Work related and general Well-being

in the context of Job Demands – Resources –model:

Does mobile work make a difference?

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Syksy 2012

HELSINGIN YLIOPISTO - HELSINGFORS UNIVERSITET - UNIVERSITY OF HELSINKI

Tiedekunta - Fakultet - Faculty	Laitos - Institution – Department
Käyttäytymistieteellinen tiedekunta	Käyttäytymistieteiden laitos

Tekijä - Författare – Author
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Työn nimi - Arbetets titel - Title
Work related and general well-being in the context of Job Demands – Resources –model: Does mobile work make a difference?

Oppiaine - Läroämne - Subject
Psykologia

Työn laji ja ohjaaja(t) - Arbetets art och handledare – Level and instructor	Aika - Datum - Month and year	Sivumäärä - Sidoantal - Number of pages
Lisensiaatin tutkielma Katariina Salmela-Aro ja Matti Vartiainen	Syyskuu 2012	29

Tiivistelmä - Referat - Abstract
Tässä tutkimuksessa tarkastellaan liikkuvan työn piirteitä työn kuormitustekijöinä suhteessa työperäiseen ja yleiseen hyvinvointiin, joita on mitattu viidellä hyvinvointimuuttujalla: uupumusasteinen väsymys, työn imu, ja työholismi kuvaavat työperäistä hyvinvointia, elämäntyytyväisyys ja masennusoireet yleistä hyvinvointia. Muuttujia tarkastellaan Demeroutin ym. (2001) kehittämän JD-R -mallin viitekehyksessä, joka mahdollistaa työn vaatimus- ja voimavaratekijöiden tarkastelun samanaikaisesti. Voimavaratekijöiksi tässä tutkimuksessa valittiin kolme henkilökohtaiseen kokemukseen liittyvää voimavaramuuttujaa, neljä organisaatioon liittyvää voimavaramuuttujaa sekä viisi palautumiseen liittyvää muuttujaa. Tutkimukseen osallistui 1415 vastaajaa kolmesta pääkaupunkiseudulla toimivasta organisaatiosta. Sähköisellä kyselylomakkeella kerätty aineisto analysoitiin hierarkkisella regressioanalyysillä. Tulokset osoittavat voimavaramuuttujien toimivan JD-R –mallin mukaisesti hyvinvointia lisäten ja pahoinvointia vähentäen. Oiremuuttujista parhaimman selitysasteen sai uupumusasteinen väsymys, jonka vaihtelusta 61 % pystyttiin selittämään seitsemän askeleen hierarkkisella regressioanalyysillä. Muiden oiremuuttujien selitysasteet vaihtelivat 31 – 49 %:n välillä. Merkittävimmiksi selittäjiksi osoittautuivat henkilökohtaiset resurssit sekä palautuminen. Tutkitut liikkuvan työn piirteet eivät osoittautuneet JD-R -mallin mukaisiksi puhtaiksi kuormitustekijöiksi, vaan niillä osoittautui olevan myös oletusten vastaisia, hyvinvointia lisääviä ominaisuuksia. Liikkuvan työn piirteillä oli oletusten vastaisesti positiivinen yhteys työnimuun ja oletusten mukaisesti positiiviset yhteydet uupumusasteiseen väsymykseen ja työholismiin. Liikkuvan työn piirteet selittivät 4 – 6 % työperäisten oiremuuttujien vaihtelusta.

Avainsanat – Nyckelord - Keywords
Liikkuva työ, hyvinvointi, JD-R –malli, voimavarat, palautuminen

Säilytyspaikka - Förvaringsställe - Where deposited
Helsingin yliopiston kirjasto Minerva

Muita tietoja - Övriga uppgifter - Additional information
Psykonet, erikoispsykologikoulutus, työn ja organisaatioiden psykologia

Abstract

The purpose of this study is to examine how mobile work characteristics are connected to work related well-being when viewed together with personal and organizational resources and individually experienced recovery from work strain in the frame of Job Demands – Resources –model (Demerouti et al. 2001). This study reports data from 1415 Finnish respondents in three large organizations located in Helsinki. The mean age of the respondents was 44.6 years and 58% of the respondents were female. The majority of the participants had a university degree and worked in a specialist position in the company. Travelling was a part of the job for 54% of the respondents and 21% worked weekly in multiple locations. In this study mobile work was regarded as a job demand through physical mobility and complexity factors introduced by Vartiainen & Hyrkkänen (2010). Self- and organization-related resources and the experience of recovery were regarded as resources in the JD-R model. Well-being was defined by three work related well-being measures and two general well-being measures, which were work exhaustion, work engagement and workaholism, in addition to depressive symptoms and life-satisfaction, respectively. The results show that personal resources and the recovery experience have the strongest association with all five well-being outcomes. Resilience, professional self-efficacy and the experience of control at work are important personal resources in regard to well-being. However, mobile work in itself does not show to be solely a job demand. Mobile work may also include resourceful aspects, especially when combined with high personal and organizational resources.

1. Introduction

With developing information and communication technologies the traditional telework has evolved into mobile and multi-locational work in many areas of working life. This change has raised the question about a possibility of potentially new complexity factors onto the field of mental work load assessment (Hyrkkänen, et al. 2007, Vartiainen and Hyrkkänen 2010). Previous studies have successfully identified locations, where mobile work is being done, and how these locations, moving between them and the technology used, pose job demands on the mobile worker (Nurmi 2010, Vartiainen & Hyrkkänen 2010). Also such typical job characteristics of mobile work as virtual teamwork, changing combinations of teams and co-operation over time-zones and cultural barriers, include the risk of disturbances which have been linked to wellbeing (Richter et al. 2006). Moreover, the importance of recovery and appropriate resting periods as well as psychological strategies used for recovering from mental work stress have emerged as new interests of research in occupational health psychology (Kinnunen and Mauno 2009; van den Heuvel et al. 2010; Pennonen 2011). However, a more detailed picture of the connections of mobile work characteristics, strain, recovery and well-being remains yet to be built. This study will provide some more pieces onto that picture.

