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Conflict between the work and family domains and exhaustion among vocationally active men and women

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ABSTRACT

Exhaustion is consistently found to be more prevalent in women than in men. Women suffer from job strain more often, which may constitute a partial explanation for this phenomenon, but experienced shortcomings in combining work and family demands may also contribute to ill health. The aim of this study was to investigate, and analyse by gender, how work-related and family-related factors, as well as the interface between them, i.e. work-to-family conflict (WFC) and family-to-work conflict (FWC), are related to exhaustion. The study was cross-sectional with self-administered questionnaires assessing exposures and outcome with previously well validated instruments. The participants were 2,726 men and 2,735 women, aged 45 to 64, vocationally active, and residing in Malmö, Sweden. Sixteen percent of the women and 8% of the men considered themselves exhausted. WFC, FWC, job strain, and low job support were all strongly correlated to exhaustion in both genders. In the multivariate analyses, adjusting for other work and family risk factors, WFC and FWC remained statistically significant risk factors for exhaustion in both men and women. Job strain, low job support, and having a somatic disorder were also independently associated with exhaustion. While WFC was more prevalent among men, it was more strongly associated with exhaustion in women than in men. In women, WFC and FWC contributed to a larger part of the explanatory power of the model, which amounted to 22% of the variance in women and 14% in men. The results imply that the concept of 'work stress' should be regarded in a wider context in order to understand gender related issues of exhaustion among vocationally active individuals.

INTRODUCTION

Exhaustion, a state comprising fatigue and loss of vitality, is consistently found to be more prevalent in women than in men (Evengard, Jacks, Pedersen, & Sullivan, 2005; Schuitemaker, Dinant, van der Pol, & Appels, 2004; Sjogren & Kristenson, 2006). As yet, no obvious explanation for this gender difference has been found. Exhaustion has frequently been associated with work-related stressors (Bultmann, Kant, Van den Brandt, & Kasl, 2002; Donders, Roskes, & van der Gulden, 2007; Hardy, Shapiro, & Borrill, 1997; Kant, Bultmann, Schroer, Beurskens, Van Amelsvoort, & Swaen, 2003; Melamed, Shirom, Toker, Berliner, & Shapira, 2006; Schnorpfeil, Noll, Wirtz, Schultze, Ehlert, Frey et al., 2002). In the last decades striking changes have occurred in the composition of the paid labour work force. Almost as many women (73%) as men (76%) worked for a living in Sweden in 1994 (Statistics Sweden, 2006), when the present study took place. Women tend to be employed in domains and positions that are characterised by high job demands and/or low decision latitude, and therefore suffer from job strain to a higher degree than do men (Emslie, Hunt, & Macintyre, 1999; Hall, 1989; Sjogren & Kristenson, 2006). This may explain some of the gender difference in exhaustion levels. However, previous studies, especially the works of Frankenhaeuser and Lundberg, indicate that the fact that women and men do not face identical working situations probably only makes up part of a possible explanatory model. For instance, studies of diurnal variation in stress hormone levels in male and female managers indicated that stress levels in women were as high after work as they were during work, whereas for men, stress levels rapidly decreased after work (Lundberg & Frankenhaeuser, 1999). Thus, even though family life constitutes an important source of satisfaction for most people, it may also entail experiences that get entangled with stress, in patterns that probably differ considerably between men and women.

Women continue to undertake the majority of unpaid domestic work in the home (Statistics Sweden, 2003). However, performing a large amount of household work does not in itself

seem to be related to adverse health outcomes (Krantz, Berntsson, & Lundberg, 2005; Oomens, Geurts, & Scheepers, 2007; Winwood, Winefield, & Lushington, 2006). Also, according to the 'role enhancement' theory, combining several roles, such as family and worker roles, can be beneficial to women's well-being (Fokkema, 2002; Lahelma, Arber, Kivela, & Roos, 2002). On the other hand, there is also empirical support for the detrimental effects of 'multiple burdens' (Mellner, Krantz, & Lundberg, 2006; Väänänen, Kevin, Ala-Mursula, Pentti, Kivimaki, & Vahtera, 2004) and of 'role conflict' in the work–family interface (Allen, Herst, Bruck, & Sutton, 2000). Even though the 'role enhancement' and the 'role conflict' theories basically imply opposite patterns of causation, they should not be seen as mutually exclusive, but rather as reflecting different aspects of very complex chains of influence. In the present study we have chosen to perform the analyses in the framework of 'role conflict' theory.

Work–family conflict (WFC) was early defined as a situation in which the role pressures from the work and family domains are mutually incompatible in some respect (Greenhaus & Beutell, 1985). Research to date has primarily investigated the consequences of when the demands of work interfere with family life, and there is substantial evidence that such conflict is associated with increased anxiety levels and depression, as well as with somatic complaints like poor appetite, fatigue and worse general health (Allen et al., 2000). In a prospective study, WFC also predicted the number of days absent from work over six months of follow-up (Jansen, Kant, van Amelsvoort, Kristensen, Swaen, & Nijhuis, 2006). The opposite direction of influence, i.e. when family obligations impede performance at work, has also been a focus of some interest (Netemeyer, Boles, & McMurrian, 1996), and in a recent study severe FWC (the term used was 'family-work spillover') increased the risk of psychological distress and suboptimal health in women (Väänänen et al., 2004). Also men may suffer from the burden of substantial household responsibilities in addition to their work responsibilities, and from role conflict in this context (Watai, Nishikido, & Murashima, 2008).

