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ABSTRACT
Burnout among general practitioners (GPs) is a problem in many countries. Research indicates that burnout is less likely to occur among intrinsically motivated employees. Based on self-determination theory, we investigate 1) whether intrinsically motivated GPs are less burned out than their colleagues, and 2) whether the most intrinsically motivated GPs are more likely to burn out when exposed to an external regulatory accreditation programme. General practices in Denmark were cluster randomized to mandatory accreditation in 2016, 2017 or 2018. We measure GPs’ intrinsic motivation and burnout levels one and two years into the accreditation process. We use a balanced panel of GPs (n = 846) to estimate mixed effects ordered logit models. We find that GPs with high intrinsic motivation are less burned out than their colleagues. However, the most intrinsically motivated GPs are significantly more burned out when exposed to accreditation compared to their colleagues. We conclude that being intrinsically motivated may not shield from burnout when external regulation is imposed.

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1. Introduction

In many countries, the well-being of general practitioners (GPs) is threatened by low job satisfaction and burnout [1–3]. GPs’ well-being is important as it influences quality of care. GP prescription patterns, patients’ adherence to medical treatments and patient satisfaction [4,5]. Moreover, well-being has proven central for the retention of GPs [5]. Hence, in times of GP shortage [5,6], well-being is key.

One measure of well-being is burnout [7,8], which, among GPs, has been associated with increasing administrative burdens, greater workload, and longer working days [3]. This may negatively impact GPs’ work motivation. Sinsky et al. remarked in their paper on burnout in general practice that “joy is in short demand” [9]. Persons experiencing pure joy and pleasure from the work in itself, regardless of external rewards, are intrinsically motivated [10]. Intrinsic motivation is known to be a positive predictor for performance [11–14] – also among health care professionals [14,15]. Intrinsically motivated employees are less likely to be burned out [13,16–19], as they are nurtured by self-determination, a theoretical term defined as exerting control over one’s life [10]. The self-determination framework focuses on the motivation of individuals through their inherent growth inclinations and innate psychological needs, such as competence development, work autonomy, and relatedness [10,20]. However, especially for the highly intrinsically motivated employees, it can be challenging to meaningfully integrate externally imposed activities associated with control and loss of autonomy, as they have a distinct need for self-determined behaviour [10,20]. Based on this, it has been advised that organisations are cautious when applying coercive controls such as monitoring, in order not to inadvertently harm occupational well-being [13]. Nevertheless, the health care sec-
tor has been exposed to various regulatory systems in recent years, such as appraisal and revalidation systems, accreditation programmes, report cards and certification (see e.g. [21–24]).

In Denmark, mandatory accreditation of general practice was implemented as a cluster randomized field experiment from 2016–2018. Previous research has shown that the mandatory accreditation programme was considered a tool for external control among most GPs [25]. Nevertheless, being accredited did not crowd out intrinsic motivation [24]. However, even if no harm is done at the aggregate level, subgroups of GPs may be negatively influenced by the regulation. Although evidence from other professions suggest that intrinsically motivated employees are generally less burned out than their colleagues [13,16–18], crucial questions are 1) whether this is also the case in a general practice setting, where GPs own their private practices, and 2) whether highly intrinsically motivated GPs are more likely to burn out than their colleagues, when exposed to external regulation that holds the potential for compromising experiences of autonomy, competence, and relatedness.

2. Study setting

2.1. Danish general practice

GPs in Denmark work in their own private practices contracting with the public health care authorities in a mixed capitation and fee-for-service system. The system is tax-financed, and most GP services are free of charge to patients [26]. In 2016 there were 3,421 GPs in Denmark organised in 1,922 practices [27,28]. While demands for services have increased over the years, among other things due to an ageing population and more chronically ill patients [29], the number of GPs has decreased by approximately 6 % since 2007 [27]. The proportion of GPs suffering from moderate and severe burnout, respectively, has increased from 24 % and 3 % in 2004 to 38 % and 11 % in 2016 [30,31].

2.2. External regulation: accreditation of general practice in Denmark

In Denmark, mandatory accreditation of general practice was implemented in the years 2016–2018. The regulatory system was rolled out in a stepwise cluster randomised process where practices were randomly assigned to accreditation year in clusters defined by the 98 municipalities in Denmark. The order of practice accreditation within each municipality was also randomised [24]. The aim of accreditation was to improve quality of care and patient safety in general practice [32] through fulfilment of 16 pre-determined standards and their quality indicators. The degree of fulfilment of the standard indicators was assessed in a surveyor visit undertaken by a professional accreditation agency (The Danish Institute for Quality and Accreditation in Healthcare (IKAS)). One year before the visit, GPs received a letter with the date of their survey. Each general practice was rewarded one of three final grades based on the surveyor visit: Accredited, accredited with remarks or not accredited. The accreditation statuses are publicly available on a website (http://www.ikas.dk/afgørelser/almen-praksis/).

