

Kandidatnummer: 10084

Norwegian validation of the Occupational Depression Inventory

Bachelor's thesis in psychology

Supervisor: Renzo Bianchi

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Preface

The work on this bachelor's thesis on work-related distress was advised by Renzo Bianchi, who is the co-founder of the instrument investigated in the present study, the Occupational Depression Inventory (ODI). Renzo decided the general theme of this study and formulated the aims. The study group consisted of nine students. We collected data using an online questionnaire. We chose our own research questions and approaches towards the general theme and were, within some analytical boundaries lined out by Renzo, also given the freedom to make our own analytical choices in the work with the data set. The ODI items were already back-translated when the preliminary questionnaire was handed out by Renzo, who also did us the favor of measuring the mean scores of the ODI, the HADS-D and the OSS as well as reversing two items of the HADS-D to facilitate reliability analysis. The translations of the other questionnaire items, all the analyses and discussions were performed by me, as well as literature search through Google Scholar to find relevant literature.

I want to thank Renzo Bianchi for being available to answer questions and provide guidance throughout a challenging spring semester. I am especially grateful for the weekly group meetings provided to the study group by Renzo, which served as a social arena and a basis for the exchange of knowledge and fruitful discussions. The 485 respondents deserve a special thanks for sharing how happy (or unhappy) they are with work and life in general. I will be forever grateful for my parents taking care of me and feeding me when morale hit rock-bottom. Lastly, my dear friends deserve a big shoutout for always being there and making life enjoyable. Thank you!

Abstract

The research area of occupational health is invested in identifying, treating and preventing distress in individuals resulting from conditions at work. The Occupational Depression Inventory (ODI) is an instrument for assessing work-related depressive symptoms, developed to facilitate comprehensive and effective interventions in occupational health practices. In this thesis, the fit of the ODI in the Norwegian context has been explored, with the aim of validating the ODI in Norway and learn more about the correlates of occupational depression. This study involved 485 Norwegian employees. The data was collected with a self-administered online questionnaire. The Maximum Likelihood factoring technique of Exploratory Factor Analysis (EFA) indicated unidimensionality, while Cronbach's α and McDonald's ω demonstrated the ODI to have strong reliability. Pearson's correlation coefficient was utilized to examine the criterion validity and discriminant validity of the ODI. As hypothesized, the variables correlated in the expected directions, supporting the criterion validity of the ODI. In regard to the discriminant validity, the ODI's association with a cause-neutral depression scale was satisfactory. The anticipation of the suicidal ideation item to be the least frequently endorsed was also met. In summary, the analyses confirmed the hypotheses and found the ODI to exhibit robust structural and psychometric properties in the Norwegian context. Existing literature was utilized to gain a broader understanding of the state of the art. Consistent with earlier validation research, the findings suggest the ODI can be relied on in clinical assessments of work-related distress. However, further research should use representative samples to produce generalizable findings and gather more in-depth data on the correlates of occupational depression.

Keywords: *work-related distress, depression, occupational health, suicidal ideation, burnout*

Word count: 7013

Mental health is a topic of increasing concern in modern society, with the issue extending to occupational settings. Traditionally, being classified as mentally ill and receiving mental health care has included prejudices, stigma and negative social consequences (Corrigan et al., 2014). From the agenda being set on mental *illness* and theoretical and therapeutical approaches towards those that are severely ill, there is today a shift towards a more supportive system where the focus is on proactiveness and prevention (Arango et al., 2018). Mental *health* is a key term as subjective well-being is being promoted. Population-based efforts are valuable in gaining knowledge on how to identify risk factors in the population at an earlier stage, how to prevent development of mental illness and how to design effective interventions (Mykletun & Harvey, 2012). Along with the health-wise rationale of prevention and treatment of depression, decreasing morbidity and mortality includes a socioeconomic rationale, supported by broad research (Knapp et al., 2011; Zechmeister et al., 2008). The consequences of depression among the working population include direct costs from medical and social resources, as well as indirect economic costs that stem from absenteeism, production losses, job turnover and premature death (Berto et al., 2000; Cuijpers et al., 2007; Luppá et al., 2007).

The Norwegian mental health context

The Norwegian Ministry of Health and Care Services explicitly states that mental health is included as an equal part of the government's public health work and that prevention is a key strategy in this work (Helsedirektoratet, 2018). *The Working Environment Act* has since its birth in 1977 served the purpose of securing "a working environment that provides a basis for a healthy and meaningful working situation, that affords full safety from harmful physical and mental influence..." (Arbeidsmiljøloven, 2005, § 1-1). This act sets a nationwide standard for working conditions for both the employer and employee, including the potential

psychological burden of work. A Norwegian report on working environment in the health and social sector highlights the difficult balance between workers' right to have a safe and proper working environment and the right patients and users have to receive the help they need (Hagen & Svalund, 2019). Healthcare professionals are an example of a group frequently exposed to physical and verbal abuse, incidents associated with decreased job satisfaction and increased occupational strain (Mento et al., 2020).

The attention given mental health from the Norwegian government results from the fact that mental health issues are highly prevalent both nationwide and globally. A study assessing absence from work in the Norwegian population found that among 101,512 individuals, 16.8% of all long-term sick leave instances (>2 weeks) in 1997 and 1998 were due to mental health issues (Nystuen et al., 2001). In 2022, mental illnesses were the cause of 15.7% of all sick leave instances in Norway (Arbeids- og velferdsforvaltningen (NAV), 2023). In the 2015 Global Burden of Disease study, depression is highlighted as the single most contributing factor to global disability, represented by the number of healthy living years that are lost to non-fatal health loss, or Years Lost to Disability (YLD) (Vos et al., 2016). Along with muscular- and skeletal diseases, the 2016 Burden of Disease study in Norway highlighted depression and anxiety as main contributing factors to YLD, with noteworthy prevalence among youth and the ages that are able to work (Øverland et al., 2018).

