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IMPACTS OF HOME-BASED TELEWORK ON QUALITY OF LIFE FOR EMPLOYEES AND THEIR PARTNERS. QUANTITATIVE AND QUALITATIVE RESULTS FROM A EUROPEAN SURVEY

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ABSTRACT. The study investigates the effects of home-based telework on quality of life (QoL). Four dimensions of QoL were analysed; overall satisfaction with life, sense of belonging, sense of becoming and sense of being. Through cross-national survey data (from 217 job holders and 112 partners) and by means of structural equation modeling, a positive association was found between home-based telework to a worker's sense of belonging (beta $= 0.30$, $p < 0.001$). On the other hand, a negative path was detected from the job holder's home-based telework to his or her partner's overall satisfaction with life (beta $= -0.27$, $p < 0.05$). After controlling for subdimensions of life quality, home-based work did not affect the job holder's overall life satisfaction. Moreover, the more concentration the job holder reported, the lower the sense of belonging was reported by his or her partner (beta $= -0.28$, $p < 0.05$). No simple explanation for the negative effects were found, but our interviews with the group of workers and their families leave us the impression that the problem of overworking and withdrawal was most relevant to the cases, in combination with negative spill-over effects and unclear boundary settings in the home.

KEY WORDS: home-based telework, family, quality of life, satisfaction with life.

The diffusion of new information and communication technology at the office and the home has made organizations less dependent on co-location of their workers in time and space. As a consequence, work is increasingly disconnected from traditional office space and office buildings and it may be conducted in more suitable or convenient places. In particular, during recent decades working from home with the support of computers and telecommunication tools has emerged as a new and promising way of performing work for large segments of the workforce. This phenomenon is usually referred to as distance work, telework (Gray et al., 1993; Huws et al., 1990), telecommuting (Nilles, 1994), remote work (Hamblin, 1995) or home work. To accentuate the topic of this article, we will use the term *home*-based telework, which refers to paid work done at a different location from the premises of the employer, namely an employee's *home*. Home-based telework appears as one major area where new technology has the potential to change people's daily practices and thereby bring about a better life for the



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individual. These work arrangements have been around for some time now and are being adopted not just by early adopters but by employers and employees in general (ECaTT, 2000; TWA, 2000).

According to a large pan-European study, as many as 9 million people in the European Union are now regular teleworkers, a figure representing 6% of the total workforce (ECaTT, 2000). Of these, roughly one-third (2 million) are considered home-based teleworkers, inasmuch as they work from home at least one full working day per week.

A characteristic of telework is that it finds support in multiple arguments and thus also in many different camps in society. For instance, telework is frequently supported by governmental bodies as a way of reducing emissions from city traffic, while organizational managers prefer to see it as a way of getting a more flexible staff and to reduce the need for office space. On the level of the individual worker, however, the practice of conducting work at home on one or more days per week is expected to produce positive effects, such as higher efficiency at work, better concentration, reduction of stress and a better family life. These effects are often covered under the general term and concept "quality of life" (QoL).

The different motives propelling home-based teleworking in society are not necessarily mutually antagonistic. Telework may be a configuration that can combine the best of different worlds. As a matter of fact, the issue of workers' QoL has been put on the agenda in many organizations as individual employees' well-being seems to be decisive in determining the extent of their professional contributions. For instance, Daniels (2000, p. 73) argues that "there are significant associations between psychological well-being and a range of behaviours associated with performance and productivity – such as absenteism – and commitment to the organization" (see also Brooke and Price, 1989; Van Dyne et al., 1994; Wright et al., 1993). In a more knowledge-based economy, the knowledge and creativity of workers are increasingly regarded as elements in the company's core value (Drucker, 1994; Gibbons et al., 1994; Nonaka and Takeuchi, 1995). The question at stake here is whether working from home actually increases QoL for the worker, as is believed. Former studies in this area have given mixed evidence of the effects of home-based telework on individuals' physical and emotional health. In a review study, Van Sell and Jacobs (1994) hold that control, flexibility and concentration are the main factors that improve QoL for home-based teleworkers, and our intention is partly to attempt to replicate this finding.

A related question concerns the impact of home-based telework on the job holder's family. A common belief has been that working from home makes it easier for employees to enjoy their families (Toffler, 1980). Although much of the literature has assumed that a better balance between work life and family life would be achieved automatically, further analysis suggests that such may not be the case (Duxbury et al., 1998). There appears to be no consensus in the literature on whether home-based telework in fact contributes to better coping with conflicting roles and to less family conflict. Thus a second aim of our study was to contribute to the limited knowledge of how home-based telework affects QoL for the job holder's partner.

Despite this growing concern with issues related to QoL, no paradigmatic agreement on a common understanding of the concept seems to have been established. From a thorough review of the literature, however, QoL is reasonably understood as referring to both subjective and objective components (Cowen, 1991; Cummins, 2000; Diener and Suh, 1997; 1999; Fernández-Ballesteros, 1998; Haybron, 2000; Jacob and Willits, 1994; Kammann et al., 1984; Lane, 1996; Lerner, 1997; Moum, 1992; Olson and Schober, 1993; Raphael, 1996; Ringen, 1995; Rubio et al., 2001; Schwarz and Strack, 2000; Veenhoven, 1998; 2000; Vittersø, in press; Vittersø and Nilsen, 2002; Watten et al., 1995; WHOQOL and group, 1998).

Given the multidimensionality of the construct, Robert Lane's three-component theory seems a fruitful overall framework for QoL research (Lane, 1996; 2000). Lane (2000, p. 6) believes that both objective and subjective components (specified as subjective well-being and human development) are necessary to account for the overall QoL concept. Accordingly, QoL is properly defined by the relationship between two subjective sets of circumstances and one objective set. The objective element is conceived as quality of conditions (QC), whereas the subjective elements of a high QoL comprise: (1) a sense of subjective well-being and (2) personal development, learning and growth (QP). The basic concept can be expressed in a simple formula: (QoL $= f$(QC, QP) – see Lane, 1996, p. 259).

