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Job satisfaction of general practitioners: an international comparison

A multilevel analysis of country-, practice-, and GP
characteristics on GP job satisfaction

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Preface

Dear reader,

with great pleasure I present my master thesis to you: ‘Job satisfaction of general practitioners: an international comparison’.

I have worked very hard over the past few months during my internship at Nivel (Netherlands Institute for health services research) and I am very satisfied with the end result. However, I could not have done this without the much appreciated help of others.

Firstly, I want express special thanks to Peter Groenewegen, who was both my thesis supervisor and my internship supervisor. He helped me a lot by passing his knowledge about primary care and general practitioners in particular, providing interesting insights and giving constructive feedback. My positive experiences at my internship organization have also got me more excited about conducting research. Secondly, I would like to thank my fellow intern Daniël de Veer for providing feedback and moral support, and for being a pleasant colleague in general.

Furthermore, I would like to thank Willemijn Schäfer for answering any questions I had about the QUALICOPC data and providing feedback via email and Skype. In addition, I would like to thank Peter Spreeuwenberg for helping me with several questions regarding statistics, such as merging of different datasets and interpreting the results of the analyses.

Finally, I would like to thank all my other colleagues at Nivel for always showing interest in my research and providing a very pleasant work environment during my internship.

I hope you enjoy reading my thesis.

Sincerely,

Emiel Stobbe

Abstract

Purpose

Job satisfaction of general practitioners (GPs) is an important issue, because of widespread dissatisfaction in several countries. GPs often feel overburdened by administrative detail that keeps them from direct patient-related work. Workload of GPs is increasing as a result of demographic and epidemiological changes. The complexity of healthcare systems and managerial pressure may have affected job satisfaction as well. The aim of this study is to analyse job satisfaction in an international comparative framework.

Theory

A general theory of how people 'produce' their own wellbeing is described and applied to the job satisfaction of GPs. It is expected that job satisfaction is influenced by the stimulation that GPs experience from the variety and challenges of their tasks, from comfortable working conditions, such as hours and pay, from their social status, and from behavioural confirmation from colleagues and patients. Based on these general insights more specific hypotheses are developed.

Methods

Data from the QUALICOPC study is used, conducted among approximately 7,000 GPs in 34 (mainly European) countries. Job satisfaction was measured in the GP survey through six items (combined into a scale) about job experience. Independent variables are taken from the GP survey and from existing data on country and healthcare system level. Data were analysed using linear multilevel regression analysis, with countries and GPs as levels.

Results

GPs vary in job satisfaction with the lowest levels in Spain, Hungary, Slovakia, Estonia and Lithuania and the highest levels in Sweden, Norway, Canada, Cyprus and Denmark. Findings show that around 33% of the total variance is situated on the country level and that in countries with a higher GDP per capita, GPs are more satisfied. At the GP- and practice level, practicing technical procedures and preventive care, vacation, feedback from colleagues, patient satisfaction, and age are positively related to GP job satisfaction and working hours is negatively related to GP job satisfaction.

Discussion

Despite the finding that a substantial portion of the variation in GP job satisfaction is accounted for by country level characteristics, this study has not been able to identify relevant country level characteristics, other than GDP per capita, that explain the variation in GP job satisfaction between countries. Therefore, based on the GP- and practice level results, recommendations on how to organise GP-friendly primary care practices are formulated regarding nurse substitution of GP tasks, the work-life balance and peer feedback.

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1. Introduction

1.1 Background

It is important that health care professionals enjoy their work. Higher job satisfaction seems to have positive effects on the physicians themselves, since physicians with higher job satisfaction have a lower likelihood of burnout (Renzi, Tabolli, Ianni, Di Pietro & Puddu, 2005), longer retention (Pathman, Williams & Konrad, 1996), and lower job stress, higher involvement in decision-making and higher job interest (Whalley, Bojke, Gravelle & Sibbald, 2006). Another aspect is the relation between workload and job satisfaction, since workload and job satisfaction may have an effect on the workstyle of physicians and the quality of their work (Groenewegen & Hutten, 1991). Research has shown that job satisfaction among health professionals is related to higher quality of care, better relationships with their patients, and more satisfied patients (Williams & Skinner, 2003; Haas et al., 2000; Grembowski et al., 2005). Linn, Yager, Cope and Leake (1985a) have shown that physician satisfaction correlates with better continuity of care, higher patient satisfaction and lower no-show rates of patients. Furthermore, higher job satisfaction of physicians is also related to better compliance to treatments by patients (DiMatteo et al., 1993) and more verbal and nonverbal communication with patients (Bensing, Van den Brink-Muinen, Boerma & Van Dulmen, 2013). In sum, higher job satisfaction of health care professionals can have positive effects on health care professionals themselves, their patients, and health care delivery as a whole.

On the other hand, low job satisfaction can have some serious negative consequences for health care professionals. Shapiro, Burkey, Dorman and Welker (1997) have already suggested that a full understanding of work experiences requires a consideration of both positive and negative features of the job. According to Williams and Skinner (2003), a low satisfaction of physicians with their work is related to several outcomes that can be considered as an indication of a reduced quality of care, such as less satisfied patients and higher turnover. Stress and job satisfaction are highly correlated and satisfaction is in turn related to patient satisfaction (Linn et al., 1985b). Low job satisfaction of physicians is related to poor clinical outcomes and suboptimal health care delivery as well (Goetz et al., 2011). Research has shown that physicians who are less satisfied with their job are 2 to 3 times more likely to leave medicine than more satisfied physicians (Landon, Reschovsky, Pham & Blumenthal, 2006; Buchbinder, Wilson, Melick, & Powe, 2001). This enhanced risk on leaving the profession can have negative consequences for the quality and the continuity of care (Freeman, Olesen, & Hjortdahl, 2003). If physicians are not satisfied with their work for a longer period of time it can result in health problems for themselves as well (Sundquist & Johansson, 2000). For example, research by Linzer et al. (2001) has shown that satisfaction

has a strong direct effect on burnout. Again, the job satisfaction of health care professionals can have important consequences for both the professionals themselves and their patients, both in positive and negative ways.

Although the term general practitioner (GP) does not have the exact same meaning in all countries and the health care systems within countries are different, the job conditions of GPs from different countries are sufficiently similar to be able to make useful comparisons regarding job satisfaction (Van Ham, Verhoeven, Groenier, Groothoff, & De Haan, 2006b). This study aims to find the causes of variation in job satisfaction between GPs in different countries. Williams et al. (2002) have found that practice and, to a lesser extent, physician characteristics influence job satisfaction and that workplace conditions are an important determinant of the well-being of physicians. However, Sibbald, Bojke and Gravelle (2003) insist that personal and practice characteristics of doctors only explain a small portion of the overall variation in job satisfaction, which suggests that the most important causes of the job satisfaction of GPs should be sought in the wider context. This study has the potential to enhance the knowledge on the distribution of this variation between individual GP characteristics, practice characteristics and country characteristics and can therefore contribute to the knowledge about job satisfaction of health care professionals.

1.2 Research Questions

The first question that will be answered is a descriptive question on the distribution of GPs' job satisfaction in 34 (mostly European) countries.

How satisfied are general practitioners with their job in 34 different countries?

The second question will be an explanatory question on country- and GP level characteristics that are related to GP job satisfaction.

How can we explain differences within and between countries in the job satisfaction of general practitioners?

Finally there will be an answer to a policy question, based on the findings in the two previous questions.

What evidence-based policy advice can be given to increase general practitioners' job satisfaction?

1.3 Societal Relevance

Dale et al. (2015) have found that GPs often experience factors that lead to burnout and they state that it is urgent to tackle these issues so GPs can develop coping strategies and interests to protect them from burnout. When working in a certain health profession is related to a higher likelihood of burnout it may be less appealing for medical students to pursue a career in this profession. It is therefore important to promote job satisfaction among GPs because it will help to maintain the current workforce and to make general practice a more appealing career option for new doctors as well (Meli, Ng, Singer, Frey, & Schaufelberger, 2014). Job satisfaction is an important factor for intentions to quit and when there is more attention for this it may help to maintain and create a larger supply of general practitioners (Sibbald et al., 2003).

Scheurer, McKean, Miller and Wetterneck (2009) have argued that physician satisfaction is a multifaceted concept and that most of the factors that are related to it are modifiable, which means that targeted interventions could result in higher physician satisfaction. According to Van Ham et al. (2006b), the factors that are related to increased job satisfaction are most often directly related to the content of the profession itself, while factors that relate to conditions of employment, such as the amount working hours and the amount of paperwork, are often related to low job satisfaction. This suggests that interventions that are aimed at increasing satisfaction should be aimed at different aspects of physicians' work. Insight into these factors could help to increase GP job satisfaction, while it can simultaneously be used to decrease the negative consequences of low job satisfaction, such as burnout (Van Ham et al., 2006b). Wallace, Lemaire and Ghali (2009) have suggested that measures of physician wellness and satisfaction are actionable because in situations of sub optimum physician wellness effective interventions can be, and already have been, implemented.

Kristensen and Johansson (2008) have stressed that cross-country studies of satisfaction are highly important because when it turns out that job satisfaction is higher in some countries than in others it can be argued that the arrangements in working life in countries with low job satisfaction should resemble those in better performing countries. A more comprehensive overview of important factors that affect job satisfaction of GPs and the variation between countries in these factors can thus be very useful in order to increase the job satisfaction of GPs in multiple contexts through specific interventions at the appropriate levels. This study could help to better understand which factors are important at different levels and thus make the interventions more tailored and more effective.

1.4 Scientific Relevance

Although there is quite some literature on job satisfaction in general and of health care professionals in particular, there is still a lack of knowledge about the causes of variation in job satisfaction between health care professionals in an international comparative perspective. Evidence shows that it is generally the nature of the work itself that affects job satisfaction the most, but that group-level job characteristics and organisational-level characteristics affect job satisfaction as well (Rogelberg, 2007). Research by Westover and Taylor (2010) has shown that the determinants of job satisfaction vary by country and that economic and social influences that affect experiences at work differ between countries. Rogelberg (2007) argues that cultural factors seem to affect job satisfaction as well, although the causes of differences in job satisfaction across countries are mostly unknown. Some studies have shown differences in job satisfaction between GPs from different countries, but these have mostly involved only two or three countries or had only small samples (e.g. Rout & Rourt, 1997; Solberg, Tómasson, Aasland, & Tyssen, 2014; Tyssen, Palmer, Solberg, Voltmer, & Frank, 2013). By using a multilevel approach and including 34 countries, measuring both country level and GP level factors, this study aims to add to these studies by providing a more comprehensive international perspective. This approach will provide more knowledge about the causes of variation in job satisfaction between GPs in different countries and what portion of this variation can be attributed to which level.

1.5 Empirical Strategy

This thesis aims to identify the causes of variation in job satisfaction between health care professionals in an international comparative perspective in 34 (mainly European) countries among approximately 7,000 general practitioners. In order to do this the data from the international study ‘Quality and Costs of Primary Care in Europe’ (QUALICOPC) will be analysed with a multilevel analysis, which is aimed at evaluating the performance of primary care systems in Europe when it comes to quality, access and costs (Schäfer, 2016: chapter 1). The QUALICOPC study contains 26 European Union member states along with Australia, Canada, Iceland, FYR Macedonia, New Zealand, Norway, Switzerland, and Turkey.

The dependent variable, job satisfaction, is measured using a scale of six statements on whether GPs are satisfied with different aspects of their job. These statements are about whether they think their work is useful, whether it is interesting, whether they feel like their administrative tasks take up too much time, whether their work causes too much stress, whether they regard GPs to be respected, and whether there is a good balance between their work and the rewards they receive for it.

The independent variables are measured at two different levels. First, the country level, which consists of characteristics of the healthcare system, the overall economy and the national organizational structure of the aforementioned countries. Secondly, the GP practice level, which can be divided into practice characteristics such as the organizational structure of the practice, available resources, and the task environment, and the individual GP level characteristics such as age and gender. These characteristics can be considered as one level, since only one GP per practice was asked to fill in the questionnaire. Thus, the practice- and individual level are considered as the same level.

1.6 Chapter Overview

In chapter 2 there is a definition given of job satisfaction, followed by a theoretical framework and the formulation of hypotheses. Chapter 3 will contain a description of the data and the operationalisation of the used concepts. A summary of the results will be given in chapter 4, followed by a conclusion about the variation of job satisfaction between the different levels and the contributions and limitations of this thesis in chapter 5. Finally, chapter 6 contains some policy recommendations that are based on the conclusions from chapter 5.

2. Theory and Hypotheses

2.1 Definition of Job Satisfaction

The literature provides many different definitions of job satisfaction, but the definition that has been used the most is provided by Locke (1976), who considers job satisfaction as “a pleasurable or positive emotional state resulting from the appraisal of one’s job or job experiences”. Job satisfaction can be both considered as a global concept that can be measured by a single question about how satisfied people are with their job in general, the ‘global approach’, and as a multifaceted concept that measures the feelings people have towards multiple aspects of their job, the ‘facet approach’ (Schmit Jongbloed, 2017). Spector (1997) considers job satisfaction as a multifaceted concept and defines it as “how people feel about their job and different aspects of their job.” Which aspects of a job are particularly important for the overall job satisfaction of employees is dependent on their profession, their career stage, and their work situation (Schmit Jongbloed, Borleffs, Van Lohuizen & Cohen-Schotanus, 2010). Factors that have generally been found to be closely related to job satisfaction are the nature of the work, the quality of management and the work environment (Buciuniene, Blazeviciene & Bliudziute, 2005). It is important to consider different aspects of work when studying job satisfaction, instead of solely using a single measure for overall job satisfaction, because workers may be more satisfied with certain aspects of their job than with other aspects. The definition of GP job satisfaction that will be used in this research is ‘the production of positive feelings regarding aspects of the profession of general practitioner, influenced by the resources that are available and the present circumstances’, which is based on the Social Production Function Theory.

2.2 General framework theory: Social Production Function Theory

The Social Production Function Theory (SPF) is a theory of goal-oriented behaviour, which states that people try to optimize the achievement of universal goals, within a set of given resources and constraints, in order to produce their own well-being (Ormel, Lindenberg, Steverink & Verbrugge, 1999). According to Diener, Suh, Lucas and Smith (1999), work can be related to the production of well-being because it brings people a certain level of stimulation that they desire, social relationships, and a sense of belonging and meaning. This relation between work and well-being suggests that SPF can be applied to explain the job satisfaction of GPs by explaining under which circumstances and with the use of which resources GPs can reach the goal of producing higher job satisfaction. The instruments that are described in the theory as requirements to reach the goals of well-being also largely seem to correspond with the seven domains that have been found by Konrad et al. (1999) to explain

physician job satisfaction: autonomy, relationships with colleagues, relationships with staff, relationships with patients, pay, resources, and status.

The SPF theory is based on both psychological, sociological and economic ideas and considers people as active agents who are able to choose cost-effective ways to produce their own well-being in a rational manner, while these rational considerations are dependent on the information that is available to them and the circumstances they have to deal with (Ormel et al., 1999). The SPF model assumes that physicians provide care in an effective way and act rationally against the background of their ideas and knowledge about the appropriate means and ends to achieve this (Bruers, Felling, Truin, Van 't Hof & Van Rossum, 2004). The central components of SPF are the link between the realisation of goals and well-being, definitions of universal and instrumental goals, and the substitution of instrumental goals based on a cost-benefit analysis. Table 1 shows the hierarchy of social production functions.

Table 1: The hierarchy of social production functions (Ormel et al., 1999)

Top level	Subjective Well-being				
Universal goals	Physical Well-being		Social Well-being		
First-order instrumental goals	Stimulation/ Activation (optimal level of arousal)	Comfort (absence of physiological needs; pleasant and safe environment)	Status (control over scarce resources)	Behavioural confirmation (approval for “doing the right things”)	Affection (positive inputs from caring others)
Activities and endowments (means of production for instrumental goals) (examples)	Physical and mental activities producing arousal	Absence of pain, fatigue, thirst, hunger, vitality, good housing, appliances, social welfare, security	Occupation, lifestyle, excellence in sports or work	Compliance with external and internal norms	Intimate ties, offering emotional support
Resources (examples)	Physical and mental abilities	Food, health care, money	Education, social class, unique skills	Social skills, competence	Spouse, empathy, attractiveness

As shown in Table 1, SPF identifies two universal goals that lead to subjective well-being: physical well-being and social well-being (or social approval). Lindenberg (1984) distinguishes these goals as ultimate goals, while the goals on the lower level are instrumental goals that can be considered as instruments to produce the ultimate goals. Whether people can reach their goals is influenced by the circumstances they face and the resources they possess, which shows the connection with the social and the institutional context (Groenewegen,

1996). It depends on the social and institutional circumstances in what ways, i.e. through which instrumental goals, people can reach the ultimate goals of physical and social well-being. They strive for the realisation of these goals by making use of the resources they possess and within the circumstances they have to deal with. Some means of production are more efficient than others because they are multifunctional in the sense that they can produce multiple instrumental goals at the same time (Lindenberg, 1996). Physical well-being is acquired through the right mix of two instrumental goals: stimulation/activation and comfort. The second universal goal in SPF theory is social well-being, which is acquired through three instrumental goals: status, behavioural confirmation and affection. The three instrumental goals for social well-being are (tied to) emotional states, such as dominance and pride for status, shame and guilt for behavioural confirmation, and compassion and love for affection (Lindenberg, 2001).

It is assumed that for the social well-being of physicians esteem and recognition by patients and colleagues are instrumental, while for their physical well-being the focus on their practice as a business and the distribution of tasks in the practice are instrumental (Bruers et al., 2004). Hutten (1998) explains how several goals drive GPs in their work, which involve both personal goals and benefits for their patients, and suggests that the realisation of these goals increases the job satisfaction and the self-esteem of GPs. Important instruments to produce physical well-being are income and leisure time, while an important instrumental goal for GPs' social approval is whether they provide good care for their patients, since this will increase the social approval from both their patients and other GPs (Hutten, 1998).

2.3 Linking the five instrumental goals in SPF to GP job satisfaction

In this section I will discuss how the five instrumental goals (stimulation, comfort, status, behavioural confirmation, and affection) in SPF can be linked to the resources, circumstances and institutions that have an effect on the job satisfaction of GPs.

Stimulation

Stimulation involves activities that produce arousal, such as mental stimulation and physical effort, and humans generally appreciate stimulation, although it can become troublesome when the costs exceed the benefits (Ormel, Lindenberg, Steverink & Vonkorff, 1997). As Table 1 shows, stimulation is produced by physical and mental activities, which produce arousal that requires the use of physical and mental abilities. Work brings people a certain level of stimulation, which they use to produce well-being (Diener et al., 1999). Anjali and Anand (2015) argue that intellectual stimulation can improve people's cognitive development at work and tends to create a deeper connection to the job and more responsibility to the organisation they work for. Their study shows that employees are more satisfied with their

job and are more committed to the job when they are intellectually stimulated and challenged. Kitai et al. (1999) have shown that next to challenging work, the opportunity to use medical knowledge and work variety scored high as positive components of job satisfaction among GPs.

Hackman and Oldham (1976) explain with their 'job characteristics model of work motivation' how skill variety is one of the job characteristics that determines the meaningfulness of a job. The authors state that when a person is required to perform tasks that challenge or stretch their skills it is likely that the person will experience this task as meaningful, which will in turn result in a higher likelihood of positive work outcomes such as internal motivation and work satisfaction. Several studies on GP job satisfaction have identified variation in work and the opportunity to use their skills as factors that can increase job satisfaction for GPs (e.g. Nylenna, Gulbrandsen, Førde & Aasland, 2005; Simoens, Scott & Sibbald, 2002; Dowell, Hamilton & McLeod, 2000; Ulmer & Harris, 2002). This suggests that the job should be both challenging and varied enough to keep GPs stimulated and activated. Thus, in terms of GP job satisfaction stimulation means that GPs have a wide range of tasks that are sufficiently intellectually challenging.

