Bachelor's thesis

NTNU
Norwegian University of Science and Technology
Faculty of Social and Educational Sciences
Department of Psychology

Candidate number: 10090

Norwegian Validation of Occupational Depression Inventory

Bachelor's thesis in Psychology
Supervisor: Renzo Bianchi
May 2023

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Preface

This bachelor's thesis marks the end of my bachelor´s degree at the Norwegian University of Science and Technology. I chose to write ongoing research within the Work and Organizations Psychology perspective because of my interest in this perspective. Furthermore, I was curious how the chosen research would open up several possibilities for researchers and occupational health specialists if the measurement tool were employed. The research is part of a larger project which aims to validate the ODI in multiple countries. It has been a long and informative journey in which I have learned and immersed myself in the topic.

I want to thank my supervisor Renzo Bianchi for his guidance and support. His input on the topic, dataset, and data analysis has helped me through this project. I also want to thank my bachelor group for their support and discussions. I want to thank my family and my boyfriend for forwarding the electronic questionnaire to their contacts. Lastly, I want to thank the participants for thanking their time to answer the questionnaire.

Abstract

The present study introduces the Occupational Depression Inventory (ODI) in the Norwegian working life. The ODI is a renewed approach to assess job-induced stress and establishing a provisional diagnosis of occupational depression. ODI has been validated in several countries, such as New- Zealand, the USA, and France. This present study aims to a) validate the ODI in Norway and b) learn more about the correlations between occupational depression and variables of interest.

A sample of 485 (68% women, 31% men, and 1% individuals without gender identification) was recruited in Norway. A factor analysis suggests that the ODI met the criteria for unidimensionality, thereby showing factorial validity. An examination of the Pearson's correlations coefficient (*r*) shows that the ODI vis-à-vis "cause-neutral" depressive symptoms has a degree of discriminant validity. Speaking of the ODI´s criterion validity, the inventory showed a small to moderate relationship with our measures of interest in expected directions. Our findings endorse earlier findings of the ODI´s psychometrical and structural properties. This study suggests that the Norwegian version of the ODI can be employed for addressing job-related distress. Furthermore, this study shows a correlation between occupational depression with work variables such as physical-, verbal abuse, workplace ostracism, sick leave, and other variables such as one´s socioeconomic optimism, age, and sex.

Key words: ODI, Occupational depression, Work-attributed depressive symptoms, Work stress, Cross-sectional study, Total score reliability, Factor validity, Discriminant Validity, Criterion validity

Validation of Occupational Depression Inventory in Norway

Norway is viewed as one of the frontrunners concerning workers' rights. In 1970, Norway introduced the Working Environmental Act, a regulation emphasizing a working environment's psychosocial and organizational aspects (Karlsen et al., 2019). The Working Environmental Act aims to protect employees from possible adverse effects of work. The first paragraph states that a working environment shall provide health-promoting and meaningful work situations. A workplace shall also protect the employee against physical and psychological harm induced at work (Arbeidsmiljøloven, 1995, § 1-1).

In practice, several workplace variables challenge the regulation. Although work can be meaningful and health-promoting, it can also constitute a major source of stress (Bianchi et al., 2022; Theorell et al., 2015). Over the years, work-related stress has become a significant risk factor that can cause employees psychological, social, or physical harm (Hassard et al., 2018). APA (n.d.) defines a risk factor as phycological or environmental characteristics that can increase the possibility of developing a disease or disorder. Karlsen et al. (2019) found that in Norway, the employee's experience of work-related stress increased from 2012 to 2016, aligned with musculoskeletal problems. A workplace can contain several risk factors, such as workplace violence, bullying, and high job- demands (Hassard et al., 2018). Work-related stress has been linked to poor mental health (e.g., developing occupational depression and anxiety), increased health-impaired behaviors (e.g., smoking and alcohol consumption), and even suicidality (Innstrand et al., 2004, p. 119; Hassard et al., 2018).

A consequence of an insurmountable amount of job-induced stress is occupational depression (Bianchi et al., 2022; Theorell et al., 2015). The burden of depression can be so high that it can cause several adverse outcomes. In 2020, roughly 22% of sick leave was due to psychopathology, where depression was among the most frequent causes. The diagnosis is also comorbid with musculoskeletal problems, which caused 60% of this sick leave (NAV, 2020;

Sterud et al., 2008). Moreover, the costs for depression at individual, organizational, and societal levels are high. Individually, depression is health-damaging and life-threatening (Bianchi et al., 2022). Organizationally, it is the leading cause of work-related disability, which refers to lost productivity, reduced performance, and reduced motivation (Bianchi et al., 2022; Lanblieb et al., 2008; Madsen et al., 2017). Occupational depression can even cause an individual to fall permanently out of working life (Saksvik-Lehouillier & Vaag, 2020). Societal level, depression can be a financial burden, whereas SSB (2020) explains that Norway spent 372 billion NOK on health expenses in 2020.

The purpose of this study is to validate the Occupational Depression Inventory (ODI) in the Norwegian language and explore how the ODI fits Norwegian working life. The fact that Norway is experiencing an increased prevalence of work-related stress and depression conflicts with the ideal of the Norwegian Environmental Act (Folkehelseinstittuttet, 2018; Karlsen et al., 2018). As a result, Norway yearns for a tool to assess and manage work-attributed depressive symptoms. The Occupational Depression Inventory (ODI) was created to assess work-attribute depressive symptoms (Bianchi et al., 2020). The measurement tool can enable occupational health scientists and researchers to meet the requirements of the Norwegian Environmental Act. By assessing the employee´s work-attributed depressive symptoms, occupational health specialists can identify suffering individuals with occupational depression and offer help. At the same time, a high prevalence of occupational depression indicates risk factors at work. Based on the prevalence, the management can identify risk factors (e.g., management style or a large amount of job strain), thereby create well- aimed regulations to prevent occupational depression (Bianchi & Schonfeld, 2020).

