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## Spillover and crossover of exhaustion and life satisfaction among dual-earner parents

Evangelia Demerouti \*, Arnold B. Bakker, Wilmar B. Schaufeli

*Department of Social and Organizational Psychology, University Utrecht, P.O. Box 80.140,  
3508 TC Utrecht, The Netherlands*

*Research Institute Psychology and Health, Utrecht, The Netherlands*

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### Abstract

This study integrates spillover research of stress transferring from work to home and crossover research of strains transferring from one spouse to another. A spillover and crossover model was tested among 191 (couples of) dual-earner parents. For both males and females, it was hypothesized that (self-reported and partners' rating of) work-to-family interference (WFI) partially mediates the job demands–job exhaustion relationship, and fully mediates the job demands–life satisfaction relationship. Further, we hypothesized reciprocal crossover effects between both partners' job exhaustion and life satisfaction. The results of structural equation modeling analyses offered support for the mediating role of WFI although there were genders differences. In addition, we found a crossover path from females' exhaustion to males' exhaustion and from males' life satisfaction to their partners' life satisfaction. This implies that not only job-related strain, but also positive, context-free well-being may crossover among partners.

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*Keywords:* Crossover; Exhaustion; Life satisfaction; Spillover

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\* Corresponding author. Fax: +31 30 253 4718.

*E-mail address:* [E.Demerouti@fss.uu.nl](mailto:E.Demerouti@fss.uu.nl) (E. Demerouti).

## 1. Introduction

Many studies in the domain of Occupational Health Psychology have shown that unfavorable working conditions negatively influence employees' mental and physical health and well-being (e.g., Quick & Tetrick, 2003; Schabracq, Winnubst, & Cooper, 2003). However, less attention has been paid to possible consequences of (impaired) employee well-being for their spouses (Westman, 2001). Such a process may be particularly relevant to couples in which both members are employed and maintain a family that includes children (Rapoport & Rapoport, 1971).

In the current study, we examine among dual-earner parents two possible ways in which job demands and strain may carry over from the work domain to the home domain: spillover and crossover. In *spillover*, reactions experienced in the work domain are transferred to and interfere with the non-work domain (e.g., Lambert, 1990; Leiter & Durup, 1996). Although work may influence family life in both positive and negative ways (Grzywacz & Marks, 2000), we will exclusively concentrate on how the work of employees negatively influences their personal functioning at home. This phenomenon is also known as work-to-family interference (WFI). *Crossover* denotes the process in which stress and strain experienced by employees leads to stress and strain experienced by their spouses at home (Westman, 2001). Thus, spillover concerns an *intra*-individual transmission of stress or strain from one domain to another domain, while crossover refers to a dyadic, *inter*-individual transmission within the same domain.

Our objectives were threefold. First, we examined whether WFI plays a mediational role between job demands and well-being. Although evidence for this mediation process has been reported in previous studies (e.g., Demerouti, Bakker, & Bulters, 2004; Geurts, Rutte, & Peeters, 1999; Montgomery, Peeters, Schaufeli, & Den Ouden, 2003), the present study uses a different research strategy. Instead of utilizing only self-reports of WFI, as is done in most studies, we also use peer-ratings of spouses to evaluate work-to-family interference as perceived by their partners. This strategy may circumvent problems with common method variance in previous spillover research. Second, we investigated whether context-specific (work-related) feelings of exhaustion crossover to the partner. Again, this has been studied in the past (e.g., Westman & Etzion, 1999), but only a limited number of studies controlled for the job demands of each of the partners (see Westman, 2001; for a review). Finally, we examined the crossover of context-free (general) life satisfaction between partners, a phenomenon that has not been investigated. Therefore, our knowledge on whether—or to what extent—positive experiences may be transferred is insufficient (Westman, 2001).

Fig. 1 illustrates the proposed spillover and crossover model of dual-earner parents. The model contains within-domain relationships (marked 'w,' i.e., the relationship between job demands and exhaustion for both partners), and between-domain relationships (marked 'b,' i.e., the relationship between job demands and WFI, and the relationships between WFI on the one hand, and job exhaustion and general life satisfaction on the other hand). Finally, the model includes two crossover relationships, marked 'c,' i.e., between the exhaustion of both partners and between