3. Theoretical framework: self-determination theory

Intrinsically motivated employees are characterised as highly autonomous, hereby representing the prototypical case of self-determination [20]. Self-determination theory has traditionally focused on aspects that facilitate or limit self-motivation and well-being, including contextual factors. The findings have resulted in the identification of three psychological needs; competence, autonomy and relatedness. When these needs are satisfied, the motivation and well-being of individuals are enhanced, but when they are thwarted, motivation and well-being diminish [10].

In addition to increased performance, intrinsic motivation has been associated with high energy levels [33] and work enthusiasm and engagement [24]. Work engagement and positive emotions towards one’s job have been found to protect employees against exhaustion [19]. Several studies among public and private employees have established a negative relationship between intrinsic motivation and burnout, presumably due to the nurturing effect of self-determination [13,16–18]. Based on self-determination theory and empirical evidence from other professions, our first hypothesis is:

H1. GPs’ intrinsic motivation is negatively associated with burnout.

According to self-determination theory, external regulations will thwart the basic psychological needs and negatively affect the well-being of individuals, unless the requested behavioural change is internalised and integrated as the individuals’ own goals and values [10]. If an individual perceives that an external intervention limits autonomy and opportunities for exerting competent behaviour, the individual is most likely negatively affected [35].

It can be particularly challenging for highly intrinsically motivated employees to meaningfully integrate externally imposed activities associated with control and loss of autonomy, as they have a distinct need for self-determined behaviour [10,20]. Intrinsic motivation may therefore accentuate the potential negative effect of external regulation on occupational well-being. Empirical evidence of this is, however, lacking, although a few related studies exist [36,37].

If intrinsically motivated GPs are less burned out than their GP colleagues (this is tested in H1), they may also be shielded from burnout when externally regulated. However, based on self-determination theory, we hypothesize that the highly intrinsically motivated GPs are more vulnerable to burnout when externally regulated, as these persons are more likely to value self-determination in their work. This is especially believed to be true in cases where the external regulation is perceived as controlling, as is the case with accreditation in Danish general practice [25]. Hence our second hypothesis is:

H2. GPs with high intrinsic motivation are more burned out than GPs with low intrinsic motivation when exposed to external regulation.

4. Method

4.1. Data

4.1.1. Burnout and intrinsic motivation

Data on burnout and intrinsic motivation were obtained from two electronic surveys. The surveys were part of a larger panel of surveys (see Waldorff et al. for more information on the survey development [25]). In January 2017, an e-mail with a link to the first survey was sent out to all Danish GPs working under the national public reimbursement system (n = 3403). In January 2018, an e-mail with a link to the second survey was sent to 1146 GPs who had responded to previous questionnaires on accreditation. This was done to ensure a balanced panel. E-mail addresses were provided by the Danish Medical Association in December 2014, where the larger project on accreditation was initiated. In both surveys, two reminders were sent. Fig. 1 shows the timeline of the project.

The GPs were asked whether they felt burned out due to their work in a 6-point Likert type question (from ‘not at all’ to ‘a very great extent’). The item originates from the subscale Emotional Exhaustion in the Maslach Burnout Inventory containing a total of 22 items. The item has been found to contribute most to measuring

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burnout, with the highest overall factor loading for all subscales [38]. To elicit the latent construct of intrinsic motivation, i.e. the innate enjoyment and interest in one's daily work; seven generic 5-point Likert type questions (from ‘totally agree’ to ‘totally disagree’ with an additional ‘don’t know/will not answer’ option) were used. Existing studies have documented the validity and reliability of this measure [39], and the questions have previously been used to measure intrinsic motivation in Danish general practice [24]. The questions are inspired by the Intrinsic Motivation Inventory from Selfdeterminationtheory.org (see e.g. [40–42]).

4.1.2. Accreditation year

Data on practice allocation to accreditation year and practice identification number was provided by IKAS.