In the current study we consider the opportunity to work from a home-based office as a quality of one's objective life circumstances. We further consider that life satisfaction as well as growth and mastery are crucial factors in the subjective elements of a high QoL. The relationship between working at home on one hand and satisfaction and growth opportunities on the other is thus considered to illustrate how

QoL is a function of objective and subjective components. In line with such a conceptualization, we have utilized an inventory generated by Renwick and Brown (1996) to measure subjective QoL. As members of the Centre for Health Promotion (CHP) at the University of Toronto, Renwick and her colleagues have developed an idea of QoL, which assumes that subjective well-being represents a multidimensional phenomenon. The group emphasizes three broad areas of life as important for human development. (1) *Being* encompasses the most basic aspects of who people are as individuals. (2) *Belonging* is concerned with the fit between individuals and their various environments. (3) *Becoming* focuses on the purposeful activities in which individuals engage as they attempt to realize their goals, aspirations and hopes.

In line with this framework, the QoL Profile Inventory (Brown et al., 1996) was developed, and it will be utilized in our study. The empirical validation of this inventory is limited. The single factor analytical study reported in the literature is conducted only with an exploratory principal component analysis. Second, it provides only partial support for the suggested conceptual structure (Raphael et al., 2001). Hence a goal for the current study is to contribute an additional empirical test of the inventory, conducted by means of a confirmatory factor analysis.

Mediating Variables

Some researchers, notably Van Sell and Jacobs (1994), argue that the influence of telework on the individual's QoL appears to be explained by the teleworker's improved concentration, flexibility and control over time (p. 82). According to these authors, concentration, flexibility and control are mediating variables; that is, they explain the influences of home-based telework on the QoL variables. Similar arguments are put forward by Hackman and Oldham (1980) and Warr (1994). Teleworkers cite these variables as reasons for their home-based work, and further, researchers in this field speculate that these same variables contribute to the improvements in individual productivity, cost savings and affective reactions which are characteristic outcomes of telework arrangements:

Concentration: Working at home rather than in an office enhances the ability to concentrate on work for most individuals, if not all. Improved concentration is mainly due to less interruption.

Flexibility: A number of researchers have identified the need for flexibility as the major impetus for telework (e.g. Van Sell and Jacobs, 1994).

Control: Autonomy, which includes control over time, is a dimension of good job design (Hackman and Oldham, 1980; Warr, 1994). A large proportion of people who work at home say they want to work at their own pace, in their own way.

Work and Family Conflict

The balance between work and family has been a popular topic in home-based telework research. There are basically two views on this: that telework is part of the problem (increasing conflict); or that it is part of the solution (decreasing conflict). A recent study of telework and the balance between work and family demands (information collected two weeks before and six months after the introduction of home-based telework) shows that home-based workers had significantly lower levels of interference from work to family, significantly lower levels of interference from family to work, and significantly fewer problems managing their family time, than they did before they began home-based working (Duxbury et al., 1998).

Nippert-Eng (1996) shows how boundaries between different areas, work and home, are being *placed* and *transcended*. To create boundaries means that home-based teleworkers maintain the categories of work and leisure. The creation of boundaries is a mental activity practised through different practical activities, such as *when and where* to work (Nippert-Eng, 1996).

The definition and experience of the categories of work and leisure can be viewed as a continuum where the ideal types *integrator* and *segmentator* represent the extremes. For the integrator, the categories of work and leisure are overlapping. The distinctions between home and work are limited, and home and work are one and the same. The segmentator feels that work and leisure are separate categories. He or she strongly distinguishes between work and home, and "everything belongs to either work or home". Our understanding of home and work decides how we shape and experience our surroundings and the time we spend on activities at home and work (Nippert-Eng, 1996).

Boundaries change depending on gender, family relations and way of life, among other attributes. Where boundaries are drawn, it affects the home-based teleworker's understanding of work and leisure (Nippert-Eng, 1996). Depending on how we think, we place

and transcend boundaries around the category of work. The boundaries help us to separate one category from another (Zerubavel, 1991).

The Current Study

The analyses of this study are based on data and materials collected within a European project entitled "The Impacts of Telework on Sustainable Social Development and QoL."[1] At closure of the project in 2001, some results had been obtained and were published (Akselsen et al., 2001; 2003; France et al., 2002), but other findings appeared to need further analysis. Hence the data and materials, the instruments and research model invited investigation beyond the time span and resources of the initial project. The aims of the present study are:

(1) to re-analyse the material from the EURESCOM study (Akselsen et al., 2001) according to a revised model of QoL, and test the hypothesis that telework increases the QoL for employees;
(2) related to (1), to explore the possible effects of control, flexibility and concentration as mediating variables between the working situation and subjective QoL;
(3) to explore the relationship between employees' work situations and the QoL of their partners;
(4) finally, since empirical confirmation of the hypothesized factor structure of the QoL Profile Inventory is still defective, we wish to contribute with an empirical validation of the scale by means of a confirmatory factor analysis.

METHOD

Participants

Based on convenience sampling, a total of 531 workers who agreed to take part in the study, 224 responded. Seven of these were excluded because they failed to provide essential information (number of days per week worked at home). As a result, the study was left with 217 valid responses yielding a response rate of 41%. Responses were obtained both from workers who were carrying out different amounts and types of telework in occupations that can be characterized as knowledge work, and from workers who was non-teleworkers. A total of 88 workers came from the UK, 54 from Norway, 42 from Iceland and 33 from Portugal. Among these, 135 (62%) were males and 82 (38%) females. The majority (76%) had received a college education

or higher. The average age of the workers was 38.25 years, and 37% of the workers were between 30 and 39 years. Most of the workers (64%) were married; a further 12% were living with a partner. Some 24% described themselves as single or divorced. Approximately half (48%) of households included at least one child. The mean number of hours that workers in the joint sample were contracted to work per week was 38.9 h. However, the mean number of actual hours worked per week was nearly 10 h more, or 48.6 h.

As an additional subsample, 112 partners were included. A total of 35 partners came from the UK, 31 from Norway, 24 from Iceland and 19 from Portugal (one had another nationality and two did not fill in their nationality). Among these, 45 (40%) were males and 67 (60%) females. The average age of the partners was 38 years, and 40% of the partners were between 30 and 39 years of age. Seventy-three (65%) of the partners had full-time work, 20 (18%) had part-time work, 6 (5%) attended an educational institution full time, 2 (2%) attended part time and 11 (10%) did not work or attend an educational institution.

Procedure

The overall design of the study was a between-subjects comparison of workers who work different numbers of days per week at home. The study included two stages: first a quantitative stage, consisting of self-administered questionnaires addressing each of the hypotheses; and second, a qualitative stage, including interviews focused on a more limited set of issues.