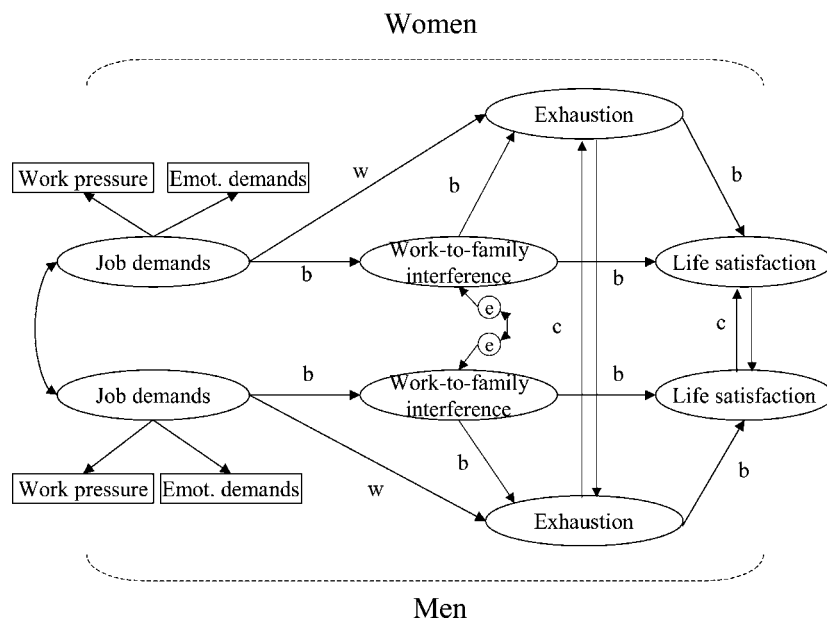


Fig. 1. The spillover and crossover model. Note. w, within-domain relationship; b, between-domains relationship; c, crossover relationship; and e, error term.

their satisfaction with life in general. Before testing this hypothesized model, we will first review the literature on spillover and crossover, thereby making a distinction between within- and between-domain effects.

### 1.1. Within-domain effects

Many studies have provided evidence for within-domain relationships between job demands and exhaustion (for an overview see: Lee & Ashforth, 1996; Maslach, Schaufeli, & Leiter, 2001). Job demands represent characteristics of the job that potentially evoke strain, in cases where they exceed the employee's adaptive capability. More specifically, job demands refer to those physical, social or organizational aspects of the job that require sustained physical and/or psychological (i.e., cognitive or emotional) effort on the part of the employee and are therefore associated with certain physiological and/or psychological costs, including exhaustion (cf. Hockey, 1997). Although job demands are not necessarily negative, they may turn into job stressors when meeting those demands requires high effort from which the employee has not adequately recovered (Meijman & Mulder, 1998).

The relationship between *specific* job demands (e.g., workload and emotional demands) and exhaustion has indeed been reported by various studies on job burnout, of which exhaustion is the core symptom (see Lee & Ashforth, 1996). Moreover, research on the Job Demands-Resources model among different occupational groups shows that (self-reported and observed) job demands may have a strong

impact on feelings of exhaustion (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Demerouti et al., 2004; Schaufeli & Bakker, 2004). This leads to the first hypothesis:

**Hypothesis 1.** Job demands (work pressure and emotional demands) relate positively to job exhaustion.

### 1.2. Between-domain effects

Following role stress theory (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964), Greenhaus and Beutell (1985) assert that work–family conflict is “a form of interrole conflict in which the role pressures from the work and family domains are mutually incompatible in some respect” (p. 77). The idea that stressors cause work–family interference which consequently leads to strain, represents a classic hypothesis in the Occupational Health Psychology literature (Geurts & Demerouti, 2003).

Job demands may interfere with family life when working time does not match the preferences of employees (Barnett, Gareis, & Brennan, 1999) or when strain built up at work is ‘taken home,’ so that at home the employee is preoccupied with work, thereby neglecting the family (Greenhaus & Beutell, 1985). The quantity and quality of *recovery* is assumed to play a crucial role (Meijman & Mulder, 1998). If opportunities for recovery after being exposed to a high workload are *insufficient*, as will be the case under conditions of WFI, the person’s psychobiological system remains activated and does not stabilize at baseline level. The person has to make additional (compensatory) effort to maintain his or her level of performance, which leads to extra psycho-physiological costs that, in turn, interfere with the recovery process. Accordingly, this accumulative process of inadequate recovery is draining the employees’ energy and may result in a state of exhaustion or breakdown (e.g., Sluiter, 1999; Ursin, 1980).

