators used a pre-prepared translation of the survey, and in these cases, they were instructed to adjust the survey to the version of the language used in their culture to make it as adequate as possible. In total, the survey was prepared in 68 different languages or language variants. The language versions of the IWAS are available on the project's website (https://workaddiction.org/international-work-addiction-scale/).

The study was conducted using the LimeSurvey platform. A link to the survey was disseminated through online advertisements and flyers, social media, newspaper articles, internal and external e-mails, and snowball sampling. After completing the survey, each participant received automatic feedback on their results and was encouraged to visit the project's website. In eight cultures, supporting data collection methods were used in the form of paid research platforms due to difficulties in collecting data in the usual way (for details, see Supplementary Material 5).

Statistical analysis

Developing the final versions of the IWAS. Before analyzing all 16 items of the initial version of the IWAS, data cleaning was performed (for details, see Supplementary Material 7). After merging databases from all cultures, the missing data were inspected. In the next step, all 16 items of the initial version of the IWAS were analyzed.

One of the main aims of the study was to create a short, seven-item valid tool derived from the initial version of the 16-item IWAS that would allow researchers to analyze all seven components of work addiction (see Table 1; Griffiths, 2005, 2011). To achieve this goal, a confirmatory factor analysis (CFA) was performed using maximum likelihood with robust standard errors (MLR) in Mplus version 8.0 (Muthén & Muthén, 2017). The model included all 16 items loading onto a single latent factor (work addiction) for each culture separately. The factor loadings of competing items (i.e., assessing the same component) were then compared, with preference given to the item with the higher factor loadings across cultures. Also, previously discussed theoretical premises and results of previous studies showing limited validity of Item 1 (salience), Item 2 (tolerance), and Item 4 (relapse) were considered (see Supplementary Material 4). Additionally, if these criteria did not provide conclusive results for preferring one competing item over other(s), a series of CFAs for the seven-item version of IWAS were conducted, consecutively testing competing items and comparing the fit of tested models to the data across cultures. The following criteria were used to assess if the model fitted the data well: comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean squared residual (SRMR). Values of CFI and TLI $\geq$0.95, RMSEA $\leq$0.06, and SRMR $\leq$0.08 indicate a good model fit (Hu & Bentler, 1999; Wang & Wang, 2012), whereas values of CFI and TLI $\geq$0.90, and RMSEA and SRMR $\leq$0.10 indicate an acceptable model fit (Kline, 2011).

After selecting the best seven items for the IWAS, a series of CFAs were performed to examine the model fit and the item loadings of the measure across cultures. Modification indices (MIs) were also calculated to examine the correlations between residuals. If theoretical and empirical premises existed, the correlations between residuals were introduced and the model fit was recalculated.

Since the study's main purpose was to develop an international measure for the work addiction construct, which will be best suited for cross-cultural studies and validly assess work addiction worldwide, a shortening of the tool was continued to obtain its optimal version. When choosing items for removal, the following were considered: (i) the model fit and the item loadings for the seven-item version of the IWAS, and (ii) residual correlations between pairs of items for the seven-item version of the IWAS. After choosing the final items, the model was tested with CFA across cultures.

Measurement invariance across cultures. Once both versions of the IWAS (i.e., the seven-item version and the five-item version with optimal psychometric properties derived from it) were established, their measurement invariance across cultures was examined to ensure that levels of work addiction can be meaningfully compared cross-

culturally. To test measurement invariance, multiple-group CFA (MGCFA) in Mplus version 8.0 (Muthén & Muthén, 2017) was used. When MGCFA yields adequate results, it is the preferred method (compared to the alignment method) due to its rigor, transparency, flexibility, interpretability, and established credibility in the field (Putnick & Bornstein, 2016). However, the alignment method is a valuable alternative if invariance is difficult to establish with MGCFA (Muthén & Asparouhov, 2018).

Measurement invariance testing included running a set of increasingly constrained structural equation models and comparing their results. The following models were examined: (i) configural model, which tests whether the factor structure is the same between groups; (ii) metric model, which tests whether the factor loadings of the items are the same between the groups; and (iii) scalar invariance, which tests whether the intercepts are the same between groups (Chen, 2007). To evaluate the measurement invariance of both versions of the IWAS, changes in RMSEA, CFI, and TLI between the models were calculated and compared.

Measurement invariance is usually considered established when comparisons of subsequent models show a change (Δ) in RMSEA $\leq$0.015 and ΔCFI and ΔTLI ≤ -0.010 (Chen, 2007; Cheung & Rensvold, 2002; Putnick & Bornstein, 2016). However, it should be noted that the aforementioned recommendations typically apply to MGCFA with a small number of groups, most often two. The recommendations on the cut-offs for large and very large numbers of groups are scarce, with those available suggesting that in such situations, the above traditional cut-offs may be too conservative, especially for groups with varied sample sizes (Rutkowski & Svetina, 2014; see also Kim, Cao, Wang, & Nguyen, 2017). In addition, when interpreting the findings from the measurement invariance, changes in model fit criteria should be considered in combination with the model fit of each of the tested models (Brown, 2015).

If the full metric or scalar invariance is not achieved, testing for partial metric/scalar invariance is possible (Byrne, Shavelson, & Muthén, 1989). To achieve this, the MIs were inspected to identify noninvariant items. The item with the largest total value of MIs was identified, and its relevant coefficients were released across cultures. This procedure was repeated until at least two items were retained in the model as invariant (Byrne et al., 1989), supporting partial invariance.

Descriptive statistics, reliability, and convergent validity. After testing the measurement invariance of both IWAS versions, their descriptive statistics and reliability were calculated with Cronbach's alpha (α) and McDonald's omega (ω) coefficients. Reliability coefficients of 0.80 and higher are considered good, and values of 0.60 are considered acceptable (Ursachi, Horodnic, & Zait, 2015). The convergent validity of both tools was examined using the average variance extracted (AVE) and composite reliability (CR). The values of AVE $\geq$0.50 and CR $\geq$ 0.70 are deemed good (Fornell & Larcker, 1981).

BWAS analyses. Over the past decade, the BWAS has been among the most commonly used work addiction measures at present, and many studies, including those providing prevalence estimates, co-occurrence with other disorders, and the strength of association with risk factors and harms, are based on it (see Andersen et al., 2023; Atroszko, 2022a, 2022b; Kun et al., 2020). It needs to be emphasized that in the current study, the BWAS (the first seven items from the initial IWAS) did not show adequate model fit in one-thirds of the cultures (see Table S6). However, the comparisons of results obtained with BWAS and IWAS are shown in the Results section to estimate potential bias in terms of prevalence estimates and strength of association with other variables resulting from using the BWAS in previous research.

Correlations between the IWAS, BWAS, and criterion variables. In the next step, the correlations between the IWAS versions and the BWAS were analyzed. Then, the correlations between the IWAS versions, the BWAS, and criterion variables, i.e., job stress, job satisfaction, and self-esteem, were calculated. Correlations were computed using the Pearson correlation coefficient with 95% confidence intervals.