Comfort

Comfort is described as a physical and psychological state. It is generally based on basic needs and the absence of detrimental stimuli, and can be divided into internal and external comfort (Ormel et al., 1997). Internal comfort refers to the absence of physiological discomforts, such as hunger, thirst and pain, whereas external comfort refers to a safe and pleasant living environment (Nieboer, Lindenberg, Boomsma & Van Bruggen, 2005). Job comfort is defined by Evans (1997) as "the extent to which an individual is satisfied with the conditions and circumstances of the job." Subsequently, when the concepts of internal and external comfort are applied to job comfort, internal comfort may refer to an absence of discomforts such as stress and exhaustion, and external comfort may refer to a pleasant work environment and pleasant working conditions. Mottaz (1988) has described adequate working conditions as an availability of sufficient resources, supplies, equipment and time, which ensures that employees are able to do a good job. Research by Parvin and Kabir (2011) has shown that good working conditions and a good work environment can have a positive effect on employee job satisfaction and their work performance. Employees are able to complete their tasks more easily, efficiently and comfortably when they are provided with good physical working conditions, such as adequate tools and equipment, lighting and cleanliness of the workplace (Aydogdu & Asikgil, 2011). It seems obvious that GPs will be more satisfied with their work if they feel comfortable while they perform their job. Research has

shown that a sub-optimal work environment and time pressure can be important factors for decreased job satisfaction among GPs (Rout, Cooper & Rout, 1996; Rout, 1999).

Van Ham et al. (2006b) concluded from their literature review on GP job satisfaction that job factors that concern employment conditions, including working hours, administrative work, and not having enough time, often seem to decrease job satisfaction. Thus, in terms of GP job satisfaction comfort could mean that GPs can work an appropriate amount of hours and that they can spend most of their time on their primary tasks of providing care to their patients. In addition, Drobnič, Beham and Präg (2010) have found that working conditions vary significantly between countries, due to differences in economic development, the proportionate contribution of different sectors to the total GDP of an economy, and the extent of public policies, which suggests that working conditions can partly explain variation in job satisfaction between workers from different countries as well.

Status

Status refers to how people rank themselves relative to others and is mainly based on control over scarce resources (Ormel et al., 1997). Status is achieved through relationships that provide you with positive feelings about what you have or what you can do, such as feeling that you are being taken seriously, are respected, are autonomous or independent, achieve more than others, have influence, and are known for your achievements, assets, or skills (Steverink & Lindenberg, 2006). Status is mainly allocated through occupations in Western countries (Lindenberg, 1996). Occupational status provides people with opportunities to increase their self-esteem and self-efficacy and is associated with repeated options to contribute or perform, to be rewarded or appreciated, and to feel that you belong to a meaningful group (Siegrist, 1996). These benefits of work are dependent of whether the investment of effort is matched by the rewards in terms of income, esteem and career opportunities (Calnan, Wainwright, Forsythe, Wall & Almond, 2001).

An important component of status from work is autonomy, which is defined by Stamps, Piedmont, Slavitt and Haase (1978) as ‘the amount of job-related independence, initiative, and freedom in daily work activities’. Autonomy has also been found to be an important factor in the job satisfaction of GPs. For example, research by Ulmer and Harris (2002) has shown that differences in job satisfaction between rural and urban GPs in Australia were mostly attributable to the fact that rural GPs showed higher satisfaction with components of autonomy, including responsibility, opportunity to use ability, and freedom to choose own way of working. Other studies have reported positive associations between GP job satisfaction and autonomy as well (Kapur, Appleton & Neal, 1999; Buciuniene et al., 2005). In addition, Grembowski et al. (2003) found that physicians show higher satisfaction in single-handed practices than in practices with a large number of physicians working in

groups, and the authors suggest that this may be caused by the fact that working in a large medical group could be accompanied by bureaucratic restrictions that reduce the physicians' autonomy. Thus, it seems that GPs generally value freedom and autonomy in their work and that their satisfaction partly depends on it.

Behavioural confirmation

Behavioural confirmation refers to a feeling of “doing right” in the eyes of relevant others (Ormel et al., 1999). Behavioural confirmation mostly results from what you do, and less from what kind of person you are or what you have. It is achieved through relationships with relevant others that provide you with positive feelings about what you do, and it includes doing things well, being a good person, and contributing to a common goal (Steverink & Lindenberg, 2006). The clearer the norms or standards on what appropriate behaviour entails, the more important behavioural confirmation will be (Lindenberg, 2001). Westert and Groenewegen (1999) argue that the most important source of social approval for medical specialists is approval by direct colleagues. This is because their work largely involves teamwork and people seek approval from relevant others that are of equal or higher status. When doctors receive criticism on their medical performance by their direct colleagues they risk losing social approval (Westert & Groenewegen, 1999). Several studies have found that having good relationships with colleagues increases the job satisfaction of GPs (e.g. Simoens et al., 2002; Buciuniene et al., 2005; Nylenna et al., 2005).

A study on family physicians in the United States by Skolnik, Smith and Diamond (1993) found that relationships with patients was one of the most important aspects of their work, while their sense of competence and relationships with colleagues and other specialists were other aspects that increased job satisfaction. The authors argue that these findings suggest that family physicians feel that they are facilitating and providing competent care through cooperation with their colleagues and that this is very important to them. This suggests that, next to direct colleagues, patients are another important source of both social approval and job satisfaction for GPs. Although patients are not of equal or higher status, they are still able to express whether they are satisfied with how their GP does his job. Positive feedback from patients is likely to give GPs a sense of “doing right” and that they are capable of providing good care. A study by Fairhurst and May (2006) has even shown that developing and maintaining relationships with patients is often more satisfactory for doctors than the more technical aspects of diagnosis and treatment and that doctors are able to maintain their identity as “good” doctors through positive experiences with patients. In sum, it is expected that good relationships with colleagues and patients have a positive effect on the job satisfaction of GPs. When a GP has few contacts with colleagues, for example because they work in a solo practice, it is expected that relationships with patients become more important.

Affection

Affection refers to love, friendship and emotional support that is acquired through caring relationships, mainly from intimate, family and friendship relations (Ormel et al., 1997). Affection refers to the love that you receive for who you are, regardless of what you have or what you do. It is achieved through relationships that give you feelings such as that you are liked, loved, trusted and accepted, and other people want to be close to you (Steverink & Lindenberg, 2006). These relationships will mostly involve a spouse, family members or close friends, and it seems unlikely that people necessarily require affection at work in order to be satisfied with their job. When the realisation of an instrumental goal is not possible, people will try to shift to means to realise other goals because they produce well-being in the most efficient way, which is called the substitution effect in SPF theory (Nieboer & Lindenberg, 2002). Thus, it is expected that a lack of affection during work hours is not detrimental to the job satisfaction of GPs because they will realise this instrumental goal through relationships outside of the work environment. GPs are expected to be more concerned with the realisation of status and behavioural confirmation than affection with regard to their social well-being and their job satisfaction.

Table 2 shows how the hierarchy of social production functions can be translated into activities and endowments that are needed to produce GP job satisfaction.

Table 2: Application of SPF theory to GP job satisfaction

Top level	GP Job Satisfaction				
Universal goals	Physical Well-being		Social Well-being		
First-order instrumental goals	Stimulation/ Activation	Comfort	Status	Behavioural confirmation	Affection
Activities and endowments (means of production for instrumental goals) (examples)	Provide a range of different services	Comfortable working conditions	Autonomy	Build/maintain relationships with colleagues and patients	-

The following sections will provide a description of conditions on an individual GP-, practice-, and country level that relate to the job satisfaction of GPs and of how these conditions can be linked to one or more instrumental goals of SPF theory, along with the deduction of hypotheses and expectations.

2.4 Hypotheses on instrumental goals and GP job satisfaction

Stimulation

The range of services that GPs are able to provide to their patients is expected to affect their job satisfaction because it determines the amount of variety that a GP can have in his job. The range of services a GP provides consists of promoting health, preventing disease and providing cure, care, or palliation (WONCA, 2002). It is expected that the more of these services a GP provides, the more stimulation is provided in terms of work variety, resulting in higher job satisfaction. In addition, recent research by Schäfer (2016: chapter 7) that is also based on the QUALICOPC study shows that patients feel like they are more involved in decision-making and experience better accessibility, continuity and comprehensiveness of care in countries where GPs have broader service profiles. This suggests that GPs who provide a wider range of services are more likely to receive positive feedback from patients, which could increase their job satisfaction from higher behavioural confirmation from patients. Thus, both in terms of higher stimulation and more behavioural confirmation it is expected that GPs who provide a wider range of services have higher job satisfaction.

The possible range of services of GPs in this study can be divided into four different categories: the extent to which patients contact a GP as the first health care provider, the extent to which GPs are involved in treatment and follow-up care for their patients, the extent to which GPs carry out certain technical procedures in their practice, and the extent to which GPs engage in health promotion to their patients. This division has also been used by Schäfer (2016: chapter 1), who based it on an international study by Boerma (2003) on the variation in the tasks of general practitioners in Europe.

H1: GP job satisfaction is higher for GPs with broader service profiles.

A factor that is related to the services GPs can provide to their patients is the availability of different medical instruments within their practices. The available equipment in a practice determines which diagnostic, treatment and preventive services a GP is able to provide (Boerma, 2003). A lack of equipment can diminish the range of services GPs can provide to their patients (Marsh, 1992). This suggests that the more medical instruments a GP has at his disposal, the more varied his service profile can be. Consequently, this higher variety in services provided is expected to provide more stimulation to a GP, which should result in higher job satisfaction. Furthermore, the medical instruments can also be linked to comfort, since having adequate tools and equipment is part of a good work environment, which makes it easier for workers to perform their jobs more comfortable and efficient (Feldman & Arnold,

1983). Thus, it is expected that GPs with more medical instruments to their disposal are more stimulated and comfortable, resulting in higher job satisfaction.

H2: GPs have higher job satisfaction if they have more medical instruments to their disposal.

Another way for GPs to have more challenging and varied tasks is to have other paid professional activities next to working as a GP. These activities could for example involve being a private physician or teaching. Research by Hartley, Macfarlane, Gantley and Murray (1999) shows that teaching clinical skills can have a positive effect on the morale of general practitioners. This is because it provides a physician with more support and feedback from their peers, and because they can enhance both their clinical skills and their teaching skills. Research by Eliason, Guse and Gottlieb (2000) also found that GPs who participate in some form of teaching were more satisfied with their work than GPs who did not teach. This suggests that teaching medical students and other paid professional activities can serve multiple instrumental goals at the same time: more stimulation from a wider variety of tasks; more status from improving their skills; and more behavioural confirmation from feedback and support from students. Thus, it is expected that GPs who have other paid professional activities are more satisfied with their job than GPs who do not have other paid professional activities.

H3: GPs job satisfaction is higher when they have other paid professional activities.

The degree of urbanisation of the practice area is expected to have an effect on GP job satisfaction for two reasons. GPs in rural areas have a more varied type of practice because of their limited number (Ulmer & Harris, 2002). A wide variety in work tasks can ensure that GPs stay stimulated and activated by their job. Research by Schäfer (2016: chapter 5) has shown that GPs in rural areas indeed have broader service profiles than GPs in urban areas, which suggests that rural GPs have more opportunities to be stimulated and activated in their work, resulting in higher job satisfaction. Furthermore, research by Fryer, Stine, Vojir and Miller (1997) shows that GPs who serve rural populations spend much more time on direct care to patients per week.

Secondly, people in rural areas have more social capital and are more attached and socially integrated to the community than people in urban areas (Putnam, 1995). Social capital has been defined by Putnam, Leonardi and Nanetti (1994) as “those features of social organisation, such as trust, norms and networks, that can improve the efficiency of society by facilitating coordinated actions”. This suggests that GPs in rural areas are more attached and integrated to their community, which would make it easier for them to develop and maintain

relationships with their patients than GPs in urban areas. These stronger relationships should make it easier for rural GPs to receive positive behavioural confirmation from patients than for urban GPs, which consequently results in higher job satisfaction.

In sum, it is expected that GPs in rural areas have more opportunities for both stimulation and behavioural confirmation, and therefore have higher job satisfaction than GPs in urban areas.

H4: GPs job satisfaction is higher for GPs in rural areas than for GPs in urban areas.

One factor on a country-level that is expected to have an effect on GP job satisfaction is the overall strength of the primary care structure in a country. The strength of a country's primary care system depends on the degree of development of multiple core primary care dimensions in the context of its health care system (Kringos, Boerma, Hutchinson, Van der Zee & Groenewegen, 2010). Strong primary care is often associated with a strong gatekeeping position of GPs, but it also involves aspects such as availability of care, patient-centered care, collaboration with other specialists, and continuity of care (Kringos, Boerma, Hutchinson & Saltman, 2015). The more a primary care system contains these aspects, the stronger it is. A strong primary care structure is defined by favourable economic conditions for primary care at a national level, strong national governance and developments in the national workforce that support primary care (Kringos et al., 2010).

In most European countries, GPs are the most important providers of primary care (Schäfer et al., 2011). This suggests that the stronger a country's primary care structure is, the more important the role of the GP within the system is. The strength of primary care is partly determined by the breadth of the service package that GPs provide because this indicates a stronger process quality (Kringos et al., 2010). Since broader service profiles provide more stimulation for GPs in terms of work variety, it is expected that a strong primary care system is positively related to GP job satisfaction. This results in the following hypothesis.

H5: GP job satisfaction is higher in countries with stronger primary care structures than in countries with weaker primary care structures.

Comfort

The number of hours worked relative to the average number of working hours within a country is expected to have a negative relationship with GP job satisfaction. A meta-analytic review by Sparks, Cooper, Fried and Shirom (1997) on the effects of working hours on health shows a small, but significant negative correlation between overall health and hours of work. Next to negative effects on health, longer working hours have been found to be associated

with a lower satisfaction with the work-family balance (Valcour, 2007), which can be explained by the fact that people who spend a lot of time and energy at work will have less time and energy for activities with their family (Frone, 2003). Several studies show that a higher number of working hours is one of the strongest predictors of lower job satisfaction for GPs as well (Appleton, House & Dowell, 1998; Sibbald, Enzer, Cooper, Rout & Sutherland, 2000; Nylenna et al., 2005; Whalley et al., 2006). Working full-time has been found to be a strong predictor of lower levels of job satisfaction (Ulmer & Harris, 2002). Simoens et al. (2002) have found that GPs who work less than 50 hours per week reported lower levels of stress and were more likely to have higher job satisfaction than GPs with excessive work hours. This suggests that the number of hours worked can be related to the instrumental goal of comfort, with levels of stress as internal comfort and not having enough time as external comfort. Even when GPs are mostly satisfied with most aspects of their job there still seems to be a negative relationship between hours of work and job satisfaction, as O'Sullivan, Keane and Murphy (2005) have found among a sample of Irish GPs. Moreover, the amount of working hours of GPs should be compared to the average number of working hours of GPs within a country. This is because the perception of an appropriate amount of working hours differs between countries, which has for example been proved by Bu and McKeen (2000), who found in an international comparison that workers from one country are expected to work more than workers from another country. This implies that the amount of working hours of other GPs within a country should be taken into account when working hours are related to job satisfaction. In sum, it is expected that GPs who work more hours overall than other GPs in their country are less satisfied with their job because they experience less comfort in their job.

H6: GP job satisfaction is lower for GPs who work more hours, relative to the average amount of working hours in their country.

Behmann et al. (2012) found that even though primary care physicians are generally satisfied with their job, they report low rates of satisfaction with administrative tasks. A study in the United States by Woolhandler and Himmelstein (2014) shows that spending a larger amount of time on administrative work affects job satisfaction of physicians negatively, even after controlling for income and several other factors. Research that focused on different aspects of job satisfaction shows that administrative work is one of the aspects that is least appreciated by GPs when compared to other physicians (Schmit Jongbloed et al., 2010; Schmit Jongbloed, Schönrock-Adema, Borleffs, Stewart & Cohen-Schotanus, 2016). Schmit Jongbloed et al. (2010) conclude from their findings that “physicians suffer from the bureaucratic demands and the increased influence of management on their daily work over

the last decades". Zuger (2004) suggests that this might be caused by the increased complexity and bureaucracy in the organization of health care. While other physicians have to deal with these issues as well, Zuger (2004) argues that they are able to delegate these tasks more often because they generally work within larger organizations than GPs. Walker and Pirota (2007) suggest that decreasing administrative tasks and increasing work based supports might be the most effective ways to improve the job satisfaction of GPs because these are some of the main aspects of the job that GPs are most unhappy with. Thus, when GPs have to spend a lot of their time on administrative work they seem to perceive this as poor working conditions and it could therefore have a negative effect on their instrumental goal of comfort.

One could argue that taking away administrative tasks from GPs would decrease the variety in their job and could therefore decrease job satisfaction. However, Van Ham et al. (2006b) state that administrative tasks are not inherent to the profession, which makes it more likely that GPs would experience an increase in job satisfaction when their administrative tasks are reduced, rather than a decrease. It is assumed that administrative work is not sufficiently intellectually stimulating for GPs to be stimulated by it and they would probably prefer to spend their time on tasks that are both more challenging and more directly related to patient care. Thus, even though administrative tasks could be seen as more stimulation, it does not seem to be the type of stimulation GPs are looking for.

In sum, it is expected that GPs who have to spend relatively more time on administrative tasks have lower job satisfaction because it provides them with less comfort and it is not sufficiently challenging to stimulate them. This leads to the following hypothesis:

H7: GPs have higher job satisfaction if they spend less time on administrative work.

Another factor that is expected to influence GP job satisfaction is the amount of time they have to spend on out-of-hours work in the evenings, nights and weekends. Even though most GPs acknowledge that out-of-hours work is an important aspect of their profession they generally consider it as very demanding (Post & De Haan, 2004). This suggests that out-of-hours work increases the subjective workload for GPs and is therefore expected to decrease their overall job satisfaction. Some authors also suggest that out-of-hours work affects the physical and mental health of GPs. Myerson (1990) found that out-of-hours work, especially night shifts, is a major source of stress for GPs because they are often too tired to properly deal with patients' problems at these times. Furthermore, a study in the United Kingdom shows that GPs who feel that their physical health is affected by their work seem to work more night shifts than GPs whose physical health was less affected by their work (Appleton et

al., 1998). Thus, in terms of less comfort from the job, out-of-hours work is expected to have a negative effect on GP job satisfaction.

H8: GP job satisfaction is lower for GPs who spend more time on out-of-hours work.

One factor that can make certain tasks easier for GPs is whether they can use a computer for these tasks. According to Protti (2005), health care lags behind other sectors with regard to realising the benefits of using computer technology, which is a shame because technology can be beneficial for their patients and improve the way health care professionals work. A study by Mannan, Murphy and Jones (2006) found that practice staff experienced benefits from using IT in the practice in terms of efficiency, communication, accessibility and accuracy of data. Health information technology (HIT) is more and more perceived as a means to improve the quality, safety and efficiency of health care systems (Chaudhry et al., 2006). It has been found that the use of IT in general practice has some benefits because it reduces unnecessary testing, makes important clinical information available, and provides support with important decisions (Wang et al., 2003). This suggests that the use of IT has the potential to reduce the workload of GPs and give them more assurance when they make decisions, so it seems to provide better working conditions for the GP. Thus, it is expected that the more GPs makes use of a computer in his work, the higher their job satisfaction.