Depression, suicidality and interventions

To be depressed includes sadness, indifference and emptiness, and trouble feeling pleasure, interest or maintaining concentration. Feelings of guilt and worthlessness are common, as well as fatigue and disturbances in appetite and sleeping patterns. The severity of depressive disorders is determined by duration, intensity of symptoms and further impact on social and/or occupational functioning (American Psychiatric Association (APA), 2013).

Suicidal ideation is found to be a solid marker for severe depression and a risk factor for suicide attempts and suicide (Simon et al., 2013), coinciding with findings of depression being the predominant diagnosis associated with suicide (Hawton et al., 2013) and main factor associated with suicidal ideation (Orsolini et al., 2020). Still, being severely depressed and being suicidal are two different states. Findings from Batterham et al. (2019) illuminate the fact that suicidal ideation can occur independently of depressive symptoms.

Predispositions towards suicidality vary between individuals, making multidimensional approaches necessary to map who is at risk for suicide (Orsolini et al., 2020). Around 650 people, or 12 in 100.000, commit suicide annually in Norway, with rates being relatively stable over the last decade. Two in three of the suicides are committed by men (Folkehelseinstituttet, 2022).

The evidence is concerning and outlines the urgent need to have mental health on the agenda. Work-based mental health interventions have proved to reduce depressive symptom levels among workers (Tan et al., 2014), with interventions combining therapeutical approaches proving to be effective (Yunus et al., 2018). The same study found the degree of therapist contact to predict effectiveness of intervention. Joyce et al. (2016) presented evidence of interventions aimed at returning employees to work being more effective when initiated at an early stage, before employees have recovered fully from symptoms. This evidence indicates that work-situated measures aimed at tackling mental health issues can make a difference.

Burnout as a criticized measure of work-related distress

The all-embracing term of work-related distress refers to the negative psychological impact of overwhelming stress at work. The term's conceptualization has commonly revolved around the construct of burnout, which consists of the dimensions of overwhelming

exhaustion, feelings of cynicism and mental distance from the job, and the sense of ineffectiveness and lack of accomplishment (Maslach & Leiter, 2016). While burnout has been recognized as a clinical diagnosis and valid reason for sick leave in Sweden since 2003 (Friberg, 2009), this is an exception rather than the rule (Nadon et al., 2022). Burnout is not classified as a clinical diagnosis in e.g. Norway. World Health Organization (WHO, 2019) define burnout as an “occupational phenomenon” and further highlight the importance of not using the construct to describe experiences outside of the workplace. Despite its position in the area of occupational health research, questions have been raised around the burnout construct’s discriminant validity in measuring work-related depressive symptoms (Bianchi et al., 2015; Chen & Meier, 2021; Golonka et al., 2019; Koutsimani et al., 2019; Rotenstein et al., 2021). Discriminant validity refers to whether the burnout construct reflects and assesses something unique when compared to general depression scales. Burnout and depression largely share symptoms, to the extent where burnout is proposed as a form of depressive condition (Bianchi et al., 2019; Bianchi et al., 2021).

Research using the burnout construct has been criticized for struggling to reach consensus on the operational definition of burnout. Nadon et al. (2022) highlight how this definitional issue has had further implications on the work towards validating burnout as a mental disorder, where the research field has reached no agreement upon possible diagnostic criteria for burnout. Another point of criticism towards the burnout measure and other available measures of work-related depressive symptoms is for failing to properly include causal considerations. Bianchi & Schonfeld (2020) emphasize how clinical health research often has to rely on individuals’ causal attributions to identify symptom sources, as this type of information often is central in reaching the right approaches and interventions in clinical settings. The authors raise worries about the current state of occupational health research and

propose the Occupational Depression Inventory (ODI) as an alternative to the available assessments of work-related distress.

The Occupational Depression Inventory

The ODI is a measure for assessing depressive symptoms that can be attributed to workplace conditions. The ODI is based on the diagnostic criteria of major depression in the *Diagnostic and statistical manual of mental disorders* (fifth ed.; DSM-5; APA, 2013), but distinguishes itself from general depression scales through the incorporation of causal attributions to work in its items. The measure also includes a suicidal ideation item to encompass more severe cases of work-related distress. Through a dedicated ODI algorithm, the items of the measure together produce a score that make identification of cases of work-related depression possible, which further can help establish provisional diagnoses of occupational depression. The overarching aim is for the ODI to become a tool for clinicians and health professionals in effectively identifying, measuring and treating work-related depression (Bianchi & Schonfeld, 2020).

Despite being recently developed, the ODI have thus far been validated in Australia, Brazil, France, Italy, New Zealand, South Africa, Spain, Sweden, Switzerland and USA. A validation involves examining the instrument's psychometric and structural properties. The ODI has shown measurement invariance across sexes and age groups, robust psychometric and structural properties across occupations, nations and languages, high reliability and both criterion and discriminant validity when compared to general depression scales as well as utility based on the total score it produces (Bianchi et al., 2022; Bianchi & Cavalcante et al., 2023; Bianchi & Schonfeld, 2020; Bianchi & Verkuilen et al., 2023; Hill & Bianchi, 2021). While these earlier validation studies of the ODI in other countries and languages have given satisfactory results, broader research is needed to account for the ODI's universal

applicability. A deeper understanding of the ODIs association with a wide array of factors will clarify the relevance and utility of the instrument in different contexts and help future research. Furthermore, the ever-increasing amount of research on the properties of the ODI will benefit the work towards establishing the ODI in occupational health practices.