Work stress is hypothesised to exert its well-documented effect on e.g. cardiovascular disease, indirectly through unhealthy behaviours (such as smoking, lack of exercise, etc.) as well as directly by neuro-endocrine stress responses (Chandola, Heraclides, & Kumari, 2009). Even if it is as yet not clear whether WFC and FWC should be seen as stressors, indicators of strain, or intervening variables in the stressor-strain relationship (van Hooff, Geurts, Taris, Kompier, Dikkers, Houtman et al., 2005), it seems probable that similar pathways are at work when their apparently negative influence on health is mediated.

In order to fully elucidate whether, and to what degree, experiences of WFC and FWC influence exhaustion levels in working men and women, work- and family-related factors per se should also be assessed and included in the analyses. However, such studies are relatively scarce. A large number of characteristics of work and family life were studied in a recent well-designed Dutch study, aiming at identifying risk factors for poor mental health. A positive mental health effect was found from having a full-time job in combination with having children. However, having a partner who contributed less to household duties or having a job with low decision latitude was related to mental illness. Including WFC and FWC into the explanatory model increased its power substantially (Oomens et al., 2007). The authors remarked that one of the issues that may deserve additional attention is the possible gender differences. Men and women may experience both work life and family life, as well as the interface between these areas, very differently.

In the present study, the main objective was to investigate the potential contribution of

work-to-family and family-to-work conflicts towards gender disparities in exhaustion levels. Assessments of other important aspects of everyday life, such as job strain and job support, and the amount of household work, were included in the analyses.

DESIGN AND POPULATION

This is a cross-sectional study using data from an existing database, the Malmö Diet and Cancer Study (MDCS). The target population consisted of all men and women residing in the city of Malmö (240 000 inhabitants) and aged 45 to 61 at the time of recruitment (January 1991 to September 1996). In all, 40.8% of the eligible population completed the whole study which consisted of a baseline questionnaire (at T0) and anthropometric testing and blood samples. Comparison with a public health survey (Lindström, Bexell, Hanson, & Isacsson, 1995; Lindström, Sundquist, & Östergren, 2001), covering 74.6% of the same age cohort, suggests that the MDCS population sample was selected towards better health than in the general population (Manjer, Carlsson, Elmstahl, Gullberg, Janzon, Lindström et al., 2001).

A subsample of MDCS, which was recruited during the time interval from February 1992 to December 1994, was invited to a follow-up study after about one year (mean follow-up time 403 days; standard deviation 49). The follow-up questionnaire (T1) was mailed to all previous participants, of whom 86.6% responded (n=12,607). Non-respondents were living alone to a somewhat higher degree than respondents, they were younger, less educated, and with lower socioeconomic status, but there were no gender differences between respondents and non-respondents.

The present study describes only the data from the follow-up questionnaire (T1), since the variables of interest here, i.e. WFC, FWC, and exhaustion, were included in this questionnaire, but not at T0.

The study population consisted of the people who were 64 years old or younger at T0 (n=10,662), and who, according to inquiry data at T1, fulfilled the following criteria: working at least 30 hours per week during the year before T1 (n=5766), not being on (self-reported) long-term (>1 year) sick leave (n=10,416), and, finally, reporting complete data on family-to-work and WFC (n=7,105). Two thousand seven hundred and twenty-six men and 2735 women fulfilled all these criteria and thus constituted the study population.

The study was approved by the Research Ethics Committee of the Medical Faculty of Lund University.

METHODS

Outcome variable – exhaustion

For the assessment of exhaustion, the SF-36 vitality scale was used (Lindeberg, Östergren, & Lindbladh, 2006; Lindeberg, Eek, Lindbladh, Östergren, Hansen, & Karlson, 2008), which is a subscale of the 36-item Short-Form (SF-36) Health Survey (Ware & Sherbourne, 1992). This questionnaire was constructed to survey health status and designed for use in clinical practice and research, health policy evaluations, and general population surveys. The SF-36 vitality scale consists of four items: 'How much of the time during the past 4 weeks' – with six response alternatives including 1 'all of the time', 2 'most of the time', 3 'a good bit of the time', 4 'some of the time', 5 'a little of the time', and 6 'none of the time' – 'did you feel full of life', 'did you have a lot of energy', 'did you feel worn out', and 'did you feel tired'? The

scorings of the last two items were reversed in order to obtain an exhaustion score, with a scale range from 4 to 24. The Cronbach's alpha of the scale was 0.81 in this population. To define exhaustion cases, a score of 16 or above was chosen. This cut-off level indicates exhaustion 'a good bit of the time' or more during the past four weeks, and has previously been shown to distinguish participants more likely to exhibit cortisol patterns compatible with chronic stress (Lindeberg et al., 2008).