Latent profile analysis and cut-offs for the IWAS. To increase the screening utility for both versions of the IWAS, in the next step, cut-offs that could help differentiate individuals with and without high work addiction risk were determined. To achieve this goal, a latent profile analysis (LPA) was performed on the entire sample using the items from both versions of the IWAS as indicators (see Bőthe et al., 2020). It was expected that at least three homogenous profiles would be identified based on risk for work addiction: low-risk, medium-risk, and high-risk. If data supported these expectations, the high-risk profile was treated as a "gold standard" to help identify individuals with work addiction (Kun et al., 2023).

Models ranging from one to five latent profiles were tested using the MLR estimator. To compare models, the following criteria were used: Bayesian Information Criterion (BIC), Akaike Information Criterion (AIC), and sample-size adjusted BIC (SABIC) (for an overview of the criteria used in LPA see Spurk et al. [2020]). The lower the BIC, AIC, and SABIC values, the better the model fit. Also computed were the Lo-Mendell-Rubin adjusted likelihood ratio test (LMR-ALRT) and the Vuong-Lo-Mendell-Rubin test (VLMR). A significant result on these tests supports the *k*-cluster model over *k*-1 clusters.

In addition, to support selecting the optimal number of latent profiles, other criteria were considered, such as the interpretability and substantive meaning of each solution, model parsimony (favoring less complex models), and the size of profiles (at least 5% of the total sample). It was calculated how well the profiles were differentiated in each solution using entropy (values $\geq$0.80 and $\geq$0.60, indicating good and adequate entropy, respectively) and average posterior probabilities (values $\geq$0.70, indicating adequate classification accuracy).

After identifying the optimal number of latent profiles, their relationships with potential correlates were examined to support their validity. Self-esteem as a potential predictor was tested using the manual R3STEP (Asparouhov & Muthén, 2014), whereas differences in job stress and job satisfaction were tested using the Bolck-Croon-Hagenaars (BCH) option (Bakk & Vermunt, 2016), available in Mplus version 8.0 (Muthén & Muthén, 2017).

Test accuracy, classification consistency, and the prevalence of work addiction. Based on participants' membership to the high-risk profile, the sensitivity (the test's ability to detect a true positive), specificity (the test's ability to detect a true negative), positive predictive value (PPV; the probability that individuals with a positive screening result have the condition of interest), negative predictive value (NPV; the probability that individuals with a negative screening result do not have the condition of interest), and overall accuracy (the probability that a test will correctly classify an individual; Trevethan, 2017) were calculated and compared for different potential cut-offs for both versions of the IWAS.

The optimal cut-offs for both IWAS versions were established based on the results obtained. The classification consistency was then examined between the cut-offs for both IWAS versions and the membership in the high-risk profile identified in LPA. For comparison purposes, the prevalence of work addiction was calculated using a polythetic approach for the BWAS (i.e., scoring "4" ["often"] or "5" ["always"] on at least four of the seven items) on which estimates in all previous research with the BWAS have been based (Andersen et al., 2023; Atroszko, 2022a, 2022b). In the last step of the analysis, the prevalence of work addiction for each culture was calculated using the cut-offs for both IWAS versions, the BWAS, and the membership in the high-risk profile identified in LPA.

Ethics

The study was conducted in accordance with the Declaration of Helsinki. The study protocol was approved by the Ethics Committee at the University of Silesia in Katowice, Poland (KEUS266/06.2022). The list of the ethical approvals obtained from local ethics committees is presented in Supplementary Material 6. The responses to the survey were anonymous, and participation in the study was voluntary. All subjects were informed about the purpose and content of the study and all provided online informed consent.

RESULTS

Missing data

Due to the very small percentage of missing data (0.04%) across all 16 IWAS items in the analyses conducted in IBM SPSS Statistics version 28.0 (IBM Corp., 2021) or supported by this package (i.e., descriptive statistics, reliability, cut-offs, classification consistency, test accuracy, and prevalence), listwise deletion was used. In the analyses conducted in MPlus (i.e., CFA, measurement invariance testing, LPA), the default option (full information maximum likelihood [FIML]) was used.

There were no missing data for job stress. The percentages of missing data for job satisfaction and self-esteem were 5.2% and 9.2%, respectively. These differences stemmed from the fact that data from participants who completed part of the survey were included in the analysis, provided that they met all the criteria (see Supplementary Material 7). Since the FIML in MPlus cannot handle missing data on predictors, to examine the relationship between self-esteem and latent profiles of work addiction, multiple imputations with 50 datasets were used, supporting the imputation process with the auxiliary variables (sociodemographic and work-related variables). This method of dealing with missing data was also used to calculate correlation coefficients between both IWAS versions, the BWAS, and potential correlates of work addiction.

Item selection

Descriptive statistics and the correlations between the items for the initial 16-item version of the IWAS are presented in Tables S7 and S8, respectively. After these calculations, the CFA was performed on the 16 IWAS items, and their item loadings were analyzed for each culture (Table S9). These analyses aimed to select the best seven items covering all seven components of work addiction. The process of item reduction is described in Supplementary Material 8. The seven-item version of the IWAS (named IWAS-7) is presented in Table 2 and in Appendix A.

CFA for the IWAS-7 across cultures

After establishing the IWAS-7, its factorial validity using CFA was examined. The model with all items loading on a single latent factor was tested. The model fit and factor loading results are presented in Table S10. For most cultures (89.4%), the model fit was acceptable or good, as indicated by the values of model fit indices. However, their values did not reach the acceptable thresholds for several cultures (10.6%). Therefore, MIs were inspected to check if the residuals of any pair of items were correlated. Based on the content of Item 3 (mood modification) and Item 5 (withdrawal), the theoretical premises, and the results of previous studies (see Supplementary Material 4), it was expected that correlating residuals for these items would improve the model fit. To check this, MIs were inspected for all pairs of items and summed across cultures. As expected, the largest value of the total MIs was noted for Items 3 and 5 (878.51). Based on this result, the residuals of those items were correlated and factorial validity of the IWAS-7 was re-examined using CFA.

The results of the CFA for the IWAS-7 with correlated residuals of Items 3 and 5 are presented in Table S11. For most cultures (95.3%), model fit was good or acceptable, as indicated by the values of model fit indices. However, for four cultures (i.e., Algeria, Georgia, Iraq, and Ukraine; 4.7%),

Table 2. Items, descriptive statistics, and overall values of loadings for the IWAS-7 (81 Cultures; N = 29,943) and IWAS-5 (85 Cultures; N = 31,352)