Vartiainen and Hyrkkänen (2010) have studied changing requirements in mobile and multi-locational work, and they have introduced a concept of complexity factors which refer to those external mental workload factors that may raise the risk of negative mental strain within a mobile worker when collaborating with others from afar. Hyrkkänen et al. (2011) have also developed an assessment model to study these changing requirements for occupational health professionals. The model consists of six complexity factors which may have a negative influence on well-being: travelling, multi-locational working, multi-cultural working environment, working time, project work and communication in a mediated manner. The model was originally made for studying distributed teams, and is now used for studying mobile workers.

The purpose of this study is to examine the association of mobile work and psychological well-being by viewing two aspects of mobile work, namely physical mobility and the

complexity factors of mobile work, through the Job Demands – Resources –model (JD-R-model) developed by Demerouti (2001) and see, how mobile work adds to the explanation rate of different psychological well-being measures. Five well-being measures are divided onto two categories: Work related well-being is here measured through work engagement, work exhaustion and workaholism. General well-being is measured through life-satisfaction and depressive symptoms. Mobile work is regarded as a job demand. Resources for the model are divided into personal and organizational resources. The experience of recovery is added into the model as a resource factor. The experience of recovery is measured through the success of daily recovery after work that Kinnunen and Mauno (2009) have found to be a useful measure of recovery, and through four recovery strategies that Sonnentag (2007) has found to form a measure for executing successful recovery.

In this study mobile work is seen as a specific type of work characterizing an individual doing telework in multiple locations alone or as a member of a dispersed group. This type of work may pose several of the complexity factors leading to well-being outcomes (Vartiainen et al. 2010; Hyrkkänen, et al. 2011). Physical mobility in this study is defined by two job characteristics: working in multiple locations work and travelling. The specific complexity factors in this study are: project work, spreading of working time, working over time-zones and multi-cultural co-operation. The two physical mobility factors are viewed separately and the four other complexity factors are summed together to examine, how they together are related to well-being outcomes.

Physical mobility factors, such as multi-locationality and travelling, have been reported to be associated with quantitative and qualitative demands of work (Hyrkkänen et al. 2011, Bergbom et al. 2011). Bergbom and others (2011) studied over 1500 Finnish employees in five different companies, where work related travelling abroad was common. They found travelling to be connected to long working days and problems in balancing work and other areas of life. Frequent travelling abroad was connected to less complete recovery after the working day and slight increase in subjective stress and exhaustion.

Vartiainen and Hyrkkänen (2010) have described the mental work-load of multi-locational work related to the different physical places where work is being carried out. The identified categories of physical working places were home, main workplace, moving places such as vehicles, secondary workplace such as meeting room at clients' and third places such as cafés or other leisure time places. They have found both benefits and drawbacks of working in different locations. Hyrkkänen and others (2011) have suggested for occupational health professionals to assess control over choosing the mobile environment as the noteworthy mediating variable for well-being.

Work involving travel was previously introduced as a physical mobility factor that may cause stress, but Bergbom and others (2011) found also resources associated with travelling at work. These were authority to make decisions regarding one's own work, dedication to one's work, satisfaction with interaction with co-workers and clients, and overall job satisfaction. Also Vartiainen and Hyrkkänen (2010) identified a similar phenomenon with multi-locational work; the experience of having control over the choices of the location contributed to autonomy, motivation and balance. The degree of autonomy seems to transform the qualities of the physical mobility factor either towards strain or towards reward.

The complexity factors of mobile work are work characteristics that typically challenge the mobile worker's capacity either by an intellectual or emotional intensity and thus introduce either strain or reward depending on the experienced degree of satisfaction (Hyrkkänen et al. 2007, Hyrkkänen 2008, Hyrkkänen et al. 2011). For example, in multi-locational work it is common that the work is carried out in a project fashion. The work load may vary due to the duration of projects or due to multiple simultaneous projects. In addition people connected with the current project may be different from the people in the previous project. This offers opportunities to meet new people but also includes the risk of emotional strain with continuous building of new social connections possibly in a foreign country. Multicultural working habits, co-workers on different time zones and communication on a foreign language are just a few examples of factors that bring complexity into the assessment of mental work load in mobile work. Also the timing of working hours may differ in mobile work: The work may be done in several few hour periods during the duration of the day instead of a single 7.5 hour period as is

often done in traditional office work. This spreading of work time may add to the autonomy of the mobile worker and bring the experience of flexibility or it may lead to increase in the amount of working time and lead to stress by eating up the free time.

Challenges of both physical and psychological recovery have been reported in connection to mobile work (Bergbom et al. 2011, Vartiainen and Hyrkkänen 2010, Kinnunen and Mauno 2009). Physical recovery is challenged especially in regard to travelling if there is limited time to rest and recuperate after a business trip and before the next working day. It is reported to be fairly common among frequently travelling business executives to go back to the office early the next day even if one has barely just returned from a trip abroad. This reduces the time used for sleeping which in turn reduces the chances of both physical and psychological recovery (Bergbom et al. 2011, Vartiainen and Hyrkkänen 2010).

Inadequate recovery has been linked to higher risk of work fatigue (van Vedhoven & Broersen, 2003). Kinnunen and Mauno (2009) showed that every third worker experienced an increased need for recovery often or always after work in a Finnish sample. Recuperation after work was fairly poor or poor in 10 % of the reported cases. The greater the need for recovery, the worse was the self-reported experience of the recuperation. Factors associated with inadequate recovery were identified in the structural aspect of work, in the job demands, in the job resources and in work commitment. Recovery was also challenged by different family situation, the amount of free time, diminished control over free time and inadequate sleep. Inadequate recovery led to a chronic need for recovery after the working day and to a failure of recuperation. (Kinnunen and Mauno 2009)

The theoretical background of this study relies on the Job Demands-Resources model (JD-R) developed by Demerouti and others (2001) (see also Bakker and Demerouti 2006). JD-R offers a model for the study of complex occupational psychology settings regardless of the content of the work since the concepts of demands and rewards of work are generic. In this study there are six dimensions of mobile work which are divided into physical mobility factors and complexity factors of mobile work and they are regarded as job demands. Resources are divided onto personal and organizational resources. Recovery experience is regarded as a

separate function. Work related well-being is defined as increased work engagement, decreased work exhaustion and decreased workaholism. General well-being is defined as increase in life-satisfaction and decrease in depressive symptoms.