Sociodemographic and lifestyle variables
Age was used as a continuous variable in all the multivariate analyses. The classification of country of origin consisted of a dichotomy between individuals born in Sweden and those born in other countries. Cohabitation status was assessed as 'living alone' or not. Subjects were asked how many hours per week they spent doing housework; the number of hours was trichotomised into the following categories: <2, 2–3, and >3 hours per day. Participants were also asked about their tobacco and alcohol habits. Those who affirmed 'smoking regularly' were classified as smokers; all others as non-smokers. Use of alcohol was quantified by answers concerning consumption during the previous month. The resulting figures were adjusted by gender and categorised into two groups: 'low/medium-risk' and 'high-risk' alcohol consumption, based on the 'quantity-frequency method' (Armor & Polich, 1982; Isacsson, Hanson, Janzon, Lindell, & Steen, 1987).

Social participation
Social participation (Hanson & Östergren, 1987) was defined as participation in formal and informal social activities such as attending theatre, cinema, church, evening classes, sports activities, and family gatherings. This instrument was developed in the Swedish National Survey on Living Conditions (Statistics Sweden, 1980) and was assessed by thirteen different questions. If three alternatives or less were indicated, the social participation of that person was considered low.

Work-related variables
Occupational class was classified according to job title and work tasks, using the manual issued by Statistics Sweden (Statistics Sweden, 1982). Six groups were constructed: 'unskilled' and 'skilled' manual workers, non-manual employees on a 'low', 'medium', and 'high' level, and 'farmers and entrepreneurs'.

Participants were asked about frequency of overtime work: every week, every month, rarely, or never. Persons having affirmed the fifth answer alternative, 'lacking fixed work-time schedule' (n=714), were excluded in the analyses where the dichotomised variable 'overtime every week, yes vs. no', was used.

The core of the demand-control theory is that job control, or 'decision latitude', interacts with the effects of psychological job demands. A 'job strain' situation is defined as the combination of high demands and low decision latitude (Karasek, 1979). Job demands and decision latitude were assessed by eleven items adapted (Karasek, Choi, Östergren, Ferrario, & De Smet, 2007) from the Job Content Questionnaire (Karasek, 1979; Theorell, Harms-Ringdahl, Ahlberg-Hulten, & Westin, 1991). Quartiles of demand and decision latitude were created by using the means and means ± 0.67 x standard deviations as the cut-points. Each individual thereby got one out of four scores in demand and decision latitude, respectively, resulting in a sixteen-cell distribution. The three cells with the highest demands and lowest decision latitude score combinations were defined as constituting the job strain category.

The six questions regarding 'job support', describing the workplace atmosphere and conditions, including the understanding and support received from supervisors and workmates, from the Swedish version of the Job Content Questionnaire (Theorell et al., 1991) were also included, and this variable was dichotomised into high and low job support at the median.

Work-to-family and family-to-work conflict
Work-to-family conflict (WFC) and family-to-work conflict (FWC) were measured by two scales, constructed from answers to four questions each. The WFC scale contains the following items: (1) Your job reduces the amount of time you can spend with the family, (2) Problems at work make you irritable at home, (3) Your work involves a lot of travel away from home, and (4) Your job takes so much energy you don't feel up to doing things that need attention at home. The FWC scale contains the following items: (1) Family matters reduce the time you can devote to your job, (2) Family worries or problems distract you from your work, (3) Family activities stop you getting the amount of sleep you need to do your job well, and (4) Family obligations reduce the time you need to relax or be by yourself. This instrument was recently validated in a large study involving cohorts from Finland, Japan, and the UK (Chandola, Martikainen, Bartley, Lahelma, Marmot, Michikazu et al., 2004). Subjects ticked having experienced each problem 'not at all', 'to some extent', or 'a great deal'. The fourth alternative 'not applicable' was interpreted as 'not being exposed to conflict', and therefore recoded as 'not at all'. Scores ranged between 4 (no conflict whatsoever) and 12 (maximum conflict). As in previous studies (Chandola et al., 2004; Gutek, Searle, & Klepa, 1991), FWC was considerably less often affirmed than WFC. Thus, 66% of the population scored 4 (=no conflict) on FWC versus 30% on WFC. Since there was a considerable difference in reply patterns between men and women, two possible dichotomisation levels appeared possible: 20% (men) and 13% (women) exposed versus 33 and 26% as regards WFC, and 11.5% (men) and 22% (women) versus 27 and 40%, respectively, as regards FWC. A sensitivity test was performed and neither alternative yielded higher correlations with the outcome. In this situation we chose the first alternative as being closest to the upper quintile considered as exposed, as had been done in other recent studies using the same instrument (Lallukka, Chandola, Roos, Cable, Sekine, Kagamimori et al., 2009; Winter, Roos, Rahkonen, Martikainen, & Lahelma, 2006). Cronbach's alpha was 0.67 for the FWC and 0.62 for the WFC scale. The Pearson correlation coefficient for the two dichotomised variables was 0.21.