H9: GP job satisfaction is higher when they use a computer for more specific purposes in their practice.

Another factor that is related to job comfort of GPs is whether and how much time they have for vacation. Vacation has been defined by Lounsbury and Hoopes (1986) as “a cessation of work, a time when a person is not actively participating in his or her job. It is a time when a person is free to pursue other interests, and therefore a time when the work situation might lose importance compared to other domains of experience such as family and personal leisure”. Vacation has been found to decrease both the behavioural and the psychological strains that are caused by job stress (Westman & Etzion, 2001) and several studies found that employees have lower levels of job strain during and a few weeks after their vacation (e.g. Lounsbury & Hoopes, 1986; Etzion, Eden & Lapidot, 1998). This seems to apply to physicians as well, since research by Ozyurt, Hayran and Sur (2006) shows that physicians who have more than two vacations per year have significantly higher scores for job satisfaction. Thus, it is expected that the more weeks of vacation GPs have per year, the higher their job satisfaction will be.

H10: GP job satisfaction is higher as GPs take more weeks of vacation per year.

A factor that can be considered as a circumstance that influences the level of comfort for a GP is the physical environment of the practice. Good physical working conditions, such as the cleanliness of the workplace, adequate tools and equipment and pleasant lighting, make it easier for employees to perform their jobs comfortably and efficiently (Feldman & Arnold, 1983). Favourable working conditions and a good work environment can have a positive effect on employee job satisfaction, which in turn enhances work performance (Parvin & Kabir, 2011). Research by Bluysen, Aries and Van Dommelen (2011) found several factors of the physical work environment that influence job satisfaction, including thermal comfort, office layout, acoustics, decoration and cleanliness. The work environment can even have a large effect on the level of an employees' pride for the work they do (Syptak, Marsland & Ulmer, 1999). On the other hand, research by Santos et al. (2003) found that occupational stress is related to the physical work environment. An absence of favourable working conditions can have a negative impact on the mental and physical well-being of workers, which in turn negatively affects their job satisfaction (Greenberg & Baron, 2003). There are also several physical conditions that are related to higher levels of stress, such as high noise levels, overcrowding in the workplace and a lack of privacy (Burke, 1988).

Thus, it is expected that GPs are more satisfied with their job when they work in a practice with good physical working conditions. It can be expected that when a practice building is in good condition and thus provides a pleasant work environment that this will make it easier for GPs to focus on their main tasks and get more satisfaction from their work. This leads to the following hypothesis:

H11: GPs job satisfaction is higher as their practice provides a more pleasant physical work environment.

It is expected that GP job satisfaction is also dependent on how out-of-hours care is organised in a country. A well-functioning health care system partly depends on whether there is appropriate out-of-hours care. Huibers, Giesen, Wensing and Grol (2009) identify nine organizational models for out-of-hours care, which they divide into three categories: small family doctor based models, large scale family doctor based models, and hospital- and national based models. First, small family doctor based models, which include individual general family practice and rota group, perform well in terms of accessibility for patients and patient satisfaction but seems to affect GP satisfaction negatively due to the high workload. Second, large scale family doctor based models, including GP cooperatives, primary care centers (PCC), deputizing services and minor injury centers/walk-in centers, seem to perform

better than small family doctor based models in terms of GP satisfaction due to a lower workload. Finally, hospital- and national based models, including telephone triage and advice centers (TTA), emergency departments of hospitals (A&E) and primary out-of-hours care integrated in the hospital, are characterised by an absence of GPs in out-of-hours care because hospitals are mainly responsible for its' provision. These models show several weaknesses and few strengths. Physicians often prefer that it is organised through a GP cooperative, because it combines size of scale advantages with organizational features of strong primary care, such as high accessibility, continuity and coordination of care (Huibers et al., 2009).

The findings of Huibers et al. (2009) suggest that the way out-of-hours care is provided in a country affects GP job satisfaction mostly in terms of workload. The most important problem Dutch GPs experienced before the year 2000 was that the way out-of-hours care was organised led to a large increase of their workload on top of their work during regular hours, which was solved to a large extent with the introduction of GP cooperatives (Uden, Giesen, Metsemakers & Grol, 2006). Several other studies have shown that GPs in several countries were not satisfied with the way out-of-hours care was organised in the past as well and that the introduction of large GP cooperatives led to a reduction of their workload and increased their job satisfaction (Giesen, Haandrikman, Broens, Schreuder & Mokkink, 2000; Sibbald et al., 2000; Evans, Lambert & Goldacre, 2002). In addition, research by Van de Berg, De Bakker and Kolthof (2004) shows that being affiliated to a cooperative explains a larger part of the variation in experienced workload than the number of hours spent on out-of-hours work.

One could argue that a model that is hospital- and national based would be accompanied by higher levels of job satisfaction than the other models because it takes away workload of GPs. However, according to Salisbury (1997), GPs are very satisfied with participation in out-of-hours care and that they experienced benefits to both their professional and their personal lives. Their main reasons to join cooperatives were the quality of care for patients and the fact that it is organised by GPs themselves. Giesen, Smits, Huibers, Grol and Wensing (2011) found that most Dutch primary care physicians were satisfied with the GP cooperatives and did not want to go back to the rotation model or end the 24-hour availability of GP care. This suggests that, next to workload, GPs care about their role in the provision of out-of-hours care because they want to remain autonomous as a profession, from which they produce their instrumental goal of status. This leads to the expectation that GPs are more likely to be satisfied with small/large family doctor based models than with hospital- and national based models in terms of status, and that large doctor based models are more satisfactory than small doctor based models in terms of workload (comfort). This leads to the following hypothesis:

H12: GP job satisfaction is lowest in countries where hospital- and national based models are dominant, higher in countries where small family doctor based models are dominant, and highest in countries where large family doctor based models are dominant.

Status

Research by Millán, Hessels, Thurik and Aguado (2013) found that self-employed individuals have a greater likelihood of being satisfied with their job than salaried employees, which has also been found for self-employed GPs, as opposed to salaried GPs (Van den Hombergh, Grol, Van den Hoogen & Van den Bosch, 1997). On the one hand this can be explained by the fact that self-employed GPs have more freedom to choose their own methods than salaried GPs. This independence should give them more status through higher autonomy, which is expected to increase job satisfaction. Boerma, Van der Zee and Fleming (1997) suggest that the independence that comes along with self-employment can encourage doctors to be involved in more activities than the basic activities of general practice. Self-employed GPs have been found to have broader service profiles than salaried GPs, except for preventive services (Schäfer, 2016: chapter 5). This suggests that self-employed GPs have more variety in their work, which gives them more opportunities for stimulation and should result in higher job satisfaction.

Thus, both in terms of autonomy and variety of work, representing the instrumental goals of status and stimulation, self-employed GPs are expected to have higher job satisfaction than salaried GPs.

H13: GPs job satisfaction is higher for self-employed GPs than for salaried GPs.

One GP characteristic that could have an effect on job satisfaction is gender. Clark (1997) states that women often show higher job satisfaction rates than men. This is quite remarkable since women often objectively have lower job quality in various work settings but still show equal or higher job satisfaction than men, which is also known as “the paradox of the contented female worker” (Phelan, 1994). It is suggested that women may be more likely to give socially desirable answers or that their job expectations are different from men (McMurray et al., 2000). This pattern of gender differences in job satisfaction has been found for GPs as well. Several studies show that female GPs were more satisfied with their job than male GPs (Cooper, Rout & Faragher, 1989; Sibbald et al., 2000; Sibbald et al., 2003). It can be argued that female GPs may be more satisfied with certain aspects of the job than male GPs, while they may be less satisfied with other aspects. This has been shown by Schmit Jongbloed et al. (2010), who found some gender differences in several aspects of physician job satisfaction. They show that male physicians were more satisfied with ‘cooperation with

support personnel' and 'professional achievements', while they were less satisfied with 'administrative tasks' than female physicians. In line with SPF theory it is likely that women are less dependent on their job for social well-being than men are and that this might make it more likely for women to be satisfied with their job. This is supported by a research by Swanson, Power and Simpson (1996), who found that female GPs have higher job satisfaction than male GPs. In particular, they found that male GPs felt less valued and experienced more stress from their role at work and intrinsic aspects of their job, including dealing with patients and administrative tasks. Thus, in terms of status and comfort it is expected that female GPs are more satisfied with their job than male GPs.

However, it can also be argued that the difference in job satisfaction between men and women is caused by the amount of hours they work. For example, Appleton et al. (1998) suggest that the gender difference in job satisfaction for GPs may be explained by the fact that women, as opposed to their male colleagues, spend less time on call, work fewer hours and delegate their work more often. Sibbald et al. (2000) have also suggested that the higher job satisfaction of female GPs might be explained by the fact that they are more likely to work part time. This finding has been supported by Van den Berg (2010: chapter 1), who explains this by the fact that, on average, men spend more time on paid work while women traditionally spend more time on caring tasks. This suggests that the relationship between gender and job satisfaction might be mediated by how many hours GPs work. This leads to two hypotheses regarding gender.

H14a: Female GPs are more satisfied with their job than male GPs.

H14b: The relationship between GP job satisfaction and gender is mediated by working hours.

According to Shortell (1974), the occupation 'physician' has appeared consistently near the top of the list in most studies on occupational structures of societies. However, he has shown that there were prestige differences *within* the occupation of physician between different specialties, with general practice taking an intermediate position. Meanwhile, Sutherland and Cooper (1992) found that general practice no longer has the same respect and prestige as a profession as it used to, and they suggest that this had a negative effect on the gratification and satisfaction of GPs. Kroneman, Van der Zee and Groot (2009) suggest that income differences between GPs from different countries can also be a reflection of their relative status, the importance that is attached to services of GPs, and differences in bargaining power. Kringos et al. (2015) found that GPs earn less than other medical specialists in most European countries, with the exception of Portugal, Spain and the United Kingdom. It is expected that

GPs will generally be more satisfied in countries where they earn more or approximately the same as other medical specialists than in other countries where they earn (much) less. This results in the following hypothesis:

H15: GP job satisfaction is higher in countries where GP income is equal or higher compared to other medical specialists than in countries where GP income is lower compared to other medical specialists.

Behavioural confirmation

It is believed that feedback is an essential aspect of maintaining and increasing workers' motivation and satisfaction (Hackman & Oldham, 1976). Feedback provides recurrent evaluations of work performance. It gives workers a better sense of what is expected of them and helps them to develop the necessary skills or judgements for the job (Wright & Kim, 2004). Judge, Locke, Durham and Kluger (1998) found that feedback is one of the core job dimensions that workers with positive self-evaluations rated their job higher on, resulting in higher job satisfaction. It is expected that GPs who have better relationships with colleagues and patients are more likely to receive feedback from them. Studies have found that having good relationships with patients and colleagues increases GP job satisfaction (e.g. Skolnik et al., 1993; Kalda, Maaros & Lember, 2000), while suboptimal or a lack of communication with colleagues and patients seems to decrease GP job satisfaction (Rout, 1999). According to Lockyer (2003), physicians are encouraged to keep on improving their knowledge and skills, to reflect on their provision of care, and to deliver services with compassion, honesty and integrity. Positive feedback can be related to behavioural confirmation because they both involve a provision of positive feelings about what you do by relevant others. As mentioned before, for GPs these relevant others are colleagues and patients. Firstly, this results in the following hypothesis:

H16: GPs who receive feedback from their colleagues have higher job satisfaction than GPs who receive no feedback from colleagues.

Secondly, patients can be a source of behavioural confirmation when they show their appreciation for the care the GP has provided to them. It seems likely that patients will be more inclined to show this appreciation when they are more satisfied. Some studies suggest a positive relationship between patients satisfaction and GP job satisfaction (e.g. Linn et al., 1985b; Haas et al., 2000). Firth-Cozens (2001) even states that physician job satisfaction has a very direct effect on patient satisfaction. Patients who are satisfied with the care they receive from their GP will probably show this both both through verbal and nonverbal

communication. It also seems likely, on the other hand, that GPs will be less satisfied when their patients show dissatisfaction with their care. Some of the main sources of lower satisfaction for GPs are increased demands by patients (Rout et al., 1996) and patients' expectations (Cooper et al., 1989). A study by Sibbald et al. (2000) found that British GPs were increasingly dissatisfied with the recognition they received from patients for their work, the stress that was caused by worrying about complaints from patients, and too high expectations by others. Thus, it seems that satisfied GPs have more satisfied patients and less satisfied GPs have less satisfied patients.

In addition, it is expected that the effect of patient satisfaction on GP job satisfaction will be stronger for GPs in a solo practice. This is because they are more client-dependent than colleague-dependent, since there are no other GPs present within their practice to receive behavioural confirmation from. In SPF theory this is called the substitution effect, which occurs when certain means are not available to reach an instrumental goal and people have to put more emphasis on other means (Nieboer & Lindenberg, 2002). This results in the following two hypotheses:

H17a: GP job satisfaction is higher when their patients are more satisfied.

H17b: The relationship between GP job satisfaction and patient satisfaction is stronger for GPs in solo practices than for GPs in shared practices.

Another factor that is expected to have an effect on GP job satisfaction is whether GPs work in a solo practice or in a shared practice with multiple GPs. McCranie, Hornsby and Calvert (1982) assume that the practice environment can influence satisfaction because they found that GPs in group practices with three or more colleagues, as opposed to practices with fewer GPs, are more satisfied with time demands, opportunities to continue medical education, opportunities to get in contact with colleagues, and the available time they have to spend on leisure activities. This suggests that working together with other GPs in a shared practice serves several instrumental goals. Opportunities to continue medical education is a form of stimulation, time demands and time for leisure activities represent comfort, and opportunities to get in contact with colleagues gives more opportunities for behavioural confirmation.

According to Freidson (1988), the prime source of pressure for physicians in a solo practice comes from the patients and he argues that solo practices, as opposed to shared practices, are more client-dependent than colleague-dependent. It is less likely for these physicians to strictly follow professional standards because they are isolated from their colleagues and are dependent of their patients for approval. Such "client-dependent practices" differ from "colleague-dependent practices" because the cooperation with and approval of

colleagues is essential in the latter. In shared practices performance is more likely to be more dependent of what other colleagues think than of patients' expectations (Freidson, 1988). Thus, even though GPs in solo practices do have opportunities to receive behavioural confirmation from patients, it is expected that GPs in shared practices have more opportunities for behavioural confirmation because they can rely on both patients and colleagues.

On the other hand, it can also be argued that GPs in solo practices have more autonomy than GPs in shared practices because they have more freedom to choose their own working methods. This claim is supported by findings of Grembowski et al. (2003), who found that physicians show higher satisfaction in single-handed practices than in larger shared practices and they suggest that this could be caused by the bureaucratic controls are imposed on physicians in shared practices. Thus, on the one hand it is expected that satisfaction is higher for GPs in shared practices in terms of opportunities for behavioural confirmation and, on the other hand, it is expected that satisfaction is higher for GPs in solo practices in terms of autonomy. This results in the formulation of two contradictory hypotheses:

H18a: GPs in shared practices have higher job satisfaction than GPs in solo practices.

H18b: GPs in solo practices have higher job satisfaction than GPs in shared practices.

An individual GP characteristic that is expected to influence GP job satisfaction in terms of behavioural confirmation is age. Age is positively related to job satisfaction and most of the differences can be explained by variation in work values and job rewards (Kalleberg & Loscocco, 1983). Research by Van Ham (2006a) found that as age increased, Dutch GPs were more satisfied with several aspects of the job, including external working conditions, collaboration and general aspects of the job. Age reflects which phase of the career someone is in and a consequence of getting older is gaining experience. This experience may provide a GP with higher status and more appreciation from patients and colleagues. Schmit Jongbloed et al. (2016) show that physicians showed greater satisfaction for appreciation from their patients in the mid- and end career stages than in the beginning of their career. The authors suggest that this might be the result of long lasting relationships they may have with their patients and of greater experience with social aspects of providing care. In sum, GPs are expected to produce more social approval from behavioural confirmation as they get older, resulting in a positive association between age and GP job satisfaction. This results in the following hypothesis:

H19: GP job satisfaction is higher as age increases.

When a patient list system is obligatory in a country patients are required to register at a specific GP practice to be able to receive care in that practice. GPs in these countries have a clearly defined practice population. The list system allows GPs to get to know their patients and the patients' families better, which results in better continuity of care (Pedersen, Andersen & Søndergaard, 2012). Continuity of care is often very important for GPs, as a Norwegian study found that 80 percent of GPs considered continuity as (very) important (Hjortdahl, 1990). Another important implication of a patient list system is that patients are more likely to be familiar with a particular GP. Familiarity with a GP was associated with higher levels of patient satisfaction with care (Schers, Van den Hoogen, Bor, Grol & Van den Bosch, 2005). Continuity of care is positively related to trust between physicians and patients (Mainous, Baker, Love, Gray & Gill, 2001). A study by Hagman and Rehnström (1985) shows that GPs and patients agreed to a large extent about the importance of seeing the same doctor in different visits. Two studies in the UK have both shown that most GPs find it very important that patients have the possibility to see the same doctor in every visit to the practice (Freeman, 1985; Kearley, Freeman & Heath, 2001). Thus, it is expected that GPs in countries where patient list systems are obligatory have more opportunities to receive behavioural confirmation from their patients because of enhanced familiarity and continuity of care. This results in the following hypothesis:

H20: GP job satisfaction is higher in countries where patient list systems are obligatory than in countries where patient list systems are not obligatory.

2.5 Overview of hypotheses

Table 3: Schematic overview of hypotheses

		Stimulation	Comfort	Status	Behavioural Confirmation
GP/ Practice level	<i>Resources</i>	H1: breadth of service profile H2: medical instruments H3: Other paid activities	H6: working hours H7: administrative work H8: out-of-hours work H9: ICT use H10: vacation	H13: employment status	H16: feedback from colleagues H17a: patient satisfaction H17b: patient satisfaction*solo/shared
	<i>Circumstances</i>	H4: urbanity	H11: physical work environment	H14a: gender H14b: gender * working hours	H18a/b: solo/shared practice H19: age
Country level	<i>Institutions</i>	H5: primary care structure	H12: out-of-hours care model	H15: relative income position	H20: patient list system

3. Data and methods

3.1 Dataset

The QUALICOPC study (Quality and Costs of Primary Care in Europe) was coordinated by NIVEL (Netherlands Institute for Health Services Research) and co-funded by the European Commission under the 7th framework programme. In the QUALICOPC study, surveys were held among general practitioners and their patients in 31 European countries (EU 27 - except for France - FYR Macedonia, Iceland, Norway, Switzerland, and Turkey) and 3 non-European countries (Australia, Canada and New Zealand). A nationally representative sample of GPs (target: N=220 GPs; Cyprus, Iceland, Luxembourg and Malta N=75 GPs) and patients (target: N=2200 patients; Cyprus, Iceland, Luxembourg and Malta N=750) filled in the questionnaire in each country (Groenewegen, Greß & Schäfer, 2016). In order to make comparisons between different regions, larger samples were taken in Turkey, Spain, Belgium and Canada. Per practice or health centre only one GP was eligible to participate. Four questionnaires were developed for the QUALICOPC study: the GP questionnaire, the Patient Experiences questionnaire, the Patient Values questionnaire, and the Fieldworker questionnaire. This study mostly uses questions from the GP questionnaire, with the exception of one question from the Patient Experiences questionnaire. The questions for these surveys were derived from existing, validated questionnaires such as the European GP Task Profile Survey (Boerma, Van der Zee & Fleming, 1997), the Primary Care Evaluation Tool (Boerma, Snoeijs, Wiegers & Baltag, 2012) and the Primary Care Assessment Tool (Shi, Starfield & Xu, 2001).