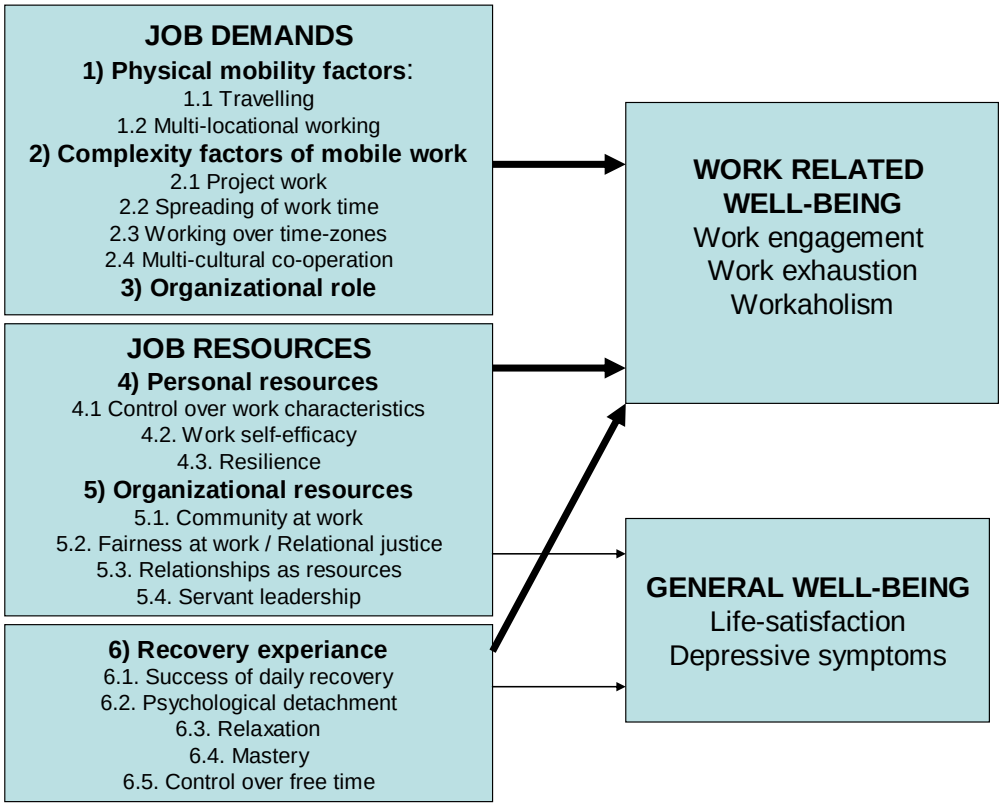

Figure 1: The variables of this study in the JD-R –model

2. Research questions and hypothesis

The purpose of this study is to examine how mobile work characteristics – both physical mobility factors and complexity factors – are connected to well-being when viewed together with personal and organization resources and individually experienced recovery from work strain in the frame of JD-R –model presented previously by Demerouti and others (2001). The research questions are: 1) Do physical mobility factors and complexity factors of mobile work have a negative association with work related wellbeing by a negative association with work

engagement, positive association with work exhaustion and positive association with workaholism and thus act as job demands? 2) Do such personal resources as control over work characteristics, work self-efficacy and resilience, have a positive association with work related well-being and thus act as job resources? Do personal resources also account for general well-being, namely high life-satisfaction and low depressive symptoms? Is the connection of personal resources stronger with work related well-being than general well-being? 3) Does the recovery experience – e.g. the high success of daily recovery and the high scores on four recovery strategies – increase work related and general well-being? Is there a difference whether the well-being is work related or general?

H1 Physical mobility factors and other complexity factors show statistically significant connections to work related well-being outcomes: They are expected to show positive association with work exhaustion and workaholism and negative association with work engagement, and thus function as job demands (Demerouti et al., 2001). Association with general well-being outcomes, namely depressive symptoms and life-satisfaction is not expected.

H2a Both resource components, namely organizational resources and personal resources are hypothesized to show statistically significant connection with occupational well-being outcomes: Resource components are expected to show positive association with work engagement and negative association with work exhaustion and workaholism, and thus function as resource factors (Demerouti et al., 2001).

H2b Both organizational and personal resources are hypothesized to show slight, but still statistically significant connection with general well-being outcomes: Resource components are expected to show positive association with life-satisfaction and negative association with depressive symptoms.

H3 Recovery experience is hypothesized to function similarly with the resource factors showing statistically significant association with both the work related and the general well-

being outcomes, namely positive association with work engagement and life-satisfaction and negative association with work exhaustion, workaholism and depressive symptoms.

3. Data and method

The participants

The questionnaire data was gathered through an e-mail survey during 23.5. – 13.6. 2011 from three large organizations in Helsinki, Finland. Organizations were chosen by their large size (employing over 500 people) and by their occupational health service provider, through which the data were collected. Organization A is a multinational network service provider that employed 1 780 persons in Helsinki area at the time of data collection. Response rate from Organization A was 38% (*N* = 654; 58% male). Organization B is a public sector administration official that employed 1 620 persons in Helsinki area at the time of data collection. The response rate from Organization B was 34% (*N* = 545; 77% female). Organization C is a Helsinki based global company specializing in water chemistry and it employed about 550 people in Helsinki area at the time of data collection. The response rate from Organization C was 39% (N = 217, 62% female).

Of the total sample (*N* = 1415) 42% were male and 58% female. The mean age of the respondents was 44.6 years and the average tenure in the organization was 15 years. The majority of the participants (60%) had a university degree and 64 % worked in a specialist position in the company. So, the employers of the participants can be characterized as professional knowledge work organizations. Nearly all respondents worked full time (94%) and on a permanent basis (96%). Almost half (46%) of the respondents had children living at home. The number of children varied from 1 – 7 and being 1.8 on the average.