4.1.3. GP and practice characteristics

Data on GP age, gender, practice type, practice location (in the five different Danish regions), and practice identification number were obtained from The Danish Medical Association in December 2014 together with the professional e-mail addresses of the GPs.

4.1.4. Data linkage

The practice identification number enabled us to link accreditation year with GP and practice characteristics. The e-mail addresses of the GPs further enabled us to link the two surveys with GP and practice characteristics.

4.2. Statistical analyses

We used a balanced panel of GPs who completed both survey 1 and survey 2. We assessed the representativeness of the GPs and tested for attrition bias to check for any systematic differences between GPs included in the balanced sample and GPs who dropped out between survey 1 and survey 2. We performed descriptive analyses and tested for differences between surveys. We further tested for successful randomisation between accreditation years among responding GPs. We used chi2 statistics or t-tests for all tests described above.

4.2.1. Analyses related to hypothesis 1

We tested our hypothesis 1 using a mixed effects ordered logit model specification taking account of the panel nature of the data and the fact that GPs are clustered in general practices as well as in municipalities. Intrinsic motivation served as our explanatory variable and was generated as a continuous variable based on a sum score from the answers to the seven questions on intrinsic motivation. A confirmatory factor analysis showed that all seven questions reflected the same dimension (chi2 = 115.0, p = 0.000; CFI = 0.85; TLI = 0.77; RMSEA = 0.068), although the factor loading for IM4 showed that the question did not contribute much to the latent construct (SFL = 0.40). We kept IM4 in the generation of the latent construct, as it captures an important aspect of intrinsic motivation. To reduce information loss, ‘don’t know’ responses on the intrinsic motivation questions were mean imputed. Cronbach’s alpha was 0.84 indicating high reliability. Standard errors were specified as robust.

Model 1a estimates the unadjusted association between burnout and intrinsic motivation. Model 1b is similar to Model 1a except that it includes control variables for GP age, gender, practice type and region. The model specifications for Model 1a and 1b are shown in the appendix.

As a sensitivity analysis of our findings for H1, we reran the analysis excluding IM4 from the intrinsic motivation variable (Model 1c) and excluding respondents with ‘don’t know’ answers (Model 1d). To check the robustness of our findings, we tested different model specifications. To control for unobservable time-invariant heterogeneity we ran fixed effects ordered logit models using the Das and Van Soest (DvS) estimator and the Blow-up and Cluster estimator. However, only two cut-off values could be used for the DvS estimator due to too few observations in each category, and a significant number of observations were dropped from both models due to many GPs with constant burnout levels across time [43]. Consequently, we ran a pooled ordered logit model and a fixed effects linear regression model [43]. Importantly our results for hypothesis 1 remained robust regardless of model specification.

4.2.2. Analyses related to hypothesis 2

We tested our hypothesis 2 using a mixed effects ordered logit model specification taking account of the panel nature of the data and the clustering of GPs in general practices and municipalities. The timing of the survey distribution together with GPs being notified about their surveyor visit one year in advance entailed that GPs could be divided into three groups based on their year of accreditation (Fig. 1).

Being accredited in 2016 or 2017 served as our explanatory variables related to being exposed to external regulation, where the reference was allocation (without exposure) to accreditation in 2018. The intrinsic motivation variable was divided into three categories: Maximum intrinsic motivation (IM = 35), above median intrinsic motivation (28 ≤ IM < 35), and below median intrinsic motivation (7 ≤ IM < 28). The category maximum intrinsic motivation consists of GPs who answered ‘totally agree’ to all seven intrinsic motivation questions, while the category with GPs above the median have on average agreed to all seven questions.

Model 2a estimates the unadjusted main effects of intrinsic motivation and accreditation. In Model 2b we investigate whether intrinsic motivation strengthens the effect of accreditation on burnout by including interaction terms between accreditation years and the intrinsic motivation categories. In Model 2c control variables for GP age, gender, practice type and region are included. The model specifications for Model 2a, 2b, and 2c are included in the appendix.

To test the sensitivity of our findings for H2, we conducted four additional analyses. First, we included intrinsic motivation as a continuous variable to investigate whether the effect of intrinsic motivation on burnout when exposed to external regulation is
linear in log odds (Model 2d). Second, we categorized the most intrinsically motivated GPs as those with an intrinsic motivation score of 34 or above, to test whether our finding is only a phenomenon for the maximum intrinsically motivated GPs (Model 2e). Third, we excluded IM4 from the intrinsic motivation variable (Model 2f). Fourth, we excluded respondents with ‘don’t know’ answers from the intrinsic motivation variable (Model 2g). As accreditation time is invariant, it was not relevant to test the robustness of our findings with a fixed effects model specification.