Participating GPs filled in the questionnaire either on paper or electronically (online or via a tablet computer). In most countries, trained fieldworkers visited the participating GP practices to collect patient data through surveys on paper, except for Belgium, where patients filled in the survey on a tablet computer. Local practice staff, instead of fieldworkers, was instructed to distribute and collect the patient surveys on paper according to the study protocol in parts of Canada, Denmark, England, New Zealand and Sweden.

In every practice, nine patients were asked to fill in the Patient Experience questionnaire about the consultation that they just had, and one patients filled in the Patient Values questionnaire. In addition, the fieldworker filled in a questionnaire about the practice facility. A unique practice identification for every participating GP practice enables researchers to link GP responses to the responses of their patients on the Patient Experience and Patient Values questionnaires and to the Fieldworker questionnaire, allowing for multi-level analyses of the data. Ethical approval was obtained in accordance with the legal requirements in each country and all the surveys were carried out anonymously.

Data collection took place between October 2011 and December 2013. The GP questionnaire was filled in by 7,414 GPs and the Patients Experiences questionnaire was filled in by 63,887 patients. Groenewegen et al. (2016) described recruitment procedures and participation rates for the QUALICOPC study and they found that the GP respondents were nationally representative for GPs in their country in terms of age and gender: the average age is 50.3 and 52.5% are female. Further details about the study protocol and questionnaire development have been published elsewhere (See: Schäfer et al. (2011) and Schäfer et al. (2013)).

Furthermore, some variables in the dataset have a substantial amount of missing values. For example, other paid activities (13.7%) and physical work environment (12.19%) had quite some missing values. In order to maintain these cases for the analyses, a ‘missing’ category was created for the categorical variables. If these categories show a significant relationship with GP job satisfaction it suggests that these missings may not be at random. If one or more of these ‘missing’ categories turns out to be significant this will be reported in the results section.

3.2 Operationalisations

3.2.1 Dependent variable

Question 60 from the GP questionnaire in the QUALICOPC study is used to measure GP job satisfaction. This question is derived from the European Task Profile Study (Boerma, 2003).

In this question the GPs were asked to what extent they agree with six statements on a scale of 1 (strongly agree) to 4 (strongly disagree). The statements are:

- I feel that some parts of my work do not really make sense
- My work still interests me as much as it ever did
- My work is overloaded with unnecessary administrative detail
- I have too much stress in my current job
- Being a GP is a well-respected job
- In my work there is a good balance between effort and reward

The items were coded in such a way that higher satisfaction is indicated by a higher score, which means that the items ‘still interesting’, ‘well-respected’ and ‘balance’ are recoded. This means that, for example, a high score on ‘still interesting’ means that a respondent strongly agrees with the statement, which indicates higher job satisfaction. Ultimately, each GP receives a score between 1 and 4 (1= low job satisfaction and 4 = high job satisfaction).

Missing data for the components were relatively low: 1.71% (127 cases) for ‘makes sense’, 0.99% (74 cases) for ‘still interesting’, 1.09% (81 cases) for ‘administrative detail’,

1.40% (104 cases) for ‘stress’, 1.50% (111 cases) for ‘well-respected’, and 1.34% (99 cases) for ‘balance’. This results in a total percentage of missing values for the dependent variable ‘job satisfaction’ of 0.47% (35 cases), which are the cases that had missing values for every job satisfaction item. There are also cases that had between one and five missing values for the job satisfaction items, and these values are inferred from the items that are observed. This method ensures that cases are included as much as possible, instead of dropping all cases with a missing value on one (or more) item(s).

3.2.2 Independent variables: GP- and practice level

Practice level data were all operationalised using data from the QUALICOPC GP questionnaire, except for ‘patient satisfaction’ and ‘physical work environment’, which were respectively operationalised using data from the QUALICOPC patient experience questionnaire and the QUALICOPC fieldworker questionnaire. The operationalisations, amount of missing values per variable and the data sources are presented in table 4.

Table 4: Operationalisations of GP- and practice hypotheses

Variable	Operationalisation	Missing values	Data source
<u>Breadth of service profile</u>			
1. First contact care	Q50 In case of the following health problems, to what extent will patients in your practice population (people who normally apply to you for primary medical care) contact you as the first health care provider? Recoded into a variable with range 1-4 for which 1 = low first contact care; 4 = high first contact care	0.63%, 47 cases missing (distributed over 17 countries, most notably Slovakia with 10 missing cases)	QUALICOPC GP questionnaire
2. Treatment of diseases	Q51 To what extent are you involved in the treatment and follow-up of patients in your practice population with the following diagnoses?	0.73%, 54 cases missing (distributed over 20 countries, most notably Slovakia with 15 missing cases)	QUALICOPC GP questionnaire

	Recoded into a variable with range 1-4 for which 1 = low treatment and follow-up; 4 = high treatment and follow-up		
3. Technical procedures	<p>Q52 To what extent are the following activities carried out in your practice population by you, or your staff, and not by a medical specialist?</p> <p>Recoded into a variable with range 1-4 for which 1 = few technical procedures; 4 = many technical procedures</p>	0.63%, 47 cases missing (distributed over 19 countries, most notably Slovakia with 12 missing cases)	QUALICOPC GP questionnaire
4. Preventive services and health promotion	<p>Q53 When do you, or your staff, measure blood pressure?</p> <p>Q54 When do you, or your staff, measure blood pressure?</p> <p>Q55 To what extent are you involved in health education as regards the following topics? [Smoking / Diet / Problematic use of alcohol]</p> <p>Recoded into a variable with range 1-4 for which 1 = low health promotion; 4 = high health promotion</p>	0.39%, 29 cases missing (distributed over 17 countries, most notably Slovakia and Finland with both 5 missing cases)	QUALICOPC GP questionnaire
Medical instruments	<p>Q25 Please tick the equipment used in your practice by yourself or your staff [...]</p> <p>Recoded into a variable with range 0-30 in absolute number of instruments</p>	0.49%, 36 cases missing (distributed over 12 countries, most notably Bulgaria with 12 missing cases)	QUALICOPC GP questionnaire
Other paid professional activities	<p>Q14 Beside your work as a GP in this practice, do you have any other <u>paid</u> professional activities? [No; yes, as a private physician/in</p>	13.7%, 1,019 cases missing (distributed over 33 countries, most notably Canada with 113 missing values)	QUALICOPC GP questionnaire

	residential setting/company doctor/medical education/other] Recoded into a dummy variable with 0 = no paid side activities; 1 = paid side activities; missing		
Urbanity	Q4 How would you characterise the place where you are currently practising? [big (inner)city / suburbs / (small) town / mixed urban-rural / rural] Recoded into 3 dummy variables with 0 = big (inner) city and 1 = suburbs or small town; mixed urban-rural or rural; missing	1.1%, 84 cases missing (relatively evenly distributed over 26 countries)	QUALICOPC GP questionnaire
Working hours	Q8 How many hours per week do you work as a GP (<u>excluding</u> additional jobs and on-call or out-of-hours services)? Recoded into a variable with range 1-75 in absolute hours per week, relative to the mean number of working hours within a country (see appendix A for mean working hours per country)	1.96%, 145 cases missing (distributed over 27 countries, most notably in Belgium and Canada with 28 and 23 cases missing)	QUALICOPC GP questionnaire
Administrative work	Q9 How many of these hours do you spend on direct patient care (consultations, home visits, telephone consultations)? To measure the amount of hours spent on administrative work the answer on Q9 is divided by the answer on Q8, resulting in a proportion of how many hours GPs spend on direct patient care as compared to	1.96%, 145 cases missing (distributed over 27 countries, most notably Canada and Belgium with 61 and 35 cases missing)	QUALICOPC GP questionnaire

	their total working hours		
Out-of-hours work	<p>Q13 In the past 3 working months (excluding holidays, etc.), how often and for how long did you have on-call duties during evenings, nights) and weekends?</p> <p>Q13.1 During evening(s) _ times; in total _ hours;</p> <p>Q13.2 During night(s)_ times; in total _ hours</p> <p>Q13.3 During weekend days _ times; in total _ hours</p> <p>Recoded into a variable with range 0 - 1668 in absolute hours of total out-of-hours work</p>	<p>15.92%, 1,180 cases missing (distributed over 34 countries, most notably Canada and Latvia with 147 and 122 cases missing)</p> <p>(The missing values on the out-of-hours variable were recoded to 0 in order to maintain cases. It is assumed that GPs who did not answer this question did not perform any out-of-hours work)</p>	QUALICOPC GP questionnaire
ICT use	<p>Q43 For which of the following purposes do you use a computer in your practice? [Not applicable; making appointments; issuing invoices; issuing drug prescriptions; keeping records of consultations; sending referral letters to medical specialists; storing diagnostic test results; searching medical information on the internet; sending prescriptions to the pharmacy]</p> <p>Recoded into a variable with range 0 - 8 in number of purposes of computer use</p>	<p>2.21%, 164 missing cases (distributed over 19 countries, most notably Lithuania and New Zealand and with 73 and 61 cases missing)</p>	QUALICOPC GP questionnaire
Vacation	<p>Q59.3 In the past 12 months, about how many weeks altogether have you been away from the practice due to vacation?</p>	<p>2.09%, 155 missing cases (distributed over 27 countries, most notably Slovakia and Latvia with 29 and 24 cases missing)</p>	QUALICOPC GP questionnaire

	Recoded into a variable with range 0 - 35		
Physical work environment	<p>Q10 How clean does the waiting room look? [Very clean; rather clean; not clean] Recoded into a dummy variable with 0 = not or rather clean; 1 = very clean.</p> <p>Q12 Can people in the waiting room hear or see what happens in the doctor's office? [Yes; no] Dummy variable with 0 = no privacy; 1 = privacy</p> <p>Recoded into a categorical variable with 0 = not clean and no privacy; 1 = clean or private; 2 = clean and private</p>	12.19%, 904 missing cases (distributed over 32 countries, most notably Denmark, New Zealand, Finland and Australia with respectively 212, 168, 153 and 152 cases missing)	QUALICOPC Fieldworker questionnaire
Employment status	<p>Q15 As a GP, are you self-employed or in salaried employment? [Salaried employment with centre or authority; salaried employment with other GP; Self-employed with contract(s) with health service, insurance or authority; Self-employed without contract(s)] Recoded into a dummy with 0 = salaried employment with centre or authority; salaried employment with other GP; and 1 = self-employed with contract(s) with health service, insurance or authority; self-employed without contract(s)</p>	1.42%, 105 cases missing (distributed over 26 countries, most notably Lithuania and Spain with 14 and 13 missing cases)	QUALICOPC GP questionnaire

Gender	Q1 Are you male or female? [male / female] Recoded into a dummy with 0 = male; 1 = female	0.38%, 28 cases missing (distributed over 15 countries, most notably Austria with 6 missing cases)	QUALICOPC GP questionnaire
Shared or solo practice	Q18 Do you work alone or in shared accomodation with one or more GPs and/or medical specialists? [alone; with _ other GPs in shared accomodation; with _ other medical specialist(s) in shared accomodation Recoded into a dummy variable with 0 = solo practice; 1 = shared practice; missing	0.97%, 72 cases missing (distributed over 17 countries, most notably Belgium, Finland and Latvia with 18, 16 and 13 missing cases)	QUALICOPC GP questionnaire
Feedback from colleague GPs	Q22.2 In the past 12 months, has the following occurred in your practice/centre: Feedback from colleague GPs (peer review or practice visitation)? [yes / no] Recoded into a dummy variable with 0 = no feedback; 1 = feedback	1.69%, 125 missing cases (distributed over 27 countries, most notably Bulgaria, Spain and Latvia with 13, 13 and 12 missing cases)	QUALICOPC GP questionnaire
Patient satisfaction	Q6.9 I would recommend this doctor to a friend or relative [yes / no] Mean score of patients per GP that would recommend their doctor, resulting in a variable with range 0-1 in proportion of patients that are satisfied	4.33%, 321 missing cases (relatively evenly distributed over 34 countries)	QUALICOPC patient questionnaire
Age	Q2 What is your year of birth? [19..] Recoded into a variable with range 21-79 in absolute years	1.05%, 78 missing cases (distributed over 26 countries, most notably Canada with 12 missing cases)	QUALICOPC GP questionnaire

3.2.3 Independent variables: country level

Country level variables were operationalised with data from external sources to the QUALICOPC study. The most influential sources are Kringos (2012), Schäfer (2016), Huibers et al. (2009), Kringos et al. (2015) and the World Bank (2016). There were no missing data on any of the country level variables. The operationalisations and data sources are presented in table 5.

Table 5: Operationalisations of country hypotheses

Variable	Operationalisation	Missing values	Data source(s)
GDP per capita	US dollars (\$)	0 cases missing	The World Bank (2016) (appendix A)
Strength of primary care structure	Strength of primary care structure on a scale 1 - 3 for which 1 = low primary care orientation and 3 = high primary care orientation	0 cases missing	Kringos (2012: chapter 7); Schäfer (2016) (appendix A)
Out-of-hours care	Categorical variable with 1 = small family doctor based model; 2 = large family doctor based model; 3 = hospital- and national based model	0 cases missing	Huibers et al. (2009); Dimova et al. (2012); Theodorou et al. (2012); Lai et al. (2013); Vuorenkoski et al. (2008); Gaál et al. (2011); Mitenbergs et al. (2012); Murauskiene et al. (2013); Berthet et al. (2015); Milevska-Kostova et al. (2017); Azzopardi-Muscat et al. (2017); Sagan et al. (2011); Vlădescu et al. (2016); Smatana et al. (2016); Tatar et al. (2011) (appendix A)
Relative income position	GP income level compared to most specialists' income Categorical variable with 1 = low; 2 = medium; 3 = high	0 cases missing	Kringos et al. (2015: chapter 2); Eide (2018) (appendix A)
Patient list system	Dummy with 1 = patient list system; 0 = no patient list system	0 cases missing	Kringos et al. (2015: chapter 3); College of Physicians and Surgeons of British Columbia (2014); Gauld (n.d.); McCartney (n.d.); Medical Board of Australia (n.d.); Medical Council of New Zealand (2008); Olson (2006: chapter 4) (appendix A)

3.3 Method of analysis

The data is analysed with Stata 15. The analysis consists of hierarchical multilevel analysis with countries and practices as levels. Individual GPs are not considered as a separate level because only one GP per practice was surveyed, which means that the practice level and the GP level are exactly the same.

A maximum level of significance of $\alpha = 0.05$ is used for the practice level. Since p-values are strongly influenced by the number of cases, and this analysis contains over 7,000 cases, a broader p-value could possibly produce excessively positive outcomes. However, for the country level a maximum level of significance of $\alpha = 0.1$ is used, because the analysis contains only 34 countries.

3.3.1 Modelling strategy

The following modelling strategy is used: an empty model is used to estimate the variance on the practice- and country level. Subsequently, the practice characteristics are added into the model in four steps, according to the relevant instrumental goals in SPF theory: stimulation, comfort, status and behavioural confirmation. These sets of practice characteristics will first be added to the empty model one at a time, after which they are all added simultaneously. This results into model 5, which will be used as a base for the country models. Each country model contains no more than three variables on a country level, since the analysis contains 34 countries. This is because the number of higher level units in a multilevel analysis should allow to sufficiently estimate a mean, a variance and the effect of the variables that are relevant at that level (Leyland & Groenewegen, 2018). As a rule of thumb the number of units you need is about ten times the number of variables that you are allowed to use in the analysis. This means that in this study the country level variables will be tested in separate models, with the GDP per capita as a control variable. Table 6 presents the modelling strategy.

Table 6: Modelling strategy

<p>M0: job satisfaction = constant + hierarchical structure specified</p> <p>M1: job satisfaction = constant + hierarchical structure specified + practice characteristics of stimulation (breadth of service profile + medical instruments + other paid activities + urbanity)</p> <p>M2: job satisfaction = constant + hierarchical structure specified + practice characteristics of comfort (working hours + administrative work + out-of-hours work + ICT use + vacation + physical work environment)</p> <p>M3: job satisfaction = constant + hierarchical structure specified + practice characteristics of status (employment status + gender)</p> <p>M4: job satisfaction = constant + hierarchical structure specified + practice characteristics of behavioural confirmation (feedback from colleagues + patient satisfaction + solo/shared practice + age)</p> <p>M5: job satisfaction = constant + hierarchical structure specified + practice characteristics of stimulation + practice characteristics of comfort + practice characteristics of status + practice characteristics of behavioural confirmation</p>
<p>Model 5 is used as a base for the country level analyses. The country models will contain all practice characteristics and GDP per capita as a control variable on country level, after which each of the country level variables are added in separate models.</p>
<p>M6: model 5 + GDP</p> <p>M7: model 5 + GDP + primary care structure</p> <p>M8: model 5 + GDP + GP cooperatives</p> <p>M9: model 5 + GDP + relative income position</p> <p>M10: model 5 + GDP + patient list system</p>

4. Results

This section starts with a description of GP job satisfaction for each of the 34 countries in the QUALICOPC dataset in section 4.1. Next, in section 4.2 the relationships between GP- and practice level characteristics and GP job satisfaction are discussed. Finally, the relationships between the country level characteristics and GP job satisfaction are discussed in section 4.3.

Because the QUALICOPC data is cross-sectional, it is not possible deduce causal relationships or speak about ‘effects’ of characteristics on job satisfaction. Instead, there will be discussed how the characteristics are ‘related to’ GP job satisfaction throughout both the results and conclusion sections.

4.1 Distribution of GP job satisfaction

The mean scores of job satisfaction per country are calculated using the job satisfaction scale as defined in section 3.2.1. The overall mean score of job satisfaction is 2.50. As table 5 shows, Denmark, Cyprus and Canada have the highest mean scores on GP job satisfaction, while Spain, Hungary and Slovakia have the lowest mean scores.

Table 7: Average job satisfaction scores per country, from highest to lowest

Country	μ job satisfaction score	Country	μ job satisfaction score
Denmark	2.97	England	2.49
Cyprus	2.81	Malta	2.47
Canada	2.77	Germany	2.45
Norway	2.75	Bulgaria	2.44
Sweden	2.73	Portugal	2.41
Australia	2.72	Poland	2.41
Luxembourg	2.71	Romania	2.38
Switzerland	2.69	Italy	2.37
New Zealand	2.68	Latvia	2.36
Netherlands	2.63	FYR Macedonia	2.35
Greece	2.62	Turkey	2.30
Ireland	2.60	Slovenia	2.29

Belgium	2.59	Lithuania	2.27
Finland	2.59	Estonia	2.27
Austria	2.56	Slovakia	2.23
Iceland	2.50	Hungary	2.17
Czech Republic	2.49	Spain	2.15

The 34 countries are divided into three categories: low, medium and high GP job satisfaction. Denmark, Cyprus, Canada, Norway, Sweden, Australia, Luxembourg, Switzerland, New Zealand, the Netherlands, and Greece score high on GP job satisfaction, while Ireland, Belgium, Finland, Austria, Iceland, Czech Republic, England, Malta, Germany, Bulgaria, Portugal, and Poland score medium on GP job satisfaction, and Romania, Italy, Latvia, FYR Macedonia, Turkey, Slovenia, Lithuania, Estonia, Slovakia, Hungary, and Spain score low on GP job satisfaction. This is shown in figure 1.