The informants for the study were recruited from four participating countries: Iceland, Norway, Portugal and the UK. Within each country, a number of companies were approached by a variety of formal and informal contacts. All these companies were in sectors where we had reason to believe that some telework was going on. Subsequently, 14 companies agreed to participate in the study. Of these, five were in the computer (hardware and software) sector, four in the telecom sector, one in the insurance sector, one in the finance sector, two in the consultancy sector and one in the seismic/oil sector. Once agreement had been obtained from a company, individual workers were then approached with the permission of the company, since it was important to have the cooperation of workers, their managers and their colleagues.

Furthermore, in stage II a limited sample (42 workers, 18 partners, 8 children, 3 friends, 9 managers and 9 colleagues, a total of 89) was selected and interviewed in more depth on a set of issues. Choice of workers to take part in this stage was a mixture of premeditation and pragmatism, where the former aspect was decided by the following guidelines: (a) Both home-based workers and non-home-based workers were included, for the sake of comparison and to deepen our understanding. (b) Workers with the highest and lowest QoL scores were chosen, to give a range of experiences. (c) Different household structures were selected, to ensure that we had a mix of partners with no children, people living alone, lone parents and people with partners and children under 12. These guidelines were blurred by the more pragmatic aspects of initial self-selection (expression of interest at the quantitative stage) and individual availability in the time span of the study. In addition, the number of people to choose from impacted on the final sample, inasmuch as in some countries we could choose from several within each category, whereas the limited numbers of informants available in other countries offered little opportunity for choice.

The quantitative sample of European workers is hardly representative of the larger universe of European knowledge workers. However, the data are appropriate for the exploration of some of the dynamics between perceived QoL and work style.

Measures

Telework: A single item was used to gather information about how often the job holders worked at their homes. The question we asked was: "*On average, how many days per week do you work at home?*"

Subjective QoL. Three dimensions of human growth and one dimension of overall life satisfaction were measured. These four variables were all quantified by means of the CHP's QoL Profile (Brown et al., 1996), which consists of a total of 108 items. The inventory represents basically two identical sets of items. For the first set, participants are asked to rate the importance of 54 items on a 5-point Likert scale. The items are grouped into the three dimensions of being, becoming and belonging. After each item has been rated according to its perceived importance, the questions are repeated. This time the participants are asked to indicate their satisfaction with each of the 54 statements (on a 5-point Likert scale). Each participant's score on each item is then calculated as a weighted composite based on the item's importance and

satisfaction. The weighting procedure details are provided in Brown et al. (1996).

In brief, the procedure gives composite scores according to the formula [(Importance response) × (Satisfaction response)]. Scores can range from −3.3 (not at all satisfied with extremely important issues) to 3.3 (extremely satisfied with extremely important issues). After the weighting procedure, the inventory contains a total of 54 items, hypothesized to be under the influence of nine facets, each of which is expressed through six indicators (items). The nine facets comprise indicators of three subjective QoL subscales, namely: (1) being, (2) belonging and (3) becoming. The nine facets are discussed below.

(1a) *Physical being*, with items focusing on the participant's appearance, exercise, hygiene, nutrition, physical health and sex life. The Cronbach's alpha (α) for this facet was 0.76. (1b) *Psychological being*, with items focusing on the degree of importance/satisfaction attributed to self-acceptance, feelings of worry and stress, general feeling about the self, mental health, mood and independence ($\alpha = 0.86$). (1c) *Spiritual being*, with items focusing on the degree of importance/satisfaction with how one celebrates spiritual events, the meaningfulness of life, hopes, religious beliefs, helping others in need and ideas of right and wrong ($\alpha = 0.72$).

(2a) *Physical belonging* is measured by items referring to safety, space for privacy, personal things, housing, neighborhood and attachment to region ($\alpha = 0.85$). (2b) *Social belonging* is measured by items asking about satisfaction with people in the family, spouse/special persons, friends, acquaintances, socializing within small groups and fitting in with larger groups ($\alpha = 0.82$). (2c) *Community belonging* derives from items that ask about satisfaction with physical access to the community, ability to attend special events, educational opportunities, work, and professional services, and amount of money one has ($\alpha = 0.71$).

(3a) *Practical becoming.* The Practical becoming facet is measured by means of questions addressing the following six items: work to do around the home, help offered to others, going somewhere, looking after oneself, looking after other people, and work to do at job or school ($\alpha = 0.77$). (3b) *Leisure becoming* is measured with items focusing on public entertainment, leisure activities, sport and recreation, hobbies, holidays and socializing with others ($\alpha = 0.83$).

Finally, (3c) *Growth becoming* relates to satisfaction with how one copes with changes in life, improvement of physical skills, learning about new things, resolving conflicts, solving problems and trying out new things ($\alpha = 0.75$).

In addition to these factors, a general satisfaction with life factor was obtained from the QoL Profile items. This factor is simply the common variance from all 54 items, in other words, the *g*-factor for the inventory (see, for example, Borkenau and Amelang, 1985; Gustafsson and Balke, 1993; Mulaik and Quartetti, 1997). The overall life satisfaction is graphically depicted in Figure 1b.

Flexibility. A tree item instrument was developed containing the following items: (a) In total, how much flexibility do you feel to have in your work? (b) Regarding working hours, how much flexibility do you feel you have? (c) Regarding where you work, how much flexibility do you feel you have? The items were to be answered on a 5-point Likert scale (1 = Strongly disagree, 5 = Strongly agree). Cronbach's alpha for the scale was 0.74.