All analyses were performed in Stata 15 [44].

5. Results

In total, 846 GPs responded to both questionnaires. This corresponds to 74 % of the GPs who were invited to answer survey 2 and 25 % of all the GPs in Denmark who were initially invited to answer survey 1. The GPs were representative to the total GP population on gender, practice type, region and accreditation year. The GPs in the sample were, however, younger. This was expected as retiring GPs drop out of the sample (Table A1). The test for attrition bias showed that there were no observable differences between GPs included in the balanced sample and GPs who dropped out between the two surveys (Table A2). The test for successful randomisation showed that GPs’ allocation to accreditation year was random on the observed variables (Table A3).

More than one third of the GPs felt somewhat burned out, while 8–10 % felt burned out to a great or very great extent. There was no significant change in degree of burnout between surveys at the overall level. The median (mean) intrinsic motivation was 28 (27.6) in survey 1 and 28 (27.3) in survey 2. Approximately 4.5 % of the GPs had the highest intrinsic motivation score obtainable (IM = 35), while 40–43 % of the GPs had on average agreed to all seven intrinsic motivation items (28 ≤ IM < 35). There was no significant change in summarised and categorised intrinsic motivation levels between surveys. However, there were significant differences in IM1 and IM7 between survey waves (Table A4).

5.1. Hypothesis 1

Model 1a and 1b in Table 1 shows the results related to hypothesis 1 stating that GPs’ intrinsic motivation is negatively associated with burnout. For both model specifications, the variable for intrinsic motivation is significantly negatively associated with burnout, meaning that an increase in intrinsic motivation among GPs is related to a decrease in burnout, and vice versa. Hence, H1 cannot be rejected.

The random effect parameters are statistically significant and positive justifying the use of multilevel models. The intra class correlations show that burnout is highly correlated within GPs, slightly correlated within general practices, and weakly correlated within municipalities.

Model 1b further shows that burnout is negatively associated with increasing age, and positively associated with being female, working in a solo practice and practicing in Region Zealand compared to in the Capital Region of Denmark.

The sensitivity analyses in Table 2 shows that the negative association between intrinsic motivation and burnout is maintained when excluding IM4 (Model 1c) and excluding ‘don’t know’ answers from the intrinsic motivation variable (Model 1d).

5.2. Hypothesis 2

Model 2a-2c in Table 3 shows the results related to our hypothesis 2 stating that GPs with high intrinsic motivation are more burned out than GPs with lower intrinsic motivation after being exposed to external regulation in the form of mandatory accreditation.

In Model 2a we see that GPs with high intrinsic motivation are less burned out than their colleagues (Maximum IM and Above median IM) and that accreditation does not significantly influence the overall burnout levels of GPs. The signs are negative indicating that it is unlikely that burnout increases at the aggregate level due to being accredited (Accreditation 2016 and Accreditation 2017). In Model 2b the interaction terms are included. We see that the interaction terms for maximum intrinsically motivated GPs exposed to external regulation (Maximum IM x 2016 and Maxi-
Table 3
Testing of H2 using mixed effects logit models.