Travelling was a part of work for 54% of the respondents and more common amongst men (75%) than women (41%). Multi-locational working e.g. working in several locations weekly, was a physical mobility factor for 21% of the respondents, more so for men (29%) than

women (17%). Only 16% of respondents had both these physical mobility factors included in their work, more for men (23.5%) than for women (10.5%).

Project work was a part of the job for the majority of the respondents (69%). Spreading of work time was a complexity factor for 60% of the respondents. Working over time-zones was one reason for the spreading of work time, and this was a complexity factor for 39% of the respondents. Multi-cultural co-operation was a complexity factor for 55% of the respondents. Out of 1413 respondents, 40% had no complexity factors in their work, 5% had one complexity factor, 16% had two complexity factors, 14% had three complexity factors and 26% had all four complexity factors. Men reported complexity factors more frequently than women. 72% of all respondents reported at least one physical mobility factor or one complexity factor in their work.

The procedure

Participation in the study was voluntary and confidential, as was explained in the cover letter of the questionnaire. Electronic bulletins explaining the purpose of the study and the confidentiality of participation were published in each organization with the help of personnel departments of each company. A personal feedback was promised to all participants, and this may have influenced the high participation. Personal feedbacks were delivered through secure e-mail messages during August – October 2011. The feedback letter contained personal results of the following scales: work fatigue, Bergen Burnout Inventory -15 (Näätänen et al. 2003), depressive symptoms, Patient Health Questionnaire -9 (Kroenke et al. 2001), work engagement, Utrecht Work Engagement Scale (Schaufeli et al. 2006, Hakanen 2002) and life-satisfaction, The satisfaction with life scale (Diener 1985). These concepts were explained in a two-page letter where alternatives for further actions were offered for different combinations of test results. Also the name and contact information of the occupational nurse in charge of the company of the respondent was included in the letter.

Measures

Of the general background factors, age, gender and number of children living at home were employed as control variables in the regression analysis. Age and number of children were continuous variables, gender a categorical variable. Demographic variables showed slight or moderate correlations with each other, as is shown in Table 3.

Physical mobility was measured by the number of travel days per year and number of weekly working locations besides the main office. These were both continuous variables. The weekly working locations were measured among those, who had given a positive answer to the categorical question: "Do you work more than 10 hours per week at some other location besides your primary desk or office?"

The four complexity factors of mobile work in this study, namely project work, spreading of work time, working over time-zones and multi-cultural co-operation were first asked by yes or no –questions, such as: "Does your work include projects?" or "Spreading of work time means that work is not done only during the traditional office hours, but it is done at different times during the day depending on the phase of the work at hand. Sometimes this means working in the evenings at home or working during free time outside the office. Does this kind of spreading of work time happen in your job?"). The four yes or no –questions were summed together, and the sum of complexity factors varied between 0 – 4 depending on how many complexity factors were present in the respondents work.

Role in the organization was regarded as a job demand in the analysis. Respondents chose one of the following to describe their work: 1 = customer service, 2 = specialist position, 3 = team manager, 4 = middle management and 5 = corporate management. This variable was used both as a continuous variable.

Personal resources included the following scales: 1) Control at work, which was measured by two items from the Areas of Work Life Scale (AWLS) (Leiter and Maslach, 2000). In the original AWLS-scale, the control at work consists of five items, but the shorter version of the scale was applied (Innanen, 2009), because otherwise the questionnaire was in the risk of

becoming too long. Descriptive information and reliability of the scale can be seen in Table 1. Items included general feeling of control over one's work, for instance: "I have influence over how I conduct my work" (1 = completely disagree, 5 = completely agree). 2) Work related self-efficacy consisted of nine items that Scholz and others (2002) found to be related to an optimistic sense of personal competence. Table 1 shows details of the scale that included such statements as: "If I have problems at my work, I usually find a way to solve them". 3) Resilience was measured with a six item scale developed by Smith and others (2008), who found it to assess the ability to bounce back after difficulties. It includes three positive and three negative statements such as: "It is hard for me to come through after stressful situations". Details of the scale can be seen in Table 1.

Table 1: Descriptive information of the independent and dependent variables (N = 1415)

	Sum variables				
	Mean	SD	Range	Nr of items	α
Physical mobility					
Number of travelling days per year	11.1	20.3	0 – 200		
Number of working locations per week	1.1	3.5	0 – 48		
Complexity					
Number of complexity factors of mobile work	1.8	1.6	0 – 4	4	.66
Personal resourcef					
Control at work (AWLS)	6.9	1.7	2 – 10	2	.49
Self-efficacy at work	30.8	4.6	8 – 40	8	.86
Resilience	21.6	4.4	6 – 30	6	.87
Organizational resources					
Community at work (AWLS)	7.0	1.8	2 – 10	2	.64
Fairness at work (AWLS)	5.8	1.9	2 – 10	2	.70
Relationships at work	4.9	1.6	0 – 7		
Servant leadership	51.5	9.9	16 – 80	16	.83
Recovery experience					
Success of daily recovery after work	3.5	0.9	1 – 5		
Psychological detachment (REQ)	12.9	3.6	4 – 20	4	.87
Relaxation (REQ)	14.9	3.1	4 – 20	4	.86
Mastery (REQ)	13.0	3.3	4 – 20	4	.84
Control over free time (REQ)	14.7	3.6	4 – 20	4	.91
Dependent variables					
Life satisfaction (Diener)	17.8	3.9	5 – 25	5	.87
Work Engagement (UWES)	31.4	10.9	0 – 54	9	.95
Work Exhaustion (BBI/Exh)	13.9	5.1	6 – 30	5	.81
Workholism	10.6	5.1	0 – 24	4	.82
Depressive symptoms (PHQ-9)	5.1	4.1	0 – 27	9	.84