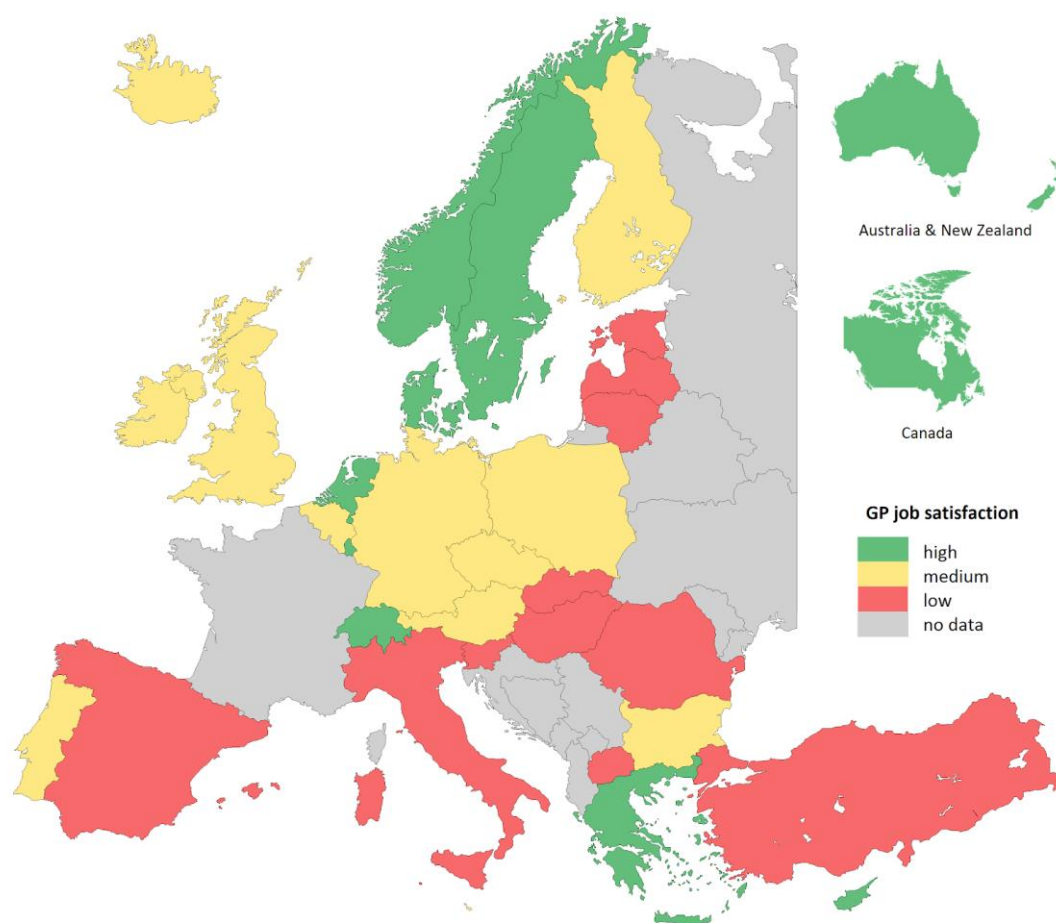


Figure 1: Mean level of job satisfaction per country

4.2 The relationship between GP- and practice characteristics and GP job satisfaction

The first model (M0) and the last model (M5) of the multilevel regression analysis are presented in this section in table 8. The other models with GP- and practice characteristics per instrumental goal (model 1-4) are presented in appendix B.

Table 8: Multilevel regression results of the interrelation between GP- and practice characteristics and GP job satisfaction

	M0 B (S.E.)	M5 B (S.E.)
y = job satisfaction		
Fixed coefficients		
constant	2.505 (.034)***	2.358 (.061)***
<i>Stimulation</i>		
Breadth of service profile:		
First contact		.014 (.010)
Treatment follow-up		-.000 (.010)
Technical procedures		.034 (.008)***
Health promotion		.061 (.025)**
Medical instruments		.001 (.001)
Other paid activities (ref = no other paid activities)		.002 (.008)
Urbanity (ref = big inner city)		
- Suburbs or small town		-.001 (.009)
- Urban-rural or rural		-.005 (.009)
<i>Comfort</i>		
Working hours		-.001 (.000)***
Administrative work		-.000 (.000)
Out-of-hours work		.000 (.000)
ICT use		.000 (.002)
Vacation		.006 (.002)**
Physical environment (ref = not clean and no privacy)		
- Clean or private		.012 (.023)
- Clean and private		.012 (.023)
<i>Status</i>		
Self-employed (ref = salaried)		.006 (.012)
Gender (ref = male)		-.014 (.008)
<i>Behavioural confirmation</i>		
Feedback from colleagues (ref = no feedback)		.024 (.008)**
Patient satisfaction		.088 (.033)**
Shared practice (ref = solo)		-.002 (.009)
Age		.000 (.000)**
Random coefficients		
Level: country variance	.038 (.009)***	.031***
Level: practice variance	.078 (.001)***	.075***

N: country	34	34
N: practice	7379	6627
ICC	.329	.293
-2*loglikelihood	2294.18	1778.02
Change in -2LL (df)		M0: -516.16 (31)***

*** $p < .001$; ** $p < .05$

Model M0 shows an ‘empty’ model that only contains the constant and intraclass correlation. The intraclass correlation in this model is $ICC = .329$ with $var(u_{0j}) = .038$ ($p < .001$) and $var(e_{0ij}) = .078$ ($p < .001$). This indicates that nearly 33% of the variance in GP job satisfaction is located at the country level and that the remaining 67% of the variance in GP job satisfaction is located at the GP- and practice level.

Model 5 contains all GP- and practice level variables. The results will be discussed according to the four relevant instrumental goals of SPF theory: stimulation, comfort, status and behavioural confirmation. The reported p-values are all two-sided.

Stimulation characteristics

From the practice characteristics that are linked to stimulation two of the four types of service have a significant relationship with GPs job satisfaction, while the two other types of service, using more medical instruments, having other paid activities, and the degree of urbanization have no significant relationship with GPs job satisfaction. It is important to note that the country variance has decreased from $var(u_{0j}) = .038$ in model 0 to $var(u_{0j}) = .033$ in model 1 (see appendix B), whereas models 2-4 do not show such a decrease. This means that the stimulation variables determine a substantial part of the differences between countries in GP job satisfaction.

Being contacted as the first health care provider by patients does not have a significant relationship with GPs job satisfaction ($B = .014$, $p = .147$). Being involved in the treatment and follow-up of patients has no significant relationship with GPs job satisfaction ($B = -.000$, $p = .994$). Carrying out more technical procedures has a significant relationship with GPs job satisfaction ($B = .034$, $p < .001$). Being involved in preventive care and health promotion is significantly related to GPs job satisfaction ($B = .061$, $p < .05$). Thus, hypothesis 1, which stated that “job satisfaction is higher for GPs with broader service profiles”, is partly confirmed. It is confirmed in the sense that certain types of services do seem to have positive relationship with GP job satisfaction but this relationship does depend on the type of service.

Having different types of medical equipment is not significantly related to GPs job satisfaction ($B = .001$, $p = .560$). This refutes hypothesis 2, which stated that “GPs have higher job satisfaction if they have more medical instruments to their disposal”.

Having other paid activities next to working as a GP, such as working as a private physician, working as a company doctor or teaching medical education, does not have a significant relationship with GPs job satisfaction ($B = .002$, $p = .779$), refuting hypothesis 3, which stated that “GPs job satisfaction is higher when they have other paid professional activities”.

GPs were asked to describe the degree of urbanization of the area where their practice is located. These areas are characterised as a big inner city, as a suburb or small town, or as an urban-rural or rural area. Model 5 shows that GP job satisfaction for working in a suburb/small town or in an urban-rural/rural area does not differ significantly from working in a big inner city (respectively $B = -.001$, $p = .887$; $B = -.005$, $p = .573$). This refutes hypothesis 4, which stated that “GPs job satisfaction is higher for GPs in rural areas than for GPs in urban areas”.

Comfort characteristics

From the practice characteristics that are linked to comfort, working hours and vacation are significantly related to GPs job satisfaction, while administrative work, out-of-hours work, ICT use and the physical environment have no significant relationship with GPs job satisfaction.

The amount of hours a GP spends on working as a GP per week, relative to the average amount of working hours of GPs within their country, has a negative significant relationship with GP job satisfaction. Job satisfaction is lower for GPs who work more hours ($B = -.001$, $p < .001$). This confirms hypothesis 6, which stated that “GP job satisfaction is lower for GPs who work more hours, relative to the average amount of working hours in their country”. Furthermore, when the amount of working hours relative to the country mean is replaced by the absolute number of working hours the negative relationship with GP job satisfaction remains significant ($B = -.003$, $p < .001$). This suggests that the relationship is somewhat stronger when the mean amount of working hours in a country is not taken into account.

The amount of hours that GPs spend on other tasks than direct patient care, which was assumed to be mostly administrative work, does not have a significant relationship with GPs job satisfaction ($B = -.000$, $p = .466$). This refutes hypothesis 7, which stated that “GPs have higher job satisfaction if they spend less time on administrative work”.¹

¹ Working hours and administrative work are also not strongly correlated ($r = .106$)

The amount of hours that GPs spend on on-call duties during evenings, nights and weekends has no significant relationships with their job satisfaction ($B = .000$, $p = .521$), which refutes hypothesis 8 stating “GP job satisfaction is lower for GPs who spend more time on out-of-hours work”.

For the ICT use variable GPs were asked for which purposes they use a computer in their practice. The analysis shows that using a computer for multiple purposes has no significant relationship with GPs job satisfaction ($B = .000$, $p = .867$). This refutes hypothesis 9, which stated that “GP job satisfaction is higher when they use a computer for more specific purposes in their practice”.

The amount of weeks GPs have been away from their practice due to vacation in a year has a significant relationship with GP job satisfaction ($B = .006$, $p < .05$). This confirms hypothesis 10, which stated that “GP job satisfaction is higher as GPs take more weeks of vacation per year”.

The physical environment variable was a combination of two variables from the fieldworker questionnaire about the cleanliness of the waiting room and the privacy of the doctor’s office. Analysis shows that the having a clean waiting room or a private doctor’s office or both do not have a significant relationship with GP job satisfaction (respectively $B = .012$, $p = .605$; $B = .012$, $p = .613$). This refutes hypothesis 11, which stated that “GPs job satisfaction is higher as their practice provides a more pleasant physical work environment”.

Status characteristics

From the practice characteristics that are linked to status, both employment status and gender show no significant relationship with GPs job satisfaction.

Being a self-employed GP, as opposed to being a salaried GP, does not relate significantly to GP job satisfaction ($B = .006$, $p = .575$). This refutes hypothesis 13, which stated that “GPs job satisfaction is higher for self-employed GPs than for salaried GPs”. As mentioned before, the missing values of the categorical variables were taken into the analysis as a separate category in order to maintain these cases for the analyses. The analysis shows that the ‘missing’ category for employment status is significantly related to GP job satisfaction ($B = .096$, $p < .05$). This suggests that these missings are not at random. Unfortunately, it is unclear why GPs who’s employment status is unknown would differ in job satisfaction from salaried or self-employed GPs.

GP gender does not have a significant relationship with GP job satisfaction ($B = -.014$, $p = .059$). Thus, hypothesis 14a, which stated that “female GPs are more satisfied with their job than male GPs”, is refuted.

Additional analysis shows that the relationship between gender and GP job satisfaction is not mediated by working hours, which is not surprising since there was no

significant relationship between gender and GP job satisfaction in the first place. Thus, hypothesis 14b, which stated that “The relationship between GP job satisfaction and gender is mediated by working hours”, is refuted. As with the employment status variable, the ‘missing’ category for gender does show a significant relationship with GP job satisfaction ($B = -.203, p < .05$). Again, it is unclear why GPs with a missing value on the gender variable would differ from males or females with regard to their job satisfaction.

Behavioural confirmation characteristics

From the practice characteristics that are linked to behavioural confirmation, feedback from colleagues, patient satisfaction and age have significant relationships with GP job satisfaction, while the type of practice (shared or solo practice) has no significant relationship with GP job satisfaction.

For the variable about feedback from colleagues GPs were asked whether they have received feedback from colleagues through peer reviews or practice visitations. Analysis shows that feedback from colleagues has a strong significant relationship with GP job satisfaction ($B = .024, p < .05$). This confirms hypothesis 16, which stated that “GPs who receive feedback from their colleagues have higher job satisfaction than GPs who receive no feedback from colleagues”.

For the patient satisfaction variable it was measured what proportion of a GP’s patients would recommend their doctor to a friend or relative. Analysis shows that this patient satisfaction does have a significant relationship with GP job satisfaction ($B = .088, p < .05$). This confirms hypothesis 17a, which stated that “GP job satisfaction is higher when their patients are more satisfied”. Furthermore, additional analysis shows that there is no moderation effect of the type of practice on the relationship between patient satisfaction and GP job satisfaction, because the interaction term of patient satisfaction and solo/shared practice is not significantly related to GP job satisfaction (see model 4.1 in appendix B: $B = -.000, p = .739$). These results mean that there is a significant positive relationship between patient satisfaction and GP job satisfaction, but that the strength of this relationship does not differ between GPs in solo- or shared practices. Because this relationship was not significant in model 4.1, it has been left out of the analyses for the subsequent models 5-10. Furthermore, additional analysis shows that the strength of the positive relationship between feedback from colleagues and GP job satisfaction does not differ between GPs in solo- and shared practices either.

Whether GPs work in a solo practice or in a shared accommodation with other GPs and/or medical specialists does not have a significant relationship with GP job satisfaction ($B = -.002, p = .838$). This refutes both hypotheses 18a and 18b, which respectively stated that

“GPs in shared practices have higher job satisfaction than GPs in solo practices” and “GPs in solo practices have higher job satisfaction than GPs in shared practices”.

Finally, age does have a significant positive relationship with GP job satisfaction ($B = .000, p < .05$), which means that as the age of GPs increases, the more satisfied they are with their job. This confirms hypothesis 19, which stated that “GP job satisfaction is higher as age increases”.

4.2.1 Summary of GP- and practice level results

GPs who carry out technical procedures, practice preventive care and receive feedback from other GPs are significantly more satisfied with their job than their colleagues who do not. Furthermore, fewer working hours, more weeks of vacation per year and higher age are significantly related to higher job satisfaction for GPs. Thus, hypotheses 6, 10, 16, 17a and 19 are confirmed and hypotheses 1 is partly confirmed.

GP gender, type of employment and practice, being the first health care provider, being involved in treatment and follow-up of patients, using more medical instruments, having other paid activities, the degree of urbanization, carrying out more administrative and out-of-hours work, using a computer, the physical environment, and having more satisfied patients do not have a significant relationship with job satisfaction. Thus, hypotheses 2, 3, 4, 7, 8, 9, 11, 13, 14a, 14b, 17b, 18a and 18b are refuted.

4.3 The relationship between country characteristics and GP job satisfaction

In this section, the country level variables are added to model 5, which contains all GP- and practice level variables. These variables are not displayed in the models 6-10, even though they are included in the analyses. Since none of the country level variables have missing values, the country- and practice N remain the same as in model 5.

As mentioned before in section 3.3.1 about the modelling strategy, each country level model cannot contain more than three variables on a country level, since the number of countries is 34 and the rule of thumb states that you need at least ten times more units of analysis than higher level variables (Leyland & Groenewegen, 2018). The control variable that will be used in each model is GDP per capita, as shown in model 6. The subsequent models, model 7-10, will all contain this control variable with the addition of one country level variable. Each of these models will be compared to the baseline model that contains all GP- and practice level variables (model 5). Table 9a and 9b only show the coefficients for the country level variables. The full models, which include all GP- and practice level variables as well, are presented in appendix C.

Table 9a: Multilevel regression results (model 6 and 7) of the interrelation between GP practice- and country characteristics and GP job satisfaction, including all GP practice level variables

	M6 B (S.E.)	M7 B (S.E.)
y = job satisfaction		
Fixed coefficients		
Constant	2.205 (.067)***	2.235 (.382)***
<u>Level: country</u>		
GDP per capita	.000 (.000)***	.000 (.000)***
Strength of primary care		-.014(.167)
Random coefficients		
Level: country variance	.020***	.020***
Level: practice variance	.075***	.075***
N: country	34	34
N: practice	6627	6627
ICC	.212	.212
-2*loglikelihood	1763.58	1763.57
Change in -2LL (df)	M5: -14.44 (1)***	M6: -0.01 (1)

Note: the models in this table include all GP practice characteristics

*** $p < .001$; ** $p < .05$; * $p < .1$

In model 6, the country level variable GDP per capita is added to the full model of GP- and practice characteristics (model 5). This variable is also used as a control variable in the subsequent models 7-10. The analysis shows that countries' gross domestic product per capita does have a strong significant relationship with GP job satisfaction ($B = .000$, $p < .001$).

The practice- and country variances remain significant with $\text{var}(u_{0j}) = .020$ and $\text{var}(e_{0ij}) = .075$, showing quite a decrease in country variance in comparison with model 5 ($\text{var}(u_{0j}) = .031$). This change is reflected in the ICC, which was $\text{ICC} = .293$ in model 5 and becomes $\text{ICC} = .212$ in model 6. The model is a significant improvement to model 5 (change in $-2\text{LL} = -14.44$ with 1 df).

In model 7 the strength of the primary care structure is added to the model. Analysis shows that the strength of a country's primary care structure does not have a significant relationship with GP job satisfaction ($B = -.014$, $p = .935$). This refutes hypothesis 5, which stated that "GP job satisfaction is higher in countries with stronger primary care structures than in countries with weaker primary care structures".

Table 9b: Multilevel regression results (models 8-10) of the interrelation between GP practice- and country characteristics and GP job satisfaction, including all GP practice level variables

	M8 B (S.E.)	M9 B (S.E.)	M10 B (S.E.)
y = job satisfaction			
Fixed coefficients			
Constant	2.203 (.091)***	2.205 (.069)***	2.298 (.091)***
<u>Level: country</u>			
GDP per capita	.000 (.000)***	.000 (.000)***	.000 (.000)**
Out-of-hours model (ref = small family doctor based)			
- Large family doctor based	-.005 (.072)		
- Hospital- and national based	.003 (.066)		
Relative income position (ref = low)			
- Medium		-.006 (.078)	
- High		.001 (.066)	
Patient list system (ref = no patient list system)			-.089 (.060)
Random coefficients			
Level: country variance	.020***	.020***	.019***
Level: practice variance	.075***	.075***	.075***
N: country	34	34	34
N: practice	6627	6627	6627
ICC	.212	.212	.201
-2*loglikelihood	1763.56	1763.57	1761.44
Change in -2LL (df)	M6: -0.02 (2)	M6: -0.01 (2)	M6: -2.14 (1)***

*** p < .001; ** p < .05; * p < .1

In model 8 the dominant type of out-of-hours care system is added to model 6. These systems are divided into three categories: a small family doctor based system, a large family doctor based system and a hospital- and national based system. The small family doctor based is used as the reference category. Analysis shows that the job satisfaction of GPs in countries with a large family doctor based system or a hospital- and national based system does not differ significantly from GPs in countries with a small family doctor based system (respectively B= -.005, p= .942; B= .003, p= .964). This refutes hypothesis 12, which stated that “GP job satisfaction is lowest in countries where hospital- and national based models are dominant, higher in countries where small family doctor based models are dominant, and highest in countries where large family doctor based models are dominant”.

In model 9 the relative income position compared to other medical specialists within a country is added to model 6. This variable describes whether GPs in a country earn generally less, approximately the same, or more than other medical specialists in that country. The category with countries with a relatively low income position of GPs is used as a reference category.