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Model 2a Coefficients (SE)</th>
<th>Model 2b Coefficients (SE)</th>
<th>Model 2c Coefficients (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum IM (IM = 35)</td>
<td>−5.13 (0.44)**</td>
<td>−8.58 (1.13)**</td>
<td>−8.41 (1.09)**</td>
</tr>
<tr>
<td>Above median IM (28 &lt; IM &lt; 35)</td>
<td>−2.52 (0.17)**</td>
<td>−2.48 (0.35)**</td>
<td>−2.46 (0.34)**</td>
</tr>
<tr>
<td>Accreditation 2016</td>
<td>−0.28 (0.19)</td>
<td>−0.23 (0.26)</td>
<td>−0.13 (0.26)</td>
</tr>
<tr>
<td>Accreditation 2017</td>
<td>−0.32 (0.23)</td>
<td>−0.47 (0.32)</td>
<td>−0.35 (0.32)</td>
</tr>
<tr>
<td>Maximum IM x 2016</td>
<td>n.a.</td>
<td>4.30 (1.27)*</td>
<td>4.18 (1.22)*</td>
</tr>
<tr>
<td>Maximum IM x 2017</td>
<td>n.a.</td>
<td>3.93 (1.34)*</td>
<td>3.69 (1.32)*</td>
</tr>
<tr>
<td>Above median IM x 2016</td>
<td>n.a.</td>
<td>−0.29 (0.43)</td>
<td>−0.27 (0.42)</td>
</tr>
<tr>
<td>Above median IM x 2017</td>
<td>n.a.</td>
<td>0.11 (0.44)</td>
<td>0.03 (0.43)</td>
</tr>
<tr>
<td>Control variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>n.a.</td>
<td>n.a.</td>
<td>−0.05 (0.01)**</td>
</tr>
<tr>
<td>Female</td>
<td>n.a.</td>
<td>n.a.</td>
<td>0.67 (0.20)*</td>
</tr>
<tr>
<td>Solo practice</td>
<td>n.a.</td>
<td>n.a.</td>
<td>0.66 (0.24)*</td>
</tr>
<tr>
<td>Region of Southern Denmark</td>
<td>n.a.</td>
<td>n.a.</td>
<td>0.07 (0.28)</td>
</tr>
<tr>
<td>Central Denmark Region</td>
<td>n.a.</td>
<td>n.a.</td>
<td>0.29 (0.29)</td>
</tr>
<tr>
<td>Region of Northern Denmark</td>
<td>n.a.</td>
<td>n.a.</td>
<td>−0.15 (0.21)</td>
</tr>
<tr>
<td>Region Zealand</td>
<td>n.a.</td>
<td>n.a.</td>
<td>0.70 (0.27)**</td>
</tr>
<tr>
<td>Random effect parameters</td>
<td>Var (SE)</td>
<td>Var (SE)</td>
<td>Var (SE)</td>
</tr>
<tr>
<td>GP level</td>
<td>4.54 (0.79)</td>
<td>4.63 (0.80)</td>
<td>4.54 (0.80)</td>
</tr>
<tr>
<td>Practice level</td>
<td>2.01 (0.70)</td>
<td>2.07 (0.71)</td>
<td>1.78 (0.69)</td>
</tr>
<tr>
<td>Municipality level</td>
<td>0.00 (0.00)</td>
<td>0.00 (0.00)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>Intraclass correlations</td>
<td>ICC (SE)</td>
<td>ICC (SE)</td>
<td>ICC (SE)</td>
</tr>
<tr>
<td>GP level</td>
<td>0.07 (0.03)</td>
<td>0.67 (0.02)</td>
<td>0.66 (0.03)</td>
</tr>
<tr>
<td>Practice level</td>
<td>0.20 (0.07)</td>
<td>0.21 (0.07)</td>
<td>0.19 (0.07)</td>
</tr>
<tr>
<td>Municipality level</td>
<td>0.00 (0.00)</td>
<td>0.00 (0.00)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>Fit statistics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>1692</td>
<td>1692</td>
<td>1692</td>
</tr>
<tr>
<td>LL model</td>
<td>−2213.74</td>
<td>−2206.64</td>
<td>−2188.05</td>
</tr>
<tr>
<td>Chi² statistics</td>
<td>278.05</td>
<td>349.22</td>
<td>438.15</td>
</tr>
<tr>
<td>Prob &gt; chi²</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Note: ** p < 0.001; * p < 0.05; Model 2a reports estimates for equation (4); Model 2b reports estimates for equation (5); Model 2c reports estimates for equation (6).

mum IM x 2017) are statistically significantly positive (p-values of 0.001 and 0.003, respectively). Hence, burnout among the most intrinsically motivated GPs who are exposed to accreditation is significantly higher than for their GP colleagues with an intrinsic motivation score below the median who are not yet exposed to the external regulation. This result is not found among the GPs with an intrinsic motivation above the median (Above Maximum IM x 2016 and Above Median IM x 2017). Hence, H2 cannot be rejected for GPs with maximum intrinsic motivation, while it is rejected for GPs with above median intrinsic motivation.

When control variables are included in Model 2c, we see that the overall results related to H2 remain. Again, burnout is negatively associated with increasing age, and positively associated with being female, working in a solo practice and practicing in Region Zealand compared to in the Capital Region of Denmark.

The random effect parameters are all statistically significant although the municipality random effect is very small. The intra class correlations show that burnout is highly correlated within GPs and slightly correlated within general practices.