General health
Fatigue is a central symptom in many diseases, and therefore the occurrence of somatic disorders was assessed. Subjects were asked (inquiry answers yes/no) whether they were afflicted by any of the following diseases: myocardial infarction, stroke, claudicatio, diabetes of five years duration or more, cancer of less than five years duration, rheumatoid arthritis, asthma/chronic bronchitis, or inflammatory bowel disease. Furthermore, a modified version (Östergren, Hanson, Balogh, Ektor-Andersen, Isacsson, Orbaek et al., 2005) of the Standardised Nordic Questionnaire (SNQ) (Kuorinka, Jonsson, Kilbom, Vinterberg, Biering-Sorensen, Andersson et al., 1987) was used to assess neck, shoulder and/or lumbar pain experienced 'often' or 'all the time'. All persons with any affirmative answer were classified as having a somatic disorder.

Self-rated health (Kaplan & Camacho, 1983) was assessed by a question on how the person was feeling right now, considering his or her health and general well-being. The reply alternatives ranged from 1 to 7 with the end-points spelled out, '1' as '(I) feel very good,

could not feel better' and 7 as '(I) feel very bad, could not feel worse'. The answers were dichotomised into poor (the first three alternatives) and good/medium (the other four).

Statistical analysis

Crude odds ratios (OR) and 95% confidence intervals (95% CI) were calculated to analyse associations between sociodemographic, work- and family-related variables on the one hand and exhaustion on the other. Adjustments for potential confounders were made by logistic regression analysis, in which the variables were forced into the analyses, one at a time. In the univariate analyses, WFC had shown a stronger relationship with exhaustion than had FWC; this was particularly true for women. Therefore WFC was chosen as the prime target for investigation in the multivariate analyses, but FWC was also included along with several of the other factors having shown significant associations with the outcome exhaustion. 'Living alone' was not included, however, nor was 'low social participation', and this was due to the fact that both variables had weak negative associations with WFC (correlation coefficients ranging from –0.028 to –0.075). Given the very strong relationship between self-rated health and the outcome of exhaustion (ORs 11.3 and 14.4 in men an women) these variables were considered as measuring an overlapping construct, and self-rated health was thus not entered into the multivariate analyses.

The R^2 value of the final model was calculated. The attributable fractions in the population were calculated according to the procedure described by Elwood (Elwood, 1998). Briefly, this is the risk in the whole population minus the risk in the population of unexposed subjects; this figure is thereafter divided by the risk in the whole population.

In order to test for a possible effect modification – i.e. 'Is the effect of having two risk factors worse than additive?' – synergy indexes (SI) were calculated as proposed by Rothman (Rothman, 1986). The following algorithm was used, where SI >1 signified a synergistic effect, and SI <1 an antagonistic effect:

$$SI = \frac{RR(AB) - 1}{[RR(Ab) - 1] + [RR(aB) - 1]}$$

RR = Risk ratio
Ab = exposed to one of the factors
aB = exposed to the other factor
AB = exposed to both factors

All analyses were conducted using a standard statistical analysis programme (SPSS version 12.0).

RESULTS

As can be seen in Table 1, most measures differed by gender. Women had lower socioeconomic status; they were also more prone to experiencing job strain, and spent considerably more time doing housework. Women reported their general health as worse than men, and suffered from a somatic disorder more often. Smoking, and living alone, were more frequent among women. Exhaustion was more common in women, 15.6% in women versus 8.3% in men, and so was family-to-work conflict (FWC). However, work-to-family conflict

(WFC) was more frequently experienced by men. Men also worked overtime every week more often than women, and were also high-risk alcohol consumers to a higher degree. Low social participation was somewhat more common among men.

Table 2 shows that the following variables were significantly associated with exhaustion in both genders: a non-Swedish origin, job strain, low job support, overtime every week, WFC, FWC, living alone, low social participation, poor self-rated health, and having a somatic disorder. Daily smoking was weakly associated with exhaustion; the difference was statistically significant in women but not in men. Heavy drinkers did not feel exhausted to a higher degree. Neither was there any relationship between socioeconomic status and exhaustion. In the small group of men (n=313) who spent 2 or more hours per day on housework, a weak and statistically non-significant tendency towards higher degrees of exhaustion was found, but in women, this activity had no impact on exhaustion levels.

A separate analysis was performed with the continuous measures of number of hours spent on housework and conflict (WFC and FWC). The number of housework hours was correlated to FWC in both genders (r=0.153 in men and 0.184 in women; p<0.001 in both cases). The association with WFC was more ambiguous: in men the relationship was negative (r=–0.048, p=0.013), i.e. the more housework, the less WFC, while in women an association of the same magnitude was found in the opposite direction (r=0.049, p=0.011).

Table 3 A shows the alterations of the OR for WFC and exhaustion in men with the addition of potential confounders. The fully adjusted OR was 2.2 (1.5 to 3.2). In women (table 3 B) the OR between WFC and exhaustion was higher to begin with, 4.9 versus 2.7 in men, but the pattern of decrease with addition of potential confounders was very similar. The fully adjusted OR was 3.3 (2.5 to 4.5). The R^2 values of this model were for men 14.6 and for women 20.4. The same analyses were thereafter performed with both WFC and FWC removed from the variable list. This reduced the R^2 values in men to 11.9%, and in women to 13.5%.