The relative income position does not have a significant relationship with GP job satisfaction. Analysis shows that GP job satisfaction in countries with an equal or high relative income position does not differ significantly from countries with a low relative income position (respectively $B = -.006$, $p = .943$; $B = .001$, $p = .991$). This refutes hypothesis 15, which stated that “GP job satisfaction is higher in countries where GP income is equal or higher compared to other medical specialists than in countries where GP income is lower compared to other medical specialists”.

Finally, in model 10 the variable about patient list systems is added to model 6. This is a dummy variable that shows whether countries have a patient list system or not.

Having a patient list system or not is not significantly related to GP job satisfaction ($B = -.089$, $p = .137$). It was expected that GP job satisfaction would be higher in countries with a patient list system, but the analysis shows that there is no relationship. Thus, hypothesis 20, which stated that “GP job satisfaction is higher in countries where patient list systems are obligatory than in countries where patient list systems are not obligatory”, is refuted.

4.3.1 Summary of country level results

A country's gross domestic product per capita, which was used as a control variable, is positively related to the job satisfaction of GPs. All the other country level variables, the strength of the primary care structure, the type of out-of-hours care, the income position relative to other medical specialists, and having a patient list system or not, do not have a significant relationship with GPs job satisfaction. Thus, hypotheses 5, 12, 15 and 20 are refuted.

5. Conclusion and discussion

Firstly, the high intraclass correlation in Model 0 ($ICC = .328$) suggests that around 33% of the total variance in GP job satisfaction is located at the country level. This means that national interventions aimed at increasing job satisfaction can potentially be very useful and that interventions that are solely located at the individual level, and thus do not take differences between countries into account, might not produce the desired outcomes.

Overall, when model 5 is compared with model 0, the analysis shows that the full model explains around 4% of the variance on the GP- and practice level and around 19% of the variance on the country level. Furthermore, when model 6 is compared with model 5, the analysis shows that around 35% of the remaining country level variance is explained. This is also reflected by the decrease in intraclass correlation, which was $ICC = .293$ in model 5 and $ICC = .212$ in model 6. Since the GDP per capita variable is the only variable that was added as compared to model 5, this shows that this factor explains quite a substantial part of the country level variance. Despite that patient list system is not significantly related to GP job satisfaction, the model in which it is included (model 10) does explain the largest proportion of variance on a country level, with 39% explained country level variance as compared to model 5 and an intraclass correlation of $ICC = .201$. However, since only one of the country level variables in the analyses shows a significant relationship there is still a large portion of the variance that remains unexplained. Since no variables on a GP- and practice level were added to model 6-10, these models did not explain any additional GP- and practice level variance as compared to model 5 and remains 4%. The recommendations for future research that are provided in this chapter could help to increase the proportion of explained variance in future internationally comparative studies on GP job satisfaction, both on a GP- and practice level and on a country level.

5.1 The relationship of GP and practice characteristics with GP job satisfaction

In this section the hypotheses about GP and practice characteristics are discussed, accompanied by possible explanations of why these hypotheses were confirmed or refuted.

Firstly, it should be noted that cross-sectional data such as the QUALICOPC data only show how variables are related to each other, and cannot indicate causal relationships. This means that it is not possible to say whether a statistically significant variable causes a change in GP job satisfaction, only whether there is a statistically significant relationship between them or not. This also means that certain variables, such as patient satisfaction or performing certain services, could be dependent on GP job satisfaction instead of the other way around, or that they influence each other.

Secondly it should be noted this study could be subject to sample selection bias, as it could be that GPs who are more satisfied are also more willing to participate in a large survey. However, this does not necessarily have to be the case since job satisfaction was not the main aim of the survey and it was only mentioned in one out of the sixty questions in the questionnaire. With regard to sample selection bias on a country level, an article by Groenewegen et al. (2016) about the QUALICOPC study does show that country context has an influence on participation rates. As mentioned in the methods section, further details about the recruitment procedures and participation rates of the QUALICOPC study can be found in this article.

Stimulation characteristics

The analysis of GP and practice characteristics that can be linked to the instrumental goal of stimulation shows that GPs who perform more technical procedures or are more involved in preventive services and health promotion towards their patients are more satisfied with their job than GPs who provide these services less. The other services that were studied, being the first contact for patients and being involved in treatment and follow-up of patients, are not related to GP job satisfaction. These findings suggest that GP job satisfaction could be increased by allowing GPs to spend more time on technical procedures and health promotion because it seems that they enjoy providing these services. Future research could try to measure what types of tasks GPs subjectively enjoy performing, instead of solely measuring to what extent they are involved in these tasks, to get a clearer view of which tasks have the potential to increase GP job satisfaction. It should be noted that with regard to preventive services and health promotion, it can also be argued that GPs who are satisfied engage more in these activities than less satisfied GPs. Unfortunately, this study does not allow to draw conclusions about causal relationships, so it would be interesting if future research could examine this relationship further.

Having different types of medical instruments, being involved in other paid activities next to working as a GP and the urbanity of where the practice is located were not significantly related to GP job satisfaction. With regard to the medical instruments, a possible explanation is that GPs probably have all the instruments they need and that their satisfaction will not increase if they acquire some equipment they rarely or never have to use.

The hypothesized relationship between other paid activities and GP job satisfaction was based on the assumption that these activities would increase task variety, skill improvement and positive feedback from students, but it was also implicitly assumed that GPs would enjoy performing these tasks. However, it could be that some GPs only perform these tasks because they feel that it is a necessary addition to their regular income as a GP, while they do not really enjoy to perform these tasks. It could be that the positive and

negative relationships outweigh each other, resulting in the absence of an overall relationship between other paid activities and GP job satisfaction. Further research could try to include measures of why GPs choose to perform other paid activities next to their work as a GP or not.

The expectation that there would be a relationship between the degree of urbanization and GP job satisfaction was based on findings by Schäfer et al. (2016: chapter 5), who used the same data from the QUALICOPC study, and the assumption that a broader service profile would be related to higher job satisfaction. Schäfer et al. (2016: chapter 5) showed that GPs working in rural areas have broader service profiles than GPs working in urban areas for all services, except for preventive services, while this study shows that only technical procedures and preventive services are related to GP job satisfaction. Combining the findings of these two studies shows that technical procedures is the only service that is positively related to both working in an urban area and to GP job satisfaction. This suggests that apart from the provision of technical procedures, the differences between urban and rural areas in determinants of GP job satisfaction might not be as large as expected.

Comfort characteristics

With regard to the GP and practice characteristics that can be linked to the instrumental goal of comfort, the analysis shows that the total number of working hours is negatively related to GP job satisfaction and that the amount of weeks of vacation in a year is positively related. These results are in line with the findings of Valcour (2007), who has shown that working hours are negatively related to satisfaction with the balance between work and family. An Australian study shows that the work-life balance has become increasingly important for general practitioners, especially for younger GPs and female GPs (Shrestha & Joyce, 2011) which suggests that working an appropriate amount of hours and taking enough leave for vacations could be even more important in the future in order to keep GPs satisfied with their work.

One of the more surprising findings is that there is no significant relationship between administrative work and GP job satisfaction, since this was found to be one of the most important factors that decreases job satisfaction in the literature review on GP job satisfaction by Van Ham et al. (2006b). However, due to limitations in the data, administrative work was measured by subtracting the amount of hours spent on direct patient care from the total amount of working hours, with the assumption that most of this time would be spent on administrative work. This very indirect measure might very well be the main reason for the absence of a relationship between administrative work and GP job satisfaction in this study. Another possible explanation for the absence of a relationship between GP job satisfaction and administrative work is provided by Harrison and Dowswell (2002), who found a clear

acknowledgement by GPs that they have 'bureaucratic accountability'. The authors suggest that GPs might not enjoy performing these tasks, but that they do not resist them either because they know that it is an important aspect of their work, which implies that it does not affect their overall job satisfaction. A similar point has been made by Noordegraaf (2015), who states that 'organising professionalism' is a new model of professionalism in which organising becomes more and more a part of professional work. The idea is that professional and managerial principles are no longer separated and are both important facets of the work of professionals.

Other comfort characteristics that are not significantly related to GP job satisfaction are the amount of hours GPs spend on evening-, night- and weekend shifts and the physical environment of the practice they work in. The absence of a link between the physical work environment and GP job satisfaction could be due to the way it was measured as well. The fieldworker questionnaire contained limited information about the practice environment, and most of these measures were mainly from the perspective of patients. The decision was made to use the cleanliness of the waiting room and whether people could hear or see what goes on in the doctor's office as a measure of the physical work environment, but it is clear that there are several other factors that determine how pleasant a work environment is. Furthermore, in order to know more about the relationship between GP job satisfaction and how individual GPs perceive their own work environment it is recommended to use a more subjective measure. Thus, future research that is aimed at finding a relationship between the physical work environment and GP job satisfaction should either include more factors to assess the work environment or ask GPs their own opinion about the environment they work in, because it seems likely that not all GPs share the same ideas about what a pleasant work environment entails.

Status characteristics

From the GP and practice characteristics that were linked to the instrumental goal of status, the expected relationship was found for neither of the variables used. First, whether a GP is self-employed or salaried is not significantly related to GP job satisfaction. Since this was based on the assumption that the higher autonomy of self-employed GPs, which is linked to the instrumental goal of status, would make them more satisfied than salaried GPs. This suggests that autonomy might not be related to GP job satisfaction, even though previous studies have found this relationship (e.g. Kapur et al., 1999; Buciuniene et al., 2005). Furthermore, a study by Halvorsen, Steinert and Aaraas (2012) in Norway, who found that a majority of GPs are and prefer to be self-employed, but that there is also a significant minority that would prefer a salaried position. This suggests that future research on the link between employment status and GP job satisfaction should take into account whether there is

a discrepancy between the desired and the actual employment status. However, this is only a relevant point for countries where GPs are able to choose to be self-employed or salaried, since there are some countries where municipalities own the health centers where GPs work and all GPs are therefore salaried, such as Finland, Norway and Slovenia (Kroneman, 2011).

The analysis shows GP gender is not related to GP job satisfaction. A possible explanation for this outcome has been provided by Clark (1997), who suggested that the higher job satisfaction of women might have been transitory because women used to have lower expectations of their work and he expected that these differences would disappear over time. Future research could use longitudinal data to study this phenomenon further.

Behavioural confirmation characteristics

The analysis shows that both receiving feedback from colleague GPs and higher patient satisfaction are related to higher GP job satisfaction, confirming hypotheses 16 and 17a. These hypotheses were based on the assumption that behavioural confirmation from relevant others relates to higher GP job satisfaction, which means that these findings suggest that both colleague GPs and patients are considered as such relevant others and that GPs value the relationships they have with colleagues and patients. Furthermore, the finding that GP job satisfaction is not related to the type of practice (solo or shared) a GP works in and the absence of an interaction effect between patient satisfaction and type of practice suggest that these relationships are not different between GPs in these types of practices. It also suggests that feedback does not have to be given by direct colleagues who work in the same practice, but that it can also be provided by GPs from other practices.

Finally, the analysis shows that age is positively related to GP job satisfaction, which means that the older GPs in the sample were generally more satisfied than the younger GPs. This finding could be partly explained by the phenomenon of the healthy elderly worker, also known as the 'healthy worker effect'. These healthy elderly workers are sometimes just as healthy as younger workers (Warr, 1995). With regard to job satisfaction, this could mean that the older GPs who are satisfied tend to work longer, while less satisfied GPs retire earlier and could therefore not be included in the study. Another possible explanation could be that older GPs have different expectations of work and the work-life balance than younger GPs, since a study by Buddeberg-Fischer, Stamm, Buddeberg and Klaghofer (2008) in Switzerland shows that future family physicians are less career-oriented than current physicians. Whether satisfaction increases during the career of a GP could not be proven in this study, which should be studied with a repeated measures design that are collected in a longitudinal study.

5.2 The relationship of country characteristics with GP job satisfaction

Distribution of GP job satisfaction

Geographically speaking, the distribution of GP job satisfaction over the 34 countries (see figure 1) shows that the Scandinavian countries and the non-European countries mostly have high scores on GP job satisfaction, while countries in Southern Europe and former Soviet Union countries seem to score low. More interesting, however, is that it seems that the wealthier countries generally have a higher mean GP job satisfaction. This is also supported by the findings that GDP per capita is strongly related to GP job satisfaction in the analysis and that a large proportion of the explained variance on a country level is explained by GDP per capita. However, there seem to be some exceptions to this overall picture. For example, Greece has a relatively low GDP per capita and a high score on GP job satisfaction, while countries such as Iceland and Ireland have a much higher GDP per capita but a lower score on GP job satisfaction. This supports the notion that even though GDP per capita is strongly related to GP job satisfaction, a large portion of the country level variance remains unexplained.

Unfortunately, this study has not been able to identify any other relevant country level factor that could explain the remaining unexplained variance. However, this study does show that country level characteristics of the primary care structure, the out-of-hours care model, the income of GPs compared to other medical specialists within a country, and whether there is a patient list system or not are all not related to individual GP job satisfaction.

The relationship between GDP per capita and GP job satisfaction

Although the country level characteristic GDP per capita was initially only added to the analyses as a control variable, it clearly shows a strong significant relationship with GP job satisfaction. Furthermore, it even explains 35% of the remaining country level variance after all the GP- and practice characteristics were included in the model. Despite the strong relationship that was found, this result is quite surprising. The decision to not include a hypothesis about GDP per capita was based on findings of previous research on measures of subjective well-being, such as job satisfaction. For example, a study by De Bustillo Llorente and Macías (2005) in 23 countries did not find any relation between GDP per capita, which was used as a proxy for average income, and job satisfaction. Another study, by Diener, Diener and Diener (1995) in 55 countries, did find a strong correlation between GDP per capita and life satisfaction, but after further analysis they had to conclude that the linear relationship between the two can largely be attributed to individualism. In addition, they found that four country level predictors accounted for 73% of the country level variance in

mean subjective well-being, namely high levels of income, individualism, equality and human rights. Given the strong relationship between GDP per capita and GP job satisfaction, it would be interesting if future research on GP job satisfaction could include country level measures of individualism, equality and human rights to see if these factors can explain such a large proportion of country level variance for GP job satisfaction as well.

6. Policy recommendations

In this section, policy recommendations based on the multilevel analysis will be provided. However, since the analysis shows that no country level characteristics other than GDP per capita are related to GP job satisfaction it is hard to give policy advice on an international level, while advising countries to put effort into raising their GDP would be quite obvious for many other reasons than increasing GP job satisfaction. The policy recommendations will therefore only be based on the GP- and practice level results, so they will mostly be aimed at national governments, medical associations, health care institutions and the GP community as a whole. Since it is unlikely that policies will solely be aimed at increasing GP job satisfaction, these recommendations should be considered in future primary care policy that (might) affect general practitioners.

Policy aimed at promoting the job satisfaction of general practitioners is important because it can help to maintain the current workforce and to make general practice a more appealing profession for (future) medical students (Meli, Ng, Singer, Frey, & Schaufelberger, 2014). Some countries already seem to have some problems with general practice workforce planning. For example, shortages in the supply of GPs have been predicted in Ireland (Teljeur, Thomas, O’Kelly & O’Dowd, 2010) and in England (Sibbald et al., 2003), while Australia seems to deal with an inequitable distribution of GPs between different areas (Wilkinson & Symon, 2000). Efforts to increase GP job satisfaction could both help to make current GPs postpone their retirement and to attract more new GPs and could therefore help to fill these predicted shortages.

The findings that technical procedures and preventive services are positively related to GP job satisfaction suggest that GP job satisfaction could be increased if GPs are able to focus more on services they enjoy to provide. This is also supported by Visser, Smets, Oort and De Haes (2003), who suggest that if GPs would have more time for more crucial and rewarding tasks, patient care in particular, the perceived quality of their work may increase. This could be achieved by increased nurse substitution, which means that nurses are enabled to provide more services with the intention to reduce the workload of GPs. According to Teljeur et al., (2010), increased nurse substitution has the potential to balance supply and demand of GPs, under the condition that a large number of nurses is recruited and that they are allowed to deliver a wide range of services. The authors conclude that “increased nurse substitution appears to offer the best long-term prospects of addressing GP shortages and presents the opportunity to reshape general practice to meet the demands of the future.” The findings of a study by Laurant et al. (2005) suggests that nurses who are appropriately trained can produce

the same quality of care and similar health outcomes for patients as primary care physicians. This suggests that nurse substitution can have a positive effect on GP job satisfaction without affecting the quality of care provision.

Policy recommendation 1: It is advised that nurses are trained both in larger numbers and to deliver a wider range of services, in order to reduce the workload of GPs through nurse substitution.

The findings that GP job satisfaction is negatively related to working hours and positively related to vacation suggests that GP job satisfaction can potentially increase with a better balance between their professional and private life. Both the extent to which work disturbs private life and the extent to which workers feel unable to work how they prefer to because of a high workload increase the level of stressfulness of a job (Visser et al., 2003). Work-family balance is defined by Grzywacz and Carlson (2007) as “accomplishment of role-related expectations that are negotiated and shared between an individual and and his or her role-related partners in the work and family domains”. A study in the US shows that satisfaction with the work-life balance is lower for physicians than for the general population and that this difference has become larger in the past few years (Shanafelt et al., 2015). Furthermore, a study in Switzerland by Buddeberg-Fischer et al. (2008) future family physicians are less career-oriented and they conclude that a well-balanced integration of professional and private life is an essential issue for new generations of physicians. According to Shrestha and Joyce (2011), flexible work hours, opportunities for leisure activities and improved health can potentially enhance the work-life balance of GPs and lead to higher participation of GPs in the workforce. Furthermore, providing paid and unpaid leave, such as parental leave or holidays, is considered by Skinner and Chapman (2013) as one of the most effective ways to allow workers to fulfill their responsibilities towards both work and family life. Although these findings suggest that a reduction of working hours and an increase of the number of weeks of vacation per year, it should be noted that this does not need to apply to all GPs. Darcy, McCarthy, Hill and Grady (2012) suggest that the factors that affect the work-life balance differ between different career stages and that a good work-life balance is not only important for parents with young children but is relevant for other career stages as well. They conclude that initiatives aimed at improving the work-life balance use a more tailored approach, as opposed to a ‘one size fits all’ approach. Thus, reducing working hours and allowing more time for vacation can potentially increase GP job satisfaction, but the personal preferences of GPs should be taken into account.

Policy recommendation 2: GPs should be allowed (or in case of self-employment, allow themselves) to have more or maintain flexible work hours and to take more weeks of vacation per year in order to improve their work-life balance.

Finally, the findings that feedback from colleagues and higher patient satisfaction are positively related to GP job satisfaction supports the notion that behavioural confirmation is an important instrumental goal for GPs to increase their job satisfaction. Peer feedback is found to increase confidence in one's own abilities, awareness of quality and reflection on one's own performance, while it simultaneously improves the quality of learning, the independence, and the responsibility of those who were evaluated by their peers (Sluijsmans, Dochy & Moerkerke, 1998). Prins, Sluijsmans and Kirschner (2006) argue that peer feedback activities are valuable for the professional development of GPs, but they do point out that feedback receivers should be supported to take an active role in the feedback process. This entails, for example, asking for specific types of feedback, determining whether the feedback is clear, and requesting explanations and suggestions for improvement, which could help GPs to improve their feedback skills and to become a valuable partner in the professional development process of their colleagues (Prins et al., 2006). According to Jamtvedt, Young, Tove Kristoffersen, O'Brien and Oxman (2006), providing health care professionals with data about their performance through audit and feedback may help to improve their practice, but their results do not support that mandatory use of audit and feedback are appropriate interventions to change practice. This suggests that it might be better to implement a voluntary approach, but a study on a voluntary model of external peer feedback in Scotland by Curnock, Bowie, Pope and McKay (2012) shows that only a minority of GPs has engaged in this peer feedback model, while a large majority has not participated. The GPs in their study tended to question the value of participating in the model over the standard of internal feedback from direct colleagues. However, this notion is disputed in this study, since peer feedback from colleagues is positively related to GP job satisfaction and the type of practice is not and additional analysis shows the strength of the relationship between feedback from colleagues and GP job satisfaction does not differ between GPs in solo- or shared practices. This suggests that feedback from colleagues outside of the own practice can be just as beneficial for GP job satisfaction as feedback from direct colleagues.