The sensitivity analyses in Table 4 show that the results are sensitive to the modelling of the intrinsic motivation variable (Model 2d, Model 2e and Model 2f), except from the model excluding ‘don’t know’ answers (Model 2g), where results remain the same. First, we see that the effect of intrinsic motivation on burnout when exposed to external regulation is not linear in the log odds, as the interaction terms become insignificant when intrinsic motivation is defined as a continuous variable (Intrinsic motivation x 2016: p-value = 0.412 and Intrinsic motivation x 2017: p-value = 0.963) (Model 2d). Second, when categorizing the most intrinsically motivated GPs as having an intrinsic motivation score of 34 or above, the significance of the interaction term for 2016 disappears (High IM x 2016: p-value = 0.178), while it is dampened for 2017 (High IM x 2017: p-value = 0.022) (Model 2e). This indicates that those with the maximum obtainable level of intrinsic motivation (IM = 35) is a special group of GPs. Third, when excluding IM4, it is confirmed that the most intrinsically motivated GPs (IM = 35) are indeed a special group of individuals, as it is seen that both interaction terms become insignificant (Max IM x 2016: p-value = 0.302 and Max IM x 2017: p-value = 0.528). This results from more GPs being included in the group of GPs with the highest obtainable intrinsic motivation score when removing IM4 (there are 141 observations with a max IM of 30 as opposed to 75 observations with max IM of 25) (Model 2f).

6. Discussion

Our result on the negative association between intrinsic motivation and burnout of GPs supports the findings from other professions [13,16–18]. Further, it adds to the literature by providing evidence on the association among owners of private practices. Our result that the most intrinsically motivated GPs were significantly more burned out than their GP colleagues when exposed to accreditation, lends support to the theory on self-determination, suggesting that the most intrinsically motivated individuals are those who are most vulnerable to external regulation. A reason for this finding could be that accreditation imposes feelings of loss of autonomy, competence and relatedness in the job.

Interestingly, the effect of external regulation on burnout was only found among the most intrinsically motivated GPs, and sensitivity analyses showed that results were sensitive to the specification of the intrinsic motivation variable. This suggests that the most intrinsically motivated GPs are a special group of individuals who are at greater risk of burning out when experiencing control and regulation. In a clarifying binary logistic regression analysis taking the clustering of GPs into practices and municipalities into account, we found that the group of GPs with the highest obtainable
intrinsic motivation score (IM = 35) were older, and more were from the Region of Southern Denmark compared to their colleagues. Gender and practice type did not explain the probability of belonging to the group of the most intrinsically motivated GPs (Table A5). Hence, it seems that other characteristics and personality traits, not elicited in this study, could be more important in the description of GPs who experience the greatest inner joy from their work.

Recent studies have shown that, on average, external regulation such as accreditation does not negatively impact GPs' intrinsic motivation [24], job satisfaction [45], or retirement from general practice [46]. None of these studies, however, investigated how the well-being of the most intrinsically motivated GPs was affected by the regulation. This study clearly shows that even if no harm is done at the aggregate level, subgroups of individuals in the workforce may be negatively influenced by external regulation. Other studies have found that intrinsic motivation is a positive predictor for performance [11–15]. If this also holds for GPs in Denmark, the intrinsically motivated GPs constitute a particularly important group of GPs in terms of securing treatment quality and engagement in general practice. Hence, external controlling regulations may potentially impair the entire profession in the long run. Policy makers are therefore encouraged to carefully design external regulation systems so that they impose as few restrictions on the target population as possible, albeit without compromising quality of care, to avoid perceptions of loss of autonomy. Moreover, regulations should aim at enhancing perceived competence and relatedness as these factors together constitute important psychological needs vital for occupational well-being.

One fourth of all GPs in Denmark took part in this study, and they are representative of the general GP population on observable variables, except age. We are, however, not able to test for representativeness on intrinsic motivation and burnout. Whether the results are generalisable to GPs from other countries, other occupations and organisations, and other types of external regulations may depend on the experienced needs for self-determination in the concrete setting, the extent to which the regulation is experienced as intrusive, and how it affects the psychological needs for competence, autonomy and relatedness. To gain knowledge on the generalisability of our findings, we call for more research from other fields and countries as well as comparative studies that can contribute with enlightening the topic.