Consistent relationships have been found between WFI and psychological well-being, usually tapped by strain measures. Burnout is one of the most frequently studied work-related consequences of WFI (e.g., Kinnunen & Mauno, 1998; Netemeyer, Boles, & McMurrin, 1996). In their meta-analysis, Allen, Herst, Bruck, and Sutton (2000) report a weighted mean correlation of .42 between WFI and burnout (of which exhaustion is one component). In addition, WFI has been related to several non-work related attitudes, particularly life satisfaction. The meta-analyses of Allen et al. (2000) and Kossek and Ozeki (1998) provide evidence for a negative relationship between WFI and life satisfaction, with a similar weighted mean correlation of  $-.28$  and  $-.31$ , respectively. However, it should also be noted that some studies failed to find support for this relationship. For example, Beutell and Greenhaus (1982) reported that wives’ interrole conflict was unrelated to either their own or their husbands’ life satisfaction. Taken together, we formulated the next two hypotheses:

**Hypothesis 2.** Job demands relate indirectly (through WFI) to exhaustion (all relationships are positive). Note that Hypothesis 1 and 2 together suggest that WFI partially mediates the relationship between job demands and exhaustion.

**Hypothesis 3.** Job demands relate only indirectly to life satisfaction, through the experience of WFI. The relationship between job demands and WFI is positive, and the relationship between WFI and life satisfaction is negative.

The model further includes the relationship between exhaustion and life satisfaction. While this relationship was not the focus of our study, we expect that job demands result in impaired context-specific well-being (i.e., job exhaustion), which, in turn, is associated with reduced context-free overall well-being (i.e., life satisfaction) (Edwards & Rothbard, 2000; Mauno & Kinnunen, 1999). This implies that job demands should not be directly related to life satisfaction, which has also been shown in the study of Demerouti, Bakker, Nachreiner, and Schaufeli (2000).

Note that all hypothesized relationships were tested using both self-reported and partners' ratings of WFI since we expected that partners are able to observe whether their husband/wife is busy with work and therefore cannot fulfill his/her obligations at home, or that the partner cannot enjoy the presence of others because (s)he is worrying about work.

### *1.3. Crossover effects*

Crossover involves the transmission of stress and strain from one member of a dyad to another. Westman (2001, 2002; Westman & Etzion, 1999) has argued that there are three possible mechanisms explaining crossover effects. The first mechanism concerns the direct transmission of stress and strain between partners. Accordingly, strain in one partner produces an empathetic reaction in the other that increases his or her level of strain ('Your pain is my pain'). The second mechanism suggests that the relationship between partners' strain is spurious, since what appears to be a crossover effect is the result of common stressors experienced by both partners. For instance, if both partners are working long hours, they do not have time to spend on joint, relaxing leisure activities. Consequently, their feelings of exhaustion would be related. Finally, Westman (2001) argues that crossover may be the result of an indirect process including mediating and moderating variables such as coping styles, social support, and social undermining. For example, it has been shown that social undermining behaviors (i.e., to express negative affect, convey negative evaluation or criticism, or hinder the attainment of instrumental goals) mediate the crossover of depression from one partner to the other (e.g., Westman & Vinokur, 1998).

Several crossover studies have investigated the bi-directional process and found evidence for symmetric crossover effects between partners. For example, Westman and Etzion (1995) demonstrated the crossover of burnout (i.e., physical, emotional, and mental exhaustion) from army career officers to their spouses and vice versa, after controlling for the own and the partner's job demands and sense of control. In a similar vein, Hammer, Allen, and Grigsby (1997) found evidence for bi-directional crossover of WFI from husbands to wives and vice versa, after controlling for own work salience, work schedule flexibility, and family involvement. Furthermore, Westman and Vinokur (1998) found a direct crossover effect of depression from husbands to their spouses and vice versa after controlling for (or removing the effects of) life

events and social undermining. In a recent study, Tacheuchi, Yun, and Tesluk (2002) found bi-directional crossover of partner's general cross-cultural adjustment among expatriates. The bi-directional crossover effect has also been supported in studies using a longitudinal design. For example, Barnett, Raudenbush, Brennan, Pleck, and Marshall (1995) demonstrated that *changes* in distress (i.e., anxiety and depression) of one partner were mirrored in the *changes* in distress of the other. Note that all the studies that found evidence for bi-directional crossover were carried out among couples in which both partners were employed, except the study of Tacheuchi et al. (2002).