α = Cronbach's alfa

Organizational resources were measured with four scales. Two of these were adopted from AWLS (Leiter and Maslach, 2000), namely 1) community at work and 2) fairness. For these both, the shorter version was applied (Innanen, 2009), so both scales included two items that were used as a sum variable each. An example of the community at work is: "I am a part of an encouraging working group". Fairness reflects relational and distributional justice with these items: "Management treats all members fairly in the organization" and "Resources are distributed fairly at my workplace". A one-item scale was used for 3) relationships as resources at work. This was formulated in the questionnaire: "A well functioning working group and supportive climate can make relations at work a true resource. To what extent are relations at work a resource like this for you?" Answers were given on a scale of 0 – 7, where 0 = not at all and 7 = to great extent. 4) Servant Leadership Survey (Dierendonck and Nuijten, 2011) was included in the questionnaire as a shorter version that included 16 items, which had the strongest loadings in the original reporting. The shortened scale was translated into Finnish by an independent translator. A sum variable was formed from the 16 items and used as a total, instead of eight independent dimensions, as in the original scale. See Table 1 for details on all the scales.

The recovery experience was studied from two angels: The success of recovery after work was measured by a one-question scale by Kinnunen and Mauno (2009). They found the question "How well do you recover each day after work" to give the same information as the full scale (Need for Recovery Scale) by van Veldhoven and Broersen (2003) and to be predicted by the same job characteristics, the same work engagement dimensions and the same free-time activities as the full scale as well as being in connection to the Bergen Burnout Inventory (Näätänen et al. 2003) in the similar way (Kinnunen and Mauno, 2009). Four recovery strategies by Sonnentag and Fritz (2007) were additionally included into the recovery experience. These were psychological detachment, relaxation, mastery and control over free time. Each of these dimensions was measured by four items, which were summed together as a sum variable. The Finnish translation from the original scale (Sonnentag and Fritz, 2007) was carried out in an independent translation office, where double translation was conducted. The descriptive data and reliability of all the scales is shown in Table 1.

Life satisfaction was measured with the "The satisfaction with life scale" developed by Diener et al. (1985). It consists of five items such as "The circumstances in my life are excellent" and "If I could live again, I wouldn't change a thing" (1 = completely disagree, 5 = completely agree). The reliability of the five item scale was high (see Table 1).

Work engagement was measured with the Utrecht Work Engagement Scale (Schaufeli et al. 2006), which was validated for Finnish population by Hakanen (2002). The scale was used as one dimension, since all the nine items correlated highly and produced a high reliability (see Table 1). The scale on each item was 0 – 6 (0 = never, 6 = daily) and items included such statements as "I feel full of energy when I am working" and "My work inspires me".

Work exhaustion was measured with the one dimension of Bergen Burnout Inventory -15 (Näätänen et al. 2003), namely physical exhaustion. The whole scale has three dimensions, each containing five items. It is widely used in occupational health in Finland as a diagnostic tool to assess the amount and quality of work fatigue. The physical exhaustion-dimension is known to be connected to such work environment strains as high work load and low control over one's work (Leiter and Maslach, 2000). The scale in the items was 1 – 6 (1 = completely disagree, 6 = completely agree) and a sum variable of five items was formed (see Table 1 for details).

Workaholism, e.g. working hard and compulsively regardless of time and results, was measured with a sum of four items from a scale developed by Taris et al. (2005) The items used to measure workaholism here were: "I am constantly in a hurry and competing with time", "I am busy all the time and keep many plates in the air at a time", "I feel guilty, if I'm not working on something" and "I often keep on working even after my colleagues have finished". The scale on the items was 0 – 6 (0 = never, 6 = daily).

Depressive symptoms were measured with the Patient Health Questionnaire (PHQ-9), which is a self-administered version of the PRIME-MD diagnostic instrument for common mental disorders. The PHQ-9 is the depressive symptoms module used widely in occupational health in Finland. It scores each of the 9 DSM-IV criteria from "0 = not at all" to "3 = nearly every

day". (Kroenke et al., 2001) A sum variable was formed from the nine items. Descriptive data is shown in Table 1.

Statistical analysis

Hierarchical regression analysis was applied to examine the association of physical mobility factors and complexity factors of mobile work, self- and organization-related resources and the recovery experience on three indicators of work related well-being and two indicators of general well-being. Hierarchical regression analysis was performed on each of the five well-being indicators (work engagement, work exhaustion, workaholism, life-satisfaction and depressive symptoms) separately. Demographic variables (age, gender and number of children living at home) were entered as step 1 in order to control their effects. Organizational role, which was expected to function as a job demand was entered as step 2. The physical mobility factors (travelling days per year and number of work locations per week) were entered in step 3, since they were considered as the principle strain factors of mobile work. The complexity factors (spreading of work time, project work, multi-cultural working environment and working with people on other time zones) were entered as a sum variable in step 4, since they were considered to add complexity and hence act as job demands. Self-related resources (control at work, self-efficacy at work and resilience) were entered in step 5 and organizational-related resources (community, fairness, relationships as resources and servant leadership) in step 6. Finally, the success of recovery and the recovery strategies (psychological detachment, relaxation, mastery and control over free time) were entered in step 7. Correlations between independent and dependent variables are shown in Table 3.

4. Results

Table 2 shows the results of the regression analyses. The first hypothesis (**H1**), which stated that the both mobile work components will act as job demands, was partially supported. Both the physical mobility factors and the complexity factors showed positive association to two of the occupational well-being outcomes, namely work exhaustion and workaholism, thus

reflecting the nature of a job demand. However, the association to the third work related well-being outcome – work engagement – proved also to be a positive one. This was against the hypothesis. As job demands, the physical mobility factors explained 3% of the variance of work exhaustion and 2% of the variance of workaholism. The complexity factors as job demands were able to explain 2% of the variance of work exhaustion and 4% of the variance of workaholism.