Concentration. A tree item concentration instrument was developed. The items were: (a) It is easy to concentrate on my job tasks when I work at home. (b) It is easy to become distracted when I work at

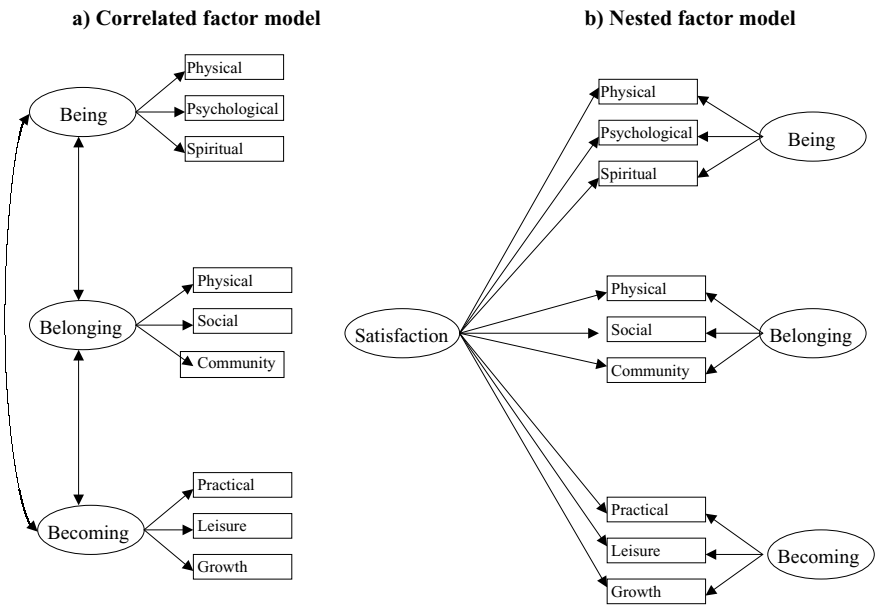


Figure 1. Correlated factor model (a) and nested-factor model (b) for the QoL Profile.

home. (c) There is a lot of noise at home. The items were answered on a 5-point Likert scale (5 = Strongly agree), and the two last items were reversed ($\alpha = 0.86$).

Control. Three items measured subjective evaluation of control in the work situation. (a) How much autonomy do you have in your work? (b) How precisely does the following statement characterize the situation in your job: My work gives me possibilities for autonomy and freedom with respect to how to conduct my work. (c) How precisely does the following statement characterize the situation in your job: The job prevents any possibility of personal initiative or judgement regarding how to do things. These items were answered on 7-point Likert scales (7 = Strongly agree). The last item was reversed to make a consistent scale, yielding an alpha of 9.73.

Analysis

Structural equation modeling using the EQS 5.7 for Windows (Bentler, 1995) constituted the principal method of data analysis. Further information about SEM is provided in (Bentler, 1980; Bollen, 2002; Kline, 1998; MacCallum et al., 1992).

Model Specifications

Three measurement models and two full structural equation models were analysed in the study. We were prepared to analyse modified models in the case of bad-fitted *a priori* models. To start with, two different subjective QoL models were conceptualized, of which the first was an ordinary correlated factor model with three items indicating the factors of being, belonging and becoming, respectively (Figure 1a). The indicators behind this model are the nine facets described above. The second model anticipated was a nested-factor model in which an additional and general satisfaction-with-life factor was added to the three being/belonging/becoming factors (Figure 1b). One could say that this model depicts a relationship within a set of orthogonal first-order latent variables of different degrees of generality. There is one general satisfaction-with-life factor with a relationship to all the observed variables, along with factors having a narrower range of influence (Gustafsson and Balke, 1993). When the general factor variance is extracted from the facets, the remaining latent variables are considered to be independent of each other. Thus there are no correlations among common factors in this model.

Our third measurement model actually depicts three separate and independent factors, namely flexibility, control and concentration. These factors have only three indicators each, which makes it impossible to test their goodness-of-fit one by one. Hence, they were tested in a single model, depicting a three-factor structure with a total of nine indicators. Although we are not perfectly safe in testing the factor structure in this way (see Mulaik and Millsap, 2000), we find this last procedure the most appropriate approach for testing the three inventories by means of a structural equation model (Figure 2).

The full regression model is depicted in Figure 3. With this model we wanted to test the impact of working from home on satisfaction with life and the three human development dimensions of being, belonging and becoming. Additionally, we have included the possible mediating effects from control, flexibility and concentration. The full regression

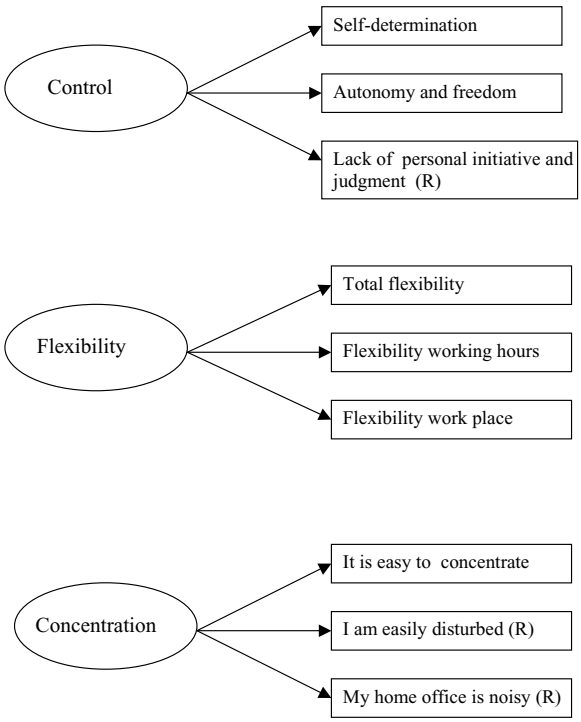


Figure 2. Factor models for the mediating variables control, flexibility and concentration.

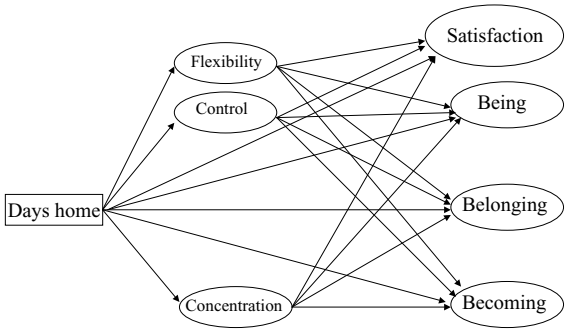


Figure 3. The full structural equation model for the QoL Profile regressed upon number of days working from a home office with flexibility, control and concentration as mediating variables.

model was first analysed with the employee data set. Next, we replaced employees' QoL data with those of their partners while constraining the data in the left-hand part of the model, according to the results from the employee data.

RESULTS

Descriptives

Tables I and II provide basic descriptives for the study variables.

The Factor Models

Quality of Life

Initially, an exploratory principal components analysis was run in the interest of replicating the results reported in Raphael et al. (2001). Compared with their 11-component solution, our data revealed 14 components with eigenvalues greater than one (Kaiser, 1974). However, since this criterion normally over-factorizes the correlation matrix (Cliff, 1988; Velicer and Fava, 1998), we re-analysed the data according to the theoretical assumption of a nine-factor solution. This decision was guided by advice given by psychometricians such as Gorsuch (1983), who claims that often theoretical assumptions may be better guidelines than the Kaiser-criterion.