There are limitations to this study. One limitation is that our panel data consisted only of two waves. This complicated our fixed effect regression analyses related to hypothesis 1, as a significant number of GPs had constant burnout levels across time. Despite this, our results importantly proved to be robust to the different model specifications. Also, it is a strength that we use panel data as previous studies have often relied on cross sectional or crossed lagged data (e.g. [13,16–18]). However, more survey waves would likely provide more variation in the data, but at the cost of reducing sample sizes. In relation to this, we only collected the data with one year apart. This was on the one hand a strength of our research design as it enabled us to observe GP burnout and motivation at important time points in the three-year accreditation process. On the other hand, the short time interval could limit variation in data over time. Nevertheless, we obtain statistically significant results

### Table 4

Sensitivity analyses for H2 using mixed effects ordered logit models.

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Model 2d</th>
<th>Model 2e</th>
<th>Model 2f</th>
<th>Model 2g</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficients (SE)</td>
<td>Coefficients (SE)</td>
<td>Coefficients (SE)</td>
<td>Coefficients (SE)</td>
</tr>
<tr>
<td>Intrinsic motivation (continuous)</td>
<td>−0.43 (0.04)**</td>
<td>n.a.</td>
<td>−0.55 (0.88)**</td>
<td>−8.46 (1.12)**</td>
</tr>
<tr>
<td>High/Max IM</td>
<td>n.a.</td>
<td>n.a.</td>
<td>−2.51 (0.28)**</td>
<td>−2.45 (0.38)**</td>
</tr>
<tr>
<td>Above median IM</td>
<td>n.a.</td>
<td>n.a.</td>
<td>−0.13 (0.26)</td>
<td>−0.13 (0.32)</td>
</tr>
<tr>
<td>Accreditation 2016</td>
<td>1.05 (1.32)</td>
<td>−0.08 (0.27)</td>
<td>−0.26 (0.30)</td>
<td>−0.43 (0.35)</td>
</tr>
<tr>
<td>Accreditation 2017</td>
<td>−0.17 (1.68)</td>
<td>−0.35 (0.32)</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Intrinsic motivation x 2016</td>
<td>−0.04 (0.05)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Intrinsic motivation x 2017</td>
<td>0.00 (0.06)</td>
<td>n.a.</td>
<td>1.04 (1.00)</td>
<td>4.18 (1.27)**</td>
</tr>
<tr>
<td>High/Max IM x 2016</td>
<td>n.a.</td>
<td>0.99 (0.73)</td>
<td>0.65 (1.03)</td>
<td>3.77 (1.36)**</td>
</tr>
<tr>
<td>High/Max IM x 2017</td>
<td>n.a.</td>
<td>1.82 (0.79)*</td>
<td>−0.25 (0.41)</td>
<td>−0.41 (0.47)</td>
</tr>
<tr>
<td>Above median IM x 2016</td>
<td>n.a.</td>
<td>−0.19 (0.41)</td>
<td>0.12 (0.38)</td>
<td>0.06 (0.46)</td>
</tr>
<tr>
<td>Above median IM x 2017</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Control variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>−0.04 (0.01)*</td>
<td>−0.05 (0.01)*</td>
<td>−0.04 (0.01)*</td>
<td>−0.05 (0.01)**</td>
</tr>
<tr>
<td>Female</td>
<td>0.70 (0.19)**</td>
<td>0.66 (0.19)*</td>
<td>0.66 (0.19)*</td>
<td>0.67 (0.21)*</td>
</tr>
<tr>
<td>Solo practice</td>
<td>0.47 (0.24)*</td>
<td>0.60 (0.23)*</td>
<td>0.60 (0.24)*</td>
<td>0.67 (0.24)*</td>
</tr>
<tr>
<td>Region of Southern Denmark</td>
<td>0.02 (0.27)</td>
<td>0.10 (0.26)</td>
<td>0.11 (0.27)</td>
<td>0.07 (0.30)</td>
</tr>
<tr>
<td>Central Denmark Region</td>
<td>0.21 (0.28)</td>
<td>0.35 (0.28)</td>
<td>0.28 (0.28)</td>
<td>0.35 (0.32)</td>
</tr>
<tr>
<td>Region of Northern Denmark</td>
<td>−0.20 (0.21)</td>
<td>−0.10 (0.21)</td>
<td>0.02 (0.21)</td>
<td>−0.14 (0.23)</td>
</tr>
<tr>
<td>Region Zealand</td>
<td>0.58 (0.24)*</td>
<td>0.70 (0.25)*</td>
<td>0.65 (0.25)*</td>
<td>0.76 (0.28)*</td>
</tr>
<tr>
<td>Random effect parameters</td>
<td>Var (SE)</td>
<td>Var (SE)</td>
<td>Var (SE)</td>
<td>Var (SE)</td>
</tr>
<tr>
<td>GP level</td>
<td>3.75 (0.88)</td>
<td>4.18 (0.83)</td>
<td>4.32 (0.80)</td>
<td>4.59 (0.92)</td>
</tr>
<tr>
<td>Practice level</td>
<td>1.57 (0.77)</td>
<td>1.81 (0.76)</td>
<td>1.85 (0.72)</td>
<td>1.85 (1.04)</td>
</tr>
<tr>
<td>Municipality level</td>
<td>0.00 (0.00)</td>
<td>0.00 (0.00)</td>
<td>0.00 (0.00)</td>
<td>0.00 (0.00)</td>
</tr>
<tr>
<td>Intrinsic correlations</td>
<td>ICC (SE)</td>
<td>ICC (SE)</td>
<td>ICC (SE)</td>
<td>ICC (SE)</td>
</tr>
<tr>
<td>GP level</td>
<td>0.62 (0.03)</td>
<td>0.65 (0.03)</td>
<td>0.65 (0.03)</td>
<td>0.65 (0.03)</td>
</tr>
<tr>
<td>Practice level</td>
<td>0.18 (0.08)</td>
<td>0.19 (0.08)</td>
<td>0.20 (0.07)</td>
<td>0.19 (0.10)</td>
</tr>
<tr>
<td>Municipality level</td>
<td>0.00 (0.00)</td>
<td>0.00 (0.00)</td>
<td>0.00 (0.00)</td>
<td>0.00 (0.00)</td>
</tr>
</tbody>
</table>

