

**Mental health among Norwegian priests: Associations with effort–reward imbalance and overcommitment**

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## **Abstract**

*Purpose* The study aim was to determine the prevalence of anxiety and depression symptoms among Norwegian priests, and to examine their associations with effort–reward imbalance (ERI) and overcommitment.

*Methods* Eight hundred four priests in the Norwegian Church completed the Hospital Anxiety and Depression scale (HADS), the Effort–Reward Imbalance-Questionnaire (ERI-Q), and the Intrinsic Effort Scale, measuring overcommitment.

*Results* A significant proportion of the priests (23.4%) had HADS scores indicating a possible anxiety problem. Somewhat fewer had depression problems (9.3%). Both anxiety and depression difficulties were associated with an imbalance between effort given and rewards received at work. Priests characterized by a combination of this imbalance and high scores on overcommitment had more anxiety and depression symptoms.

*Conclusions* There is a higher occurrence of mental health challenges among priests than among the regular population. This applies in particular to anxiety symptoms measured by the HADS. These findings also indicate that it may be fruitful to explore mental health conditions among priests who report different combinations of effort–reward and overcommitment.

## **Keywords**

Priests, Clergy, Mental Health, Effort-Reward Imbalance

## **Introduction**

As an organization, the church differs from other organizations in relation to organizational structure, objectives and tasks. Accordingly, the priest profession differs from other professions in relation to the tasks they perform and the demands with which they are faced. These obligations have been summarized into six central roles: pastor, teacher, preacher, ritualistic leader, organizer and administrator (Carroll 2006). In addition, clergy are responsible for the church's role in the community, manage slim church budgets (Kuhne and Donaldson 1995), assist members of the congregation with mental health challenges (Wang et al. 2003), and balance work demands against expectations of family and spouse (Lee and Iverson 2003; Morris and Blanton 1998).

It is essential to maintain mental health among an occupational population that has so many challenges and different roles (Weaver et al. 2002). However, studies show a higher prevalence of depression among clergy compared with the general populations (Knox et al. 2002, 2005, 2007; Proulx 2008). Although several of these studies had small, nonrandom samples, Proeschold-Bell et al. (2013) also found a higher depression rate among a representative sample of all United Methodist clergies in North Carolina compared with a general population.

Regarding anxiety, the results have been more mixed. For example, Knox et al. (2002) and Proeschold-Bell et al. (2013) found a higher incidence of anxiety symptoms among clergy compared with the general population. However, in a UK study of Anglican clergy, male clergy had more anxiety than men in the general population, while female clergy had less anxiety than women in the general population. In that study, no differences were found between male and female clergy (Jones et al. 2004). In contrast, Musson (1998) found male clergy to have less anxiety compared with the general population.

Studies have examined whether mental health problems among clergy are related to occupational stress (Proeschold-Bell et al. 2013) or to individual coping strategies and personality (Dolittle 2007; Joseph et al. 2011). However, this literature is still sparse and generally characterized by cross-sectional studies of relatively small samples and qualitative studies (Kreiner et al. 2006). In addition, these studies often use instruments and a terminology adapted to an ecclesial life and specific aspects of the priestly ministry when measuring mental health (Francis et al. 2004) and occupational stress (Proeschold-Bell et al. 2013). This provides advantages for follow-up and prevention, but makes it more difficult to compare results with those for other professions. Consequently, in the current study we wished to examine the prevalence of mental health problems among Norwegian priests, and examine how this is associated with perceived work conditions. In contrast, using standardized instruments allows us to compare these results with those for other professions and general populations.

One influential model in the study of psychosocial working environment and health is the Effort–Reward Imbalance Theory (Siegrist 1996). This model emphasizes that both extrinsic and intrinsic factors influence employee health. Numerous studies have shown that effort–reward imbalance predicts development of poor mental health (Nieuwenhuijsen et al. 2010; Siegrist 2008; Stansfeld and Candy 2006). In a modified version of the model, high demands (extrinsic and intrinsic) and low rewards were associated with both depression and anxiety symptoms among priests (Proeschold-Bell et al. 2013). However, as far as we know, the original model has not been tested in a population of priests. Consequently, we wished to examine the effort–reward model-based hypotheses in relation to anxiety and depression using a sample of priests in the Norwegian Church. More specifically, the effort–reward imbalance model consists of three hypotheses (Lau 2008). These include: (1) *The effort–reward imbalance hypothesis* – The mismatch between high effort and low reward (no reciprocity) leads to adverse health; (2) *The*

*overcommitment hypothesis* – A high level of personal commitment (overcommitment) increases adverse health risk (even when effort–reward imbalance is absent); and (3) *The interaction hypothesis* – Relatively higher risks of adverse health are expected in individuals characterized by conditions (1) and (2).