The attributable proportion of exhaustion in men was 22% for WFC and 9% for job strain; for women the corresponding figures were 23 and 13%.

Table 4 shows how WFC and FWC interact with concurrent job strain in the occurrence of exhaustion. In both genders moderate synergistic effects were found in all analyses, with SIs ranging from 1.72 to 1.86.

DISCUSSION
Main findings
This large cross-sectional study of vocationally active men and women confirmed that work-family conflict (WFC) and family-work conflict (FWC) were both associated with exhaustion, findings which were not affected by other work and family risk factors. Job strain, low job support, and having a somatic disorder were also independently associated with exhaustion in both genders. While WFC was more prevalent among men, it was more strongly associated with exhaustion in women than in men. A larger variance in exhaustion was explained by the WFC and FWC variables in women than in men.

Methodological considerations and comparison with previous studies
The methods for measurement of sociodemographic data, psychosocial work characteristics, social networks, self-rated health, and musculoskeletal symptoms were either self-explanatory or previously well-validated.

As regards the measure of exhaustion, the vitality scale of the SF-36 has the advantage of indicating a considerable level of fatigue, which is still distinct from symptoms of depression or anxiety (Lindeberg et al., 2006).

The WFC/FWC measurement instrument has been used before (Chandola et al., 2004; Winter et al., 2006), although with minor variations in its application. In the study by Chandola et al., total scores had to range between 4 and 12, which indicates that persons having ticked the 'not applicable' alternative in any one of the 8 questions would not have entered the study. In the study reported by Winter and co-authors, the fourth alternative was instead 'I have no family', and in such cases the respondents were omitted. Neither in the Chandola study nor in ours were people living alone excluded. As stated by Grzywacz, 'such a limitation reflects too narrow a conceptualization of family, as even single childless adults often carry considerable family commitments to parents, siblings, and other kin' (Grzywacz & Marks, 2000, p. 114). Recoding 'not applicable' into 'no conflict', as was done here, might have led to some misclassification, the direction of which, however, would bias the results towards the null hypothesis.

Since item (4) in the WFC scale and items (3) and (4) in the FWC scale clearly involve fatigue- or recovery-related issues, they may be considered as partly overlapping with the outcome, and thus result in dependent misclassification of the exposure. To make sure that the relationship between WFC/FWC and exhaustion was not dependent on these three items, we performed the same analyses described above without them. The 'new' WFC variable was related to exhaustion with the crude OR of 1.9 (95% confidence interval 1.4 to 2.5) in men and 3.4 (2.6 to 4.4) in women. The corresponding figures for the 'new' FWC variable were 2.5 (1.9 to 3.4) in men and 3.1 (2.5 to 3.9) in women. These ORs thus, as regards WFC, indicate weaker but still statistically significant relationships compared with the ones attained by using the full WFC scale, whereas for FWC they did not change essentially. This fact, along with the desire to increase the feasibility of comparisons with other studies, led to the decision to use the full WFC/FWC instruments.

A propensity to report conflict in the work–home interface might be a manifestation of the same personality trait that leads to a tendency to report and/or to feel more exhausted than the average person. However, one previous study offers evidence to the contrary (Grzywacz & Marks, 2000) and it should be noted that FWC and WFC turned out as, even though related, different entities in the present study.

We found no direct relationship between the time spent doing housework and exhaustion. In previous studies investigating the same issue, results have been conflicting (Boye, 2008; Mellner, Krantz, & Lundberg, 2006). The simple quantitative measure of number of hours worked in the household that we used captured an interesting gender difference, however, in that women tended to experience more WFC with more hours worked in the household, while the opposite was true for men. Nevertheless, it may still have been too rough to catch a potential association with the outcome exhaustion. Some authors have chosen to focus on a personal assessment of domestic responsibility level, i.e. 'shared with partner' versus 'sole responsibility', rather than on number of hours occupied with household tasks. Associations with negative outcomes were found in all these cases (Krantz & Östergren, 2001; Oomens et al., 2007; Väänänen et al., 2004). In analogy with the concept of job strain, an instrument called 'domestic strain' was recently developed. This measure, as well as 'perceived inequity in the relationship with spouse/cohabiter', was associated with lower self-rated health

(Staland-Nyman, Alexanderson, & Hensing, 2008). In the future, the domain of household work should be further explored both from a methodological and an empirical point of view.

The results may be biased by selection, firstly since the participants in the original sample tended to be in better health than the general population, and secondly since individuals with at the same time high exposures of WFC/FWC and high exhaustion levels might reasonably be expected to remain in the working force to a lesser degree than persons with lower WFC/FWC and lower exhaustion levels. Hence, a healthy worker effect would result in this sample of working people, which, however, would bias the results towards the null, and therefore rather speaks to the strength of the association.