However, there are also several studies exclusively showing *uni*-directional crossover effects or no crossover at all. For instance, several studies have found unique effects of husbands' job stress on the well-being of their wives (Burke, Weir, & DuWors, 1980; Jackson & Maslach, 1982; Long & Voges, 1987; Rook, Dooley, & Catalano, 1991). Other studies have investigated the impact of women's employment, but not their specific job stress, and found negative effects of wives' employment on their husbands' strain (Haynes, Eaker, & Feinleib, 1983; Rosenfield, 1992; Staines, Pottic, & Fudge, 1986). Note that these latter studies neither specified which element of wives' employment was responsible for the crossover, nor did they control for the men's job stress levels. In a more elaborated study, Jones and Fletcher (1993) found that males' job demands crossed over to females' anxiety and depression after controlling for females' job stress, particularly among men working in highly stressful jobs. They did not find such an effect from wives to husbands. Thus, studies that found uni-directional crossover from husbands to wives were mainly focused on men and did not control for or include wives' levels of job or life stress.

All the studies reviewed so far investigated *negative* crossover, such as when job stress and strain of one spouse affects the job strain of the other spouse. However, just as negative aspects of the job may have a negative impact on one's partner's well-being, positive experiences may crossover to the partner as well (Westman, 2001). Because positive experiences and feelings are not merely the absence of stress (Fredrickson, 2001), investigating positive crossover may enhance theoretical thinking and make practical contributions to the crossover literature (Westman, 2001). The only study that examined the crossover of *positive* experiences (marital satisfaction), in addition to the transmission of negative experiences (exhaustion and psychosomatic complaints) found *no* empirical support for crossover (Mauno & Kinnunen, 1999).

Our final two hypotheses are (see also Fig. 1):

**Hypothesis 4.** There is bi-directional crossover of exhaustion between both partners.

**Hypothesis 5.** There is bi-directional crossover of life satisfaction between both partners.

The main reason why we predict *bi-directional* instead of *uni-directional* crossover effects is that our study was conducted among *dual-earner* parents, where both partners were working at least part-time. While it is conceivable that the crossover effect from husbands to wives is stronger than the other way around—since men work normally longer hours than women in The Netherlands and women have been found to be more

empathic than men (Larson & Almeida, 1999)—we have no reason to believe that the working conditions and well-being of women cannot influence the well-being of men.

## 2. Method

### 2.1. Participants

The participants in the study were 191 couples of dual-earner parents in The Netherlands. Of the 1000 questionnaires distributed, 407 were returned, resulting in a response rate of 41%. Twenty-five questionnaires could not be used in the analyses, because only one partner participated, thus leaving 382 questionnaires or 192 couples for data analyses. The demographic characteristics of these dual-earner parents are presented in Table 1. As can be seen, men were slightly older than the women: the average age of the men was 35.86 ( $SD = 4.70$ ) and of the women 33.64

Table 1  
Demographic characteristics of the dual-earner partners ( $N = 191$  couples)

Characteristic (%)	Men	Women
Age (years)		
24–30	12	21
31–35	35	46
36–40	37	27
41–51	16	6
Years in higher education		
0–4	6	8
5	24	22
6	4	3
9	22	38
10	44	29
Type of work <sup>a</sup>		
People	55	75
Things	23	5
Information	32	20
Leadership position		
Not supervisor	61	79
Supervisor	39	21
Working hours per week		
≤ 32 h/week	23	81
>32 h/week	77	19
Job tenure		
0–5	6	9
6–10	26	41
11–15	40	37
>15	28	13

<sup>a</sup> The differentiation between work with people, things or information/data is based on the Dictionary of Occupational Titles (DOT; US Department of Labor, 1977), which utilizes these three dimensions to evaluate the job complexity for every job.



( $SD = 4.66$ ) years. Of the couples, 90% had children younger than three years old who lived at home. Specifically, 45% had only one child, 38% had two children, 14% had three children, and 2% had four children. The most frequently mentioned level of education for women was college, whereas men had more often completed a University degree. Women worked more often with people (75%) than men did (55%). In addition, more men (39%) than women (21%) had a supervisory role. Both men and women had a regular day shift, with men working more hours than women (contractual hours per week; Men  $M = 37.14$ ,  $SD = 5.58$ ; Women  $M = 27.49$ ,  $SD = 7.38$ ). The majority of the participants was on payroll (Men 86%, Women 92%).