Both parts of the second hypothesis (**H2a and H2b**), which stated that both personal and organizational resources will act as resources in the JD-R model, were supported. The hypothesis was tested in two ways with a seven step regression analysis. The first of these is shown in Table 2, where the personal resources are entered into the solution as step five, and the organizational resources are entered as step six. The alternative was also run, where organizational resources were entered as step five and personal resources as step six. In both solutions the explanation rate of resource factors together remained the same and supported both parts of the hypothesis, but change could be seen the mutual proportions of the respective resources. Personal resources as step five accounted for 18% of the variance of life-satisfaction, 32% of work engagement, 24% of work exhaustion, 6% of workholism and 20% of depressive symptoms (shown in Table 2). Personal resources as step six explained 9% of the variance of life-satisfaction, 16% of work engagement, 15% of work exhaustion, 6% of workaholism and 12% of depressive symptoms (the alternative solution). Organizational resources were able to explain 4% of the variance of life-satisfaction, 8% work engagement, 2% of work exhaustion, 3% of workaholism and 3% of depressive symptoms as step six (shown in Table 2) and 12% of the variance of life-satisfaction, 23% of work engagement, 11% of work exhaustion, 3% of workaholism and 11% of depressive symptoms as step five (the alternative solution). Both solutions supported both parts of the second hypothesis (H2a and H2b), e.g. both personal and organizational resources acted as job resources in the JD-R model, and the association to work related well-being was stronger than to general well-being.

The third hypothesis (**H3**) suggested that the recovery experience will act as a resource factor, and it was supported. The negative associations with work exhaustion, workaholism and depressive symptoms and the positive associations with life-satisfaction and work engagement

were all according to the hypothesis. The recovery experience was able to explain 5% of the variance of life-satisfaction, 3% of work engagement, 30% of work exhaustion, 13% of workaholism and 11% of depressive symptoms.

Table 2: Results of regression analysis: Physical mobility factors and complexity factors as antecedents of psychological well-being

Dependent variables	*Work Engagement*		*Work exhaustion*		*Workaholism*		*Life satisfaction*		*Depressive symptoms*	
Parameters	β	r	β	r	β	r	β	r	β	r
Step 1: Demographics										
Age	.07*	.06*	-.04	-.02	-.12***	-.12***	.03	-.00	-.04	.00
Gender	.15***	.05*	.00	.03	.03	-.02	.10***	-.01	.03	.11***
Number of children living at home	.01	.02	-.01	.02	.00	.06*	.11***	.12***	-.10	-.10
ΔR^2	.01*		.00		.02***		.02***		.02***	
Step 2: Physical mobility										
Number of travelling days per year	.03	.11***	.00	.11***	-.02	.13***	.02	.08**	-.02	-.03
Number of working locations per week	.02	.09**	.02	.13***	.02	.12***	.00	.03	.03	.02
ΔR^2	.02***		.03***		.02***		.01*		.00	
Step 3: Complexity factors of mobile work										
Sum of 4 complexity factors	.04	.14***	.07	.18***	.12***	.25***	.10**	.14***	.04	-.03
ΔR^2	.02***		.02***		.04***		.01**		.00	
Step 4: Content of work										
Organizational role	.03	.20***	.05	.12***	.12***	.23***	.06	.17***	-.07*	-.12***
ΔR^2	.02***		.00		.02***		.01*		.01	
Step 5: Personal resources										
Control at work (AWLS)	.10***	.41***	-.09***	-.26***	-.12***	-.07*	.09**	.32***	-.03	-.27***
Self-efficacy	.27***	.53***	.05	-.22***	.13***	.02	.15***	.38***	.01	-.32***
Resilience	.08**	.44***	-.17***	-.41***	-.11***	-.15***	.07*	.36***	-.19***	-.44***
ΔR^2	.32***		.24***		.06***		.18***		.20***	
Step 6: Organizational resources										
Community at work (AWLS)	.07*	.38***	-.00	-.23***	.06	.01	.05	.31***	-.06	-.30***
Fairness at work (AWLS)	-.01	.31***	-.07*	-.29***	-.11**	-.10***	.05	.28***	-.01	-.27***
Relationships at work	.11***	.30***	-03	-.09**	.05	.03	.08**	.21***	-.03	-.16***
Servant leadership	.23***	.45***	.03	-.20***	.19***	.06	.07	.31***	-.07	-.28***
ΔR^2	.08***		.02***		.03***		.04***		.03***	
Step 7: Recovery										
Success of daily recovery after work	.13***	.34***	-.36***	-.68***	-.22***	-.37***	.13***	.37***	-.34***	-.54***
Psychological detachment (REQ)	-.09**	.07**	-.34***	-.64***	-.21***	-.43***	.07*	.22***	-.02	-.30***
Relaxation (REQ)	-.03	.20***	-.03	-.44***	-.10**	-.29***	.10**	.26***	-.04	-.30***
Mastery (REQ)	.15***	.32***	.04	-.25***	.02	-.11***	.02	.22***	-.03	-.27***
Control over free time (REQ)	.01	.23***	-.08**	-.39***	.02	-.20***	.00	.21***	-.06	-.29***
ΔR^2	.03*		.30***		.13***		.05***		.11***	
Seven step total R^2	.49***		.61***		.32***		.31***		.38***	
N	1193		1202		1207		1207		1183	

β = Standardized beta-coefficients from the final step of the models, r = Pearson correlation, R^2 = Explanation rate, ΔR^2 = Change in explanation rate for each block