It should also be emphasized that the participants were 45 to 65 years of age, which implies that family responsibilities probably included caring for teenage children and aging parents or other relatives, rather than for infants and younger children.

In the review article from 2000, Allen and co-authors demonstrated the widespread and serious consequences associated with negative interference between work and family (Allen et al., 2000). More recent studies confirm the findings. Thus, both WFC and FWC affected the mental health of men and women in three countries in the previously mentioned study from 2004 (Chandola et al., 2004). As reported above, in the Dutch prospective study, employees reporting such conflict had a higher average number of absent days over six months of follow-up (Jansen et al., 2006) and also a significantly higher risk of developing fatigue and an elevated need for recovery (Jansen, Kant, Kristensen, & Nijhuis, 2003). Frone, in 2000, found that both WFC and FWC were also positively related to clinically significant diagnoses of mood, anxiety, and substance dependence disorders (Frone, 2000). In one of the few studies where significant associations between WFC and adverse health outcomes were not identified, the period of observation was four years, and it was suggested that conflict in the work–home interface exerts its effects in a shorter time span (Frone, Russell, & Cooper, 1997).

As always with cross-sectional studies, conclusions about causal pathways should be made with caution; exhaustion could have been the first chronological event rather than conflicts in the work–family interface. Van Hooff and co-authors attempted to disentangle these relationships in a longitudinal study from 2005, and found a significantly better fit for the model implying strain-based work–home interference as being the precursor to poor health than the opposite (van Hooff et al., 2005). Another prospective study came to the same conclusion (Jansen et al., 2003), although in both papers it is stated that a reversed causation cannot be ruled out, and that a bi-directional relationship may be at hand.

Conclusions
While sharing the common denominator of working at least 30 hours per week, men and women in this population seemed to differ in almost all other aspects of work and family conditions considered. This was valid from the very robust characteristic 'socioeconomic status', with all its implied consequences for health and wellbeing (Marmot, 2004), to reported time spent on housework. However, as shown in the multivariate analyses, the pattern of influence for each factor associated with the outcome exhaustion was strikingly similar in both genders. Only WFC, although more prevalent among men, stood out somewhat as being more prominent in its impact on exhaustion in women than in men. 'Work-to-family conflict occurs when one's efforts to fulfil work role demands interfere with one's ability to fulfil family demands' (Frone, 2000, p. 888). What constitutes the 'family

demands' for each family member is of course not a static or uniform quantity. In this study women tended to report more WFC the more they worked in the house, while the opposite was true for men. Hence, women may both more readily assess their accomplishments in the family as non-satisfactory and, by tradition, consider such a failure as more devastating (Chandola et al., 2004; Gutek et al., 1991) – and, as shown here, more tiring. Another possible interpretation could be that men and women facing WFC react differently as regards their actual output of household work. With the no longer particularly recent entry of women into the labour market, it is becoming increasingly obvious that an assessment of external strain in a person's life cannot be limited to the work sphere alone. It is true that both the concepts of household workload and of conflict in the work–home interface need to be further explored and developed. However, our results support that important information can indeed be obtained by complementing traditional stress evaluation instruments with measurements also assessing FWC and WFC.

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Table 1. Sociodemographic, psychosocial, and health-related variables in a cohort of middle-aged vocationally active men (n=2726) and women (n=2735). Malmö Shoulder Neck Study.

Variable (ns missing)		Men		Women		P value
		n	%	n	%	
Age	45–49	560	20.5	612	22.4	0.02
	50–54	1060	38.9	1108	40.5	
	55–59	817	30.0	767	28.0	
	60–64	289	10.6	248	9.1	
	Total	2726		2735		
Country of birth (1)	Sweden	2444	89.7	2484	90.8	0.17
	Other	281	10.3	251	9.2	
Socioeconomic status (7)	Non-manual, high	632	23.2	361	13.2	<0.001
	Non-manual, middle	627	23.0	619	22.7	
	Non-manual, low	371	13.6	873	32.0	
	Manual, skilled	390	14.3	193	7.1	
	Manual,unskilled	338	12.4	565	20.7	
	Self-employed and farmers	365	13.4	120	4.4	
Job strain (50)	No	2311	85.7	2094	77.2	<0.001
	Yes	387	14.3	619	20.8	
Low job support (44)	No	1258	46.6	1248	45.9	0.62
	Yes	1441	53.4	1470	54.1	
Overtime every week (714)	No	1735	78.5	2254	88.9	<0.001
	Yes	476	21.5	282	11.1	
Living alone (2)	No	2349	86.2	2006	73.4	<0.001
	Yes	376	13.8	728	26.6	
Housework, hours per day (61)	< 2	2370	88.3	1163	42.8	<0.001
	2–3	253	9.4	1074	39.5	
	> 3	60	2.2	480	17.7	
Low social participation	No	2095	76.9	2183	79.8	0.009
	Yes	631	23.1	552	20.2	
Daily smoking (39)	No	2162	80.2	2084	76.4	0.001
	Yes	534	19.8	642	23.6	
Alcohol consumption (27)	Low/medium-risk	2051	75.7	2454	90.1	<0.001
	High-risk	660	24.3	269	9.9	
Self-rated health (10)	Good/medium	2203	80.9	1970	72.2	<0.001
	Poor	521	19.1	757	27.8	
Somatic disorder	No	1828	67.1	1652	60.4	<0.001
	Yes	898	32.9	1083	39.6	
Exhausted (27)	No	2491	91.7	2295	84.4	<0.001
	Yes	224	8.3	424	15.6	
Work-to-family conflict (WFC)	No	2207	81.0	2377	86.9	<0.001
	Yes	519	19.0	358	13.1	
Family-to-work conflict (FWC)	No	2412	88.5	2170	79.3	<0.001
	Yes	314	11.5	565	20.7	