Several studies have tested the interaction hypothesis with an underlying synergetic understanding of an interaction effect: that the level of the moderator variable overcommitment influences the relationship between the independent and dependent variables (Siegrist and Li 2016). In line with such a view, we would expect the associations between effort–reward imbalance and health variable to be strongest among employees with high scores on overcommitment. However, we were also interested in employees with scores on the overcommitment and effort–reward scales, which are understood to have opposing health effects (i.e. the combination of low overcommitment with high effort–reward score and *vice versa*). As such, we have previously also divided respondents into four groups according to combinations of high and low scores on the overcommitment and effort–reward scale, respectively. This resulted in four groups: *Relaxed*, *Struggling*, *Exaggerated* and *Despaired* (Lau 2008).

*Relaxed priests* are nonovercommitted and receive adequate reward when effort is taken into consideration. *Struggling priests* are not overcommitted, but experience an imbalance in effort compared with reward. *Exaggerated priests* are overcommitted in a working setting, but their effort is reciprocated with reward. *Despaired priests* are overcommitted in a work setting where their effort is not matched by received reward. We expected Despaired priests to reveal less favorable anxiety and depression scores compared with others. Further, we expected favorable scores among Relaxed priests. We were also interested in priests whose scores on the overcommitment and effort–reward scales are presupposed to have opposing effects on mental health (i.e. Struggling and Exaggerated priests).

Consequently, our first study goal was to examine the levels and incidence of anxiety and depression among priests in the Norwegian Church. Secondly, we wanted to investigate how the effort scale and the different reward parameters in the ERI model (esteem, job promotion and job security) were associated with anxiety and depression, respectively. Third, we sought to examine whether a mismatch between high effort and low reward was associated with anxiety and depression. Fourth, we investigated whether overcommitment was associated with anxiety and depression. Fifth, we tested whether an interaction between effort–reward imbalance and overcommitment was associated with poor mental health, beyond what would be predicted by effort–reward imbalance and overcommitment, using both a synergistic and an additive approach.

## **Method**

The study stems from an effort to reveal factors that might contribute to prevention of psychosocial work-related stress, with the aim of developing and evaluating a positive working environment in the Norwegian Church. In Norway, about 70 percent of the population belongs to the Evangelical Lutheran Christianity. Most people who confess to the Evangelical Lutheran faith are members of the Norwegian Church. Until 2016, this was the official religion in Norway, and the church was directly subordinate to the state. After 2016, the Norwegian Church was established as its own legal entity, with financial support from the state. The project was funded by the Ministry of Church Affairs and the ecclesiastical employer and interest organization (KA). It was developed through a joint reference group in which representatives of various trade unions and employers' associations participate. The work began in 2011 and the data collection was completed in spring 2012.

## **Procedure**

Central and local employers prepared electronic lists of e-mail addresses of all employees in the Norwegian Church. All employees working in the church were invited by e-mail to participate in a web survey. This email contained, in addition to the invitation, a written description of the project, and a description of how to proceed in order to participate in the survey.

## **Participants**

It was difficult to determine response rates because we obtained only the e-mail addresses of those employed in the Norwegian Church, without information about gender, age, marital status or employee category. However, when comparing the number of respondents with those registered in various job categories in employer payroll and personnel systems, our best estimate is that about 60% of the priests in the Norwegian Church participated in the survey.

## **Measurements**

### *Background variables*

Age, gender and marital status were self-reported in the questionnaire. As shown in Table 1, respondents were primarily male (72.6%), reflecting the profession's population. The larger proportion (56.7%) were over age 50 years. Eighty-five percent lived in a relationship (married or cohabiting), while 15% lived without a partner (single, separated, divorced or widowed).