TABLE I
Basic descriptives and Spearman correlation coefficients for the study variables (workers)

	1	2	3	4	5	6	7
1. Days home	1.000						
2. Being	−0.058	1.000					
3. Belonging	0.212*	0.513*	1.000				
4. Becoming	0.111	0.680*	0.651**	1.000			
5. Flexibility	0.310*	0.083	0.238*	0.166*	1.000		
6. Control	0.131	0.110	0.244*	0.147	0.437**	1.000	
7. Concentration	0.171	0.038	0.138	0.158	0.061	0.021	1.000
Mean	1.581	2.392	3.511	1.914	3.631	5.676	4.049
SD	1.471	1.957	1.912	1.706	0.833	1.020	0.836
Skewness	0.935	0.563	0.086	0.474	−0.811	−0.951	−1.306

Note: $^{*}p < 0.05$; $^{**}p < 0.01$. SD = Standard deviation. Days home = Number of days working from home office. $N = 217$.

Table III summarizes the main finding from our principal components analysis. It shows that two of the facets had all their respective items loading on one component; one facet had five items loading on a component; two facets had four of their six items with loadings as hypothesized; and two facets had three items correctly loading. One of the facets, the spiritual being dimension, did not fit any of the nine components. Note also that the community belonging facet was divided between two components.

To turn now to a confirmatory factor analysis, only the sumscores representing the nine facets were used as indicators for the inventory. This manner of analysis is a so-called internal-consistency approach to aggregating items into parcels (Kishton and Widaman, 1994), and it represents a practical–liberal philosophical position, as discussed by Little et al. (2002). Even if such a parceling procedure may give a better fitting solution as compared with raw score indicators (Bandolas, 2002), the two QoL models proposed in Figure 1 did not fit the data well. The correlated factor model (cf. Figure 1a) revealed the following goodness-of-fit: χ^2 (24, $n = 200$) = 91.1, $p < 0.001$, CFI = 0.92, RMSEA = 0.12 (0.10–0.15). The confidence interval for the RMSEA is in parenthesis. For the nested model, the goodness-of-fit estimates were: χ^2 (18, $n = 200$) = 75.4, $p < 0.001$, CFI = 0.93, RMSEA = 0.13 (0.10–0.16).

TABLE II
Basic descriptives and Spearman correlation coefficients for the study variables (partners)

	1	2	3	4	5	6	7
1. Days home[a]	1.000						
2. Being[b]	−0.189	1.000					
3. Belonging[b]	0.096	0.749***	1.000				
4. Becoming[b]	−0.213*	0.764***	0.790***	1.000			
5. Flexibility[a]	0.310**	0.130	0.057	−0.017	1.000		
6. Control[a]	0.131	0.010	0.024	0.030	0.437**	1.000	
7. Concentration[a]	0.171	−0.183	−0.105	−0.061	0.061	0.021	1.000
Mean	1.578	2.480	3.607	2.022	3.631	5.676	4.049
SD	1.471	2.040	2.014	1.806	0.833	1.020	0.836
Skewness	0.935	0.646	0.335	0.657	−0.811	−0.951	−1.306

Note: $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$. SD = Standard deviation. Days home = Number of days working from home office. $N = 112$.
[a]Data from workers.
[b]Data from partners.

TABLE III
Number of items (with loadings >0.40) for the nine facets of the QoL Profile

Facets	Items included in component
Being, physical	5/6
Being, psychological	6/6
Being, spiritual	0/6
Belonging, physical	6/6
Belonging, social	4/6
Belonging, community	3/6
Becoming, practical	4/6
Becoming, leisure	6/6
Becoming, growth	3/6

Note: Principal component analysis with Varimax rotation. The theoretical model suggests six items per component (factor). $N = 132$.

The correlation between the being factor and the becoming factor was extremely high ($r = 0.98$). Because of this high correlation, an attempt was made to modify the model. A revised factor structure in which the being and the becoming factors were merged into one factor was thus analysed next. For the correlated factor model, the revised configuration did not help much in terms of goodness-of-fit (χ^2 (26, $n = 200$) = 96.1, $p < 0.001$, CFI = 0.91, RMSEA = 0.12 (0.09–0.14)). On the other hand, the revised nested model showed improved goodness-of-fit (χ^2 (19, $n = 200$) = 42.1, $p = 0.002$, CFI = 0.95, RMSEA = 0.08 (0.05–0.11)). For this latter model, the CFI is 0.95 and the RMSEA is 0.08, which we consider to be acceptable. Hence for subsequent analysis of the full regression models, the revised factor model with two nested factors was chosen.

Flexibility, Control and Concentration

As independent factors, the three constructs flexibility, control and concentration did not achieve acceptable goodness-of-fit (χ^2 (27, $n = 179$) = 73.8, $p < 0.001$, CFI = 0.91, RMSEA = 0.10 (0.07–0.13). However, when the control and flexibility factors were allowed to correlate, fit measures became excellent (χ^2 (26, $n = 179$) = 24.0, $p = 0.57$, CFI = 1.00, RMSEA = 0.00 (0.00–0.05).

The Regression Models

Workers

For the model depicted in Figure 3, an acceptable fit was obtained (χ^2 (129, $n = 168$) = 198.3, $p < 0.001$, CFI = 0.94, RMSEA = 0.06 (0.04–0.07). The model further reveals that more days working at home significantly increased employees' sense of belonging ($\beta = 0.30$, $p < 0.001$). This relation is depicted as the thick arrow in Figure 4. In the figure, only significant paths are revealed (thin arrows mark significant paths for the partner data). No significant impacts from home-working on control, flexibility or concentration were found in this model.