Item number			Item content	Component of work addiction	Descriptive statistics				Number (percent) of standardized loadings reaching a given threshold			
					IWAS-7[b]		IWAS-5		IWAS-7[b]		IWAS-5	
Initial IWAS	IWAS-7[a]	IWAS-5[a]			M	SD	M	SD	≥0.40	≥0.60	≥0.40	≥0.60
3	3	2	Worked in order to reduce feelings of guilt, anxiety, helplessness and depression?	Mood modification	2.57	1.24	2.58	1.25	75 (92.6%)	31 (38.3%)	76 (89.4%)	24 (28.2%)
5	5	N/A	Become stressed if you have been prohibited from working?	Withdrawal	2.22	1.20	N/A	N/A	71 (87.7%)	22 (27.2%)	N/A	N/A
7	7	5	Worked so much that it has negatively influenced your health?	Problems	2.67	1.20	2.69	1.21	81 (100%)	77 (95.1%)	85 (100%)	80 (94.1%)
10	1	1	Been unable to stop thinking about work (e.g., you have been thinking about work in your free time, on vacation, or at night)?	Salience	2.95	1.15	2.97	1.16	81 (100%)	77 (95.1%)	84 (98.8%)	71 (83.5%)
12	2	N/A	Felt you should work more and more?	Tolerance	2.62	1.21	N/A	N/A	80 (98.8%)	61 (75.3%)	N/A	N/A
15	4	3	Tried to reduce the amount of your work but failed?	Relapse	2.38	1.17	2.38	1.17	81 (100%)	80 (98.8%)	85 (100%)	85 (100%)
16	6	4	Neglected everything except your work (your family, friends, hobby, and free time)?	Conflict	2.23	1.16	2.24	1.16	81 (100%)	81 (100%)	85 (100%)	85 (100%)

Note. M = mean, SD = standard deviation. Items 3, 5, and 7 of the IWAS-7 and Items 2 and 5 of the IWAS-5 were taken from the Bergen Work Addiction Scale (BWAS; Andreassen et al., 2012). Items 2 and 4 of the IWAS-7 and Item 3 of the IWAS-5 were taken from an alternative version of the BWAS (Orosz et al., 2016). Items 1 and 6 of the IWAS-7 and Items 1 and 4 of the IWAS-5 were self-developed.

[a] The order of the items in the IWAS-7 and IWAS-5 follows the order of items representing respective work addiction components in the BWAS (Andreassen et al., 2012).

[b] For the IWAS-7, data from four cultures (i.e., Algeria, Georgia, Iraq, and Ukraine) in which the model fit was poor, were excluded from analyses. The language versions of the IWAS-7 and IWAS-5 are available on the project's website (https://workaddiction.org/international-work-addiction-scale/).

the model fit criteria were much below acceptable thresholds. As a result, these cultures were excluded from further analyses with IWAS-7. The remaining cultures had relatively high (≥0.60) or acceptable (≥0.40) factor loadings, although a few instances (3.0%) of loadings somewhat lower than 0.40 also occurred for several cultures (see Table S11). These cultures were retained for measurement invariance testing based on the acceptable fit of the model.

Development and factorial validity of the IWAS-5

Since the essential purpose of the present study was to develop an IWAS version that would be best suited to cross-cultural comparisons, after establishing the IWAS-7, adjustments were continued to obtain the optimal IWAS version with proper model fit in all cultures. First, Item 5 was removed due to its lower loadings across cultures (for details, see Table 2 and Table S11) as well as the correlated residual between Items 3 and 5 in the IWAS-7. The next item selected for removal was the item assessing tolerance (i.e., Item 12). This item had relatively low factor loadings (for details, see Table 2 and Table S11), and the model that included this item showed a poor model fit for several cultures. These suboptimal psychometric properties of Item 12 were consistent with the expectations described in Supplementary Material 4, according to which the tolerance component may have potentially limited diagnostic utility. After removing Item 12, a five-item version of the IWAS named the IWAS-5 was obtained (see Table 2 and in Appendix B).

The results of testing the factorial validity of the IWAS-5 are presented in Table S12. For all cultures, the CFI values were at least 0.90, and the SRMR was lower than 0.08. For eight cultures (9.4%), the RMSEA value slightly exceeded the threshold of 0.10. However, for models with small degrees of freedom, the RMSEA is known to often falsely indicate a poorly fitting model as it penalizes simpler models with fewer parameters being estimated (Kenny, Kaniskan, & McCoach, 2015). Most factor loadings had good or acceptable values across cultures, although several (2.4%) did not reach a value of 0.4 (mostly for item 3; see Table S12). As with the IWAS-7, these cultures were retained for measurement invariance testing with analogous caveats.

Measurement invariance across cultures for the IWAS-7 and IWAS-5

To investigate if the scores in the IWAS-7 and IWAS-5 can be compared meaningfully across cultures, the measurement invariance of the measures was tested. The results of these analyses are presented in Table 3. For both IWAS versions, the values of RMSEA and TLI were below the cut-offs, supporting the metric invariance. Although the values of change for CFI (−0.015 and −0.011 for the IWAS-7 and IWAS-5, respectively) slightly exceeded the traditional cut-off of −0.010, such small differences between the values obtained and the cut-offs for CFI were deemed negligible, considering a large number of comparison groups and varied sample sizes (Desa, Van de Vijver, Carstens, & Schulz, 2019). Moreover, as suggested by the results of a simulation study by Rutkowski and Svetina (2014), for a larger number of groups, a more liberal criterion for change in CFI (such as ≤ −0.020) for the metric invariance can be more appropriate.

Constraining the model intercepts did not support the full scalar invariance either for the IWAS-7 or IWAS-5 (see Table 3). Therefore, MIs for intercepts of each item across cultures were calculated and summed, and the intercepts of the item with the highest total value of MIs were freed. For the IWAS-7, the intercepts for Item 5, which had the highest overall value of MIs (2,140.03), were first freed. The model was then recalculated, and each step of the analysis was repeated, resulting in freeing the intercepts consecutively for Item 12 (total MIs = 1,196.40), Item 3 (total MIs = 908.51), Item 15 (total MIs = 857.94), and Item 16 (total MIs = 886.72). The items that remained invariant included Items 7 and 10. After freeing the intercepts for five items in the IWAS-7, the change in the model fit indices between the metric invariant model and the partial scalar invariant model improved. Among the model fit indices, only the change in CFI (−0.011) exceeded the recommended value of −0.010 very slightly. Therefore, the scalar partial invariance

Table 3. Measurement invariance across cultures for the IWAS-7 and IWAS-5

Model	$\chi^2_{(df)}$	RMSEA (90% CI)	CFI	TLI	ΔRMSEA	ΔCFI	ΔTLI
IWAS-7							
Configural	$3659.21_{(1,053)}^{***}$	0.082 (0.079, 0.085)	0.954	0.926			
Metric	$5012.62_{(1,533)}^{***}$	0.078 (0.076, 0.081)	0.939	0.933	−0.004	−0.015	0.007
Scalar	$12472.69_{(2,013)}^{***}$	0.119 (0.117, 0.121)	0.817	0.846	0.041	−0.122	−0.087
Partial scalar[a]	$5723.10_{(1,613)}^{***}$	0.083 (0.081, 0.085)	0.928	0.924	0.005	−0.011	−0.009
IWAS-5							
Configural	$916.86_{(425)}^{***}$	0.056 (0.051, 0.061)	0.987	0.975			
Metric	$1706.85_{(761)}^{***}$	0.058 (0.054, 0.062)	0.976	0.973	0.002	−0.011	−0.002
Scalar	$5715.37_{(1,097)}^{***}$	0.107 (0.104, 0.110)	0.881	0.908	0.049	−0.095	−0.065
Partial scalar[b]	$2459.04_{(845)}^{***}$	0.072 (0.069, 0.075)	0.958	0.958	0.014	−0.018	−0.015

Note. [a] Free intercepts for items 3, 5, 12, 15, and 16. [b] Free intercepts for items 3, 15, and 16. Df = degrees of freedom; RMSEA = root mean square error of approximation; CI = confidence interval; CFI = comparative fit index; TLI = Tucker-Lewis index; ΔRMSEA/CFI/TLI = change in RMSEA/CFI/TLI. $^{***}p < 0.001$.

for the IWAS-7 was supported, suggesting that items in the IWAS-7 were similarly understood across 81 cultures.