Background

Job-related distress has been a focal concept within occupational health science. There has yet to be a consensus among scientists on how to conceptualize and measure this issue

(Schonfeld & Bianchi, 2021). Burnout is a construct that has been closely associated with work-related distress. Maslach (1996) explains that burnout emerges from unmanageable distress and comprises the symptoms of emotional exhaustion, depersonalization, and reduced personal accomplishment. Although burnout has been a popular concept among occupational health scientists, the subject has been disputed based on its limitations (Schonfeld & Bianchi, 2021).

Burnout includes several limitations that make its usability problematic (Bianchi & Schonfeld, 2021; Sowden et al., 2022). First, burnout lacks a unitary definition and established diagnosis criteria, leading the researchers to interpret the construct differently. Occupational health specialists can hardly treat or prevent a condition that is not clearly defined and identified (Sowden et al., 2022). Second, the construct is not legally recognized as a medical condition by the American Psychiatric Association and the Work Health Organization. This results in practical implications for suffering employees, as there are no rights for treatments concerning burnout (Bianchi et al., 2022; Sowden et al., 2022; Koutsimani et al., 2019). Third, the construct's discriminant validity has been questioned multiple times, as several findings show that depressive symptoms correlate highly with the core components in burnout scales such as the MBI (Bakker, 2000; Meier, 1984, p. 216; Schonfeld & Bianchi, 2022). At the same time, burnout considerably overlaps with depression regarding symptoms and etiology (Bianchi et al., 2020; Koutsimani, 2019). The substantial overlap between burnout and depression has led to researchers debating whether burnout could be a dimension or a risk factor of depression (Koutsimani et al., 2019).

Bianchi and Schonfeld (2020) propose a paradigm shift from burnout to occupational depression. Depression is a common medical disorder characterized by dysphoric mood and anhedonia (American Psychiatric Association, 2013). The severity and duration of the depressive symptoms can be seen as a continuum and categorical. On the low end, depressive symptoms vary from mild to short-lasting and circumscribed. On the high end, depressive

symptoms could be experienced as severe, persistent, and generalized (Bianchi et al., 2020; WHO, 2023).

Depression has substantial etiological and clinical grounds. Unlike burnout, depression is based on firm clinical and empirical research. Burnout was constructed based on personal experiences and anecdotal observations (Bianchi & Schonfeld, 2021; Schonfeld & Bianchi, 2022). Researchers in favor of burnout argue that the distinction between depression and burnout is that burnout emerges from a specific context (work), while depression is context-free. Although the foundation of depression is a complex interplay between genes, environmental and psychological factors, its first stage can be domain-specific (Koutsimani, 2019). Furthermore, similar to burnout, a large number of empirical findings and theoretical reflections suggest that unwieldy stress can trigger depression (Praag, 2004). This suggests that the more exposed an individual is to chronic and prolonged stressors at work, the individual becomes more prone to develop occupational depression (Langlieb et al., 2008; Koutsamani et al., 2019).

A paradigm shift from burnout to depression can benefit researchers and occupational health- specialists since depression can help overcome the limitations of burnout (Bianchi, 2021). In contrast to burnout, depression has a unitary definition and established diagnostic criteria, which can be found in American Psychiatric Association (2013) (Sowden et al., 2022). Since depression is an established concept, researchers can identify cases and prevalence of occupational depression. As a result, occupational health scientists can have an overview of work-attributed depression and strengthen the health specialist’s ability to treat suffering employees properly. Depression is also nosologically recognized as a clinical disease and, therefore, involves practical rights. This includes help from social security (e.g., as sick pay and sick leave) and clinical treatments from health services (Bianchi et al., 2022; Sowden et al., 2022)

Occupational Depression Inventory

The Occupational Depression Inventory (ODI) is a measurement tool "designed to assess work-attributed depressive symptoms and establish a provisional diagnosis of occupational depression" (Bianchi & Sconfeld, 2020, p. 2). The ODI comprises nine symptom items for major depression, which can be found in the Diagnostic and Statistical Manual of Mental Disorder, fifth edition (American Psychiatric Association, 2013). To assess occupational depression, the items in ODI are incorporated with employees´ causal attribution to their work (Bianchi et al., 2022).

ODI has a dual-lens approach to cover occupational depression; dimensional (continuum-based) and categorical approaches (diagnostic) (Bianchi & Schonfeld, 2020; Bianchi et al., 2022). On the one hand, the dimensional approach allows researchers to quantify the severity of occupational depression (Bianchi et al., 2021). On the other hand, the categorical approach enables the researcher to identify cases of occupational depression. A dimensional approach gives researchers and occupational health specialists insight into symptom development. At the same time, a categorical approach allows the researchers to identify suffering individuals and estimate the prevalence of occupational depression (Bianchi & Schonfeld, 2020; Bianchi et al., 2022). The dimensional and categorical approaches reflect the depressive symptoms are viewed as a continuum with categorical degrees of symptom severity (Alves et al., 2017; American Psychiatric Association, 2013). Since ODI contains few symptoms and is grounded in a well-known classification system, the inventory is applicable and comprehensible for practitioners (Bianchi et al., 2022).

The ODI has been validated in Australia, Brazil, France, Italy, New Zealand, South Africa, Spain, Switzerland, and the USA. Available evidence from these countries demonstrates that the ODI´s alpha and omega reliabilities are excellent (>.90). The ODI has exhibited high factorial validity, which indicates that the instrument has a unidimensional structure. Moreover,

the inventory displays satisfactory discriminant validity vis-à-vis cause-neutral depressive symptoms and convergent validity (Bianchi et al., 2022; Bianchi & Schonfeld, 2020; Bianchi & Schonfeld, 2021; Hill et al., 2021; Sowden et al., 2022).