Partners

Figure 4 shows that the study variables were differently related for the partners as compared with the job holders (thin vs. thick arrows). First, goodness-of-fit estimates indicate a somewhat poorer fit for these data (χ^2 (154, $n = 92$) = 277.9, $p < 0.001$, CFI = 0.82, RMSEA = 0.10 (0.08–0.11). Part of the explanation for the poor fit is that the parameters in the left half of the model are constrained to be equal to the paths in the model for the workers. Next, the impact of working at home was basically negative for the partners' QoL. For instance, the path from number of days spent working at home to overall satisfaction was −0.27 ($p < 0.05$). Moreover, a negative effect was detected between the workers' concentration and the partners' belonging ($\beta = -0.28$, $p = 0.05$). Although this path is significantly different from zero, it is not significantly different from the similar (non-significant) path estimated

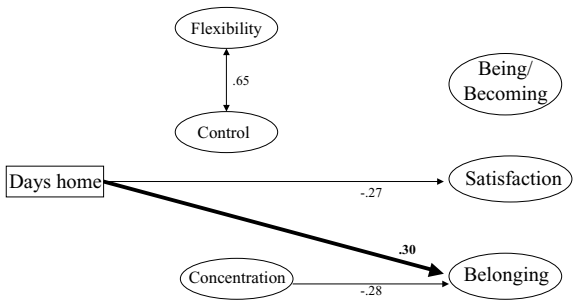


Figure 4. Significant paths retained from Figure 3 for workers (thick arrow) and partners (thin arrows).

among the workers. Similarly, the path from number of days spent working from home to general satisfaction is significantly different from zero in the worker-sample, but not significantly different from the similar (non-significant) path in the partner-sample.

DISCUSSION

For many job holders, the opportunity to work from a home office makes everyday life easier. In this article we have looked into whether such effects are measurable by means of a survey instrument tapping into the construct of subjective QoL. We found that for employees, number of days working from home did not affect overall satisfaction with life. However, it did predict an increase in the workers' sense of belonging. We did not detect any relations between remote work and any of the three hypothesized mediating variables, namely control, flexibility and concentration. At the level of zero-order correlations, these three variables were all significantly associated with number of days working at home (cf. Akselsen et al., 2001). However, as a consequence of constructing a structural model, these effects have been canalized through other paths in the model. The mediating effects suggested by Van Sell and Jacobs (1994) are thus not replicated in our study.

Another finding is that when job holders work at home a lot, their partners' general satisfaction becomes somewhat reduced. Further, as the workers' concentration in the home increases, the partners' feeling of belonging decreases. However, an important limitation to these results is that the data are obtained from a convenience sample, which restricts the possible generalizations from the study. Another remark concerns causation. In the presented model we have presumed that the causal arrows run from number of days at home to life satisfaction. Similarly, the causal arrows run from the mediating variables to life satisfaction. First, this direction looks plausible to us. Second, and contrary a widespread believes, structural equation modeling deals with correlation in a causative framework. That correlation may imply causation has been known since Sewall Wright's seminal article from 1921 (Wright, 1921), and strong arguments have been developed in recent theories on causation (Bollen, 1989; Pearl, 2000; Shipley, 2000; Spirites et al., 2000). Indeed, it is difficult to imagine using SEM without assuming

that correlation implies causation. However, a well-fitting structural equation model does not provide verification of causality. Rather, it offers the opportunity to reject it. In other words, doing a SEM analysis implies the possibility of having ones ideas about causality rejected, but not verified.

The Impact of Home-based Telework on the Workers' Belonging Scores

The model could not support a strong link between working at home, measured as number of days at home, and satisfaction. This finding indicates that the general argument that home-based telework leads to increased QoL for the employee as well as his or her family should (at least) be moderated. Still, one of the subordinated human development dimensions, belonging, was strengthened by the intensity of home-based telework. As mentioned above, the belonging domain concerns the person's fit with his or her environments, and it can be divided into three subdomains: physical, social and community belonging.

Two general explanations for this relationship seem to be relevant. First, it might be that teleworking *has been initiated* because a worker would like to spend more time in local physical environments, with friends and family he or she enjoys being with. Teleworkers are thus self-selected, acting on some initial needs or motives. A second and opposing explanation is that possibly the flexible (home-based) working situation itself has *influenced workers' perceptions*, "making them" appreciate the aspect of belonging more and more. Finally, the strong connection between days at home and feelings of belonging could also be explained as a matter of workers rationalizing their actual working pattern.

In general, our interviews seemed to support the first explanation: that an initial motive to stay in the local environment drives the development of home-based telework arrangements, and not the other way around. When, for instance, talking about motives for teleworking, many informants touched on factors related to the belonging dimension such as family concerns, affinities with local regions and closeness to old friends. Two of the main factors motivating work in the home in our sample were to reduce or avoid commuting to work, and family commitments. In particular, workers with small children very often spoke about telework as a means of improving the situation for the

whole family. One male informant said:

> The most important issue is the relaxed family rhythm – which means a better life for the whole family. Next comes a calm place for tasks that need some reflection.
>
> (Anton, Norwegian teleworker)

Several informants also highlighted a wish to live close to their home towns as an important motive. In some cases informants had older relatives to take care of in local towns. In other cases workers wanted to spend more time together with old friends. One informant who had moved back to the region where his wife was born said:

> We have work and family – we take care of parents-in-law, and so on, but that's the advantage of being here, back to where the family is; it is closer.
>
> (Jens, Norwegian teleworker)

The two motives of concern about family and reduction of commuting time were often closely integrated. A desire to work from home could proceed from a worker's wishing to spend more time with one's children, but what makes it difficult to do so is not working in an office *per se* but living far from that office and spending a significant amount of time commuting. Thus, home-based telework may have appeared to be a remedy for both these problems.

However, we also received support for the second explanation, that home work in itself could strengthen the belonging dimension in a worker's life. In the experience of some informants, teleworking made it easier to develop their social networks. One partner felt the family had more time to spend on its social network because of teleworking:

> Yes, that's perhaps one of the positive effects of his day at home – we have several times invited friends for dinner at 5 o'clock – and that doesn't happen on days other than his day at home
>
> (Partner of Anton, Norwegian teleworker)

Others told us that their relationships with neighbors had also improved during the period they worked at home. A female teleworker, doing her work from the kitchen on the first floor, said visits from neighbors were

nice but sometimes also could be a little bit disturbing:

> They know that usually it is dark here in the kitchen when I am not at home, but when a light is on they know I am at home.
>
> (Berit, Norwegian teleworker)

Thus, for most teleworkers it seems reasons related to belonging factors constitute the individual motivation for teleworking from home. However, in some cases the teleworking practice itself strengthens the sense of belonging. The fact that many of our teleworkers had moved out from urban areas into a smaller town or village could be a contributing factor here, since it might be easier to develop a stronger sense of belonging to a local area than to a larger city.