The same strategy of freeing the intercepts of specific items was applied to the IWAS-5 to test whether partial scalar invariance could be established across 85 cultures. The highest total value of MIs for intercepts (1,046.03) was noted for Item 15, and the intercepts of this item were freed across cultures. After the model was recalculated, the highest total value of MIs was observed for Item 3 (961.80) and, in the next round of calculations, for Item 16 (984.81). The intercepts of those items were freed. As a result, Item 7 and Item 10 (i.e., the same items as in the IWAS-7) remained invariant. The change in RMSEA between the metric and partial scalar invariance models met the cut-off of 0.015. Although the change in CFI (−0.018) and TLI (−0.015) slightly exceeded the threshold of −0.010, these differences were regarded as negligible, considering the large number of cultures involved in the analysis and the varied sample sizes (Desa et al., 2019; Rutkowski & Svetina, 2014). Moreover, the decision was supported by a good model fit of the partial scalar invariance model, as indicated by the values of RMSEA (0.072 [90% confidence interval: 0.069, 0.075]), CFI (0.958), and TLI (0.958) (Brown, 2015). Therefore, the partial scalar invariance model for the IWAS-5 was deemed acceptable across all 85 cultures investigated.

Reliability and convergent validity of the IWAS-7 and IWAS-5

The reliability coefficients measured with Cronbach's α and McDonald's ω for the IWAS-7 and IWAS-5 are presented in Table S11 and Table S12, respectively. The reliability of both IWAS versions was high (≥0.8) for most cultures (IWAS-7: 93.8% [α] and 92.6% [ω] of the cultures; IWAS-5: 67.1% [α] and 70.6% [ω] of the cultures). The acceptable value of ≥0.60 was reached in all cultures for both IWAS versions. In 19 cultures (23.5%), the AVE and CR for the IWAS-7 reached the values of >0.5 and >0.7, respectively. For the IWAS-5, these values were reached in 39 cultures (45.9%). Importantly, in all remaining cultures, for both versions of the IWAS, the CR was higher than 0.60. In such cases, values of AVE less than 0.50 can be accepted (Fornell & Larcker, 1981). Therefore, the convergent validity of both versions of the IWAS can be deemed adequate across cultures.

Correlations between the IWAS-7, IWAS-5, and BWAS

Descriptive statistics and correlation coefficients between the IWAS-7, IWAS-5, and BWAS are presented in Table S13 and Table S14, respectively. For the entire sample, the correlation coefficient between the IWAS versions was 0.97. In all the analyzed cultures, the IWAS versions were correlated at least at 0.95. The average correlation between the IWAS versions and BWAS for the entire sample was 0.90 for the IWAS-7 and 0.86 for the IWAS-5. The range of correlation coefficients across cultures was 0.83–0.95 for the IWAS-7 and the BWAS, and 0.69–0.92 for the IWAS-5 and the BWAS.

Correlations with criterion variables

The descriptive statistics for the correlates of work addiction (i.e., job stress, job satisfaction, and self-esteem) are presented in Table S15. The Pearson correlation coefficients with 95% confidence intervals between the IWAS-7, IWAS-5, and BWAS scores and the criterion variables are presented in Table S16. For the entire sample, the correlation coefficients between the IWAS versions and criterion variables were 0.42 (IWAS-7) and 0.45 (IWAS-5) for job stress, −0.28 (IWAS-7) and −0.32 (IWAS-5) for job satisfaction, and −0.22 (IWAS-7 and IWAS-5) for self-esteem. For the BWAS, the correlation coefficients were 0.41 for job stress, −0.22 for job satisfaction, and −0.16 for self-esteem. Notably, they were considerably lower for all criterion variables than for the IWAS-5 and, to a lower extent, for the IWAS-7.

As for the culture-level analysis, scores on the IWAS-7 and IWAS-5 correlated positively with job stress in all analyzed cultures. The two measures were also negatively related to job satisfaction in almost all cultures (i.e., in 96.3% and 98.9% of the cultures for the IWAS-7 and IWAS-5, respectively). The correlation coefficients varied across cultures, ranging for job stress from 0.23 to 0.63 for the IWAS-7 and from 0.17 to 0.66 for the IWAS-5. The ranges for job satisfaction were between −0.07 and −0.47 for the IWAS-7, and between −0.13 and −0.51 for the IWAS-5. The BWAS score was positively related to job stress in all cultures except one (ranges from 0.14 to 0.64) and negatively to job satisfaction in 83.5% of cultures (ranges from 0.10 to −0.46).

In addition, the IWAS-7 and IWAS-5 scores were negatively related to self-esteem in 87.7% and 89.4% of the cultures, and the correlation coefficients ranged from 0.09 to −0.45 for the IWAS-7 and from 0.03 to −0.48 for the IWAS-5. The BWAS score was negatively related to self-esteem in 74.1% of cultures, and the correlation coefficients varied from 0.18 to −0.37.

LPA and cut-offs

To determine an optimal cut-off for differentiating individuals with and without high risk of work addiction, LPA was conducted. The results of the comparison of model fit criteria for both versions of the IWAS are presented in Table S17 and Fig. S1 and described in Supplementary Material 9. Based on the results and meaningfulness of the solutions, the three-profile solution was retained as best-fitting the data for the IWAS-7 and IWAS-5, and was adopted for subsequent analyses.

The three profiles for the IWAS-7 and IWAS-5 are presented in Fig. 1. The profiles identified for both measures were almost identical, notably for the mean values of item scores in the highest risk profile, suggesting diagnostic levels of specific symptoms. Members of Profile 1 (38.0% of the sample for the IWAS-7 and 40.0% for the IWAS-5) had the lowest levels of the symptoms of work addiction ("low-risk" profile), members of Profile 2 (42.2% and 40.9%) had moderate levels ("medium-risk" profile), and members of Profile 3 (19.8% and 19.1%) had high levels ("high-risk" profile).