Present Study

This present study is a cross-sectional study with a dual purpose: *a) to validate the ODI in Norway and b) to learn more about the correlations of occupational depression.* The Norwegian version of the ODI has not been tested far. In order to evaluate how the ODI´s psychometric and structural properties behave in Norway, this study will examine the ODI´s reliability and validity in the Norwegian population. Reliability refers to the consistency, accuracy, and replicability of a measurement. Reliability determines whether the results in ODI are similar across similar or repeated work- situations (Heale & Twycross, 2015). Moreover, Heale & Twycross (2015, p. 66) defines validity as "the extent to which a concept is accurately measured in a quantitative study." In this case, the study will investigate if the ODI can capture the unified concept of occupational depression in the Norwegian population.

There are different types of reliability and validity measures. This study will focus on ODI´s internal reliability and factorial, discriminant, and criterion validity. First, the *ODI´s total- score reliability* will be estimated using Cronbach's alpha (α) and McDonald´s omega (ω). Second, the inventory's *factorial validity* will be explored to see if the *ODI* has a one-factor solution. A one-factor solution demonstrates that although *ODI* comprises nine different symptoms, all are related to one factor; occupational depression (IBM Statistics, 2022). Third, ODI´s *discriminant validity* will be investigated to ensure that the *ODI* covers *work-attributed depressive symptoms* rather than cause-neutral depressive symptoms. *ODI´s discriminant validity* will be examined against Hospital Anxiety Depression Scale (HADS) (Eriksen et al., 2019). Fourth, *criterion validity* will be explored to learn more about which workplace variables are associated with *occupational depression*. *Criterion validit*y is divided into predictive-, concurrent-, and

retrospective validity. This study will focus on concurrent validity, thus exploring to which extent the ODI corresponds with our measures of interest (APA, n.d.).

The ODI has consistently shown robust psychometric and structural properties in other countries. Based on these findings, it is expected that the ODI (**1**) shows a high total- score reliability, (**2**) contains factorial validity, (**3**) a degree of discriminant validity, (**4**) is positively correlated with workplace variables of physical abuse, verbal abuse, workplace ostracism, sick leave, and negatively correlated to one´s socioeconomic optimism.

Method

Study Sample

Initially, a total of 547 participants were recruited for the study. Our recruitment was with an electronic survey that included an attention-check item to detect careless respondents. 62 (11%) participants failed this item and were discarded. Thus, a total of 485 individuals participated in the study. Among these individuals are 329 women (68%), 151 men (31%), and 5 individuals without gender identification (1%).

To be able to participate in the study, the participants had to fulfill two criteria: a) currently employed and b) be at least 18 years old. The data were collected by nine students, myself included, in January and February 2023. We recruited our participants in two ways: through social media (e.g., Facebook, Instagram, or LinkedIn) and personal contacts. The participants were also invited to transmit the survey to their contacts. Of the 485 participants, 209 (43%) were aged 18-34 (early career), 120 (25%) were aged 35-49 (mid-career), and 156 (32%) were aged 50+ (late career). Participation in the study was voluntary, without compensation. Information required for consent was presented first and must be accepted before the participants could complete the survey. Participants were guaranteed full confidentiality. By

quitting the survey before submitting it, participants would cancel their participation. The study was conducted following the guidelines of the Norwegian Center for Research Data.

The measure of interest

ODI. ODI is a self-report inventory that comprises nine symptom items of occupational depression (Bianchi & Schonfeld, 2020). Core symptom items are "(**1**) depressed moods (feeling sad, empty, hopelessness), (**2**) anhedonia (a diminished interest or pleasure in all or almost all activities), (**3**) sleep alterations (getting too little sleep or sleeping too much), (**4**) fatigue/ loss of energy nearly every day, (**5**) appetite alterations (decrease or increase in appetite), (**6**) feeling of worthlessness or inappropriate guilt attributed to work, (**7**) cognitive impairment (diminish the ability to think, concentrate or indecisiveness), (**8**) psychomotor agitation or retardation (feeling of restlessness or everything is slowed down), (**9**) suicidal ideation (recurring thoughts of death)" (American Psychiatric Association, 2013, p. 161). The inventory also includes a subsidiary question about an individual's turnover intention. As earlier noted, to assess occupational depression, each framing of the symptoms is toward one´s attribution against work (Bianchi & Schonfeld, 2020).

Aligned with the DSM-5 criteria, the ODI assesses the frequency of each symptom within a two-week period (Bianchi & Schonfeld, 2020; American Psychiatric Association, 2013, p. 161). Each symptom item was rated on a 4- point scale from 0 (never to almost never) to 3 (almost every day). Participants were instructed to choose 0 (never or almost never) if their experience is unrelated to work or if the source of their experience is unidentifiable. The turnover intention offers the response options of yes, no, or I don´t know (Bianchi & Schonfeld, 2020).

As mentioned earlier, the ODI´s dimensional approach assesses the severity of the symptoms, which is reflected in the ODI´s total sum or mean score. A high score signifies a

severe experience of depressive symptoms. The categorical approach allows the researchers to establish a provisional diagnosis of occupational depression. Occupational depression is produced when the individual meets the following criteria: Scores 3 (nearly or almost every day) on at least five of nine symptoms, where one of these symptoms must be anhedonia or depressed mood (Psychiatric Association, 2013, p. 160; Bianchi & Schonfeld, 2020, p. 2). The symptoms of suicidal ideation have been given special weight based on it´s alarming status (Bianchi & Schonfeld, 2020). On a related note, this study found no risk in assessing the participants' suicidal ideation.