In a larger context, the finding that feelings of social and physical belonging are important motives for teleworkers reminds us that the local milieu has not outplayed its role in modern society. Although people act in a more and more global environment, connections to locale appear to be highly important for today's modern knowledge workers. While clearly this state of affairs does not automatically trigger a higher level of satisfaction with life in general, it may be telling us that to some extent flexible new forms of work are developed on the basis of relatively subjective factors. If so, this study may support theories that stress the argument that globalism goes hand in hand with local development (Castells, 1996; Mingione, 1994; Naisbitt, 1994).

Impact of Home Work on the Partner's Satisfaction

As mentioned above, the satisfaction of partners decreased as intensity of home work increased (see Figure 4). It is striking that while the teleworker seems to develop a stronger sense of belonging when increasing the intensity of his or her home work, this trajectory contributes negatively to their partner's satisfaction. In the following section we discuss four different types of explanations that highlight various sides of the home-based telework experience. They are withdrawal due to overwork, spillover of problems from work to private life, unclear boundaries at home, and a situation in which work is unevenly divided between partners.

First, partners might experience a high level of stress because home-based teleworkers distance themselves from family life and necessary

housework. In such cases home-based work could result in a heavier workload for the partner or make them feel uncomfortable as they simply see less of their spouses. Either phenomenon might lead to a reduction in general level of satisfaction with life. This type of argument finds some support from the negative effect of a worker's concentration on the partner's satisfaction level, apparent in Figure 4. Theoretically, this type of argument has been elaborated by Hochschild (1997), who states that the spheres of work and home are changing. Our homes and the places where we take our leisure are arenas for tasks following routines, such as cleaning, preparing food, delivering and picking up children at their activities and so on. In contrast, life at work is more challenging and attractive, where it is a "law" to be creative. Thus people tend to spend more and more of their time and energy at work, at a cost to home and family.

In the interviews, several partners touched upon the problems of overwork and withdrawal. Most informants seemed to be very aware of the problem of working too much, but still most admitted that they probably worked more than they would if they had a regular work style. One informant said:

> ... It is possible for me to work in the morning, during the whole day and in the evening – that is too much ....
>
> (Hans, Norwegian teleworker)

Some also admitted to working on weekends. For some this involved no more than a couple of hours checking e-mail before Monday morning, but for others it involved something more akin to a regular work day if a deadline was coming up. One informant said:

> I sometimes do have a look on a Sunday just to look at the email and see what needs to be sorted out for next week. So I might do a couple of hours on a Sunday, but I am not in a position where I think – I've got to do that.
>
> (Kevin, UK teleworker)

Second, if a teleworker carries too much of his or her work-related problems into the family sphere, it might cause a negative satisfaction level for the partner. This explanation is closely related to "spill-over theories" which discuss how situations in work life and family life seem to influence each other in different ways (Williams and Alliger, 1994; Zedeck, 1992). Similarly, critical theory has been used as a theoretical

frame to explain how work life seems to invade private spaces when working from home becomes more widespread (Deetz, 1992; Williams, 1988). Several of the teleworkers' partners indeed indicated that some of their problems related to spillover from work to private life. When one partner was asked if it was a burden that her partner was working a lot, she replied:

> No, not that he is working. It's that he is always feeling guilty about not working enough .... I think he feels he is never completely free.
>
> (Partner of Marit, Norwegian teleworker)

A third explanation for the negative effect on the partner's satisfaction could stem from confusion about work and family time. If a partner did not really know if a home-based teleworker was working or not, this *unclear* situation might place stress on the partner. This type of explanation has also been the subject of much recent literature discussing alternative work arrangements, including home-based telework. For instance, boundary theory (Nippert-Eng, 1996; Perlow, 1998) has discussed how people manage (or do not manage) to create proper boundaries between their private and vocational social spheres. These boundaries are influenced by stage of life (Zerubavel, 1991) and individual needs for distinguishing between work and leisure.

During our interviews, teleworkers appeared to be conscious of the importance of not mixing work life with family life. For instance, most had dedicated rooms for doing home work. One had even built a separate "office" in the garden. Still, some partners said it could be stressful to get information on whether the teleworker was available or not:

> It's a challenge for the whole family: we [wife and kids] should not disturb him. But he informs us in certain ways; i.e., I will work until four o'clock, or now I'm quitting this task, so I'll be with you.
>
> (Partner of Anton, Norwegian teleworker)

> It can be frustrating, you know, when you think this is my ... this is our time, and why is he still ... why is that PC still switched on?
>
> (Anita, Partner of Kieron, UK teleworker)

Finally, we could speculate that the partner or spouse feels *envy* because of the teleworker's high level of flexibility. In comparison, their own working conditions may appear more negative, and as a consequence their satisfaction with life decreases. Our interviews gave us a few

indications that the first explanation is sometimes true. At least in the interviews, most partners seemed to be happy and not to envy their partners for their work situation. However, this issue may be hard to discuss openly with other family members present.

In sum, it is impossible to give a single simple explanation for the negative effect of home-based telework intensity on the satisfaction of the partner. Our interviews with a group of workers and their families leave us still feeling that the problem of overworking and withdrawal was most relevant to the cases, in combination with negative spill-over effects and unclear boundary settings in the home. This finding must be seen in the light of our sample: mostly professionals, working in high-tech companies or banking/finance, with relatively high levels of education. It is possible that overwork is a greater problem here than in other business sectors. Whether such is actually the case leads us into speculation, since it is beyond the scope of our data to give answers to these issues.

About the Weak Connection Between Home-based Telework Intensity and QoL Measures

The weak connection between home-based telework and the overall satisfaction needs to be discussed further. First, it raises the question of whether our way of measuring the concept of telework is valid; that is, whether our procedure measures the relevant aspects of home-based telework. It could be that a more moderate number of days working at home is optimal for the satisfaction of the workers and that a non-linear measure would be a better way to describe the connection. In fact, there are some good reasons to believe full-time home-based workers may experience more of the undesirable aspects of teleworking, such as "fuzzier" boundaries with private life and reduction of contact with other professionals, than do teleworkers who work at home with a lesser intensity.