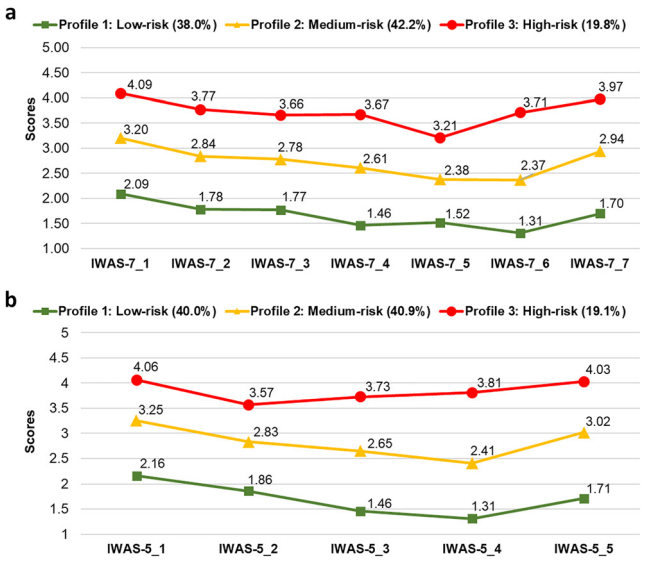

Fig. 1. LPA of the IWAS-7 (Fig. 1a) and IWAS-5 (Fig. 1b) Items
Note. For the IWAS-7, the consecutive items assess the following components of work addiction: salience, tolerance, mood modification, relapse, withdrawal, conflict, and problems. For the IWAS-5, the consecutive items assess salience, mood modification, relapse, conflict, and problems.

After identifying the latent profiles for the items of the IWAS-7 and IWAS-5, correlates of latent profile membership were tested (Tables S18 and S19). For both measures, higher levels of self-esteem were associated with a lower likelihood of membership in the high-risk profile (odds ratio [*OR*] = 0.72 and 0.73 for the IWAS-7 and IWAS-5, respectively) and medium-risk profile (*OR* = 0.83 and = 0.84), compared to membership in the low-risk profile (Table S18). Moreover, higher levels of self-esteem were associated with a lower likelihood of membership in the high-risk profile (*OR* = 0.86 and 0.87) compared to membership in the medium-risk profile.

As for differences in levels of job stress and job satisfaction, the high-risk profile demonstrated the highest levels of job stress and the lowest levels of job satisfaction (Table S19). In addition, members of the medium-risk profile had higher levels of job stress and lower levels of job satisfaction than members of the low-risk profile.

When extremely high scores (i.e., 6 and 7) on the job stress item were coded as "high job stress," 47.6% of members of the high-risk profile for the IWAS-7 were classified as demonstrating high job stress, compared to 10.1% of members of the low-risk profile, and 23.1% of members of the medium-risk profile. For the IWAS-5, the corresponding values were 49.0% versus 9.2% versus 24.0%.

As a result of coding extremely low scores (i.e., 1 and 2) on the job satisfaction item as "low job satisfaction," 20% of members of the high-risk profile for the IWAS-7 were classified as experiencing low job satisfaction, compared to 5.9% of members of the low-risk profile, and 9.8% of members of the medium-risk profile. For the IWAS-5, the corresponding values were 21.2% versus 5.5% versus 9.9%.

Test accuracy, classification consistency, and the prevalence of work addiction

Treating the high-risk profile derived from the LPA as the "gold standard" for establishing cut-offs for the IWAS-7 and IWAS-5, the sensitivity, specificity, PPV, NPV, and overall accuracy for the subsequent cut-offs were calculated. The results are presented in Table S20. Considering all the above accuracy measures together, a score of 24 for the IWAS-7 and a score of 18 for the IWAS-5 were suggested as being optimal. For this threshold, IWAS-7's sensitivity was 86.9%, specificity was 98.6%, PPV was 93.4%, NPV was 96.9%, and overall accuracy was 96.3%, respectively. These results mean that approximately 13% of high-risk individuals were misclassified by the IWAS-7 as not being at high risk of work addiction, while this tool incorrectly identified less than 2% of low-risk and middle-risk individuals as being at high risk of work addiction. Moreover, approximately 6% of individuals scoring 24 or higher on the IWAS-7 were not actually at high risk of work addiction, whereas approximately 3% of those scoring below 24 were actually at high risk. Overall, more than 96% of participants were correctly classified by the IWAS-7. The aforementioned values were very similar for the cut-off of 18 for the IWAS-5 (sensitivity: 83.8%, specificity: 98.7%, PPV: 93.7%, NPV: 96.3%, and overall accuracy of 95.9%). These results indicate the high accuracy of both versions of the IWAS for screening purposes.

In the next step of the analysis, the classification consistency of the cut-offs for both versions of the IWAS and BWAS, and the membership in the high-risk profile based on LPA were tested (see Table S14). The classification consistency for cut-offs for the IWAS-7 and IWAS-5 in the entire sample was 94.4%. For the cut-offs for the IWAS-7 and BWAS, it was 87.9%, and for the cut-offs for the IWAS-5 and BWAS, it was 86.8%. As for the cut-offs for the IWAS versions and the membership in the high-risk profile, the values for the classification consistency were 96.4% for the IWAS-7 and 95.9% for the IWAS-5.

Based on the cut-off criteria for the IWAS-7 and IWAS-5, the size of the high-risk profile in LPA, and a polythetic approach for the BWAS scores, the prevalence rates of work addiction for the entire sample and across cultures were calculated. The results are presented in Table S14. The average prevalence of work addiction was 17.9% for the IWAS-7 (ranging from 1.9% to 34.4%) and 16.7% for the IWAS-5 (ranging from 0.9% to 32.4%). The average prevalence of work addiction based on the high-risk profile in LPA was 19.3% for the IWAS-7 (ranging from 1.9% to 34.2%) and 18.7% for the IWAS-5 (ranging from 0.9% to 32.4%). For the BWAS, the average prevalence of work addiction was considerably higher (23.9%) than for the IWAS-7 and IWAS-5, ranging from 2.8% to 42.0%.

DISCUSSION

The main aim of the present study was to develop a cross-culturally invariant work addiction scale that can be used

freely and globally, providing valid, reliable, and comparative results that will allow for broad generalizations and investigation of the phenomenon worldwide, as well as for practical screening applications and risk assessment. It needs to be emphasized that the study included participants from 85 cultures, and the main aim was to identify a scale structure that would validly represent the essential features/symptoms of the work addiction construct in all of these cultures. This implies that adequate fit of the most common pattern had precedence over specific measurement models showing the best fit in particular cultures. This approach provides a measure that captures universal features of workaholism globally and minimizes cross-cultural variability in its manifestations.

The single-factor seven-item solution representing all common components of addiction (Griffiths, 2005, 2011) of the IWAS (IWAS-7) showed partial scalar invariance in 81 cultures. A five-item version of the IWAS (IWAS-5), representing all components apart from physiological features indicative of neuroadaptation to the behavior (tolerance and withdrawal), showed partial scalar invariance in all 85 cultures. The reliability of the scale was acceptable (≥0.60) in all cultures for the IWAS-7 and IWAS-5 and high (≥0.80) in the majority of the cultures (H_1 supported). The factor loadings were satisfactory in nearly all instances. The few cases of somewhat lower loadings for the mood modification item (IWAS-7 and IWAS-5) and the withdrawal item (IWAS-7) require further investigation and cautious application of the tools in the specific cultures in question (see recommendations on scale use in Supplementary Material 10). It must be considered that obtaining significantly higher loadings across so many cultures and all items is likely impossible, considering the complex nature of the construct of work addiction covering a few major and diverse components (preoccupation, loss of control, negative consequences, salience, and appetitive effects), and the fact that individual differences across samples can influence how participants understand, interpret, and respond to the items of a measure, thus affecting factor loadings. Language and cultural factors likely influenced invariance analyses to some extent, with issues associated with the wording and meaning of items and response alternatives and patterns.