We used a back-translation method to investigate the Norwegian version of the ODI (Table 1). First, the English version of the ODI was translated into Norwegian by two native Norwegian speakers. Second, the Norwegian version was translated back into English by two different Norwegian speakers fluent in English. The translators were unfamiliar with the measurement before participating in the translation process. Third, we compared the Norwegian version of the ODI derived from the back-translation with the original English version. No problematic discrepancies were identified.

Hospital Anxiety and Depression Scale (HADS). The Hospital Anxiety and Depression Scale (HADS; Cronbach´s α = .85, McDonald´s omega ω = .85) was included to assess "cause-neutral" depressive symptoms. HADS comprises 7 symptom items, where the respondents were asked if they had experienced some of the symptoms during the last week (Eriksen et al., 2019). The cause-neutral depressive symptoms were assessed on a 5-point scale from 0 (I strongly disagree) to 5 (I very much disagree).

Workplace variables. Participants were asked if they had, over the past six months, encountered physical assaults or verbal abuse at work. Response options were yes, no, or I do not know (Bianchi et al., 2022). Workplace ostracism (Cronbach´s α = .85, and McDonald´s omega ω = .86) was assessed through a 5- point ostracism scale (Rudert et al., 2022). The

participants were asked to rate from 1 (never) to 5 (always) how often they experienced workplace ostracism during the last two months. Concerning sick leave and job promotion, the participants were asked if they had been on sick leave or had gotten a job promotion over the past six months. In this context, job promotion means a higher status and/ or higher income. The alternative answers were yes, no, or I do not know (Bianchi et al., 2022).

Socioeconomic optimism. Participants' socioeconomic optimism regarding Norway´s s future for the next 50 years was assessed on a 5- point scale from 1 (extremely optimistic) to 5 (Not optimistic at all).

Table 1

Norwegian version of the items of the Occupational Depression Inventory (ODI)

Items	
ODI 1	Mitt arbeid var så stressende at jeg ikke kunne glede meg over ting jeg vanligvis liker å gjøre.
ODI 2	Jeg følte meg deprimert på grunn av jobben min.
ODI 3	Stress relater til jobben førte til søvnproblemer (jeg hadde vanskeligheter for å sovne, sove uforstyrret, eller jeg sov mye mer enn vanlig).
ODI 4	Jeg følte meg utmattet på grunn av jobben min.
ODI 5	Jeg følte at appetitten min ble forstyrret på grunn av jobbstress (jeg mistet appetitten min, eller jeg spiste for mye).
ODI 6	Min opplevelse på jobb fikk meg til å føle meg mislykket
ODI 7	Jobben min stresset meg så mye at jeg hadde problemer med å fokusere på det jeg gjorde (f.eks. å lese en avisartikkel) eller å tenke klart (f.eks. å ta beslutninger).
ODI 8	Som et resultat av jobbstress følte jeg meg rastløs, eller det motsatte, alt gikk saktere- for eksempel i måten jeg beveget meg eller snakket på.
ODI 9	Jeg tenkte at jeg vil heller være dø enn å fortsette i denne jobben.
Turnover intention (SQ)	Dersom du har støtt på minimum noen av problemene nevnt ovenfor, fører disse problemene til at du vurderer å slutte i in nåværende jobb eller stilling?

Data analysis

SPSS version 28 was employed to conduct reliability, factor, and bivariate analysis. As earlier mentioned, the total- score reliability was estimated with two indicators; Cronbach's α

and McDonald's ω. The reliability indices were interpreted after these recommendations: .70 as acceptable, .80 as good, and .90 as excellent (Lance et al., 2006).

Factor analysis was applied to examine the ODI´s factor validity. The ODI´s factorial structure was investigated using Maximum Likelihood as an extraction method. I used an oblique (promax) rotation—in case several factors would emerge, we would assume such factors to correlate (Field, 2018). In light of earlier evidence, I anticipated that all ODI items load substantially (<.30) on one factor—occupational depression. Factor loadings represent the correlation between the items and the factor(s) (Tavakol & Wetzel, 2020). The cutoff value of the factor loadings was restricted to <.30, factor loadings below this value would be excluded (Field, 2018, p. 798). Furthermore, items 1 to 8 were expected to load substantially on a single factor. In contrast, item 9 may exhibit a somewhat lower loading because item 9 is about suicidal ideation, a rarely endorsed item. I examined the part of the variance extracted that was accounted for by the factor(s). Kaiser's criterion of eigenvalues greater than one was applied to retain the emerging factor(s) (Field, 2018; Lance et al., 2006).

The ODI discriminant and criterion validity was conducted with bivariate analysis. Discriminant validity refers to the degree a measure (ODI) deviates from another measure (HADS) that measures a different construct (APA, n.d.). The discriminant validity of the ODI vis-à-vis the HADS was explored with Pearson´s correlation (*r*). Pearson´s correlation coefficient (*r*) measures the strength and direction between two variables on a scale that ranges from – 1 to + 1 (Sedgwick, 2012). The discriminant validity was explored at a scale level, where I looked at the correlations between the ODI´s mean score and HADS's mean score. A correlation starting at r =.80 might indicate that the ODI lacks discriminant validity (Bianchi et al., 2021). Regarding criterion validity, the associations between occupational depression and our measures of interest were also inspected using Pearson´s correlation (*r*).

Results

Descriptive statistics

The normal distribution of the ODI mean score is positively skewed (skewness =1.21, standard error =0.11), which is unsurprising due to our non-clinical sample. As shown in Table 2, the symptom items ranged from a minimum of 0 to a maximum of 3. Among our participants, 75.3% (*n* =365) scored between 0.00 to 0.99, 21.5% (*n*=105) scored between 1.00 to 1.99, and 3.1% (*n*=15) scored between 2.00 to 3.00. 2% (*n*=11) of our participants can likely meet the criteria for occupational depression. An investigation of turnover intention revealed that 31% (*n*=149) considered leaving their current job due to their experiences.