### *The effort–reward imbalance model*

Participants answered a Norwegian version (Lau 2008) of the standardized, self-administered Effort–Reward Imbalance-Questionnaire (ERI-Q) (Siegrist et al. 2004). Five items measured effort (deleting an item from the standard measure, asking for physical workload), while reward was measured with three scales: esteem (five questions), job promotion (four questions) and job

security (two questions). Effort scale items asked whether the item content described a typical experience with their work situation, and if so, whether the conditions caused strain. Response options included: 1 = “does not apply”; 2 = “does apply, but not strained”; 3 = “does apply and somewhat strained”; 4 = “does apply and strained”; and 5 = “does apply and very strained”. The 11 items measuring reward were framed similarly, although with reversed coding, so that the lower the summary scores for reward, the higher the subjective ratings of distress due to low reward. The three reward scales were used both separately and in a merged version, by averaging the variables in the three reward scales. Cronbach’s alpha values were 0.84 for the effort scale and 0.78 for the combined reward scale.

Next, the Effort–Reward Imbalance (ERI) measure was created by dividing the effort scale (numerator) by the reward scale (denominator) to quantify the amount of ERI; thus, ERI is higher with increasing ratio values. The effort–reward ratio was calculated as follows:  $\text{effort/reward} \times \text{correction factor}$  (correcting for the difference in the numbers of items between the two scales).

Overcommitment at work was measured using the Norwegian version of the short form of the Intrinsic Effort Scale (Lau 2008). Five items focus on “inability to withdraw from work” and one item focuses on “disproportionate irritability”. Response options were on a four-point rating scale (1 = strongly disagree, 2 = disagree, 3 = agree, 4 = strongly agree) and Cronbach’s alpha was 0.80. A principal components analysis, with varimax rotation, confirmed a one-factor solution.

#### *Symptoms of anxiety and depression*

Symptoms of anxiety and depression were measured by the Hospital Anxiety and Depression scale (HADS) (Zigmond and Snaith 1983), a 14-item survey with response options scored from zero to three. A two-factor solution was supported by principal components analysis; Cronbach’s



alphas were 0.83 and 0.76 for the anxiety and depression scales, respectively. Consequently, an anxiety subscale (HAD-A) and a depression subscale (HAD-D), with seven items each, were computed. Forms with at least five of the seven items filled in on any subscale were included. The scores were computed as the mean of valid responses multiplied by seven. Because the best balance between sensitivity and specificity for the HADS as a screening instrument has most frequently been reported with a cut-off score of  $\geq 8$  (Bjelland et al. 2002), this value was used for the present study.

### **Statistics**

Using cross-tabulation with chi square test, we examined whether the occurrence of high levels of effort–reward imbalance, anxiety and depression were unevenly distributed in relation to gender, age and marital status.

A series of multivariate logistic regression analyses were performed to test how the effort scale and the different reward parameters (esteem, job promotion and job security) were associated with anxiety and depression, respectively. In these analyses the independent variables were centered, with 1 standard deviation as unit of analyses. The effort–reward imbalance hypotheses, was tested with two different independent variables (a dichotomous ERI ratio score with cut-off point at 1, and ERI ratio quartiles) in separate logistic regression analyses. The overcommitment hypothesis was tested with a continuous centered version of the overcommitment scale, with 1 standard deviation as unit of analyses. In these analyses, gender, age and marital status were controlled for.

Because logistic regression analyses substantially reduce statistical power, linear regression analyses were also conducted to test the effort–reward imbalance hypothesis, the overcommitment hypothesis and the interaction hypothesis. In order to test the effort–reward

imbalance and overcommitment hypotheses, ERI ratio and overcommitment were entered simultaneously in a series of regression analyses, controlling for age, gender and marital status. The interaction hypothesis was tested by entering multiplicative terms (ERI ratio \* overcommitment) in the first step of the models. All independent variables were centered in these analyses.

To test the hypothesis that relatively higher risks of reduced mental health are expected in those participants characterized by experiencing failed reciprocity between efforts and rewards and overcommitment, participants were assigned to one of four groups according to their overcommitment scale and ERI ratio scores. The four groups were: *relaxed employees* (low on overcommitment and low on ERI); *struggling employees* (low on overcommitment and high on effort–reward); *exaggerated employees* (high on overcommitment and low on effort–reward); and *despaired employees* (high on both overcommitment and effort–reward) (Lau 2008). Scores above the median split on both the overcommitment and ERI ratio scales were characterized as high. The general linear models univariate analysis of variance was used to test for mean differences in anxiety and depression between these four groups. In these analyses, gender, age and marital status were controlled for. Pairwise comparisons were tested simultaneously with post hoc Sidak tests, which adjust the significance level for multiple comparisons.