Aims of the study

The present study aimed to validate the ODI in the Norwegian language and increase the knowledge on the correlates of occupational depression. More specifically, the data analysis addressed the instrument's criterion validity, discriminant validity, factorial validity and total-score reliability. Criterion validity refers to how well the ODI correlates with established standards of comparison. Correlations that strongly deviate from expectations would thus raise worries about the ODI's predictiveness and weaken the instrument's general validity. This aspect was assessed through examination of the associations with workplace violence (hereunder physical aggression and verbal abuse), sick leave, job promotion and socioeconomic optimism (SEO), as well as the associations with the depression subscale of the Hospital Anxiety and Depression Scale (HADS-D) and the Ostracism Short-Scale (OSS). Ostracism concerns experiences of exclusion and of being ignored, which have been found to be closely related with development of depressive symptomology (Rudert et al., 2021). While the ODI and the HADS-D are based on the same diagnostic criteria of the DSM-5 (APA, 2013), the former is as aforementioned implementing causal considerations to work to its items. Thus, the ODI's discriminant validity was examined in regard to the association with the HADS-D. The ODI's factorial validity was investigated through determining if the ODI items' factor loadings and factorial structure were satisfactory. The total-score reliability was investigated to determine the consistency of the ODI under the same conditions. Strong

reliability scores would be promising regarding the use of the instrument in clinical practices.

Prior to analyzing these presented properties, following hypotheses were made:

1. One factor is sufficient in explaining the inter-item associations of the items of the ODI, who together will reflect a single construct – occupational depression.
2. Of the nine ODI-items, the suicidal ideation item will be the least frequently endorsed.
3. The ODI shows criterion validity with measures of relevance.
 - a. Occupational depression will be positively related to the general depression, workplace ostracism, workplace violence and sick leave.
 - b. Occupational depression will be negatively related to job promotion and SEO.
4. The ODI shows discriminant validity with a cause-neutral depression scale.
 - a. Occupational depression will show a substantial, though not perfect, positive relationship with the HADS-D.

Method

Procedure

Data collection to the present study was a self-administered digital questionnaire. Recruitment was performed by nine students, including myself, in January and February 2023.

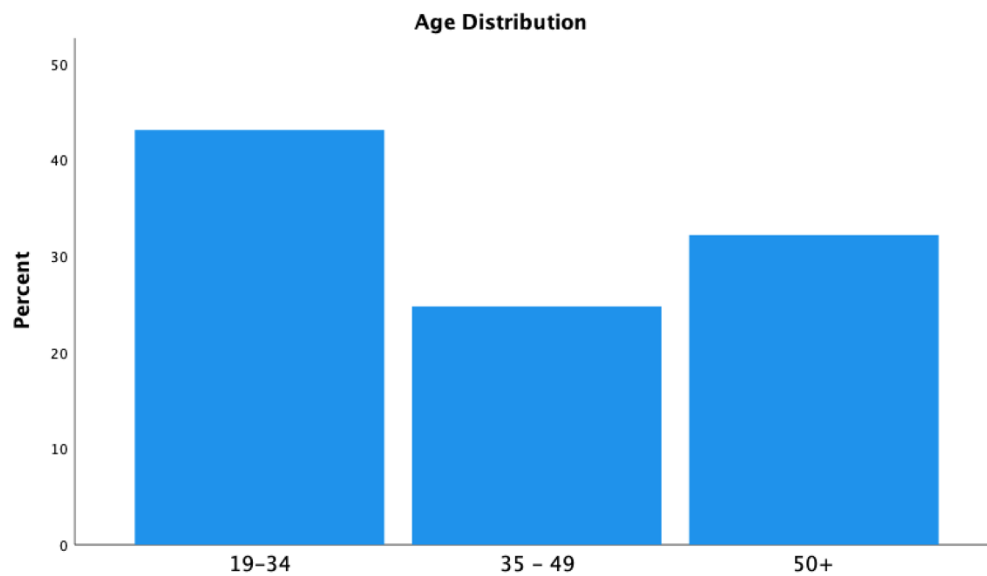
Respondents were reached through personal networks, social media and mailing organizations (convenience sampling), as well as through encouraging participants to transmit the survey to contacts (snowball sampling). The questionnaire was made available through a hyperlink to nettskjema.no. Participation in the study was voluntary and involved informed consent. To be eligible for the study, an individual had to be (a) currently employed and (b) 18 years or older. The participants were guaranteed full confidentiality. The study was conducted as per Guidelines of Norwegian center for research data.

Sample

The final sample of participants were narrowed down from an initial 547 participants through the use of an attention-check item which identified 62 (11%) participants being inattentive. These were excluded from the study and left the final sample with 485 participants. Of these 485 participants, 43.1% ($n = 209$) were aged 18-34, 24.7% ($n = 120$) were aged 35-49, and 32.2% ($n = 156$) were aged 50+ (see Figure 1 for a graphical representation of the age distribution).

Figure 1

The age distribution in the sample

**Measures: ODI**

The primary measure of interest in the present study was the Occupational Depression Inventory (ODI). The ODI is based on the diagnostic criteria for major depression in the DSM-5-manual (APA, 2013). The nine core symptoms that make out the clinical diagnostic criteria are reflected in nine symptom items. In addition, a tenth subsidiary question measuring turnover intention is included in the ODI, which refers to the employees' willingness to quit their job. These ten items making out the ODI and their Norwegian translation can be found in *Table 1*. The participants were asked to report on these items in a two-week window, consistent with the diagnostic criteria in DSM-5 for major depression (Bianchi & Schonfeld, 2020).

ODI's items are formulated in a causal way that implements attributions to their work, such as "My experience at work made me feel like a failure". Additionally, the participants were informed that these items were measuring their work-experience prior to responding. Respondents self-reported their experience on a four-point Likert scale, including 0 "never or

almost never”, to 1 “a few days only”, to 2 “more than half the days”, and 3 “nearly every day”. The turnover intention-item is rated on a three-point scale, including “yes”, “no” and “I don’t know”.

ODI is a tool designed to be utilized either dimensionally or categorically (diagnostically). Completion of the measure quantifies the items, and through the ODI algorithm a total ODI score is created. This score indicates the severity of the work-related depressive symptoms on a continuum. The suicidal ideation item is given particular weight in the calculation process, due to the severity of the symptom. Responding 1 “a few days only” or 2 “more than half the days” to the statement “I thought that I'd rather be dead than continue in this job” will have a considerable impact on the total ODI score. Categorically, ODI can help identify cases that reflect occupational depression and provide provisional diagnoses for professionals. They are provisional in the sense that a clinical diagnosis has to be made by a trained clinician (Bianchi & Schonfeld, 2020).