**Notes:** **p < 0.001; *p < 0.05; Model 2d includes intrinsic motivation as a continuous variable; Model 2e categorizes the most intrinsically motivated GPs as those with an intrinsic motivation score of 34 or above; Model 2f excludes IM4 from the intrinsic motivation variable; Model 2g excludes don’t know answers from the intrinsic motivation variable.
in our models, which indicates that with more expansive data, even stronger effects may be observed.

Another potential limitation is our choice of burnout measure (see e.g. [47] for an overview of different measures). As it was too comprehensive to include all items from Maslach Burnout Inventory in our survey, we selected the item that contributed most to measuring burnout [35]. It has been shown that a single question can effectively be used to screen for burnout [48], although this question was not based on Maslach’s burnout items. In our survey, we used another scale (ranging from ‘not at all’ to ‘to a very great extent’) than Maslach et al. [38], as discussions with GPs revealed that they could not conform to the original scale (ranging from ‘never’ to ‘every day’), since burnout was not experienced as something that fluctuated on a day-to-day basis. It is likely that the use of a more itemised burnout measure would have resulted in even stronger results.

Although our findings were robust to various different model specifications, including fixed effects models, future studies on the causal relationship between burnout and intrinsic motivation could contribute to a further understanding of the mechanisms at play. Moreover, qualitative studies could explore the processes and mechanisms that happen or are perceived to happen when an accreditation program is introduced into a general practice clinic. Identifying these might be a way to develop preliminary causal explanations between accreditation and burnout. Finally, future studies should seek to verify the positive association between intrinsic motivation and performance, also in a general practice context. If the most intrinsically motivated GPs perform better in terms of efficiency and quality of care, policy makers should seek to protect them from burnout and other well-being issues. It is, however, important to shield these GPs from burnout irrespectively, as we currently face a GP shortage [5, 6]. And even though the highly intrinsically motivated GPs only represent a small group of GPs, they do account for 4.5% of the GP workforce.

7. Conclusion

We found that GPs with high intrinsic motivation are less burned out than their colleagues. However, the most intrinsically motivated GPs are significantly more burned out when exposed to accreditation relative to their colleagues. We conclude that being intrinsically motivated may not shield from burnout when external regulation is imposed.

Ethics

The project received approval from the Data Protection Agency at University of Southern Denmark (file number 10.301). Participation in the study was recommended to GPs by the Danish College of General Practice; Committee of Multipractice Studies in General Practice (file number 29–2016). The Regional Scientific Ethical Committees for Southern Denmark assessed the study and concluded that no further ethical approval was needed cf. section 14, subsection 1 in the Act on Research Ethics Review of Health Research Projects (file number S-20152000-178).

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Declaration of Competing Interest

The authors report no declarations of interest.

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Appendix A. Supplementary data

Supplemental material related to this article can be found, in the online version, at doi: https://doi.org/10.1016/j.healthpol.2021.01.004.

References