The procedure of combining the extrinsic and intrinsic components of ERI in a subgroup analysis, was also tested by entering the four groups according to supposed level of stress (from relaxed to struggling to exaggerated to despaired) in logistic regression analyses, predicting anxiety and depression, respectively. In these analyses, the relaxed category was used as reference group.

Data were analyzed using SPSS for Windows (version 22, IBM Corp., Armonk, NY).

### **Ethics and approvals**

These data were anonymous, with all names and personal ID numbers omitted. The study was conducted in accordance with the World Medical Association Declaration of Helsinki and with permission from the Norwegian Centre for Research Data.

### **Results**

As shown in Table 2, 9% of the priests experienced an imbalance between the effort they provided in their jobs and the rewards they received in terms of recognition, career opportunities and job security. We found no statistically significant differences in this outcome in relation to gender, age or marital status. Further, 23.4% had scores of  $\geq 8$  on the HAD-A, indicating an anxiety disorder (Table 2). Compared with men (19.9%), more women had high HAD-A scores (32.7%). We also found significant differences in relation to age, with higher rates of anxiety in the group aged 30–39 years (35.4%) and lower rates among priests aged 50–59 years (17.8%) and those over 60 years (15.7%). In relation to depression, 9.3% of the priests had high scores on the HAD-D (8 or higher), indicating a depressive disorder. There were no significant differences on this measure in relation to gender, age or marital status.

As shown in Table 3, a continuous score on efforts, and an overall reward score as well as the three underscores esteem, job promotion and job security were associated with anxiety and depression, respectively. In addition, the effort–reward imbalance hypotheses (that a mismatch between high effort and low reward is associated with anxiety and depression), was supported in the two different independent approaches; using a dichotomous ERI ratio score with cut-off point at 1, and when using ERI quartiles (Table 3). The overcommitment hypothesis (that a high level of personal commitment is associated with anxiety and depression) was also supported, as shown in Table 3.

In a stepwise linear regression analysis, both ERI ratio and overcommitment were associated with anxiety and depression, when controlling for gender, marital status and age (Table 4). In separate analyses, ERI ratio was correlated with anxiety ( $\beta$ : .19;  $p < 0.01$ ) and depression ( $\beta$ : .23;  $p < 0.01$ ), and overcommitment was correlated with anxiety ( $\beta$ : .48;  $p < 0.01$ ) and depression ( $\beta$ : .34;  $p < 0.01$ ). The interaction of ERI ratio and Overcommitment was not significantly associated with either Anxiety or Depression.

As shown in Table 5, Despaired priests had higher anxiety scores than the other groups. At the same time, Relaxed priests were found to have less anxiety than Exaggerated and Despaired priests. When it came to depression, Relaxed priests had lower values than all the other groups and Despaired priests had higher depression scores than Relaxed and Exaggerated priests.

In Table 6, a similar pattern is shown when using dichotomous versions of the anxiety and depression scales, with particularly high odds ratios for despaired priests compared with the reference category of relaxed priests. Because no one in the small group of struggling priests had clinically high scores of anxiety, we did not get any results for this group in relation to anxiety.

## **Discussion**

Among the priests in this study, 23.4% had scores  $\geq 8$  on the HADS-A, which is indicative of a need for further clinical follow-up for anxiety issues (Bjelland et al. 2002). We found a strong gender difference in HADS-based anxiety symptoms, with 32.7% of female priests reporting high scores compared with 19.9% of male priests. Compared with studies of the general Norwegian population in which the HADS has been used to measure anxiety and depression symptoms (Bjelland et al. 2009; Grav et al. 2012; Sterud et al. 2008; Stordal et al. 2001, 2003), our results reveal a distinctly higher prevalence of anxiety symptoms among both female and male priests. For example, in a national study among paramedics (Sterud et al. 2008), 13.8% of women and

9.8% of men had scores  $\geq 8$  on the HADS-A. Compared with a US study that also used the HADS-A, including all United Methodist clergy in North Carolina, our anxiety rates were higher (Proeschold-Bell et al. 2013). In the US study, 13.5% had scores of  $\geq 8$ , with a slightly higher incidence among women (16.7%) compared with men (12.6%) (Proeschold-Bell et al. 2013).