The ODI was translated into Norwegian using a back-translation method, where the English version was translated into Norwegian by two fluent Norwegian speakers. Then, two different Norwegian speakers performed a new translation back into English. None of the translators had prior knowledge of the ODI. The original English version did not show any troubling discrepancies from the back-translated English version when compared.

Table 1*Norwegian version of the Occupational Depression Inventory*

Symptoms	Items
Anhedonia	Mitt arbeid var så stressende at jeg ikke kunne glede meg over ting jeg vanligvis liker å gjøre. <i>My work was so stressful that I could not enjoy the things that I usually like doing.</i>
Depressed mood	Jeg følte meg deprimert på grunn av jobben min. <i>I felt depressed because of my job.</i>
Sleep alterations	Stress relatert til jobben førte til søvnproblemer (jeg hadde vanskelig for å sovne eller sove uforstyrret, eller jeg sov mye mer enn vanlig). <i>The stress of my job caused me to have sleep problems (I had difficulties falling asleep or staying asleep, or I slept much more than usual).</i>
Fatigue/loss of energy	Jeg følte meg utmattet på grunn av jobben min. <i>I felt exhausted because of my work.</i>
Appetite alterations	Jeg følte at appetitten min ble forstyrret på grunn av jobbstress (jeg mistet appetitten min, eller det motsatte, jeg spiste for mye). <i>I felt my appetite was disturbed because of the stress of my job (I lost my appetite, or the opposite, I ate too much).</i>
Feelings of worthlessness	Mine opplevelser på jobb fikk meg til å føle meg mislykket. <i>My experience at work made me feel like a failure.</i>

Cognitive impairment	<p>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).</p> <p><i>My job stressed me so much that I had trouble focusing on what I was doing (e.g., reading a newspaper article) or thinking clearly (e.g., to make decisions).</i></p>
Psychomotor alterations	<p>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.</p> <p><i>As a result of job stress, I felt restless, or the opposite, noticeably slowed down—for example, in the way I moved or spoke.</i></p>
Suicidal ideation	<p>Jeg tenkte at jeg ville heller være død enn å fortsette i denne jobben.</p> <p><i>I thought that I'd rather be dead than continue in this job.</i></p>
Turnover intention (SQ)	<p>Dersom du har støtt på minimum noen av problemene nevnt ovenfor, fører disse problemene til at du vurderer å slutte i din nåværende jobb eller stilling?</p> <p><i>If you have encountered at least some of the problems mentioned above, do these problems lead you to consider leaving your current job or position?</i></p>

Notes. SQ: subsidiary question

Measures: Hospital Anxiety and Depression Scale

The 7-item depression subscale of The Hospital Anxiety and Depression Scale was used to assess general depression among the study sample (Eriksen et al., 2019; Skoogh et al., 2010). The items of HADS-D were rated on a Likert scale ranging from 0 “I strongly

disagree” to 4 “I strongly agree”, with 2 “I neither agree nor disagree” as the neutral option in the middle. A sample item is: “I look forward with enjoyment to things.” Both Cronbach’s α and McDonald’s ω had a value of 0.85 for the HADS-D. 11% ($n = 52$) had HADS-D mean scores of 3 or above, indicating that a relatively low part of the group exhibited moderate to strong depressive tendencies.

Measures: Ostracism Short Scale

The 4-item work-related version of the Ostracism Short Scale was used to assess the subjective experience of exclusion among the study sample during the last two months (Rudert et al., 2020). The items were rated on a 5-point Likert scale, ranging from 0 “never” to 4 “always”. The items were: “Others ignored me”; “Others shut me out from the conversation”; “Others treated me as if I wasn’t there”; “Others did not invite me to activities”. Cronbach’s α had a value of 0.85 for the OSS, while McDonald’s ω had a value of 0.86.

Other measures in the study

Along with HADS-D, OSS and the primary measure of interest, the ODI, the questionnaire included two workplace violence items assessing physical aggression and verbal abuse (Bianchi et al., 2022), a sick leave item (Bianchi et al., 2022), a job promotion item (Bianchi et al., 2022), an attention-check item, sociodemographic items and a socioeconomic optimism item (SEO). The questionnaire also included an introductory message and a concluding message to provide relevant information to participants.

Data analyses

The tool used for data analysis was IBM SPSS Statistics (Version 28). Both descriptives, frequencies and graphs were mapped to identify distributions. To account for the factorial validity and examine the factor structure of the ODI's 9 items, the Maximum Likelihood factoring technique of Exploratory Factor Analysis (EFA) was used. The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and Bartlett's test of sphericity were conducted to assess the data's suitability for factor analysis, through determining the strength of the associations between the variables.

Cronbach's α and McDonald's ω were computed to estimate the total-score reliability of the ODI, HADS-D and OSS. Values under .70 are considered likely unacceptable, values between .70 and .80 are considered borderline acceptable, values between .80 and .90 are considered good, while values above .90 are considered excellent (Lance et al., 2006). Pearson's correlation coefficient was utilized to examine the criterion validity of the ODI, through investigating ODI's correlations with the items on work ostracism (OSS), general depression (HADS-D), workplace violence, sick leave, job promotion and socioeconomic optimism (SEO). Pearson's correlation coefficient was also used to determine ODI's discriminant validity with HADS-D. As the former assesses work-related depressive symptoms and the latter assesses general depressive symptoms, a moderately high correlation was anticipated. A perfect ($r = 1.00$) or close-to-perfect (r in the .90s) correlation would suggest that the ODI's discriminant validity is problematic.

Two negatively loaded items of the HADS-D were reversed to allow reliability analyses, while the mean score for the measure was reversed to allow correlation analyses.