Factor validity and Reliability

The sampling adequacy was measured with Kaiser- Meyer- Olkin (KMO) and Barlett´s test of sphericity. KMO = 0.92 is well above the criterion of 0.5 and affirms that the sample size is likely adequate for factor analysis. According to Kaiser & Rice, a KMO above .90 indicates "marvelous" sampling adequacy. Barletts´s test of sphericity is significant, $p<.001$, which suggests that the correlations between the variables are substantial enough to complete factor analysis. A determinant of .15 implies no problems for singularity or multicollinearity (Field, 2018).

I obtained one factor by applying Kaiser´s criterion of eigenvalues greater than 1 (Field, 2018). The one factor accounted for 49% of the variance extracted. Also, the Scree Plot showed clearly that there was one relevant factor. The items loaded from .40 to .78 on the factor (*M*= .69, *SD* =.12, *R*=.38) (Table 3). ODI´s total score reliability has shown to be excellent, Cronbachs α= .89 and an Omegas ω = 0.90.

Discriminant Validity and Criterion Validity

ODI vis-à-vis the depression subscale of the HADS, r= .66, $p<.001$, displays a large and statistically significant relationship. A correlation of .66, though large, still suggests a degree

of discriminant validity. Regarding criterion validity, occupational depression was found to correlate in the expected direction with other variables of interest. The inventory also had a statistically significant relationship with the other variables without job- promotion.

Occupational depression exhibited a small relationship with physical aggression, r = .09, p =.047, verbal abuse, r = .22, p <.001, sick leave, r =.26, p <.001 and a moderate association with workplace ostracism, r=.42, p <.001. Moreover, occupational depression was moderately correlated with socioeconomic optimism, r=-.31, p<.001. Age, r=.14, p=.002 and sex, r=-.19, p<.001 exhibit a small and positive relationship with occupational depression. Sex exhibited a negative relationship with occupational depression. Because sex was coded 0 for females and 1 for males, women tended to report more depressive symptoms than men.

Table 2

Descriptive Statistics of the ODI (N=485)

ODI items	Mininum	Maximum	M	SD	Skewness (SE)	Kurtosis (SE)
1	0	3	0.75	0.82	0.94 (0.11)	0.36 (0.22)
2	0	3	0.60	0.80	1.32 (0.11)	1.22 (0.22)
3	0	3	0.84	0.90	0.80 (0.11)	-0.24 (0.22)
4	0	3	1.0	0.91	0.65 (0.11)	-0.32 (0.22)
5	0	3	0.57	0.84	1.40 (0.11)	1.17 (0.22)
6	0	3	0.65	0.79	1.22 (0.11)	1.12 (0.22)
7	0	3	0.55	0.73	1.14 (0.11)	0.59 (0.22)
8	0	3	0.59	0.82	1.34 (0.11)	1.12 (0.22)
9	0	3	0.10	0.40	4.95 (0.11)	27.09 (0.22)

Note: M: mean; *SD:* standard deviation*; SE:* standard error

Table 3

Summary of Maximum Likelihood Factor Analysis on Occupational Depression Inventory (N = 485)

	Factor loading	Communality
	Occupational Depression	
1) Mitt arbeid var så stressende at jeg ikke kunne glede meg over ting jeg vanligvis liker å gjøre.	**.78**	.61
2) Jeg følte meg deprimert på grunn av jobben min.	**.72**	.52
3) Stress relatert til jobben førte til søvnproblemer (jeg hadde vanskelig for å sovne eller sove uforstyrret, eller jeg sov mye mer enn vanlig).	**.72**	.52
4) Jeg følte meg utmattet på grunn av arbeidet mitt.	**.79**	.62
5) Jeg følte at appetitten min ble forstyrret på grunn av jobbstress (jeg mistet appetitten min, eller det motsatte, jeg spiste for mye).	**.66**	.44
6) Min opplevelse på jobb fikk meg til å føle meg mislykket.	**.64**	.41
7) Jobben min stresset meg så mye at jeg hadde problemer med å fokusere på det jeg gjorde (f.eks. å lese en avisartikkel) eller å tenke klart (f.eks. å ta beslutninger).	**.77**	.60
8) Som et resultat av jobbstress følte jeg meg rastløs, eller det motsatte, alt gikk saktere – for eksempel i måten jeg beveget meg eller snakket på.	**.73**	.53
9) Jeg tenkte at jeg ville heller dø enn å fortsette i denne jobben.	**.40**	.17
Eigenvalue	4.89	
% av variance	49	
Total variance	4.41	

Note. The extraction method was “Maximum Likelihood”; rotated with promax (direct oblimin) with Kaiser Normalization. Values reported from Factor Matrix as only one-factor solution was extracted and the solution cannot be rotated.

Table 4

Descriptive statistics & Pearson correlation (N= 485)

Variables	*M*	*SD*	1	2	3	4	5	6	7	8	9	10
1. Occupational Depression (ODI)	0.63	0.58	-									
2. (HADS)	2.09	0.66	0.66***	-								
3. Physical aggression	0.07	0.26	0.09*	0.02	-							
4. Verbal abuse	0.29	0.45	0.22***	0.09	0.33***	-						
5. Workplace ostracism	1.59	0.65	0.42***	0.41***	0.01	0.16***	-					
6. Sick leave	0.23	0.42	0.26***	0.25***	0.02	0.06	0.15***	-				
7. Job promotion	0.20	0.69	-0.07	-0.10*	-0.06	-0.02	-0.05	-0.04	-			
8.Socioeconomic optimism	2.46	0.86	-0.31***	-0.32***	-0.03	-0.22***	-0.24***	-0.15***	0.05	-		
9. Age	40.29	13.6	-0.14**	-.013**	-0.17***	-0.18***	0.02	0.02	-0.11*	-0.00	-	
10. Sex[a]	0.31	0.47	-0.19***	-0.08	-0.01	-0.02	-0.02	-0.13**	0.40	0.07	-0.06	-

Note. * p <.05, ** p < .01, *** p<.001. HADS: Hospital Anxiety and Depression Scale (7-item). [a]0=women, 1 = men. The sample included 329 women, 151 men, and five without gender identification.