Policy recommendation 3: National professional GP organisations are advised to facilitate opportunities for GPs to meet each other, in order to create more opportunities for audit and feedback between colleague GPs.

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Appendix A: Data tables

Table 10: Average number of working hours per week, per country

Country	Mean working hours	Country	Mean working hours
Australia	37.14	Lithuania	35.07
Austria	43.78	Luxembourg	45.99
Belgium	51.25	FYR Macedonia	40.80
Bulgaria	39.20	Malta	46.90
Canada	40.34	Netherlands	43.04
Cyprus	37.38	New Zealand	36.71
Czech Republic	36.09	Norway	36.05
Denmark	40.96	Poland	38.38
Estonia	37.75	Portugal	40.18
Finland	35.74	Romania	35.73
Germany	49.87	Slovakia	37.37
Greece	38.21	Slovenia	37.34
Hungary	37.65	Spain	35.70
Iceland	39.76	Sweden	34.13
Ireland	41.21	Switzerland	46.64
Italy	33.33	Turkey	40.78
Latvia	38.84	United Kingdom (England only)	40.16

Source: QUALICOPC GP questionnaire

Table 11: GDP per capita, per country

Country	GDP per capita (\$)	Country	GDP per capita (\$)
	in 2016		in 2016
Australia	49,755	Lithuania	14,913
Austria	44,758	Luxembourg	100,739
Belgium	41,272	FYR Macedonia	5,237
Bulgaria	7,469	Malta	25,145
Canada	42,349	Netherlands	45,638
Cyprus	23,542	New Zealand	39,413
Czech Republic	18,484	Norway	70,868
Denmark	53,579	Poland	12,414
Estonia	17,737	Portugal	19,872
Finland	43,433	Romania	9,523
Germany	42,161	Slovakia	16,530
Greece	17,891	Slovenia	21,650
Hungary	12,820	Spain	26,617
Iceland	60,530	Sweden	51,845
Ireland	64,175	Switzerland	79,888
Italy	30,669	Turkey	10,863
Latvia	14,071	United Kingdom	40,412
		(England only)	

Source: The World Bank (2016)

Table 12: Strength of primary care, per country

Country	Strength of PC structure*	Country	Strength of PC structure*
Australia	2.51	Lithuania	2.27
Austria	2.22	Luxembourg	1.90
Belgium	2.21	FYR Macedonia	2.37
Bulgaria	2.14	Malta	2.12
Canada	2.34	Netherlands	2.50
Cyprus	1.91	New Zealand	2.36
Czech Republic	2.14	Norway	2.27
Denmark	2.38	Poland	2.12
Estonia	2.29	Portugal	2.41
Finland	2.31	Romania	2.31
Germany	2.20	Slovakia	2.02
Greece	2.10	Slovenia	2.36
Hungary	2.08	Spain	2.43
Iceland	1.77	Sweden	2.23
Ireland	2.20	Switzerland	2.04
Italy	2.33	Turkey	2.27
Latvia	2.14	United Kingdom	2.52
		(England only)	

* Range of scale 1-3 (low primary care orientation – high primary care orientation)

Sources: Kringos (2012: chapter 7, p. 200); Schäfer (2016: appendix 4, p. 186)

Table 13: Type of out-of-hours care model, per country

Country	Type of out-of-hours care model	Country	Type of out-of-hours care model
Australia	Small family doctor based	Lithuania	Hospital- and national based
Austria	Small family doctor based	Luxembourg	Hospital- and national based
Belgium	Small family doctor based	FYR Macedonia	Hospital- and national based
Bulgaria	Hospital- and national based	Malta	Hospital- and national based
Canada	Hospital- and national based	Netherlands	Large family doctor based
Cyprus	Hospital- and national based	New Zealand	Large family doctor based
Czech Republic	Hospital- and national based	Norway	Small family doctor based
Denmark	Hospital- and national based	Poland	Large family doctor based
Estonia	Hospital- and national based	Portugal	Large family doctor based
Finland	Hospital- and national based	Romania	Hospital- and national based
Germany	Small family doctor based	Slovakia	Hospital- and national based
Greece	Small family doctor based	Slovenia	Small family doctor based
Hungary	Hospital- and national based	Spain	Hospital- and national based
Iceland	Large family doctor based	Sweden	Large family doctor based
Ireland	Large family doctor based	Switzerland	Small family doctor based
Italy	Hospital- and national based	Turkey	Hospital- and national based
Latvia	Hospital- and national based	United Kingdom (England only)	Large family doctor based

Sources: Huibers et al. (2009); Dimova et al. (2012); Theodorou et al. (2012); Lai et al. (2013); Vuorenkoski et al. (2008); Gaál et al. (2011); Mitenbergs et al. (2012); Murauskiene et al. (2013); Berthet et al. (2015); Milevska-Kostova et al. (2017); Azzopardi-Muscat et al. (2017); Sagan et al. (2011); Vlădescu et al. (2016); Smatana et al. (2016); Tatar et al. (2011)

Table 14: Relative income position of GPs compared to other medical specialists, per country

Country	Relative income position	Country	Relative income position
Australia	Low	Lithuania	Low
Austria	Low	Luxembourg	Low
Belgium	Low	FYR Macedonia	Low
Bulgaria	Low	Malta	Low
Canada	Low	Netherlands	Low
Cyprus	High	New Zealand	Low
Czech Republic	High	Norway	Medium
Denmark	Low	Poland	Medium
Estonia	Low	Portugal	High
Finland	Low	Romania	Low
Germany	Low	Slovakia	Low
Greece	Low	Slovenia	Low
Hungary	Medium	Spain	High
Iceland	Low	Sweden	Medium
Ireland	High	Switzerland	Low
Italy	Low	Turkey	Low
Latvia	Low	United Kingdom	High
		(England only)	

Source: Kringos et al. (2015: chapter 2)

Table 15: Patient list system, per country

Country	Patient list system	Country	Patient list system
Australia	N	Lithuania	Y
Austria	N	Luxembourg	N
Belgium	N	FYR Macedonia	Y
Bulgaria	Y	Malta	N
Canada	N	Netherlands	Y
Cyprus	N	New Zealand	Y*
Czech Republic	Y	Norway	Y
Denmark	Y	Poland	Y
Estonia	Y	Portugal	Y
Finland	Y	Romania	Y
Germany	N	Slovakia	Y
Greece	Y	Slovenia	Y
Hungary	Y	Spain	Y
Iceland	Y	Sweden	N
Ireland	N	Switzerland	N
Italy	Y	Turkey	Y
Latvia	Y	United Kingdom	Y
		(England only)	

Sources: Kringos et al. (2015: chapter 3); College of Physicians and Surgeons of British Columbia (2014); Gauld (n.d.); McCartney (n.d.); Medical Board of Australia (n.d.); Medical Council of New Zealand (2008); Olson (2006: chapter 4)

*It is not mandatory for GPs to have a patient list system in New Zealand, but it is a prerequisite to be eligible for government subsidies.

Appendix B: Results for all GP- and practice characteristics

Table 16: Multilevel regression results of the interrelation between GP- and practice characteristics and GP job satisfaction – all GP- and practice level models

	M0 B (S.E.)	M1 B (S.E.)
y = job satisfaction		
Fixed coefficients		
constant	2.505 (.034)***	2.388 (.044)***
<i>Stimulation</i>		
Breadth of service profile:		
First contact		.009 (.009)
Treatment follow-up		-.002 (.008)
Technical procedures		.030 (.008)***
Health promotion		.068 (.024)**
Medical instruments		.001 (.001)
Other paid activities		.008 (.008)
Urbanity (ref = big inner city)		
- Suburbs or small town		-.003(.009)
- Urban-rural or rural		-.009 (.009)
<i>Comfort</i>		
Working hours		
Administrative work		
Out-of-hours work		
ICT use		
Vacation		
Physical environment (ref = not clean and no privacy)		
- Clean or private		
- Clean and private		
<i>Status</i>		
Self-employed (ref = salaried)		
Gender (ref = male)		
<i>Behavioural confirmation</i>		
Feedback from colleagues (ref = no feedback)		
Patient satisfaction		
Shared practice (ref = solo)		
Age		
Random coefficients		
Level: country variance	.038 (.009)***	.033 (.008)***
Level: practice variance	.078 (.001)***	.077 (.001)***
N: country	34	34
N: practice	7379	7287
ICC	.329	.302
-2*loglikelihood	2294.18	2183.28
Change in -2LL (df)		M0: -110.90 (13)***

*** p < .001; ** p < .05

	M2 B (S.E.)	M3 B (S.E.)
y = job satisfaction		
Fixed coefficients		
constant	2.556 (.045)***	2.516 (.035)***
<i>Stimulation</i>		
Breadth of service profile:		
First contact		
Treatment follow-up		
Technical procedures		
Health promotion		
Medical instruments		
Other paid activities		
Urbanity (ref = big inner city)		
- Suburbs or small town		
- Urban-rural or rural		
<i>Comfort</i>		
Working hours	-.001 (.000)***	
Administrative work	-.000 (.000)	
Out-of-hours work	.000 (.000)	
ICT use	.003 (.002)	
Vacation	.007 (.002)**	
Physical environment (ref = not clean and no privacy)		
- Clean or private	.012 (.023)	
- Clean and private	.013 (.023)	
<i>Status</i>		
Self-employed (ref = salaried)		-.009 (.011)
Gender (ref = male)		-.012 (.007)
<i>Behavioural confirmation</i>		
Feedback from colleagues (ref = no feedback)		
Patient satisfaction		
Shared practice (ref = solo)		
Age		
Random coefficients		
Level: country variance	.038 (.009)***	.038 (.009)***
Level: practice variance	.077 (.001)***	.078 (.001)***
N: country	34	34
N: practice	6965	7379
ICC	.333	.329
-2*loglikelihood	2050.71	2281.33
Change in -2LL (df)	M0: -243.47 (11)***	M0: -12.85 (7)***
*** p < .001; ** p < .05		

	M4 B (S.E.)	M4.1 B (S.E.)	M5 B (S.E.)
y = job satisfaction			
Fixed coefficients			
constant	2.402 (.045)***	2.400 (.045)***	2.358 (.061)***
<i>Stimulation</i>			
Breadth of service profile:			
First contact			.014 (.010)
Treatment follow-up			-.000 (.010)
Technical procedures			.034 (.008)***
Health promotion			.061 (.025)**
Medical instruments			.001 (.001)
Other paid activities			.002 (.008)
Urbanity (ref = big inner city)			
- Suburbs or small town			-.001 (.008)
- Urban-rural or rural			-.005 (.009)
<i>Comfort</i>			
Working hours			-.001 (.000)***
Administrative work			-.000 (.000)
Out-of-hours work			.000 (.000)
ICT use			.000 (.002)
Vacation			.006 (.002)**
Physical environment (ref = not clean and no privacy)			
- Clean or private			.012 (.023)
- Clean and private			.012 (.023)
<i>Status</i>			
Self-employed (ref = salaried)			.006 (.012)
Gender (ref = male)			-.014 (.008)
<i>Behavioural confirmation</i>			
Feedback from colleagues (ref = no feedback)	.028 (.008)***	.028 (.008)***	.024 (.008)**
Patient satisfaction	.091 (.031)**	.093 (.032)**	.088 (.033)**
Shared practice (ref = solo)	.009 (.008)	.009 (.008)	-.002 (.009)
Shared practice*patient satisfaction		-.000 (.000)	
Age	.000 (.000)**	.000 (.000)**	.000 (.000)**
Random coefficients			
Level: country variance	.037***	.037***	.031***
Level: practice variance	.077***	.077***	.075***
N: country	34	34	34
N: practice	7068	7068	6627
ICC	.327	.327	.293
-2*loglikelihood	2078.02	2077.91	1778.02
Change in -2LL (df)	M0: -216.16 (9)***	M0: -216.27 (10)***	M0: -516.16 (31)***

*** p < .001; ** p < .05

Appendix C: Results for all GP-, practice- and country characteristics

Table 17: Multilevel regression results of the interrelation between GP- and practice characteristics and GP job satisfaction – all country level models

	M6 B (S.E.)	M7 B (S.E.)
y = job satisfaction		
Fixed coefficients		
constant	2.205 (.067)***	2.235 (.382)***
<u>Level: GP/practice</u>		
<i>Stimulation</i>		
Breadth of service profile:		
First contact	.014 (0.10)	.014 (.010)
Treatment follow-up	-.000 (.010)	-.000 (.010)
Technical procedures	.032 (.008)***	.032 (.008)***
Health promotion	.062 (.025)**	.062 (.025)**
Medical instruments	.001 (.001)	.001 (.001)
Other paid activities (ref = no other paid activities)	.002 (.008)	.002 (.008)
Urbanity (ref = big inner city)		
- Suburbs or small town	-.001 (.009)	-.001 (.009)
- Urban-rural or rural	-.005 (.009)	-.005 (.009)
<i>Comfort</i>		
Working hours	-.001 (.000)***	-.001 (.000)***
Administrative work	-.000 (.000)	-.000 (.000)
Out-of-hours work	.000 (.000)	.000 (.000)
ICT use	-.000 (.002)	-.000 (.002)
Vacation	.005 (.002)**	.005 (.002)**
Physical environment (ref = not clean and no privacy)		
- Clean or private	.012 (.023)	.012 (.023)
- Clean and private	.011 (.023)	.011 (.023)
<i>Status</i>		
Employment status (ref = salaried)	.005 (.012)	.005 (.012)
Gender (ref = male)	-.014 (.007)	-.014 (.007)
<i>Behavioural confirmation</i>		
Feedback from colleagues (ref = no feedback)	.024 (.008)**	.024 (.008)**
Patient satisfaction	.088 (.033)**	.088 (.033)**
Shared practice (ref = solo)	-.002 (.009)	-.002 (.009)
Age	.000 (.000)**	.000 (.000)**
<u>Level: country</u>		
GDP per capita	.000 (.000)***	.000 (.000)***
Strength of primary care		-.014 (.167)
Out-of-hours model (ref = small family doctor based)		
- Large family doctor based		
- Hospital- and national based		
Relative income position (ref = low)		
- Medium		
- High		

Patient list system (ref = no patient list system)

Random coefficients

Level: country variance	.020***	.020***
Level: GP/practice variance	.075***	.075***
N: country	34	34
N: GP/practice	6627	6627
ICC	.212	.212
-2*loglikelihood	1763.58	1763.57
Change in -2LL (df)	M5: -14.44 (1)***	M6: 0.01 (1)

*** p < .001; ** p < .05; * p < .1

	M8 B (S.E.)	M9 B (S.E.)	M10 B (S.E.)
y = job satisfaction			
Fixed coefficients			
constant	2.203 (.091)***	2.205 (.069)***	2.298 (.091)***
<u>Level: GP/practice</u>			
<i>Stimulation</i>			
Breadth of service profile:			
First contact	.014 (.010)	.014 (.010)	.014 (.010)
Treatment follow-up	-.000 (.010)	-.000 (.010)	-.000 (.010)
Technical procedures	.032 (.008)***	.032 (.008)***	.032 (.008)***
Health promotion	.062 (.025)**	.062 (.025)**	.061 (.025)**
Medical instruments	.001 (.001)	.001 (.001)	.001 (.001)
Other paid activities (ref = no other paid activities)	.002 (.008)	.002 (.009)	.002 (.008)
Urbanity (ref = big inner city)			
- Suburbs or small town	-.001 (.009)	-.001 (.009)	-.001 (.009)
- Urban-rural or rural	-.005 (.009)	-.005 (.009)	-.005 (.009)
<i>Comfort</i>			
Working hours	.001 (.000)***	-.001 (.000)***	-.001 (.000)***
Administrative work	-.000 (.000)	-.000 (.000)	-.000 (.000)
Out-of-hours work	.000 (.000)	.000 (.000)	.000 (.000)
ICT use	-.000 (.002)	-.000 (.002)	.000 (.002)
Vacation	.005 (.002)**	.005 (.002)**	.005 (.002)**
Physical environment (ref = not clean and no privacy)			
- Clean or private	.012 (.023)	.012 (.023)	.012 (.023)
- Clean and private	.011 (.023)	.011 (.023)	.011 (.023)
<i>Status</i>			
Employment status (ref = salaried)	.005 (.012)	.005 (.012)	.005 (.012)
Gender (ref = male)	-.014 (.007)	-.014 (.007)	-.014 (.012)
<i>Behavioural confirmation</i>			
Feedback from colleagues (ref = no feedback)	.024 (.008)**	.024 (.008)**	.024 (.008)**
Patient satisfaction	.088 (.033)**	.088 (.033)**	.088 (.033)**
Shared practice (ref = solo)	-.002 (.009)	-.002 (.009)	-.002 (.009)
Age	.000 (.000)**	.000 (.000)**	.000 (.000)**
<u>Level: country</u>			
GDP per capita	.000 (.000)***	.000 (.000)***	.000 (.000)***
Strength of primary care			
Out-of-hours model (ref = small family doctor based)			
- Large family	-.005 (.072)		

doctor based			
- Hospital- and national based	.003 (.066)		
Relative income position (ref = low)			
- Medium		-.006 (.078)	
- High		.001 (.066)	
Patient list system (no patient list system)			-.089 (.060)
Random coefficients			
Level: country variance	.020***	.020***	.019***
Level: GP/practice variance	.075***	.075***	.075***
N: country	34	34	34
N: GP/practice	6627	6627	6627
ICC	.212	.212	.201
-2*loglikelihood	1763.56	1763.57	1761.44
Change in -2LL (df)	M6: -0.02 (2)	M6: -0.01 (2)	M6: -2.14 (1)***

*** p < .001; ** p < .05; * p < .1

Appendix D: Syntax

```
use "U:\data\Q PE version 5.0 March 2015 cleaned.dta"
```

```
***** Patient satisfaction *****
```

```
tab recommen
```

```
generate patsat = recommen
```

```
recode patsat (9=.)
```

```
tab patsat
```

```
sort mergecode
```

```
collapse (mean) patsat, by (mergecode)
```

```
recode patsat (.=999)
```

```
tab patsat
```

```
drop if mergecode==.
```

```
save "U:\data\Patient satisfaction_9juni.dta"
```

```
use "U:\data\Q FW version 5.0 March 2015 cleaned.dta", clear
```

```
***** Physical environment practice *****
```

```
*** Clean waitingroom
```

```
tab cleanwtr
```

```
gen clean=.
```

```
replace clean = 0 if cleanwtr==2 | cleanwtr==3
```

```
replace clean = 1 if cleanwtr==1
```

```
recode clean (.=999)
```

```
tab clean
```

```
*** Privacy office
```

```
tab hearcons
```

```
gen privacy=.
```

```
replace privacy = 0 if hearcons==1
```

```
replace privacy = 1 if hearcons==0
```

```

recode privacy (.=999)

tab privacy

gen physenv= clean + privacy

replace physenv = 999 if physenv==1000 | physenv==1998

label define physical_environment 0 "Not clean AND no privacy" 1 "Clean OR private" 2
"Clean AND private"
label values physenv physical_environment

tab physenv

sort mergecode

collapse physenv, by (mergecode)

tab physenv

drop if mergecode==.

save "U:\data\Physical environment9juni.dta"

use "U:\data\Q GP version 5.1 March 2016 bewerkt voor analyse.dta", clear

***** Dependent variable: GP job satisfaction *****

tab satsense
tab satinter
gen satinter_rev=5-satinter
tab satadmin
tab satstres
tab satresp
gen satresp_rev=5-satresp
tab satbalan
gen satbalan_rev=5-satbalan

keep country ungpnr satsense satinter_rev satadmin satstres satresp_rev satbalan_rev

rename satsense item1
rename satinter_rev item2
rename satadmin item3
rename satstres item4
rename satresp_rev item5
rename satbalan_rev item6

reshape long item, i(ungpnr) j(itemID)

generate it1=0