Table 2. Crude odds ratios (OR) and 95% confidence intervals (CI) of cases of exhaustion and sociodemographic, psychosocial and health-related variables. Mamö Shoulder Neck Study.

		Men			Women		
		N of cases	%	OR (95% CI)	N of cases	%	OR (95% CI)
Age	45–49	57	10.2	1.9 (1.1, 3.4)	101	16.6	1.3 (0.9, 2.0)
	50–54	91	8.6	1.6 (0.9, 2.8)	186	16.9	1.4 (0.9, 2.0)
	55–59	60	7.4	1.4 (0.8, 2.4)	105	13.8	1.1 (0.7, 1.6)
	60–64	16	5.6	1.0	32	13.0	1.0
	Total						
Country of birth	Sweden	186	7.6	1.0	375	15.2	1.0
	Other	38	13.6	1.9 (1.3, 2.8)	49	19.7	1.4 (1.0, 1.9)
Socioeconomic status	Non-manual, high	50	7.9	1.0	62	17.2	1.0
	Non-manual, middle	59	9.4	1.2 (0.8, 1.8)	85	13.8	0.8 (0.5, 1.1)
	Non-manual, low	31	8.4	1.1 (0.7, 1.7)	142	16.4	1.0 (0.7, 1.3)
	Manual, skilled	30	7.7	1.0 (0.6, 1.5)	30	15.6	0.9 (0.6, 1.4)
	Manual, unskilled	29	8.7	1.1 (0.7, 1.8)	87	15.6	0.9 (0.6, 1.3)
	Self-employed and farmers	25	6.9	0.9 (0.5, 1.4)	17	14.2	0.8 (0.4, 1.4)
Job strain	No	158	6.9	1.0	259	12.4	1.0
	Yes	65	16.8	2.7 (2.0, 3.8)	163	26.5	2.5 (2.0, 3.2)
Low job support	No	61	4.9	1.0	117	9.4	1.0
	Yes	163	11.3	2.4 (1.8, 3.3)	304	20.8	2.5 (2.0, 3.1)
Overtime every week	No	127	7.3	1.0	324	14.5	1.0
	Yes	49	10.3	1.4 (1.0, 2.0)	61	21.6	1.6 (1.2, 2.2)
Living alone	No	171	7.3	1.0	282	14.1	1.0
	Yes	53	14.2	2.1 (1.5, 2.9)	142	19.6	1.5 (1.2, 1.8)
Housework, hours per day	< 2	190	8.0	1.0	181	15.6	1.0
	2–3	22	8.7	1.1 (0.8, 1.7)	172	16.1	1.0 (0.8, 1.3)
	> 3	7	11.9	1.5 (0.7, 3.4)	66	13.9	0.9 (0.6, 1.2)
Low social participation	No	154	7.4	1.0	303	14.0	1.0
	Yes	70	11.2	1.6 (1.2, 2.19)	121	22.1	1.7 (1.4, 2.2)
Daily smoking	No	170	7.9	1.0	302	14.6	1.0
	Yes	53	10.0	1.3 (0.9, 1.8)	121	18.9	1.4 (1.1, 1.7)
Alcohol consumption	Low/medium-risk	163	8.0	1.0	384	15.7	1.0
	High-risk	61	9.3	1.2 (0.9, 1.6)	40	14.9	0.9 (0.7, 1.3)
Self-rated health	Good/medium	75	3.4	1.0	98	5.0	1.0
	Poor	149	28.7	11.3 (8.4, 15.3)	324	43.1	14.4 (11.2, 18.4)
Somatic disorder	No	99	5.4	1.0	160	9.7	1.0
	Yes	125	13.9	2.8 (2.1, 3.8)	264	24.6	3.0 (2.4, 3.7)
Work to family conflict (WFC)	No	141	6.4	1.0	282	11.9	1.0
	Yes	83	16.1	2.8 (2.1, 3.7)	142	40.0	4.9 (3.8, 6.3)
Family to work conflict (FWC)	No	170	7.1	1.0	256	11.9	1.0
	Yes	54	17.3	2.7 (2.0, 3.8)	168	29.9	3.2 (2.5, 4.0)

Table 3 A Age-adjusted odds ratios (95% confidence intervals) of exhaustion in relation to work-to-family conflict, with forward stepwise addition of potential confounding factors, calculated in a cohort of middle-aged vocationally active men (n=2182). Malmö Shoulder Neck Study.