Discussion

This study presents the ODI in the Norwegian population. ODI is a renewed approach to measure job-ascribed stress and identify likely cases of occupational depression (Bianchi et al., 2022a; Bianchi et al., 2022b). ODI´s psychometrical and structural properties were inquired by investigating the inventory´s reliability score, factorial-, discriminant-, and criterion-validity. Our findings suggest that the ODI´s psychometrical and structural properties behave satisfactorily within the Norwegian working-life context. Overall, our results support earlier findings found in other validation studies of the ODI and indicate that the ODI can be extended to the Norwegian population (Bianchi et al., 2023; Bianchi et al., 2022; Bianchi & Schonfeld, 2020; Hill et al., 2021).

Total- Reliability Score

As expected, the ODI´s high total- score reliability score demonstrates the measurement tool's robust psychometrical and structural properties. The high-reliability score reflects ODI´s internal consistency, suggesting inter-relatedness between the items. Moreover, a high-reliability score supports the assumption that the ODI has a unidimensional structure (Mohsen & Dennick, 2011). Nonetheless, it should be noted that our reliability scores are slightly lower than other findings. Other research on the ODI found reliability scores that exceed 0.90 (Bianchi et al., 2022; Bianchi & Schonfeld, 2020; Bianchi & Schonfeld, 2021; Hill et al., 2021; Sowden et al., 2022). A reliability value over 0.90 might indicate that some items are redundant. Therefore, a maximum alpha value of 0.90 is sometimes recommended (Lance et al., 2006; Mohsen & Dennick, 2011). The interpretation of our reliability values suggests that, although our reliability indicators are slightly lower than others, they are likely excellent (Lance et al., 2006).

Factorial validity

As expected, the Norwegian version of ODI displayed factorial validity. A factor analysis revealed a one-factor solution, indicating that the instrument contains a unidimensional structure. In short, our results indicate that despite covering nine different symptoms, the ODI captures the phenomenon of occupational depression (Bianchi et al., 2022). Moreover, all items loaded substantially, >.30 on the Occupational Depression factor. This supports the assumption that all items were considerably related to occupational depression and that no items should be excluded from the measurement (Field, 2018, p.798).

Our factor loadings show that ODI 4 (fatigue/ loss of energy) loaded highest with occupational depression. In contrast, ODI 9 (suicidal ideation) loaded least with occupational depression. The differences in factor loadings between ODI 4 and ODI 9 reflect the dimensional approach in the ODI. On the low end, we can find fatigue/ loss of energy, the most prevalent

symptom for people suffering from major depression (Bianchi et al., 2022; Makowski et al., 2021). On the higher end, we can discover suicidal ideation, which few people in the general population experience as it is a severe symptom (Bianchi et al., 2022, p. 11). Such results are comparable with Bianchi and colleagues' (2022) study of the ODI in France, Switzerland, and Australia. The researcher also found that the most endorsed item is item 4, while item 9 is the least endorsed. Furthermore, in the categorical approach, individuals will likely be provisionally diagnosed with occupational depression at the higher end of the continuum (Bianchi & Schonfeld, 2020).

Discriminant validity

As anticipated, the ODI showed a degree of discriminant validity vis-à-vis HADS. The correlation between the instruments is expected because both instruments assess depressive symptoms. At the same time, the size of the correlation suggests a degree of distinctiveness. These differences could be caused by the fact that ODI assesses work-attributed depressive symptoms, while HADS assesses depressive symptoms in a cause-neutral manner. The discriminant validity underpins the purpose of the ODI. Individuals diagnosed with occupational depression in ODI should also be diagnosed as depressed in HADS. In contrast, not all individuals diagnosed with general depression could meet the criteria for occupational depression since ODI is supposed to assess occupational depression (Bianchi & Schonfeld, 2020, p. 5). Our findings of discriminant validity are highly consistent with Bianchi & Schonfeld's (2020) initial validation study, which also based ODI´s discriminant validity with HADS and Hill et al. (2021), who used Depression Anxiety Stress Scales with 21 items.

Criterion validity

Regarding workplace variables, as expected, we found a positive relationship between occupational depression and the variables of verbal abuse, physical abuse, workplace ostracism, and sick leave. Our results suggest that occupational depressio*n* has a larger relationship with

verbal abuse rather than physical abuse. This finding is aligned with the results of the validation study in Italy (Bianchi et al., 2022, p. 9). A possible explanation is that the risk factor of workplace bullying occurs more often as verbal rather than physical abuse (Nilsen et al., 2014). Actions in verbal abuse include degrading, criticizing, and judging one´s appearance or job performance. Another possible explanation is that some of our participants could work within the healthcare system, where encountering workplace violence is expected. Workplace violence refers to threats (verbal abuse) and acts of violence (physical abuse) against health professionals (Nøland et al., 2021). Workplace violence can cause a series of negative consequences, such as being highly stressed or having adverse emotions at work (Rasool et al., 2019). However, several mediating factors exist between workplace violence and an employee thriving at work. These mediating factors are, for instance, the feeling of job satisfaction, self-achievement, and great colleague relationships (Zhao et al., 2018). Thus, individuals can encounter physical and verbal abuse at work without suffering from occupational depression.