As predicted based on theoretical premises and previous studies (Clark et al., 2016; Kun et al., 2020), work addiction was positively related to job stress in all cultures, with a relatively high mean correlation, and was associated negatively with job satisfaction in almost all cultures and showed negative (in the overwhelming majority of cultures) or null relationships with self-esteem (H_2 mostly supported). These latter somewhat mixed results may stem from the single-item nature of the self-esteem measure and known cross-cultural differences in self-esteem assessment associated with rather complex socioeconomic, sociodemographic, gender-equality, and cultural value indicators (Bleidorn et al., 2016). Correlations with criterion variables differed significantly between cultures. For example, the highest correlation of work addiction (measured with the IWAS-5) with job stress was found in Ireland (0.66) and lowest in Iraq (0.17). Cultural factors and sample characteristics may potentially affect these differences. Future studies would provide more insight into this.

These results provide empirical support for the construct validity (factorial and concurrent validity) of the seven- and five-item IWAS. These findings support the notion that work addiction has the same symptoms' structure, which is associated with excessive stress across cultures. It indicates that work addiction is a universal construct worldwide (H_3 supported). It has clearly negative character, and it phenomenologically manifests as an addictive behavior that can be meaningfully assessed and compared cross-culturally using the IWAS. Results obtained with the scale allow for generalizations provided that the proper sampling methods are used (e.g., random sampling).

Construct validity

Both the IWAS-7 and the IWAS-5 cover all fundamental components of addiction definition (Sussman & Sussman, 2011) and reflect essential (required) features for diagnosing disorders due to addictive behaviors (see Table 1), i.e., loss of control, priority given to work over other activities, and negative consequences causing distress or impairment in important areas of functioning (as they are currently defined in ICD-11 for the behavioral addictions gambling disorder and gaming disorder; WHO, 2019). The IWAS-7 represents all common components of addiction (Griffiths, 2005, 2011), and the IWAS-5 encompasses all components except for withdrawal and tolerance. As it was analyzed in detail in the description of the item selection and generation process (see Supplementary Material 4), somewhat inferior psychometric properties of these items were expected based on theoretical grounds and previous studies.

Withdrawal showed residual correlations with mood modification in the IWAS-7, and both items showed relatively lower factor loadings than other items. This may be due to the difficulty in psychometric measurement of the complex nature of emotional regulatory mechanisms of work addiction and their intricate associations with potential psychophysiological adaptations (Bereznowski, Atroszko, & Konarski, 2023). Two main factors may have a considerable effect on it: (i) non-specificity of mood regulation with work (some forms of it may be non-problematic and relatively common, e.g., individuals may boost their mood with work in a non-pathological fashion) and (ii) non-specificity of appetitive effects and withdrawal symptoms (e.g., working to reduce anxiety may be a primary motivation for overworking or may be part of coping with withdrawal). These potential explanations account for both the low factor loadings of these items and their residual correlations. More elaborate measures may be developed to represent these mood regulation mechanisms more precisely and investigate their cross-cultural variability, which seems to be indicated by the different functioning of these items in some cultures.

Similarly, tolerance may be difficult to assess psychometrically or has limited validity in the case of some

behavioral addictions (Razum, Baumgartner, & Glavak-Tkalić, 2023). Tolerance may increase at the beginning of the addictive process but may not be as pronounced when the addiction progresses. This would explain the relatively lower factor loadings of items representing this component. Also, measuring diminished positive response to previous "doses" of work instead of increasing the "dose" may better capture the tolerance mechanism in the case of work. Future studies should investigate the validity of this approach. Also, a recent study showed that the "liking" feature associated with tolerance in work addiction may show similar characteristics to overeating and negatively predict usage frequency (File, Bőthe, File, Griffiths, & Demetrovics, 2023). Tolerance effects may be present in workaholism and be similar to substance-related addictive behaviors (Lindgren et al., 2018).

Moreover, both tolerance and withdrawal represent physiological features indicative of neuroadaptation, which currently is not officially recognized as a facet of disorders due to addictive behaviors in contrast to substance use disorders (WHO, 2019). To date, there is very limited evidence of abstinence effects in behavioral addictions, and very little is known about their potential role in relapse (Fernandez, Kuss, & Griffiths, 2020). Besides, tolerance and withdrawal are not necessary symptoms to diagnose substance dependence because they are not always present, even for well-established addictive psychoactive substances such as alcohol, stimulants, or opiates (WHO, 2019). This might also affect the somewhat inferior psychometric properties in some cultures of items assessing tolerance and withdrawal in work addiction. While their good diagnostic properties in many cultures suggest that there likely are physiological features indicative of neuroadaptation to work, future in-depth studies should establish whether that is true, what is the nature of these neuroadaptations and what their role is in the diagnosis of work addiction.

On the other hand, Items 7 (problems) and 10 (salience) of the initial 16-item scale were fully invariant across cultures. They represent core addiction components of total preoccupation with the behavior leading to negative consequences. Moreover, Items 15 (relapse) and 16 (conflict) showed consistently high factor loadings across cultures, representing components of loss of control over working behavior and associated conflicts that it brings to life, further supporting the very high content validity of the scale. To sum up, items (7, 10, 15, 16) representing essential features of the addictive disorder, as defined in the International Classification of Diseases (WHO, 2019), consistently outperformed (psychometrically) items that assess rather peripheral or conditional (non-required) symptoms of addiction (tolerance, withdrawal, and mood modification; see Table 1).

Cut-off score and test accuracy

Cut-off scores for the IWAS-7 of 24 and the IWAS-5 of 18 were established based on LPA analyses in which the profile with the highest scores on all symptoms of work addiction was a reference standard ("gold standard"; see Bőthe et al., 2020; Kun et al., 2023; H_4 supported). They showed high sensitivity, specificity, PPV, NPV, and overall accuracy (for comparison with typically found values of these test diagnostic parameters among screening or diagnostic tests, see Alberg, Park, Hager, Brock, & Diener-West, 2004). The mean values of all items in this profile indicated the presence of the symptoms, with relatively highest scores on negative consequences and salience. It is worth noting that this profile yielded almost identical results in terms of mean item values and sample percentages for the IWAS-7 and IWAS-5. Also, the mean item values were similar to the previous study with the BWAS in Hungary, identifying a profile with high scores on all items (Kun et al., 2023). This provides evidence for the replicability of the profile with high scores on all items as an indication of a group with a high risk of work addiction or being addicted to work. This profile also had higher levels of job stress, lower job satisfaction, and lower self-esteem than other profiles, with approximately 5 times more individuals experiencing high job stress and about 3.5 times more experiencing low job satisfaction than in the profile with the lowest scores on work addiction symptoms.

The average prevalence of work addiction was 17.9% for the IWAS-7 and 16.7% for the IWAS-5. The average prevalence of work addiction based on the high-risk profile in LPA was 19.3% for the IWAS-7 and 18.7% for the IWAS-5. Since these samples are not nationally or otherwise representative and vary in terms of sociodemographic variables, they should not be directly compared. Nevertheless, some of them are relatively large and diverse and, therefore, may provide some initial estimates of the potential scale of the problem, especially in cultures in which no studies on work addiction have been conducted before (a vast majority of the cultures).