	Model 1	Model 2 = Model 1 + Overtime every week	Model 3 = Model 2 + Job strain	Model 4= Model 3 + Low job support	Model 5 = Model 4 + Family-to-work conflict	Model 6 = Model 5 + Country of birth	Model 7 = Model 6 + Somatic disorder
Work-to-family conflict (yes vs. no)	2.7 (1.9, 3.7)	2.6 (1.8, 3.8)	2.5 (1.7, 3.6)	2.4 (1.6, 3.4)	2.1 (1.4, 3.0)	2.0 (1.4, 3.0)	2.2 (1.5, 3.2)
Overtime every week (yes vs. no)		1.0 (0.7, 1.5)	1.1 (0.7, 1.6)	1.0 (0.7, 1.5)	1.1 (0.7, 1.6)	1.1 (0.7, 1.6)	1.1 (0.8, 1.7)
Job strain (yes vs. no)			3.0 (2.1, 4.2)	2.7 (1.9, 3.8)	2.7 (1.9, 3.8)	2.6 (1.8, 3.7)	2.2 (1.5, 3.1)
Low job support (yes vs. no)				2.0 (1.4, 2.8)	1.9 (1.4, 2.7)	1.9 (1.4, 2.7)	1.9 (1.3, 2.7)
Family-to-work conflict (yes vs. no)					1.9 (1.3, 2.9)	1.8 (1.2, 2.8)	1.8 (1.2, 2.8)
Country of birth (not Sweden vs. Sweden)						1.7 (1.1, 2.7)	1.5 (1.0, 2.4)
Somatic disorder (yes vs. no)							2.9 (2.1, 4.0)

Nagelkerke R square 14.6 %

Table 3 B Age-adjusted odds ratios (95% confidence intervals) of exhaustion in relation to work-to-family conflict, with forward stepwise addition of potential confounding factors, calculated in a cohort of middle-aged vocationally active women (n=2502). Malmö Shoulder Neck Study.

	Model 1	Model 2 = Model 1 + Overtime every week	Model 3 = Model 2 + Job strain	Model 4= Model 3 + Low job support	Model 5 = Model 4 + Family-to-work conflict	Model 6 = Model 5 + Country of birth	Model 7 = Model 6 + Somatic disorder
Work-to-family conflict (yes vs. no)	4.9 (3.8, 6.4)	4.8 (3.7, 6.4)	4.6 (3.5, 6.1)	4.2 (3.1, 5.5)	3.5 (2.6, 4.6)	3.5 (2.6, 4.6)	3.3 (2.5, 4.5)
Overtime every week (yes vs. no)		1.0 (0.7, 1.5)	1.0 (0.7, 1.5)	1.1 (0.8, 1.5)	1.0 (0.7, 1.5)	1.1 (0.7, 1.5)	1. 1 (0.8, 1.6)
Job strain (yes vs. no)			2.5 (1.9, 3.1)	2.1 (1.7, 2.7)	2.1 (1.6, 2.7)	2.1 (1.6, 2.7)	2.0 (1.5, 2.5)
Low job support (yes vs. no)				2.0 (1.5, 2.6)	1.9 (1.5, 2.5)	1.9 (1.5, 2.5)	1.9 (1.4, 2.4)
Family-to-work conflict (yes vs. no)					2.2 (1.7, 2.9)	2.2 (1.7, 2.9)	2.0 (1.6, 2.6)
Country of birth (not Sweden vs. Sweden)						1.0 (0.7, 1.5)	1.0 (0.7, 1.4)
Somatic disorder (yes vs. no)							2.6 (2.0, 3.3)

Nagelkerke R square 20.4 %

Table 4 Test for effect modification of the association between 'work-to-family conflict' or 'family-to-work conflict', and the prevalence of exhaustion, regarding exposure to job strain, calculated in a cohort of middle-aged vocationally active men (n=2726) and women (n=2735), presented as age-adjusted odds ratios with 95 percent confidence intervals and synergy indexes. Malmö Shoulder Neck Study.

	Men			Women		
	n	*OR (95% CI)*	*SI*	*n*	*OR (95% CI)*	*SI*
Neither	1880	1.0		1851	1.0	
'Work-to-family conflict', no job strain	431	2.8 (2.0, 3.9)		243	4.8 (3.5, 6.5)	
No 'work-to-family conflict', job strain	305	2.7 (1.9, 4.0)		505	2.4 (1.9, 3.2)	
Both	82	7.1 (4.2, 11.9)	1.74	114	10.7 (7.2, 16.0)	1.86
Neither	2045	1.0		1689	1.0	
'Family-to-work conflict', no job strain	258	2.8 (1.9, 4.1)		394	3.1 (2.3, 4.1)	
No 'family-to-work conflict', job strain	334	2.8 (2.0, 4.0)		448	2.5 (1.9, 3.3)	
Both	52	6.2 (3.3, 11.7)	1.72	166	6.6 (4.7, 9.4)	1.78