Results

ODI mean scores ranged from 0.000 to 3.000, where 75.3% ($n = 365$) scored between 0.000 and 0.999, 21.6% ($n = 105$) scored between 1.000 and 1.999, and 3.1% ($n = 15$) scored between 2.000 and 3.000. The latter group are likely in the risk zone of being cases of occupational depression. 30.7% ($n = 149$) answered “Yes” on the ODI’s turnover intention-item on whether they considered leaving their current job or position.

Table 2

Correlations and descriptives of the main variables of the study (N = 485)

Variabel	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Age	-	-	-									
2. Sex	0.31	0.47	.06	-								
3. ODI	0.63	0.58	-.13**	-.19***	-							
4. HADS-D	2.09	0.66	-.11**	-.08	.66***	-						
5. OSS	1.59	0.69	.03	-.02	.42***	.41***	-					
6. Physical aggression	0.07	0.26	-.19***	-.01	.09*	.02	.01	-				
7. Verbal abuse	0.29	0.45	-.18***	-.02	.22***	.09	.19***	.33***	-			
8. Sick leave	0.23	0.42	.05	-.13**	.26***	.25***	.15***	.02	.06	-		
9. SEO	2.46	0.86	.00	.07	-.31***	-.32***	-.24***	-.03	-.22***	-.15***	-	
10. Job promotion	0.20	0.40	-.12*	.04	-.07	-.10*	-.05	-.06	-.02	-.04	.05	-

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 3*Factor analysis on items measuring occupational depression (N = 485)*

	Occupational Depression	Communality
ODI1: Anhedonia	.78	.61
ODI2: Depressed mood	.72	.52
ODI3: Sleep alterations	.72	.52
ODI4: Fatigue/loss of energy	.79	.62
ODI5: Appetite alterations	.66	.44
ODI6: Feelings of worthlessness	.64	.41
ODI7: Cognitive impairment	.77	.60
ODI8: Psychomotor alterations	.73	.53
ODI9: Suicidal ideation	.41	.17
<hr/>		
<i>Eigenvalue</i>	4.86	
% of variance	49%	
Total variance %	49%	
Range	.38	

Note. Factor loadings higher than 0.4 in bold; Extraction method was Maximum Likelihood factoring technique.

Table 4*Descriptives of the items of the ODI (N = 485)*

Variable	Minimum	Maximum	M	SD
ODI1	0	3	0.75	.82
ODI2	0	3	0.60	.80
ODI3	0	3	0.84	.90
ODI4	0	3	1.03	.91
ODI5	0	3	0.57	.84
ODI6	0	3	0.65	.79
ODI7	0	3	0.55	.73
ODI8	0	3	0.59	.82
ODI9	0	3	.10	.40

The total-score reliability of the ODI was satisfactory for both Cronbach's α (.89) and McDonald's ω (.90). Values on the .80- and .90-level are considered good and excellent, respectively.

The KMO-test confirmed the suitability of the ODI-items in a factor analysis, KMO = 0.92. Bartlett's test was significant, $p < .001$. All the nine items of the ODI scale loaded onto one factor. The factor explained 49% of the total variance. Factor loadings had a range of .38, where ODI4 (fatigue/loss of energy) had the strongest loading of .79 ($M = 1.03$, $SD = 0.91$) and ODI9 (suicidal ideation) had the weakest loading of .41 ($M = 0.10$, $SD = 0.91$).

The criterion validity of the ODI was investigated through a correlation analysis with Pearson's correlation coefficient. The strongest correlation was found to be between ODI and HADS-D ($r = 0.66$, $p < .001$), while ODI and OSS had the second strongest correlation, ($r = 0.42$, $p < .001$), indicating that people scoring high on depression and ostracism are likely to score high on occupational depression. The total ODI score was significantly associated to sick leave ($r = .26$, $p < .001$). The two items of workplace violence correlated significantly, verbal abuse ($r = .22$, $p < .001$) and physical aggression ($r = .09$, $p < .05$), where the latter

association was especially weak. Next, SEO showed a negative correlation ($r = -.31, p < .001$), indicating higher ODI score relates to lower socioeconomic optimism. The correlation between ODI and job promotion ($r = -.07, p = .117$) was the only non-significant of the analysis. None of the correlations deviated from expected directions.

Concerning the discriminant validity, the correlation between ODI and HADS-D was examined ($r = 0.66, p < .001$), revealing that the two measures correlated significantly and substantially, though not perfectly and not very highly.

Discussion

The aim of this study was to validate the ODI in the Norwegian language and increase the knowledge on the correlates of occupational depression. This discussion will first present the main findings, followed by a broader discussion on the variables investigated in the analysis. With the four hypotheses as a framework for the discussion, the findings from the analyses will together with the aspects presented in the introduction serve as a basis to elaborate on the further implications and to conclude with the contributions of this thesis.

Main findings

The results of this study are indicating the ODI to fit satisfactorily in the Norwegian context. The findings are consistent with earlier validation studies on the ODI (Bianchi et al., 2022; Bianchi & Cavalcante et al., 2023; Bianchi & Schonfeld, 2020; Bianchi & Verkuilen et al., 2023; Hill & Bianchi, 2021).

The first hypothesis of the present study, that one factor was sufficient in explaining the inter-item associations of the items of the ODI, was supported by the results from the Maximum Likelihood factoring technique of Exploratory Factor Analysis (EFA). All the nine items of the ODI scale loaded onto one factor, indicating unidimensionality. A further implication of the results is support of the use of a total ODI score, meaning that the goal of ODI as a dimensional and diagnostical tool is reasonable. On the basis of McDonald's ω and Cronbach's α , the ODI exhibited high reliability, which indicates that the measure will produce consistent, reliable results under the same conditions.

The results confirmed the second hypothesis that suicidal ideation would be the least frequently endorsed of the nine ODI items. This finding coincides with previous research on the ODI and is reasonable in the sense that degree of suicidality has been found to correlate with severity of depressive symptoms (Dold et al., 2018). In the present study, 6.8% ($n = 33$)

of respondents answered 1 or higher on the suicidal ideation item, indicating suicidal thoughts due to working conditions are prevalent in the sample. Still, only 3.1% ($n = 15$) scored between 2.000 and 3.000 on total ODI score. Running the ODI algorithm (see Supplementary Material 6 in Bianchi & Schonfeld, 2020) in SPSS identified 2.3% ($n = 11$) as likely cases of occupational depression, which is a lower rate than respondents reporting suicidal ideation. This finding and the aspects presented in the introduction illustrate the complex and nuanced relationship between depressive symptoms and suicidality in individuals.