Unlike other validation studies of the ODI, this study examined the relationship between occupational depression and workplace ostracism population (Bianchi et al., 2023; Bianchi et al., 2022; Bianchi & Schonfeld, 2020; Hill et al., 2021). The correlation size suggests that workplace ostracism has the strongest association with occupational depression compared to other variables (Table 4). Workplace ostracism has become a major risk factor at work, and it refers to when individuals perceive themselves as being socially ignored or excluded. The characteristics of ostracism include receiving silent treatment, not being invited to social events, and being ignored in conversations (Vui-Yee & Yen- Hwa, 2020). Besides verbal abuse, workplace ostracism is another common form of bullying (Nilsen et al., 2014). The correlation between occupational depression and workplace ostracism is unsurprising, as workplace ostracism can be perceived as more harmful than verbal abuse (Vui-Yee & Yen- Hwa, 2020). Since workplace ostracism threatens the psychological need for belongingness, ostracism leads

to a series of consequences. Employees exposed to ostracism experience social pain comparable to physical pain. Furthermore, ostracism threatens different needs, such as autonomy, control, and experiencing one´s job as meaningful. Consequently, workplace ostracism is an organizational stressor that can induce substantial job stress (Chung, 2018).

Occupational depression was positively linked to sick leave over the past six months, similar to Bianchi et al. (2022) validation study. Compared to verbal abuse, physical abuse, and workplace ostracism, occupational depression shows a larger and more significant relationship with sick- leave. This indicates that sick leave is a possible outcome of occupational depression. The other variables mentioned are potential stressors that can trigger occupational depression and indirectly effect sick leave. The notion that occupational depression leads to sick leave is supported by the fact that depression is one of the most frequent causes of sick leave (NAV, 2020).

Job promotion had no significant relationship with occupational depression, consistent with ODI´s validation study in Italy (Bianchi et al., 2022). Job promotion can be viewed as a reward that reflects one´s accomplishment at work. Kalleberg & Mastekaasa (2001) found that Norway is less career-oriented than the USA. Thus, job promotion does not necessarily have significant importance for Norwegian employees. A possible reason is that Norway practices participative management and focuses on relational employment between organizations and employees. Relational employment emphasizes equality between employees and leaders (Kalleberg & Rognes, 2000). Kalleberg and Rognes (2000) explain that compensation in relational contracts is not given as job rewards but rather as a higher salary. Salaries are negotiated by regulations, trade unions, and personally initiated negotiations. Instead, the comparative salary moves people to organize strikes or to have negative emotions by experiencing inequality in salary rather than the quest to seek job promotion (Hansen & Seip, 2017; Kalleberg & Rognes, 2000).

As anticipated, our findings show a negative link between occupational depression and socioeconomic optimism. Our findings demonstrate that the more optimistic individuals are about Norway´s future, the less they score on occupational depression. This result is underpinned by Bianchi et al. (2022) validation study in Italy. Moreover, the relationship between occupational depression and socioeconomic optimism is also in accordance with Hagen and colleagues' (2005) study. The researchers found that socioeconomic status is associated with chronic musculoskeletal complaints in Norway, whereas musculoskeletal problems are often comorbid with depression (Hagen et al., 2005). Norway is a welfare country with labor regulations, such as the Norwegian Environmental Act. The Norwegian Environmental Act emphasizes employees´ rights to job security, which can create a feeling of safety (Kalleberg & Rognes, 2000). Furthermore, given that Norway is a welfare state, individuals can feel confident that it will help and protect them if they are in a socioeconomic crisis. Our findings show that although Norway offers several benefits, such as job security, like other countries, socioeconomic stress is an essential stressor to occupational depression (Bianchi et al., 2022).

Our results show a negative relationship between occupational depression and the variables age and sex. These results contradict the other validation studies of ODI, where sex and age were not significant with occupational depression (Bianchi et al., 2023; Hill et al., 2021). The significant results are likely because a large proportion of our participants are women and are early in their careers, which could lead to a bias called p-hacking. P-hacking refers to the more sample we have of women and people earlier in age, the higher the probability of achieving a significant level (Field, 2018, p. 107).

Limitations

There are at least three limitations in this study. First, we relied on a nonrandom sampling method, where we obtained the participants through convenience and snowball sampling.

Consequently, the representativeness of our sample in terms of age, sex, socioeconomic status, and health status is unclear (Emerson, 2015). Second, 68% of our participants are women, which, as discussed, could lead to p- hacking (Field, 2018, p. 107). These limitations limit the generalizability of our findings. Therefore, our estimate of the prevalence of occupational depression should not be generalized to the Norwegian working population. At the same time, the interpretation of the correlations between our variables and occupational depression should be read with caution, as our sample is not representative. Implementing random sampling could better clarify the study´s representativeness, which could increase the study´s generalizability (Cooper & Metlzoff, 2018). Random sampling reduces the influence of external factors such as socioeconomic and health status. However, random sampling is difficult to accomplish. The method makes it challenging to assess large populations, costly, and time-consuming (Emerson, 2015). Moreover, random sampling is an impractical method in this study since our goal was to validate the study in the general working population. The general working population cannot be circumscribed (Bianchi et al., 2022).

Third, our use of cross-sectional design is well-suited for the purpose of this study. However, the cross-sectional design prevents us from examining the causality of occupational depression and the workplace variables, such as sick leave, workplace violence, and workplace bullying. To address this issue, future studies of the ODI that entails a longitudinal approach can provide insight into the causality between occupational depression and both work and non-work variables (Taris et al., 2021). A longitudinal study allows the researchers to investigate ODI´s test-retest reliability to ensure the external consistency of the measurement tool (Bianchi et al., 2022; Taris et al., 2021). Furthermore, a longitudinal study enables the researchers to possibly see which effect the ODI and the diagnosis of occupational depression have if implemented in the Norwegian workplace.