In relation to depression, 9.3% of the priests scored  $\geq 8$  on the HAD-D, indicating a possible depressive disorder. This number is more consistent with what others have found in studies of the general Norwegian population (Grav et al. 2012; Stordal et al. 2003). However, compared with Norwegian ambulance workers, we found more symptoms of depression among male priests (9.2%) compared with male ambulance workers (3.7%) (Sterud et al. 2008). Because few studies have examined the prevalence of depression among priests with the HADS, it is difficult to compare these numbers with other priest populations.

In contrast to a study of 62,344 Norwegian adults that found a higher incidence of depression among those over 50 years (Stordal et al. 2001), we found no age differences. This may be a result of a healthy worker effect, where those with best mental health remain in the profession. However, it is difficult to draw any conclusion about this in a cross-sectional study, beyond taking note that we did not find age differences in despite expecting to do so.

The particularly high incidence of anxiety symptoms in this study may indicate that a priest population answers the HADS differently than do other populations. That is, we cannot exclude the possibility that these high scores reflect a response style of reporting about concerns that do not necessarily signify clinical anxiety. However, it should not be ruled out that these results reflect a real phenomenon. It may be particularly difficult for priests to seek help for anxiety issues, as such feelings can be perceived as contradictory to central beliefs about the appropriateness of not being fearful. Thus, it may be that priests are less likely to seek and

receive treatment for their anxiety disorder compared to others. However, in order to investigate the validity of the HADS in this occupational population, it will be necessary to follow up those with high scores in structured clinical interviews to assess anxiety and depression.

In this study, 9% of the priests had higher than average levels on the effort scale than they had on the reward scale, indicating an effort–reward imbalance. This is almost twice the rate as we have reported previously in a Norwegian sample of municipal employees (Lau 2008), but at the same level as previously found in a nationwide sample of Norwegian general practitioners and private practice specialists (Veltmer, Rosta, Siegrist & Aasland, 2011). This indicates that more priests experience an imbalance between the effort they provide and the rewards they receive, compared with other public employees. However, because we used an aggregate score to measure effort and reward, we do not know what kind of reward (recognition, career opportunities or job security) these priests might have less of, nor whether it is primarily a burdensome effort that creates the imbalance. However, despite such an uncertainty, we found that the effort scale and the three reward parameters were equally associated with anxiety and depression. This gives an indication that all of these conditions may have an impact on both anxiety and depression issues, although we cannot say that one is caused by the other.

Logistic and linear regression analyses provide support for both the effort–reward imbalance and the overcommitment hypotheses, in relation to symptoms of anxiety and depression. The effort-reward imbalance hypothesis was supported both in a dichotomy approach and when using a ERI ratio quartiles approach. The procedure of the established convention of applying a cut-off point of 1.0 in the ERI ratio has been criticized of running a risk of under- or over- estimation (Montano & Siegrist, 2016). It is therefore recommended to use ERI ratio quartiles or continuous ERI data as well. In the current study, where only 9 % of the priest had an effort–reward imbalance, it could be difficult to evaluate a potential dose-response relationship.

Therefore, we used the ERI quartile approach in addition to the dichotomous approach.

We found no support for the synergetic interaction hypothesis in multivariate logistic regression or in the linear regression analyses, possible because these results are sensitive to the model building technique. However, when assigning employees to different groups according to their scores on the effort–reward and overcommitment scales, we found, as expected, that Despaired priests have less favorable mean health scores compared with the other groups. This supports an additive interaction effect, which states that the combination of overcommitment and high ERI scores is especially detrimental. Thus, we see a fairly clear tendency: Despaired priests had higher scores on measures of both anxiety and depression symptoms than the other groups, while Relaxed priests had lower scores. Struggling and Exaggerated priests had levels in between these groups. The logistic regression analyzes yielded comparable results with the results from the general linear models univariate analysis of variance. We found a clear dose-response effect in these analyzes. In particular, Despaired priest had larger odds ratio values for both anxiety and depression when compared to the reference group, Relaxed priests. A problem with the division into four groups was few individuals in the group of struggled priests. When neither of these had clinical levels on HADS-A, we did not get results for this group in the logistic regression analysis.