The third hypothesis, that the ODI would show criterion validity with measures of relevance, was largely supported in the results. The first prediction was that occupational depression would be positively related to general depression, workplace ostracism, workplace violence and sick leave. The significant positive correlation between occupational depression and general depression was *the* strongest of all investigated correlations, while occupational depression and workplace ostracism shared the second strongest correlation in the data. Both physical aggression, verbal abuse and sick leave showed significant positive associations with occupational depression, but physical aggression's association was particularly weak. 6.8% ($n = 33$) answered 'Yes' to whether they in the last six months had experienced physical aggression in work settings, reflecting that a small proportion encounters such threats in their daily work life. A bigger proportion reported having experienced verbal abuse, mirroring findings of verbal abuse being more common across all sectors (Eurofound, 2017; Kim, 2022). As aforementioned, healthcare workers have increased odds of facing workplace violence. Despite physical aggression having the potential of leading to greater trauma, findings are that healthcare workers exposed to verbal aggression that may seem like minor incidents still experience significant psychological distress (Walsh & Clarke, 2003).

The second prediction of the third hypothesis was that occupational depression would be negatively related to job promotion and SEO. The correlation between total ODI-score and

job promotion was the only non-significant among the correlations with occupational depression, with a nearly negligible association. 19.6% ($n = 95$) of participants answered “Yes” to the job promotion item, which is a considerable amount. The insignificant correlation indicates that an increase or decrease in occupational depression is not associated with changes in status or income, which raises questions about the relevance of the item to the Norwegian work context and the impact of organizational culture. Occupational depression and SEO showed a significant negative association, with a weak effect size. Investigating the individual ODI items’ relation to SEO, the ones displaying the strongest correlations were ODI1 ($r = -.26, p < .01$), ODI2 ($r = -.24, p < .01$) and ODI6 ($r = -.27, p < .01$), with the symptoms of the items respectively being anhedonia, depressed mood and feelings of worthlessness. The fact that these symptoms are the ones with the biggest effect size in the opposite direction of SEO can, with caution, be interpreted as logical, as being optimistic about the socioeconomic future may not coincide with scoring high on these work-attributed symptom items.

The fourth hypothesis, that the ODI would show discriminant validity with a cause-neutral depression scale, was reflected in the results. Support was found for the prediction that there would be a substantial, though not perfect, positive correlation between occupational depression and general depression. Generally, correlations below 0.8 indicate that there is no evidence for a discriminant validity problem (Rönkkö & Cho, 2022). This entails that the ODI manages to implement the depressive symptoms of DSM-5 while still reflecting and assessing something different from general depression scales. The discriminant validity of the ODI was thus demonstrated, a tendency seen in earlier validation studies on the ODI (e.g. Bianchi & Schonfeld, 2020).

General discussion

Regarding the ODI's overarching aim of being applied to clinical practices (Bianchi & Schonfeld, 2020), there is a general consensus of higher standards for acceptable reliability score thresholds (Cho & Kim, 2015), as the use of a measure in clinical settings for e.g. diagnostical purposes can potentially have more direct and serious consequences for individuals. Cho & Kim's (2015) advice on settling for a reliability score threshold is: "When the importance of a decision made on the basis of a test score increases, the standard for reliability should also increase" (p. 218). The strong reliability scores the ODI has exhibited in the present study and earlier validation studies (e.g. Bianchi & Verkuilen et al., 2023) imply the measure has potential as a tool in clinical health practices.

With the ODI being based upon the DSM-5 diagnostic criteria for major depression, some overlap between occupational depression and general depression will naturally exist. When doing research on the mechanisms behind depressive conditions, causal inferences are unlikely (Kennair & Hagen, 2016). Psychological processes are complex, and the environmental risk factors for the subjective experience of depression are hard to map. Hence confounding variables will always be at risk of occurring when measuring occupational depression, as is the case with all psychological constructs. With the benefit of the ODI framework being that it clearly makes a causal link between depressive symptoms and work settings, validation studies of the ODI can "utilize" discriminant validity to state that the measured ODI scores are empirically distinguishable from general depression scores (Rönkkö & Cho, 2022). The association with the HADS-D-scores in the present study is therefore satisfactory, being neither too weak nor too strong.

The evidence on the link between suicidal ideation and depression paints a somewhat chaotic picture in an occupational health context in need of clarity and specificity. The causal formulation of the suicidal ideation item in the ODI is thus a strength, as respondents possibly

can pinpoint workplace conditions as the source of their suicidal ideation. Still, participants may find it hard to give accurate answers on a sensitive topic. Therefore, ensuring that participants' confidentiality or anonymity is maintained is important in facilitating for precise data (Howard et al., 2021). If executed properly, the ODI can be a tool for occupational health specialists to identify suicidal ideation and the workplace factors that influence suicidal tendencies. Further, adequate and comprehensive interventions can be settled earlier, to prevent suicidal ideation, increase workers' well-being and reduce number of suicide attempts and deaths. A barrier to improving the mental health of employees can be individuals' reluctance to seek help, as there still exists stigma surrounding mental health issues. This aspect is covered in the following paragraph.