In general, the interviews revealed a critical attitude towards a full-time teleworking arrangement. One worker who had experienced full-week teleworking through periods of illness in his family described it this way:

> If you are going to stay at home for five days, you get isolated .... It is strenuous, and you need high self-discipline to make it work. Working at home once a week is the ideal situation.
>
> (Norwegian teleworker)

Others stressed the value of being present at the office when one is solving work tasks:

> To maintain being part of the team [socially] and to get interesting tasks, you have to join the team physically. The ideal situation is three days at work in the office and two days at home.
>
> (Jens, Norwegian teleworker)

All in all, the qualitative material suggests that two or three days of home-based telework probably brings more satisfaction for the workers than a full week of teleworking. Such arrangements might also reduce the risk of negative side-effects on the teleworkers' partners and families. Second, the weak connection between days at home and satisfaction indicates that other variables are more important for the well-being of a teleworker than the intensity of work at home. Our qualitative findings indicate that traditional factors such as trust on the part of managers and control in how to solve work tasks are important. Several teleworkers stressed this point:

> I know what I've got to achieve and as my boss said to me once, 'Yeah, great, you can go out and play golf five days a week if you want. I don't mind how you do your job; I know you can't do your job if you go out and play five days a week, but it's your job to manage, so I like that.
>
> (Mark, UK Teleworker)

The qualitative interviews also indicated that freedom and control in how to do the work were important for workers' well-being and satisfaction. To develop the satisfaction of the teleworker, it is probably better to try to stimulate a better climate of relationships among teleworkers, colleagues and managers than to increase the intensity of the telework.

The Mediating Variables

Our analysis did not support the hypothesis based on the model of Van Sell and Jacobs (1994) suggesting concentration, flexibility and control as mediating variables. That model is contradicted by what was found in the interviews. Greater possibilities for work being more concentrated, for more flexibility in work hours, and for more control over the work situation are reported as both motivations and experience for home-based teleworkers. A possible explanation for the lack

of support for the mediating variables may relate to a weakness in the measurement of home-based telework (as discussed earlier in relation to QoL), or in the measures for the mediating concepts. The mediating concepts were developed for the purpose of this study; they were measured by only three items each and have not been validated otherwise.

The QoL Profile Inventory

An important aim of the current study was to validate the QoL Profile Inventory (Renwick and Brown, 1996) empirically. Compared with the only factor-analytical results reported in the literature, our results bear some similarities and some discrepancies with those of Raphael et al. (2001). Although not entirely identical, the results from our study are roughly consistent with those reported by Raphael and co-workers. There is one exception, however. In the Raphael et al. (2001) data, none of the items in the facet of psychological being loaded on more than one component, whereas five of the six spiritual being items loaded on a single component. In contrast, our results showed that all the psychological being items loaded on one component, whereas none of the spiritual being items loaded on more than one component. Why the spiritual and psychological being facets behave in such a discrepant manner is difficult to interpret. We see two plausible explanations. First, the notion of spirituality may be different in North America as compared with Western Europe. For instance, the relationship between religiosity and subjective well-being seems to be somewhat different in the USA in comparison with European countries (Veenhoven, 1998), although currently the evidence is not solid enough to be conclusive. A second explanation relates to the different samples in our study as compared with the Raphael et al. (2001) sample. They based their analysis on a sample of Canadian gay men, half of whom were HIV+, whereas our sample is drawn without any relation to sexuality or health considerations. Thus, the lack of coherence in psychological being in the Canadian sample could be related to homosexuality, or to the HIV diagnosis, as could the coherence among the spirituality items. These two suggestive explanations are mere speculation. More cross-cultural (including subcultural) data should be analysed before strong conclusions about factorial invariance are drawn on these questions.

Another aspect of the QoL Profile awaiting further debate is the merging of the being and becoming factors. All three domains of

the inventory are highly correlated, in consequence of which their theoretical positions as independent dimensions should be reconsidered. In particular, the two factors being and becoming, which correlated at 0.98 in our data, can hardly be considered as distinct constructs. However, whether the high correlation is an artifact of our sample or it is a distinctive element of the inventory remains to be determined. Replication is preferable before the constructors of the inventory consider a reconceptualization of their QoL measurement.

Clearly, the QoL Profile needs further validation and refinement before its status as a QoL measure can be trusted. In particular, the dimensionality of both first-order factors (i.e. the facets) and second-order factors (i.e. being, belonging and becoming) is unclear. This indeterminacy makes it difficult to get a clear view of what the relationship presented in the article means. Hence the results in this article must be interpreted with some conceptual care. Nevertheless, the results are intriguing and point to the need for a closer look into both the dimensionality of the QoL concept and the full consequences of flexible work arrangements.

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NOTE

[1] See http://www.eurescom.de/Public/projects/p900-series/P904/P904.htm for access to the project's public reports.

APPENDIX

Home-based telework in the EU, Switzerland (CH) and the USA

	Home-based teleworkers – alternating or permanent	Home-based teleworkers – supplementary	Home-based teleworkers – all
Austria	(2.0)	(4.7)	6.7
Belgium	2.2	5.3	7.5
Denmark	2.6	15.1	17.7
Finland	4.7	11.0	15.7
France	(2.2)	(2.3)	4.5
Germany	1.6	6.3	7.9
Greece	(2.1)	(3.9)	6.0
Ireland	(0.5)	(5.5)	6.0
Italy	(0.8)	(1.7)	2.5
Luxembourg	(0.9)	(2.4)	3.3
Netherlands	9.0	11.6	20.6
Portugal	(0.5)	(1.1)	1.6
Spain	(0.3)	(2.0)	2.3
Sweden	(5.3)	(9.5)	14.9
UK	2.4	8.5	10.9
EU	2.1	5.3	7.4
CH	(4.2)	(7.1)	11.4
USA	5.1	12.2	17.3

Note: All persons employed ($N = 5901$), weighted; EU averages weighted by EU15 population.

Source: Statistical Indicators Benchmarking the Information Society (see http://www.sibis-eu.org/sibis/index.htm). According to the survey, the frequency of home-based teleworkers (including supplementary, alternating and permanent home-based teleworkers) in the EU is currently 7.4% of the labour force. In the UK the frequency is 10.9%, whereas in Portugal it is 1.6%. The Nordic countries (Sweden at 14.9%, Finland at 15.7% and Denmark at 17.7%) and the Netherlands (at 20.6%) are well ahead of the rest of EU. The survey does not include Norway and Iceland, which are the other two countries comprising the sample in this paper. However, national specific data from these countries provides evidence (Brynin et al., 2002; Gallup, 2001; Julsrud, 1999) to do a similar estimation of the level of intensity for these countries as for the other Nordic countries.

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