Table 3: Correlations between the independent variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	1													
2	.14***	1												
3	-.12***	-.16***	1											
4	-.02	-.17***	.09**	1										
5	-.02	-.13***	.03	.25***	1									
6	-.15***	-.31***	.18***	.34***	.21***	1								
7	-.02	-.23***	.14***	.32***	.17***	.39***	1							
8	-.04	-.04	.07**	.07**	.03	.09**	.24***	1						
9	.01	-.13***	.07**	.11***	.10***	.21***	.22***	.30***	1					
10	-.04	-.14***	.06*	.03	.07**	.13***	.13***	.26***	.66***	1				
11	-.09**	-.07**	.06*	.05	-.02	.10***	.14***	.38***	.25***	.28***	1			
12	-.06*	-.11***	.08**	.03	-.02	.02	.14***	.47***	.16***	.20***	.47***	1		
13	.03	.08**	-.03	-.00	.01	-.01	.02	.15***	.15***	.14***	.36***	.14***	1	
14	-.04	.03	.06*	.05	.01	.05	.21***	.53***	.21***	.20***	.45***	.62***	.21***	1
15	-.05	-.12***	.03	-.05	-.06*	-.04	-.02	.27***	.30***	.45***	.29***	.30***	.12***	.24***
16	-.00	.03	-.02	-.16***	-.16***	-.25***	-.22***	.10***	.07**	.23***	.12***	.18***	.10***	.09***
17	-.07**	.03	-.27***	-.02	-.03	-.10***	-.04	.12***	.18***	.23***	.15***	.13***	.10***	.12***
18	.08**	-.13***	-.14***	.05	.07**	.08**	.05	.07**	.32***	.32***	.18***	.08**	.12***	.07**
19	.06*	.01	-.35***	-.06*	.01	-.10***	-.05	-.14***	.12***	.28***	.12***	.12***	.06*	.12***

Demographic variables
1. Age
2. Gender
3. Number of children at home

Physical mobility factors
4. Number of travelling days per year
5. Number of working locations per week

Complexity factors of mobile work
6. Sum of four complexity factors

Content of work
7. Organizational role

Personal resources
8. Control at work (AWLS, sum of 2)
9. Self-efficacy at work (sum of 8)
10. Resilience (sum of 6)

Organizational resources
11. Community at work (AWLS, sum of 2)
12. Fairness at work (AWLS, sum of 2)
13. Relationships at work
14. Servant leadership (sum of 16)

Recovery strategies
15. Success of daily recovery
16. Psychological detachment (REQ, sum of 4)
17. Relaxation (REQ, sum of 4)
18. Mastery (REQ, sum of 4)
19. Control of free time (REQ, sum of 4)

Table 3 continues:

	15	**16**	**17**	**18**	**19**
15	1				
16	.54***	1			
17	.45***	43***	1		
18	.34***	20***	.46***	1	
19	.40***	31***	.67***	.47***	1

Demographic variables
20. Age
21. Gender
22. Number of children at home

Physical mobility factors
23. Number of travelling days per year
24. Number of working locations per week

Complexity factors of mobile work
25. Sum of four complexity factors

Content of work
26. Organizational role

Personal resources
27. Control at work (AWLS, sum of 2)
28. Self-efficacy at work (sum of 8)
29. Resilience (sum of 6)

Organizational resources
30. Community at work (AWLS, sum of 2)
31. Fairness at work (AWLS, sum of 2)
32. Relationships at work
33. Servant leadership (sum of 16)

Recovery strategies
34. Success of daily recovery
35. Psychological detachment (REQ, sum of 4)
36. Relaxation (REQ, sum of 4)
37. Mastery (REQ, sum of 4)
38. Control of free time (REQ, sum of 4)

Note: *** = $p < .001$, ** = $p < .01$, * = $p < .05$ in both Tables 2 and 3

5. Discussion

The partial support of the first hypothesis suggests that the mobile work components are not pure job demands, but can also function as resources. Similar findings have been made by Bergbom and others (2011) concerning travelling and Vartiainen with Hyrkkänen (2010) concerning multi-locational work. Also previous studies concerning telework – one form of multi-locational work – have associated both strains and resources with this form of mobile work (Gajendran and Harrison, 2007; Mann and Holdsworth, 2003). So the findings of the current study continue the short tradition of mobile work studies demonstrating the versatile qualities of both physical mobility and the other complexity factors of mobile work in connection to work related well-being.

The current findings suggest that mobile work is not an isolated work strain factor, nor are its components such autonomous psychosocial strain factors as the traditional work strain factors that have previously been assessed in the occupational health. In regard to work related well-being outcomes (work engagement, work exhaustion, workholism) the explanation rate of the two physical mobility factors and four complexity factors together was between 4 – 6%. In regard to one of the general well-being outcomes, namely depressive symptoms, the explanation rate remained at zero. This can be expected, since depressive symptoms have previously been linked to such work characteristics as poor team climate or low procedural and relational justice (Ylipaavalniemi et al. 2005) or the lack of instrumental support from peers and supervisors (Waldenström et al. 2008), and these characteristics can prevail with or without mobile work characteristics. This study showed a slight, but still statistically significant association with life-satisfaction. A similar finding was made by Virick et al. (2010) in connection to telecommuting and life-satisfaction. However in their study the relation was curvilinear and mediated by work drive and work enjoyment.

The current results suggest that personal and organizational resources have a strong association with psychological well-being and thus point to the direction that individual qualifications – manifesting perhaps in individually made interpretations of the mobile work aspects – might turn some of the mobile work components into job resources instead of job demands, e.g. negative strain factors. This study does not support the notion that the

mobile working population possesses more resources. The complexity factors did correlate with personal resources but the physical mobility factors showed insignificant correlations with both personal and organizational resources. When making interpretations of the findings of this study, one needs to keep in mind that there is no single group of respondents that could be identified as "the mobile working population". Instead there are aspects of work including mobile features and employer groups with more of these features as well as employer groups with less of these features. The findings suggest that the higher the position in the organization – especially middle management and corporate management – the more mobile features are included in the work.

The results of this study were able to explain 32 – 61% of the variance of work related well-being outcomes and 31 – 38% of the general well-being outcomes. The division of well-being onto work related and general well-being did not prove to be as clear in the light of the data at hand as one would expect, even if slight emphasis of explanation rates in favor of work related well-being can be seen. However, there is somewhat great variance in the explanation rates between the three outcome variables that constituted work related well-being in this study. For example, when viewing organizational role, work engagement and workaholism both showed a statistically significant 2% explanation rate, but work exhaustion remained at 0%. This suggests that the likelihood of both work engagement and workaholism tend to increase when moving up the organizational ladder, but the risk for work exhaustion prevails fairly even throughout the organizational hierarchy. This in itself is interesting but simultaneously it suggests that there is no single "work related well-being", but several different indicators or profiles – some distributed more evenly throughout the organization than others. This is noteworthy for Finnish occupational health psychologists.