As presented in the introduction, the sick leave rates due to mental health issues in Norway have been relatively stable over the last twenty years. This category of sick leaves has consequently proven to last longer than all other disease groups on average between 2018 to 2022, and number of working days lost to mental health issues made out 22 % of all lost working days in the Norwegian workforce in 2022 (NAV, 2023). This annual report also shed a light on the fact that many choose not to pursue mental health care at all, leaving a severe number of depression cases unaccounted for. The explanation can lie in cultural norms and attitudes towards mental health issues. Men are in particular known for not being open about their mental health and for committing the most suicides (Brown et al, 2019; WHO, 2021). Stigma and anticipation of stigma related to mental health issues can be barriers against seeking mental health care (Corrigan et al., 2014; Yang et al., 2020) and for employees in being open about the reason for their sick leave (Volz et al., 2022). A study on the impact of depression on European workers found that among 715 workers on sick leave due to depression, 25% of participants did not inform their employer of the reason for their sick leave, where 49% of these reasoned this with the matter being too private and 30% felt the

employer would not understand (Ipsos, 2012). Personal, structural, political and economic factors can be additional factors that inhibits openness about mental health (Corrigan et al., 2014).

On the job promotion item, which investigated whether participants had experienced higher status and income during the last six months, the insignificant findings could be a reflection of the economic situation in Norway. In 2021, the mean unemployment rate among European Union (EU) countries was 7.1%, while Norway's unemployment rate was 4.4% (Eurostat, 2022). 8.7% of employees in Norway were low-wage earners (earning two thirds or less of the national median gross hourly earnings) in 2018 (Eurostat, 2021). Add the fact that Norway had the second highest median gross hourly earnings compared to the EU countries in 2018 (Eurostat, 2021) and the nation's economic situation becomes clear. Low unemployment rates, low proportions of low-wage earners, high general wage levels and a generally stable national economy may be explanations as to why increased status and income and workplace well-being is not closely linked in this sample of Norwegian employees. Further research on the aspects discussed above in both Norway and other less wealthy countries will provide valuable knowledge on the topic.

An explanation to the low correlation between ODI and physical aggression could be that those in the workforce experiencing physical aggression often are in professions where such threats are perceived as a part of the job. In a study on UK health service employees that had faced workplace violence, severity of psychological responses was found to correlate with whether employees felt prepared to handle verbal and physical aggression, and whether such incidents were expected (Walsh & Clarke, 2003). The same authors found verbal aggression to have a greater impact on health workers. They hypothesized that this was due to these threats being perceived as more personally directed and meaningful, making them more threatening than less severe acts of physical aggression. How workers are affected could also

be determined by personal factors, such as coping style (Jeong & Kim, 2018). Research confirm that the health and social sectors are particularly exposed to working environment threats (Foley & Rauser, 2012; Piquero et al., 2013), with patients and users being the primary source of violence. Generally, a safe and health-promoting working environment that simultaneously includes the tasks and demands of the profession is not given in many sectors. The aspects discussed above could explain why physical aggression may serve as a poor predictor of occupational depression. To draw any definite conclusions on the low correlation would be rushed, but one can say that relatively few in the workforce experience physical threats and those that do are often aware of the risk of them occurring. Workplace violence is either way a severe issue that must be tackled. The consequences could be severe on different levels, possibly impacting both the well-being of employees, the productivity at the workplace and the economy of the organization.

The moderate association between occupational depression and work ostracism confirms an expected link. From a social psychological point of view, being ignored and excluded at the workplace would hurt a basic need of employees – to be part of a group and feel affinity. Social rejection has been found to be a risk factor for developing depressive symptoms such as shame and social withdrawal (Rudert et al., 2021).

The field of occupational health science has to this date not reached consensus on the operational definition and measurement of burnout, hence failing to identify differential diagnostic criteria, prevalence, biomarkers, etiology and proper interventions (Bianchi et al., 2022; Nadon et al., 2022). On the topic of stigma surrounding mental health issues, a positive side to the burnout construct has been the view of it as a less stigmatizing alternative to the depression label (Bianchi et al., 2019; Bianchi et al., 2016). Burnout has established itself in popular culture and is in particularly present in communication about work-related distress (Heinemann & Heinemann, 2017). Still, research on this topic is scarce and has not yet

demonstrated a mitigating effect of burnout on people's attitudes (Bianchi et al., 2016). Despite its shortcomings, the burnout construct has shown relevance as a work-related concept and has led to extensive research on work-related distress (Nadon et al., 2022). The limitations mentioned above and the unresolved debate surrounding the distinction between burnout and depression point towards a need for further research to conclude with the role burnout should play in the future landscape of occupational health science.

The ODI is in comparison to burnout a more concise and comprehensive tool of mapping job-related distress that thus far has shown great promise as a context-specific measure of depression. The ODI implements both dimensional and diagnostic considerations that enable accurate estimation of prevalence and effective identification of individuals that likely suffer from work-related distress. The suicidal ideation item covers a crucial topic and helps identifying individuals with suicidal tendencies to provide valuable information for further interventions. Being based upon long-established research on depression, another strength of the ODI vis-à-vis burnout is a stronger clinical foundation (Bianchi et al., 2020). The findings in this thesis are consistent with findings across earlier validation studies on the ODI in different countries and languages, and together they document the ODI as an instrument with high validity and strong reliability. The correlations investigated in the present study provide new information in a Norwegian context, increasing the knowledge on the ODI in relation to general depression, work ostracism, sick leave, workplace violence, job promotion and socioeconomic optimism.

Further research

The insignificant correlation between occupational depression and job promotion calls for more comprehensive examination of relevant aspects, such as the economic climate and organizational culture in Norway. The general low effect sizes exhibited with both

occupational depression and the other variables were also a worry for the predictiveness of job promotion.

Verbal abuse and physical aggression differed in the effect sizes displayed with the other variables of the study. This evidence is possibly a reflection of the varying prevalence of the two factors in and across work sectors and highlights the need for future ODI studies involving specific occupational sectors, such as the health and social sector. Then, more accurately mapping of the prevalence and the belonging associations are possible, making room for more conclusive inferences when put up against other occupational sectors.

The perhaps most intriguing area of research surrounds the suicidal ideation item. The implications of an occupational tool that helps identifying and embracing the most vulnerable individuals could be immense. An interesting focus could be in regard to how individuals that score high on suicidal ideation should be approached in further interventions. Investigating whether e.g. age, gender and work sector are predictors of which therapeutical approaches are optimal opens up for a better understanding. Qualitative research on individuals can clarify causal associations between factors.