Conclusion

This study suggests that the ODI's psychometrical and structural properties in the Norwegian- working life context are coherent with available evidence of the ODI (Bianchi et al., 2022; Bianchi & Schonfeld, 2020; Bianchi & Schonfeld, 2021; Hill et al., 2021; Sowden et al., 2022). Our findings exhibit that occupational depression is related to workplace variables, such as physical abuse, verbal abuse, workplace ostracism and one´s socioeconomic optimism, and sick- leave. These workplace variables can be found in a workplace environment and might be one of the causes of Norway´s increasing prevalence of depression and sick leave (Folkehelseinstittutet, 2018; NAV 2020).

By employing the ODI in the Norwegian work-life occupational health specialists, clinicians gain a tool to identify and treat suffering individuals with occupational depression more effectively. At the same time, gain a measurement tool that can give the clinicians an overview of depressogenic factors (Bianchi & Schonfeld, 2020; Bianchi et al., 2022). Before concluding, it should be noted that ODI only assesses work-attributed depressive symptoms and not causal attributions rooted in internal dispositions (e.g., self- blame) or external dispositions (e.g. bad management styles) (Bianchi et al., 2022; Hill et al., 2021). Despite this fact, based on the comprehensive etiology of depression, the diagnosis is best understood as an interplay between internal and external dispositions (Langlieb et al., 2019; Koutsimani, 2019). Therefore, identifying the role of work variables and working conditions is essential for understanding the development of depression and forming well-aimed regulations to prevent the diagnosis (Bianchi et al., 2020; Bianchi et al., 2022).

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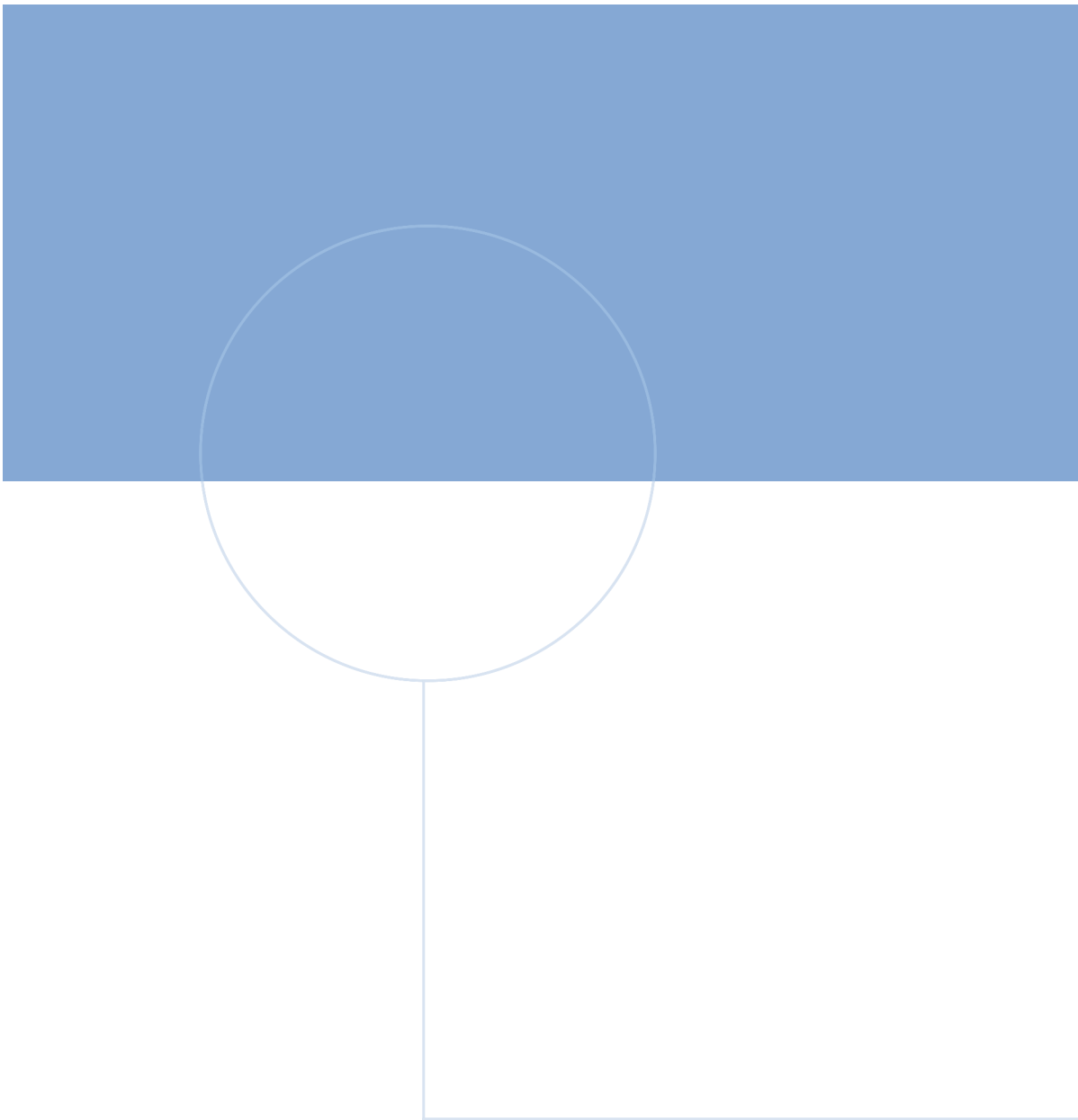

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