The results from this cross-sectional study make it difficult to conclude whether there are causal relations between the effort–reward imbalance model and overcommitment on the one hand, and anxiety and depression symptoms on the other. It may be that an unfavorable work environment contributes to the development of anxiety and depression symptoms. That is, an insecure job situation may lead to anxiety, or a demanding workload or lack of recognition might lead to hopelessness and fatigue which gradually develops into depression. Alternatively, it is uncertain that the working environment is objectively stressful or insecure or if it is regarded as

such by priests affected by symptoms of anxiety or depression. For example, both the experience of work demands as stressful and of the workplace as uncertain are components of the effort–reward imbalance model. Symptoms of depression might lead to experiences of the working environment as particularly burdensome, while anxiety symptoms could conceivably contribute to a perception of the workplace as uncertain.

Some of the same causality problems exist with the overcommitment scale. Assuming a causal relationship, overcommitment might cause anxiety and depression, or may be a result of those symptoms. A closer look at the scale that measures overcommitment shows several questions on which we would expect high scores from those with anxiety. Consequently, in order to examine potential causal relationships, we need prospective studies that can control for baseline mental health.

In sum, this study shows that priests with mental health challenges, as well as those overcommitted in their work, experience that work as stressful. This makes it suitable to intervene at two levels: individually or via the work environment. Using our division of four groups may therefore have practical significance when choosing interventions aimed at reducing health problems. Those in the Strugglers group may profit from measures that make the working environment less strenuous or more rewarding in terms of recognition, job security or career opportunity. Exaggerators, on the other hand, would likely benefit more from individual counseling with a view toward reducing overcommitment. Finally, Despaired individuals would likely benefit most from a combination of both intervention types.

But these conditions are not necessarily as simple as proposed here. For example, among strugglers there might be a group with anxiety, where this condition means they are not able to perceive rewards at the same time as it increases their perception of strain. We will therefore emphasize that we due to the cross sectional design of this study, not can claim that bad working



environment leads to poor mental health. Consequently, when people have an anxiety or depression problem, this must be prioritized. Therefore, one should first examine the mental health of priests with high scores of anxiety and depression. This emphasize the importance of a good occupational health services, which focuses on the mental health of priests. Secondly, one should also do surveys of the work environment in each congregation, both in relation to the burden of efforts and lack of rewards, but also by other factors which may be relevant to the individual's well-being and health.

### **Limitations and strengths**

One study strength was that we relied on a large-scale survey with a reasonable response rate among Norwegian priests. However, it was also based on a cross-sectional design; therefore, the observed associations cannot be used to deduce causal relationships, but to generate well supported hypotheses. If we assume a causal relationship, an effort–reward imbalance may lead to an increased likelihood of unfavorable mental health. However, unsatisfactory self-reported job conditions might also reflect that symptoms of anxiety or depression contribute to a perception of work conditions as tedious and straining. In addition, because individual factors, such as negative affectivity or personality were not included in this study, confounding influences from such factors cannot be excluded.

### **Conclusions**

A relatively large proportion of priests' HADS scores were consistent with anxiety or depression problems. Simultaneously, we found strong correlations between these mental health challenges and self-reported stressful work environments in terms of an imbalance between executed effort and received reward, and with a tendency to overcommitment in work. These associations are not

necessarily causally related, but the results may be valuable in developing preventive measures in the working environment, and individual measures aimed at priests with mental health challenges. Consequently, categorizing priests according to their effort–reward imbalance and overcommitment scores may have practical implications for the choice of preventive measures aimed at reducing mental health problems.

### **Conflict of interest**

The author declares to have no conflict of interest.

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**Table 1** Sample characteristics

		Frequency	Percent
Gender	Men	584	72.6
	Women	220	27.4
Age	≤29	17	2.1
	30–39	147	18.3
	40–49	184	22.9
	50–59	259	32.2
	≥60	197	24.5
Marital status	Without partner	121	15
	Married/cohabitant	683	85

**Table 2** Prevalence rates of high ERI ratio and anxiety and depression symptoms

		ERI		HAD-A		HAD-D	
		Percent with high score (>1)	$\chi^2$	Percent with high score ( $\geq 8$ )	$\chi^2$	Percent with high score (>8)	$\chi^2$
Total		9%		23.4%		9.3%	
Gender	Men	8.6%	.40	19.9%	14.8**	9.2%	0.2
	Women	10%		32.7%	*	9.5%	
Age	$\leq 29$	11.8%	2.6	23.5%	27.2**	5.9%	5.6
	30–39	11.6%		35.4%	*	8.8%	
	40–49	9.8%		29.9%		13.6%	
	50–59	8.1%		17.8%		8.5%	
	$\geq 60$	7.1%		15.7%		7.1%	
Marital status	Without partner	10.7%	.50	24.8%	.7	9.1%	.9
	Married/cohabitant	8.6%		23.1%		9.4%	