Correlations of the IWAS-7 and the IWAS-5 were very high across cultures ($r \geq 0.95$). The classification consistency using different methods (LPA on the IWAS-7 and the IWAS-5, cut-off score for the IWAS-7 and the IWAS-5) was also very high (≥89%) in all cultures (see Table S14).

The IWAS compared to the BWAS

Correlations of both IWAS versions with the BWAS were noticeably lower but still suggested high convergence. Overall, the BWAS polythetic cut-off score tended to overestimate the prevalence of work addiction. It went as much as 17.1% higher when compared to the IWAS-5 cut-off score in Norway (in which most studies on nationally representative samples with the BWAS were previously conducted; Andersen et al., 2023). However, it has to be considered that the amount of bias is likely associated with the prevalence in a particular sample (the higher the rates, the larger the bias), so these bias estimates are not directly comparable. Nevertheless, it suggests that previous studies with the BWAS using a polythetic cut-off score, which shows lower prevalence estimates in comparison to the DUWAS or the WART (Andersen et al., 2023), likely overestimated the prevalence of work addiction. It can be concluded that the IWAS-5

screening thus provides relatively conservative estimates of work addiction prevalence in comparison to other instruments. Using the IWAS-5 for screening should minimize method-related inflation of estimates from population-based studies.

Moreover, the BWAS tended to underestimate the strength of work addiction with negative correlates such as higher job stress, lower job satisfaction, and lower self-esteem when compared to the IWAS-7 and the IWAS-5. This was most likely due to previously observed low diagnostic utility of the salience and tolerance items the way they were originally operationalized (cf. Atroszko et al., 2023; Bereznowski & Konarski, 2020). The IWAS includes a more diagnostically accurate description of these symptoms as well as items reflecting addiction-specific harm and loss of control concerning conflict and relapse, referring to clearly pathological forms of excessive and compulsive involvement in work.

In conclusion, previous results with the BWAS are highly comparable to those obtained with IWAS regarding associations with the investigated criterion variables. Nevertheless, in general, the BWAS, in comparison to the IWAS, somewhat overestimates work addiction prevalence and underestimates its associations with distress and harm. Future syntheses may integrate previous findings with those with the IWAS, accounting for the slight bias discussed above. Moreover, other scales, such as the DUWAS or the Multidimensional Workaholism Scale (MWS; Clark et al., 2020) popular in the organizational literature, were previously shown to be convergent with the BWAS, indicating that all measure the same construct (Buono et al., 2024). The MWS and the DUWAS showed even higher positive correlations than the BWAS with healthy engagement and lower correlations with poor functioning indicators. These results show that the DUWAS and the MWS cover the even less extreme spectrum of workaholism than the BWAS and are more useful in differentiating lower levels of the variable, making them of limited diagnostic and screening utility when estimating clinically relevant risk. In other words, they measure the part of the spectrum that is less associated with functional impairments and harm.

Recommendations for the IWAS use

Based on the results obtained, it is recommended that the IWAS-5 be used in all cultures when there is a need for a cost-efficient, brief, valid, reliable, and cross-culturally comparative measurement of work addiction. The IWAS-7 showed some inferior psychometric properties in a few cultures where the model fit was not acceptable (i.e., Algeria, Georgia, Iraq, and Ukraine; possible causes for poor fit include translation issues, cultural differences, and sample composition and quality), and therefore, in these cultures, the scale was not tested for measurement invariance. Moreover, in a few other cultures, factor loadings on the mood modification and withdrawal items were low. In these cultures, further studies are necessary to investigate whether the model fit and low factor loadings problems of the IWAS-7 result from the sampling method in the present study or represent systematic cross-cultural differences in the psychometric performance of the scale (see Supplementary Material 10 for recommendations). In addition, somewhat lower loadings on the mood modification item of the IWAS-5 across cultures need further investigation.

The IWAS-5 can be considered the most diagnostically conservative available tool to measure work addiction (in comparison to the IWAS-7, the BWAS, and likely other available scales such as the WART or the DUWAS since the BWAS was previously shown to be most conservative in terms of screening results among the available scales; Andersen et al., 2023), meaning that the established cut-off of 18 points minimizes the number of false positives. Also, the associations of the IWAS-5 with potential harms and impairments tend to be stronger than the IWAS-7 and the BWAS. In other words, individuals identified as having a high risk of work addiction with the IWAS-5 (scoring above 18 points) are most likely suffering from the problem of compulsive overworking and its negative consequences, at least to some extent.

Despite the aforementioned slight differences, in most cultures, the IWAS-7 and the IWAS-5 showed almost identical diagnostic utility. They yielded similar prevalence rates and correlation patterns with other variables. Whenever more in-depth analyses of the symptoms of work addiction are planned (e.g., with network analysis), it is recommended to use the IWAS-7 cautiously. Supplementary Material 10 and Table S21 provide detailed recommendations for using the scale in each of the 85 cultures.

Strengths and limitations

To the best of the authors' knowledge, the present study is the first to investigate the measurement invariance of a work addiction scale across such a diverse range of samples in terms of language and culture. It comprised sample sizes, allowing for sufficiently powered and meaningful statistical analyses. Based on over a decade of systematic analyses of the existing work addiction measures, particularly the BWAS (Andreassen et al., 2012; Atroszko, 2022a; Bereznowski et al., 2023; Bereznowski & Konarski, 2020), conceptual clarification of the construct of work addiction and its proper operationalization (Atroszko, 2022a, 2022b; Atroszko et al., 2019), a well-fitting model was developed and validated in 85 cultures achieving partial scalar invariance which is very rare in psychological research comparing such broad socio-cultural groups. It was possible to obtain cut-off scores that can be used worldwide with good diagnostic accuracy, which is difficult for such a brief measure. The IWAS showed good concurrent validity, confirming that it measures a negative construct associated with high job stress (in all cultures), low job satisfaction (in almost all cultures), and low self-esteem (in most cultures). As a result, this study provides a brief screening tool with good psychometric properties in all 85 cultures.

In terms of limitations, the studies used online convenience samples that were not nationally representative,

which limits the generalizability, and the results in different cultures were not directly comparable in terms of prevalence rates. Moreover, all data collected were self-reported, making it vulnerable to limitations associated with such data (e.g., common method, social desirability, and recall biases). The cut-off scores were obtained empirically based on LPA to identify a "gold standard," which has its limitations. Future studies should use clinical diagnoses as a "gold standard" to further assess the accuracy of the obtained cut-offs. Single-item measures used for concurrent validity testing may have a limited variance of scores, resulting in underestimated strength of their relationships with work addiction. Otherwise, while obviously inadequate for precise diagnosis, single-item measures show good validity and reliability in specific research contexts, such as in the current study for investigating associations among variables (Matthews, Pineault, & Hong, 2022). Relatively low sample sizes in some cultures resulted in limited statistical power of analyses, which may translate to higher type II errors, e.g., limiting detection of subtle differences in strengths of association of work addiction with job stress, job satisfaction, and self-esteem across cultures. However, it should be noted that these limitations do not affect the meaning of the conducted analyses and any of the basic conclusions drawn from the study, e.g., that work addiction is associated with negative correlates.