```

```

replace it1=1 if itemID==1
replace it1=it1-(1/6)
generate it2=0
replace it2=1 if itemID==2
replace it2=it2-(1/6)
generate it3=0
replace it3=1 if itemID==3
replace it3=it3-(1/6)
generate it4=0
replace it4=1 if itemID==4
replace it4=it4-(1/6)
generate it5=0
replace it5=1 if itemID==5
replace it5=it5-(1/6)
generate it6=0
replace it6=1 if itemID==6
replace it6=it6-(1/6)

* multilevel model including dummy's
xtmixed item it1 it2 it3 it4 it5 it6 || country: || ungnpr: , residuals(independent, by (itemID))

* calculate residuals, (Include eb4 if 4 levels)
predict re*, reffects
predict eb*, reses

generate satisfaction_country= _b[_cons] +re1
generate satisfaction_country_gp= _b[_cons] +re1 +re2
collapse satisfaction_country_gp satisfaction_country, by (ungnpr)

merge 1:1 ungnpr using "U:\data\Q GP version 5.1 March 2016 bewerkt voor analyse.dta"

sort country

* Calculate mean scores for job satisfaction per country

by country: sum satisfaction_country_gp
sum satisfaction_country_gp

save "U:\data\GP data with job satisfaction.dta"

use "U:\data\GP data with job satisfaction.dta", clear

***** Independent practice variables*****

***** Breadth of service profile *****

drop _merge

sort mergecode

merge 1:1 ungnpr using "U:\data\Service profile\schaaloecd_com2_firstcontact.dta"

* tab scale_com2_firstcontact_gp_count

```



```

gen firstcontact=scale_com2_firstcontact_gp_count

tab firstcontact

drop _merge

sort mergecode

merge 1:1 ungnpr using "U:\data\Service profile\schaaloecd_com3_treatfollowup.dta"

* tab scale_com3_treatfollowup_gp_coun

gen treatfollowup=scale_com3_treatfollowup_gp_coun

tab treatfollowup

drop _merge

sort mergecode

merge 1:1 ungnpr using "U:\data\Service profile\schaal4_technical_procedures.dta"

* tab schaal4_technical_procedures_art

gen techproc=schaal4_technical_procedures_art

tab techproc

drop _merge

sort mergecode

merge 1:1 ungnpr using "U:\data\Service profile\schaaloecd_com6_hp.dta"

* tab scale_com6_hp_gp_country

gen healthprom=scale_com6_hp_gp_country

tab healthprom

***** Medical instruments *****

* Generate a variable that adds the number of medical instruments in a practice (range 0-30)

generate instruments = hemoglob + glucotes + cholsmtr + blccount + ophthalm + protosc +
otoscope + gastrosce + sigmoido + xray + ultsoun + microscp + audiomtr + bicergo + eyetono
+ peakflow + spiromtr + electcar + blpressm + infusion + doctbag + urincath + coagulom +
minsurg + suturset + defibril + dispsyri + dispglow + refriger + resucita

replace instruments = . if hemoglob==. | glucotes==. | cholsmtr==. | blccount==. |
ophthalm==. | protosc==. | otoscope==. | gastrosce==. | sigmoido==. | xray==. | ultsoun==. |
microscp==. | audiomtr==. | bicergo==. | eyetono==. | peakflow==. | spiromtr==. | electcar==.
| blpressm==. | infusion==. | doctbag==. | urincath==. | coagulom==. | minsurg==. |
sudurset==. | defibril==. | dispsyri==. | dispglow==. | refriger==. | resucita==.

```

***** Other paid activities *****

* tab sideact

* label define side 0 "no paid side activities" 1 "paid said activities" 999 "missing"

***** Urbanity *****

* tab urbanization

* label def urb 1 "Big (inner)city" 2 "Suburbs or small town" 3 "Urban-rural or rural" 999 "missing"

***** Working hours *****

gen wrkhrsmean=.

replace wrkhrsmean=43.78161 if country==1
replace wrkhrsmean=51.24737 if country==2
replace wrkhrsmean=39.20465 if country==3
replace wrkhrsmean=37.38028 if country==4
replace wrkhrsmean=36.08676 if country==5
replace wrkhrsmean=40.95714 if country==6
replace wrkhrsmean=37.75000 if country==7
replace wrkhrsmean=35.74286 if country==8
replace wrkhrsmean=49.87234 if country==10
replace wrkhrsmean=38.21395 if country==11
replace wrkhrsmean=37.65315 if country==12
replace wrkhrsmean=39.7625 if country==13
replace wrkhrsmean=41.21472 if country==14
replace wrkhrsmean=33.33023 if country==15
replace wrkhrsmean=38.84186 if country==16
replace wrkhrsmean=35.06757 if country==17
replace wrkhrsmean=45.98667 if country==18
replace wrkhrsmean=46.90323 if country==19
replace wrkhrsmean=43.04274 if country==20
replace wrkhrsmean=36.05102 if country==21
replace wrkhrsmean=38.37900 if country==22
replace wrkhrsmean=40.17593 if country==23
replace wrkhrsmean=35.73272 if country==24
replace wrkhrsmean=37.36744 if country==25
replace wrkhrsmean=37.34483 if country==26
replace wrkhrsmean=35.70258 if country==27
replace wrkhrsmean=34.13402 if country==28
replace wrkhrsmean=46.63776 if country==29
replace wrkhrsmean=40.77926 if country==30
replace wrkhrsmean=40.15569 if country==31
replace wrkhrsmean=37.14000 if country==32
replace wrkhrsmean=40.33782 if country==33
replace wrkhrsmean=36.70659 if country==35
replace wrkhrsmean=40.79577 if country==36

* Generate a variable that shows the proportion of workinghours in comparison with the country mean

```

gen workinghours = (wrkhrs / wrkhrsmean) * 100

tab workinghours

***** Administrative work *****

replace pathrs=wrkhrs if pathrs>wrkhrs
gen pathrspc= (pathrs/wrkhrs) * 100

* Generate a variable that shows the proportion of time spent on administrative work

gen adminwork = (100 - pathrspc)

tab adminwork

***** Out-of-hours work *****

tab evenhrs
tab nitehrs
tab wkndhrs

replace wkndhrs=. if wkndhrs==1200
replace evenhrs=0 if evenhrs==.b & evenfreq==0
replace nitehrs=0 if nitehrs==.a & nitefreq==0
replace nitehrs=0 if nitehrs==.b & nitefreq==0
replace wkndhrs=0 if wkndhrs==.a & wkndfreq==0
replace wkndhrs=0 if wkndhrs==.b & wkndfreq==0

* Set missings to zero, in order to include them in the analysis

* Generate a variable that adds the evening-, night-, and weekend hours in the past 3 months

gen all_oohrs=evenhrs+nitehrs+wkndhrs

recode all_oohrs (.=0)

* tab all_oohrs

*** max is 1670 uur **
replace all_oohrs=. if all_oohrs>1670

* Generate a variable that shows the number of hours spent on out-of-hours care per week

gen oohrswk=all_oohrs/13

* Generate a variable that shows whether a GP spent any time on out-of-hours care or not

gen oohrs_yes=.
replace oohrs_yes=0 if oohrswk==0
replace oohrs_yes=1 if oohrswk>0 & oohrswk!=.

replace oohrswk=. if oohrswk==0

tab all_oohrs

```

***** ICT use *****

* Generate a variable that adds the number of different purposes a GP uses a computer for

```
gen ict_use=pcappoin+pcinvoic+pcdrugpr+pcconsrc+pcreflet+pcresult+pcintern+pcpharm  
replace ict_use=0 if nopcuse==1
```

```
tab ict_use
```

***** Vacation *****

```
tab absvaca
```

* Generate a variable for number of weeks of vacation in the past year

* All GPs with more than 6 weeks of vacation are added to the '6 weeks' category

```
replace absvaca=-1 if absvaca==.  
replace absvaca=6 if absvaca>=7  
replace absvaca =. if absvaca ==-1
```

***** Employment status *****

* Generate a variable that shows whether a GP is self-employed or salaried

* Mixed is added to the 'salaried' category

```
tab employment
```

```
replace employment = 1 if employment ==3
```

```
* label def empl 1 "Salaried" 2 "Self-employed" 999 "Missing"
```

***** Gender *****

```
* tab sex
```

```
* label def sex 0 "Male" 1 "Female" 999 "Missing"
```

***** Shared or Solo practice *****

```
* tab shareacc
```

```
* label define share 0 "Solo practice" 1 "Duo or group practice" 999 "Missing"
```

***** Feedback from colleagues *****

```
replace qualpeer=., if qualpeer==999
```

```
recode qualpeer (.=999)
```

```
label define feedback 0 "No feedback" 1 "Feedback" 999 "Missing"
```

```
label values qualpeer feedback
```

```
tab qualpeer
```

***** Age *****

* tab age

***** Country variables *****

***** Primary Care strength *****

drop pc_strength

gen pc_structure=.

```
replace pc_structure = 2.2436 if country == 1
replace pc_structure = 2.2317 if country == 2
replace pc_structure = 2.1392 if country == 3
replace pc_structure = 1.966 if country == 4
replace pc_structure = 2.1604 if country == 5
replace pc_structure = 2.3875 if country == 6
replace pc_structure = 2.3049 if country == 7
replace pc_structure = 2.3059 if country == 8
replace pc_structure = 2.2222 if country == 10
replace pc_structure = 2.1194 if country == 11
replace pc_structure = 2.0964 if country == 12
replace pc_structure = 1.8366 if country == 13
replace pc_structure = 2.1799 if country == 14
replace pc_structure = 2.3357 if country == 15
replace pc_structure = 2.1682 if country == 16
replace pc_structure = 2.2762 if country == 17
replace pc_structure = 1.9415 if country == 18
replace pc_structure = 2.1361 if country == 19
replace pc_structure = 2.4906 if country == 20
replace pc_structure = 2.273 if country == 21
replace pc_structure = 2.1409 if country == 22
replace pc_structure = 2.4053 if country == 23
replace pc_structure = 2.3099 if country == 24
replace pc_structure = 2.0545 if country == 25
replace pc_structure = 2.3672 if country == 26
replace pc_structure = 2.4335 if country == 27
replace pc_structure = 2.2518 if country == 28
replace pc_structure = 2.0459 if country == 29
replace pc_structure = 2.2849 if country == 30
replace pc_structure = 2.5129 if country == 31
replace pc_structure = 2.341 if country == 32
replace pc_structure = 2.3694 if country == 35
replace pc_structure = 2.3564 if country == 33
replace pc_structure = 2.2372 if country == 36
```

* tab pc_structure

***** Out-of-hours care model *****

gen gpcoop=.

```
replace gpcoop = 1 if country == 32 | country == 1 | country == 2 | country == 10 | country == 11 | country == 21 | country == 26 | country == 29
```

```
replace gpcoop = 2 if country == 13 | country == 14 | country == 20 | country == 35 | country == 22 | country == 23 | country == 28 | country == 31
```

```
replace gpcoop = 3 if country == 3 | country == 33 | country == 4 | country == 5 | country == 6 | country == 7 | country == 8 | country == 12 | country == 15 | country == 16 | country == 17 | country == 18 | country == 36 | country == 19 | country == 24 | country == 25 | country == 27 | country == 30
```

```
label define oohmodel 1 "Small family doctor based" 2 "Large family doctor based" 3 "Hospital- and national based"  
label values gpcoop oohmodel
```

```
* tab gpcoop
```

```
***** Relative income position *****
```

```
gen relinc=.
```

```
replace relinc = 1 if country == 32 | country == 1 | country == 2 | country == 3 | country == 33 | country == 6 | country == 7 | country == 8 | country == 10 | country == 11 | country == 13 | country == 15 | country == 16 | country == 17 | country == 18 | country == 36 | country == 19 | country == 20 | country == 35 | country == 24 | country == 25 | country == 26 | country == 29 | country == 30
```

```
replace relinc = 2 if country == 12 | country == 21 | country == 22 | country == 28
```

```
replace relinc = 3 if country == 4 | country == 5 | country == 14 | country == 23 | country == 27 | country == 31
```

```
label define incpos 1 "Low" 2 "Medium" 3 "High"  
label values relinc incpos
```

```
* tab relinc
```

```
***** Patient list system *****
```

```
* tab listsys
```

```
***** Mean working hours per country *****
```

```
* tab wrkhrsmean
```

```
***** GDP per capita *****
```

```
gen gdppc=.
```

```
replace gdppc = 49755 if country == 32  
replace gdppc = 44758 if country == 1  
replace gdppc = 41272 if country == 2  
replace gdppc = 7469 if country == 3  
replace gdppc = 42349 if country == 33
```

```

replace gdppc = 23542 if country == 4
replace gdppc = 18484 if country == 5
replace gdppc = 53579 if country == 6
replace gdppc = 17737 if country == 7
replace gdppc = 43433 if country == 8
replace gdppc = 42161 if country == 10
replace gdppc = 17891 if country == 11
replace gdppc = 12820 if country == 12
replace gdppc = 60530 if country == 13
replace gdppc = 64175 if country == 14
replace gdppc = 30669 if country == 15
replace gdppc = 14071 if country == 16
replace gdppc = 14913 if country == 17
replace gdppc = 100739 if country == 18
replace gdppc = 5237 if country == 36
replace gdppc = 25145 if country == 19
replace gdppc = 45638 if country == 20
replace gdppc = 39413 if country == 35
replace gdppc = 70868 if country == 21
replace gdppc = 12414 if country == 22
replace gdppc = 19872 if country == 23
replace gdppc = 9523 if country == 24
replace gdppc = 16530 if country == 25
replace gdppc = 21650 if country == 26
replace gdppc = 26617 if country == 27
replace gdppc = 51845 if country == 28
replace gdppc = 79888 if country == 29
replace gdppc = 10863 if country == 30
replace gdppc = 40412 if country == 31

```

```
* tab gdppc
```

```
*****Mergen van FW en PE questionnaires *****
```

```
* Merge for 'patient satisfaction' variable
```

```
drop _merge
```

```
sort mergecode
```

```
merge m:m mergecode using "U:\data\Patient satisfaction_9juni.dta"
```

```
sort ungnr
```

```
collapse country mergecode satisfaction_country_gp firstcontact treatfollowup techproc
healthprom instruments sideact urbanization wrkhrs workinghours adminwork all_oohrs
ict_use absvaca employment sex qualpeer patsat shareacc age pc_structure gpcoop relinc
listsy gdppc wrkhrsmean, by (ungnr)
```

```
* Merge for 'physical environment' variable
```

```
sort mergecode
```

```
merge m:m mergecode using "U:\data\Physical environment9juni.dta"
```

```
sort ungnr
```

```
collapse country mergecode satisfaction_country_gp firstcontact treatfollowup techproc  
healthprom instruments sideact urbanization wrkhrs workinghours adminwork all_oohrs  
ict_use absvaca physenv employment sex qualpeer patsat shareacc age pc_structure gpcoop  
relinc listsys gdppc wrkhrsmean, by (ungnr)
```

```
* Interactieterm voor 'shared/solo practice x patient satisfaction' maken
```

```
gen shareacc_patsat = shareacc*patsat
```

```
***** Variables for multilevel *****
```

```
order country ungnr satisfaction_country_gp firstcontact treatfollowup techproc healthprom  
instruments sideact urbanization wrkhrs workinghours adminwork all_oohrs ict_use absvaca  
physenv employment sex qualpeer patsat shareacc age pc_structure gpcoop relinc listsys  
gdppc wrkhrsmean
```

```
drop if ungnr==.
```

```
recode physenv (.=999)
```

```
**** Multilevel analyses****
```

```
*** Model 0 ***
```

```
mixed satisfaction_country_gp || country:  
estat icc
```

```
*** Model 1 ***
```

```
mixed satisfaction_country_gp firstcontact treatfollowup techproc healthprom instruments  
i.sideact i.urbanization || country:  
estat icc
```

```
*** Model 2 ***
```

```
mixed satisfaction_country_gp workinghours adminwork all_oohrs ict_use absvaca i.physenv  
|| country:  
estat icc
```

```
*** Model 2 met wrkhrs ipv workinghours*** -----> maakt geen verschil
```

```
mixed satisfaction_country_gp wrkhrs adminwork all_oohrs ict_use absvaca i.physenv ||  
country:  
estat icc
```

```
*** Model 3 ***
```

```
mixed satisfaction_country_gp i.employment i.sex || country:  
estat icc
```

```
*** Model 4 ***
```


mixed satisfaction_country_gp i.qualpeer patsat i.shareacc age || country:
estat icc

*** Model 4 with interaction ***

mixed satisfaction_country_gp i.qualpeer patsat i.shareacc shareacc_patsat age || country:
estat icc

*** Model 5 ***

mixed satisfaction_country_gp firstcontact treatfollowup techproc healthprom instruments
i.sideact i.urbanization workinghours adminwork all_oohrs ict_use absvaca i.physenv
i.employment i.sex i.qualpeer patsat i.shareacc age || country:
estat icc

*** Model 6 ***

mixed satisfaction_country_gp firstcontact treatfollowup techproc healthprom instruments
i.sideact i.urbanization workinghours adminwork all_oohrs ict_use absvaca i.physenv
i.employment i.sex i.qualpeer patsat i.shareacc age gdppc || country:
estat icc

*** Model 7 ***

mixed satisfaction_country_gp firstcontact treatfollowup techproc healthprom instruments
i.sideact i.urbanization workinghours adminwork all_oohrs ict_use absvaca i.physenv
i.employment i.sex i.qualpeer patsat i.shareacc age gdppc pc_structure || country:
estat icc

*** Model 8 ***

mixed satisfaction_country_gp firstcontact treatfollowup techproc healthprom instruments
i.sideact i.urbanization workinghours adminwork all_oohrs ict_use absvaca i.physenv
i.employment i.sex i.qualpeer patsat i.shareacc age gdppc i.gpcoop || country:
estat icc

*** Model 9 ***

mixed satisfaction_country_gp firstcontact treatfollowup techproc healthprom instruments
i.sideact i.urbanization workinghours adminwork all_oohrs ict_use absvaca i.physenv
i.employment i.sex i.qualpeer patsat i.shareacc age gdppc i.relinc || country:
estat icc

*** Model 10 ***

mixed satisfaction_country_gp firstcontact treatfollowup techproc healthprom instruments
i.sideact i.urbanization workinghours adminwork all_oohrs ict_use absvaca i.physenv
i.employment i.sex i.qualpeer patsat i.shareacc age gdppc listsys || country:
estat icc