\*Sig.  $p < 0.05$

**Table 3** Components in the Effort-Reward Imbalance Model, entered in adjusted logistic regression analyses (adjusted for gender, age and marital status) to predict anxiety and depression

	ANXIETY		DEPRESSION	
	OR	95% CI	OR	95% CI
Efforts <sup>a</sup>	2.1*	1.7-2.5	2.3*	1.8-2.9
Reward scales (combined) <sup>a</sup>	0.5*	0.4-0.6	0.4*	0.3-0.5
Esteem <sup>a</sup>	0.6*	0.5-0.7	0.5*	0.4-0.6
Job promotion <sup>a</sup>	0.6*	0.5-0.7	0.4*	0.3-0.5
Job security <sup>a</sup>	0.6*	0.5-0.7	0.5*	0.4-0.7
ERI-ratio > 1	5.3*	3.3–8.8	9.2*	5.3–16.1
ERI quartiles				
Lowest	Reference		Reference	
Second	2.3*	1.2-4.7	4.7*	1-22.1
Third	4.9*	2.5-9.4	10.1*	2.3-43.8
Highest	12.9*	6.9-24.4	30*	7.1-126
Overcommitment <sup>a</sup>	4.1*	3.2-5.2	3.0*	2.3-4.0

<sup>a</sup> Continuous measures with 1 standard deviation (SD) as unit of analyses.

\*Sig.  $p < 0.05$



**Table 4** Linear regression models predicting anxiety and depression by effort–reward ratio, overcommitment and the interaction between effort–reward ratio and overcommitment (adjusted for gender, age and marital status)

		Anxiety			Depression		
Step		$\beta$	Adj R <sup>2</sup>	Adj R <sup>2</sup>	$\beta$	Adj R <sup>2</sup>	Adj R <sup>2</sup>
			R <sup>2</sup>	Change		R <sup>2</sup>	Change
1	Effort–reward ratio	.19*			.23*		
	Overcommitment	.48*	.40	.35	.34*	.24	.24
2	Effort–reward ratio*	.02	.40	.00	.08	.24	.00
	Overcommitment						

\*  $p < 0.05$

**Table 5** Estimated marginal means and standard error (SE) of anxiety and depression according to combinations of overcommitment (OC) and effort–reward imbalance ratio (ERI ratio), controlling for gender, age and marital status

	Relaxed employees (n=392)		Struggling employees (n=7)		Exaggerated employees (n=340)		Despaired employees (n=65)	
	Low OC and Low ERI		Low OC and High ERI		High OC and Low ERI		High OC and High ERI	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Anxiety	3.54 <sup>ab</sup>	0.15	5.25 <sup>c</sup>	1.01	6.41 <sup>ad</sup>	0.16	8.93 <sup>bcd</sup>	3.94
Depression	2.28 <sup>abc</sup>	0.13	5.13 <sup>a</sup>	0.97	4.08 <sup>bd</sup>	0.14	6.45 <sup>cd</sup>	0.32

Note: Values with the same letter are significantly different at the 0.05 level.

**Table 6** Combinations of effort-reward imbalance (ERI) and overcommitment (OC), entered in adjusted logistic regression analyses (adjusted for gender, age and marital status) to predict anxiety and depression.

	ANXIETY		DEPRESSION	
	OR	95% CI	OR	95% CI
Relaxed employees (n=392)	Reference		Reference	
Struggling employees (n=7)	0		19.4*	3.3-115.6
Exaggerated employees (n=340)	7.8*	4.9-12.4	6.3*	2.9-13.6
Despaired employees (n=65)	24.3*	12.6-44.9	32.3*	13.6-76.4

\*Sig.  $p < 0.05$

*Relaxed employees* = low OC and low ERI

*Struggling employees* = low OC and high ERI

*Exaggerated employees* = high OC and low ERI

*Despaired employees* = high OC and high ERI