CONCLUSIONS

It is concluded that the IWAS is a valid, reliable, and short screening scale for work addiction defined as an addictive disorder that can be used globally in clinical and organizational settings, including practical and harm assessment applications, in different cultures and provides comparative and generalizable results. Cut-off scores of 24 and above for the IWAS-7 and 18 and above for the IWAS-5 have good diagnostic accuracy and allow the identification of individuals at high risk of work addiction or being addicted to work. The IWAS-7 can be used in most cultures for more in-depth investigations of work addiction symptoms and requires further validation in a few cultures. Results obtained with the BWAS are largely comparable to those with the IWAS. However, the BWAS somewhat underestimates harm and overestimates the prevalence of work addiction.

The present study is the first to provide data supporting the contention that work addiction has the same structure of symptoms associated with higher job stress and lower job satisfaction in different cultures, indicating that it is a universal phenomenon of an addictive nature worldwide. It was also related to lower self-esteem in most cultures, but more studies are required to understand how self-concept is associated with workaholism in different cultures. The IWAS may be used in clinically and organizationally oriented studies on the nature of this phenomenon, its micro-, meso, and macro-level risk factors, regulatory mechanisms, and a broad range of consequences, including estimation of its global health, social, and economic costs. Also, such studies may lay a foundation for identifying cross-culturally valid diagnostic criteria that health and other institutions and organizations could use.

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VE: investigation; resources; writing – review & editing; MEF: investigation; resources; writing – review & editing; CF: investigation; resources; writing – review & editing; HFG: investigation; resources; writing – review & editing; VG: investigation; resources; writing – review & editing; RBG: investigation; resources; writing – review & editing; LEG: investigation; resources; writing – review & editing; NG: investigation; resources; writing – review & editing; SPG: investigation; resources; writing – review & editing; MDG: writing – review & editing; NRH: investigation; resources; writing – review & editing; FWH: investigation; resources; writing – review & editing; MH: investigation; resources; writing – review & editing; BBH: investigation; resources; writing – review & editing; MH: investigation; resources; writing – review & editing; CKH: investigation; resources; writing – review & editing; IH: investigation; resources; writing – review & editing; ERI: investigation; resources; writing – review & editing; DI: investigation; resources; writing – review & editing; UI: investigation; resources; writing – review & editing; HNI: investigation; resources; writing – review & editing; DHJ: investigation; resources; writing – review & editing; PK: investigation; resources; writing – review & editing; SK: investigation; resources; writing – review & editing; AK: investigation; resources; writing – review & editing; BKubicek: investigation; resources; writing – review & editing; NK: investigation; resources; writing – review & editing; BKun: investigation; resources; writing – review & editing; JHL: investigation; resources; writing – review & editing; EL: investigation; resources; writing – review & editing; YL: investigation; resources; writing – review & editing; MLLP: investigation; resources; writing – review & editing; FM: investigation; resources; writing – review & editing; BM: investigation; resources; writing – review & editing; KM: investigation; resources; writing – review & editing; TAM: investigation; resources; writing – review & editing; SJM: investigation; resources; writing – review & editing; STMJ: investigation; resources; writing – review & editing; RM-H: investigation; resources; writing – review & editing; HTMN: investigation; resources; writing – review & editing; YO: investigation; resources; writing – review & editing; TÖ: investigation; resources; writing – review & editing; KIØ: investigation; resources; writing – review & editing; SP: writing – review & editing; JP: investigation; resources; writing – review & editing; NP: investigation; resources; writing – review & editing; HMP: writing – review & editing; RP: investigation; resources; writing – review & editing; AR: investigation; resources; writing – review & editing; AS: investigation; resources; writing – review & editing; MKS: investigation; resources; writing – review & editing; TZS: investigation; resources; writing – review & editing; MJS-F: investigation; resources; writing – review & editing; GS: investigation; resources; writing – review & editing; JSM: investigation; resources; writing – review & editing; RSobhie: investigation; resources; writing – review & editing; PS: writing – review & editing; JS: investigation; resources; writing – review & editing; MJMS: investigation; resources; writing – review & editing; LS: investigation; resources; writing – review & editing; RSun: investigation; resources; writing – review & editing; AOS: investigation; resources; writing – review & editing; SS: writing – review & editing; MT-C: investigation; resources; writing – review & editing; JT: investigation; resources; writing – review & editing; GVC: investigation; resources; writing – review & editing; AMSW: investigation; resources; writing – review & editing; XY: investigation; resources; writing – review & editing; KZ: investigation; resources; writing – review & editing; AZ: investigation; resources; writing – review & editing; and PAA: conceptualization; data curation; formal analysis; funding acquisition; investigation; methodology; project administration; resources; supervision; writing - original draft; writing - review & editing.

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SUPPLEMENTARY MATERIAL

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APPENDICES

Appendix A

The Seven-Item Version of the International Work Addiction Scale (IWAS-7)

IWAS-7

Below, you find seven questions related to your work/job. Please answer each question by selecting the one response alternative (ranging from "never" to "always") that best describes you for each question. ***How often during THE LAST YEAR have you…***	Never	Rarely	Sometimes	Often	Always
1. Been unable to stop thinking about work (e.g., you have been thinking about work in your free time, on vacation, or at night)?	1	2	3	4	5
2. Felt you should work more and more?	1	2	3	4	5
3. Worked in order to reduce feelings of guilt, anxiety, helplessness and depression?	1	2	3	4	5
4. Tried to reduce the amount of your work but failed?	1	2	3	4	5
5. Become stressed if you have been prohibited from working?	1	2	3	4	5
6. Neglected everything except your work (your family, friends, hobby, and free time)?	1	2	3	4	5
7. Worked so much that it has negatively influenced your health?	1	2	3	4	5

The International Work Addiction Scale (IWAS) is free for use for non-commercial purposes. Language versions of the IWAS can be obtained from the project's website (https://workaddiction.org/international-work-addiction-scale/).

Appendix B

The Five-Item Version of the International Work Addiction Scale (IWAS-5)

IWAS-5

Below, you find five questions related to your work/job. Please answer each question by selecting the one response alternative (ranging from "never" to "always") that best describes you for each question. ***How often during THE LAST YEAR have you…***	Never	Rarely	Sometimes	Often	Always
1. Been unable to stop thinking about work (e.g., you have been thinking about work in your free time, on vacation, or at night)?	1	2	3	4	5
2. Worked in order to reduce feelings of guilt, anxiety, helplessness and depression?	1	2	3	4	5
3. Tried to reduce the amount of your work but failed?	1	2	3	4	5
4. Neglected everything except your work (your family, friends, hobby, and free time)?	1	2	3	4	5
5. Worked so much that it has negatively influenced your health?	1	2	3	4	5

The International Work Addiction Scale (IWAS) is free for use for non-commercial purposes. Language versions of the IWAS can be obtained from the project's website (https://workaddiction.org/international-work-addiction-scale/).