Limitations

There are some limitations to the present study that are worth mentioning. The sampling methods used limit the generalizability of the findings, and how representative the study sample is of the Norwegian working population is unclear. The optimal option would be random sampling across the whole working population, but this method is rarely used in research designs due to the greater amount of resources it requires (Krishna et al., 2010). To increase the external validity, future studies should strive for including samples representative of specific work sectors and the general Norwegian working population.

The use of an online questionnaire where participants self-report their answers can lead to validity issues. There is a risk of several biases, such as over- and under-estimations, exaggerations and under-reporting to make oneself look better and imprecise or wrong recollections of the material in question. At the same time these biases could also occur in study designs involving a researcher conducting the data collection, where the mere presence of another individual can be a disturbing factor to some (Krishna et al., 2010). Such biases could be especially important to consider in relation to the suicidal ideation item of the ODI, as reaching through to individuals that struggle with suicidal tendencies can be challenging (Howard et al., 2021). These biases will likely to occur to some extent when working with bigger samples and is a compromise quantitative research often have to make to collect enough data, due to limited timeframes and, again, limited resources.

The cross-sectional study design is sufficient in this validation study, but it should be mentioned that lots of valuable information could be gained from a longitudinal design that investigate the impact of occupational depression on relevant factors over time.

The content of this study includes a broad array of articles written in Norwegian and English, with authors from all over the world. The possibility of misinterpretations in the translations and misunderstandings of the original contents in the cited articles should be mentioned, though thorough scrutiny and caution in the research process have been in focus.

Conclusion

The main findings supported the predictions made and provided evidence of the ODI having excellent psychometric and structural properties within the Norwegian context. Through the conducted data analyses, the instrument exhibited factorial validity and high total-score reliability. Investigation of the correlates of occupational depression supported the ODI's criterion validity and discriminant validity, and further provided valuable knowledge on associations, predictors and outcomes of occupational depression, while also indicating the direction future in-depth research should take. The consistency with earlier validation studies is encouraging for the utility of the ODI in helping occupational health specialists tackle the prevalent issue of work-related distress. Future ODI studies should use samples representative of the Norwegian working population and specific work sectors to clarify the generalizability of the ODI in Norway. Overall, this thesis helps illuminate the importance of psychological well-being at work and the challenges that the occupational health field have faced and still face surrounding definition and measurement of work-related distress. The ODI represents an important first step in direction of resolving these crucial issues, serving as a context-specific measure of depression to guide assessment, treatment and prevention of depressive symptoms in work settings.

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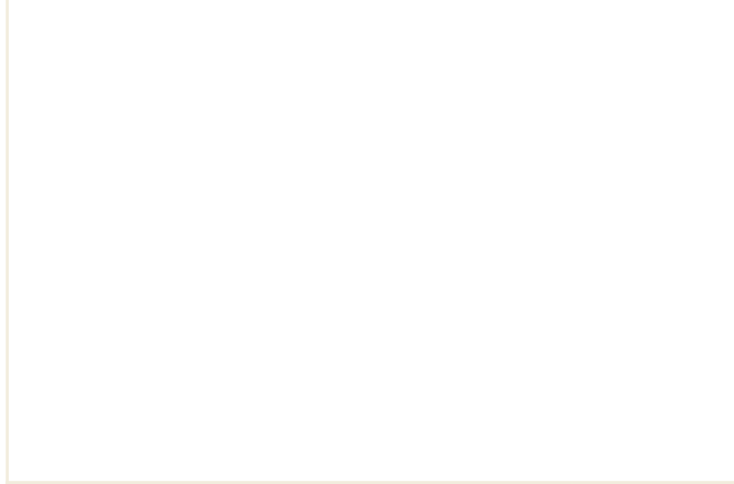
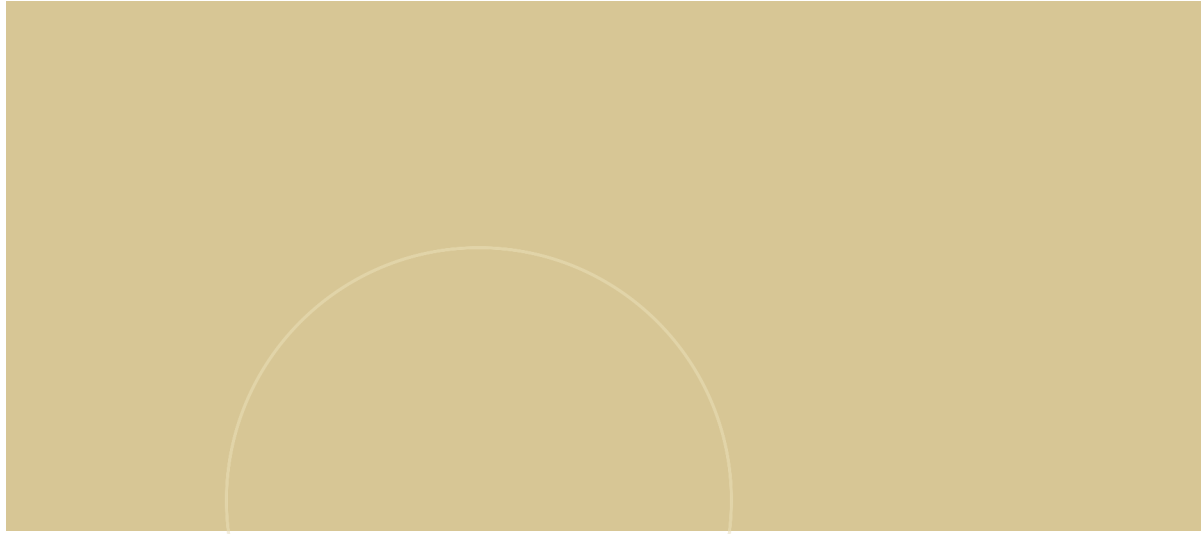
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