Previous studies in regard to the well-being outcomes of mobile work dimensions have so far been very few (Bergbom et al. 2011; Mann and Holdsworth, 2003), so we can consider the results of this study at hand to be pioneering new ground. Bergbom et al. (2011) found travelling to be positively but mildly linked to stress, work fatigue and work engagement, and the findings of this study support this suggesting that travelling can be both an enrichment and a strain, depending on the circumstances and on the individual mobile worker. In addition to the similar findings with Bergbom et al. (2011), this study found a

mild but statistically significant correlation between travel days per year and workaholism as well as between travel days and life satisfaction. Current findings raise a question of travelling being linked to complexity factors not yet studied. They also suggest travelling as a physical mobility factor to function both as a resource and a strain.

Another physical mobility factor studied here, i.e. multi-locational work, was studied from the off-campus mobility angle. Working in multiple locations has been previously linked to the strain factor of interruptions of work (Hyrkkänen et al. 2011) since the mobile worker is required to shut down the mobile office at one location and to open it up again at another location. Also cognitive ergonomics and social relations are put under strain when work is carried out in multiple locations (Hyrkkänen et al. 2011). Physical strain of multiple locations has to do with carrying portable work devices or other work related material between the different work places and with the actual physical moving (Hyrkkänen et al. 2011). This study found the number of working locations per week to be slightly positively correlated to work exhaustion and slightly negatively correlated to workaholism and to the recovery strategy of psychological detachment. The strain related to multi-locational working was generally assessed as quite low and there were no significant differences in gender or organizational roles. What seemed to be relevantly related to the strain of multi-locational work was the lack of resilience, which is a personal resource.

Complexity factors of mobile work in this study were project work, the spreading of work time, working over time-zones and multicultural co-operation, which are only a part of possible complexity factors which may have influence on occupational health (see Hyrkkänen et al. 2011). However, these four complexity factors together as a sum variable were more powerful in explaining the well-being outcomes than the mere physical mobility factors were. The sum of complexity factors gave a statistically significant explanation for the variance in four out of five well-being outcome variables. Interestingly the four complexity factors had the strongest association with workaholism. This might be mediated by age, since age was negatively correlated to both workaholism and the sum of complexity factors. However, mediating effects were not studied here, so this leaves a question for further studying.

The sum of complexity factors had interesting correlations with the lack of psychological detachment, the lack of relaxation and the lack of control over free time as well as with self-efficacy at work and resilience. The former refer to the straining character of complexity, but the latter to the resource components. It seems that the complexity factors especially can act as both positive and as negative job characteristics, i.e. as both job demands and resources. This is relevant from the work safety and occupational health view points and emphasizes the need for individual consideration when assessing or counseling mobile workers.

The current results showed the best explanation rate for work exhaustion (61%). Inadequate daily recovery explained 30% of the variance of work exhaustion, which is the manifestation of physical fatigue. Out of the recovery strategies, psychological detachment was the most essential, when viewed from the burnout angle. Second group of explanations for work exhaustion was found in insufficient personal resources. Especially the lack of resilience but also the lack of control at work was essential in explaining work exhaustion. Statistically still significant, even though milder explainers of work exhaustion were high number of complexity factors of mobile work, higher organizational role, higher physical mobility and unfair managerial treatment at work.

This study was able to contribute an overall view on mobile work characteristics in the context of strain and well-being. Out of the six mobile work characteristics studied here, project work was the most common. More than two thirds of the sample had projects included in their work. Spreading of work time, multi-cultural co-operation and travelling were also part of the majority's work in the three organizations studied here. Multi-locational work was the rarest form of mobile work with. Only one out of five respondents had to move about on a weekly basis. Working over time-zones was the second rarest form of mobile work, but its prevalence was two times that of multi-locational working.

Personal resources were the strongest explainer of well-being outcomes in this study. They were able to explain 24 - 32% of the variance of two work related well-being outcomes and 18 - 20% of the two general wellbeing outcomes. The highest explanation rate was found in association to work engagement to which self-efficacy at work was the strongest personal resource. Personal resources had the lowest 6% explanation rate on workaholism,

where young age, high organizational role and poor recovery proved to be more important explainers. In connection to workaholism, an interesting combination was found with personal resources: high self-efficacy at work combined with low control at work and low resilience gave the statistically significant 6% explanation to workaholism.

Limitations

Restrictions of this study have to do primarily with the sample. The majority of the population studied here was highly educated specialists. Over 60% of the sample was working in a specialist position for their employer, and 60% of the respondents had a university degree. On the one hand we can expect mobile work factors to be found in the work of these respondents but on the other hand we can assume that this population responds differently to the scales of the measured well-being outcomes, if compared to a working population with a smaller proportion of highly educated respondents. So in the end, the explanations of the studied seven step solution can be generalized only to the populations of specialist dominated and information intensive organizations. It can also be considered a limitation that the organizational role was used as a continuous variable in connection to job demands.

Travelling in this study was measured only in travel days. However, recent studies (for example Bergbom et al. 2011 and Hyrkkänen et al. 2011) suggest, that the number of trips of work related travelling per year, might be more important when assessing the effects of strain and occupational well-being. Our study is restricted in this respect, so even if it concerns only one dimension of mobile work, it should be kept in mind when making generalizations.

Implications

Recommendations for work safety and occupational health have to do primarily with the assessment of resource and control aspects of mobile work characteristics. Results of this study emphasize the importance of personal resources and recovery of the individual over the adjustable aspects of the mobile work itself. However, the individual control over the amount of work and the timing of the work done in mobile setting has proven to be a cornerstone of well-being, so work safety could aim its resources onto supporting mobile workers' individual control. Occupational health counseling ought to be aimed at building

and supporting personal resources and recovery strategies, which can help the mobile worker to maintain balance of well-being in the challenging and rewarding mobile working environments.

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