## 2.2. Procedure

The data were collected between September and December 2002 by means of one questionnaire, for each spouse separately. To ensure that both partners were working, participants were approached through the daycare center where they brought their child(ren). In total, nine different daycare centers participated in the study. The researchers left two identical questionnaires, one for each partner, in the pigeonhole of the children. This represents also the way in which the daycare centers spread information to the parents of the hosted children. The questionnaires were code-numbered to match the partners correctly. Despite this code numbering the participants remained unidentified as both questionnaires were answered anonymously. The partners were kindly requested to fill out the questionnaires independently. Respondents returned their questionnaires in closed envelopes to a special box placed in a central position at the entrance of the daycare center. The dual-earner parents provided information with respect to their own job demands and experienced well-being. A special feature of the study is that instead of measuring only self-reported WFI we asked participants to also provide information about the WFI of their partners.

## 2.3. Measures

*Work pressure* was measured with a short Dutch version (Furda, 1995) of Karasek's (1985) job content scale. This questionnaire has been validated in previous studies (e.g., Bakker, Demerouti, Taris, Schaufeli, & Schreurs, 2003). The scale includes three items that refer to quantitative, demanding aspects of the job (e.g., time pressure, working hard). A sample item is: "My work requires working very hard." Items are scored on a five-point Likert scale, ranging from (1) "never" to (5) "always."

*Emotional demands* were assessed with six items developed by Van Veldhoven and Meijman (1994; see also Van Veldhoven, De Jonge, Broersen, Kompier, & Meijman, 2002). The scale assesses whether employees have to deal with emotionally charged situations and whether they are confronted with events that touch them personally. An example item is: "Do you face emotionally charged situations in your work?" (1 = never, 5 = always).



*Partners' ratings of work-to-family conflict.* Participants were kindly requested to indicate the extent to which *their partners'* work negatively influences family life. The scale utilized in the current study includes three items from the Dutch questionnaire 'Survey Work-home Interference Nijmegen' (SWING; Wagena & Geurts, 2000). The shortened version has been validated in previous research (e.g., Demerouti et al., 2004). The items were adapted such that they did not refer to oneself but to the partner. An example item is 'How often does it happen that the work schedule of your partner makes it difficult for him/her to fulfill domestic obligations?' Responses could be made on a five-point scale (1 = never, 5 = always).

*Self-reported work-to-family interference.* The same scale and answer format was used to measure self-reported WFI. The employee was asked to indicate the extent to which his/her own work is negatively influencing the home situation. An example item is 'How often does it happen that your work schedule makes it difficult for you to fulfill your domestic obligations?' The correlation between self-reported WFI and the interference as rated by the partner was for men .57 and for women .53 ( $ps < .01$ ).

*Exhaustion* was measured with a subscale of the Dutch version (Schaufeli & Van Dierendonck, 2000) of the MBI-General Survey (Schaufeli, Leiter, Maslach, & Jackson, 1996). Several studies have shown that this instrument has good psychometric properties (e.g., Bakker, Demerouti, & Schaufeli, 2002; Leiter & Schaufeli, 1996). The exhaustion scale includes five items that refer to severe fatigue. Exemplary items are: "I feel used up at the end of the workday," and "I feel burned out from work." The items were scored on a seven-point rating scale (0 = never, 6 = always).

*Life satisfaction* was assessed with one single item: "How satisfied are you with your life in general?" (Lance, Lautenschlager, Sloan, & Varca, 1989). Participants were requested to indicate their life satisfaction on a 10-point rating scale ranging from 'very dissatisfied' (1) to 'very satisfied' (10).

The internal consistencies for all constructs are satisfactory (Cronbach's  $\alpha \geq .73$ ) and are displayed in Table 2.

#### 2.4. Data analysis

The matched responses of both partners were analyzed with covariance structure modeling (Jöreskog & Sörbom, 1993) using the AMOS 4 software package (Arbuckle, 1997). The maximum likelihood method of estimation could be used since all variables were normally distributed. To test the hypotheses, several nested models were compared by means of the  $\chi^2$  difference test (Jöreskog & Sörbom, 1993). Besides the  $\chi^2$  statistic, the analysis assessed the goodness-of-fit index (GFI), the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the Tucker–Lewis index (TLI).

The theoretical model we tested is presented in Fig. 1. As can be seen, job demands represented a latent factor with work pressure and emotional demands being their indicators. Exhaustion and WFI were modeled as latent factors with one indicator (i.e., the average scores of the scale items). We chose to use the single indicator rather than the multiple indicators (i.e., the scale items) because the latter would have resulted in a model with 36 manifest variables. According to Bentler and Chou

Table 2  
Means, standard deviations, Cronbach's  $\alpha$  (on the diagonal), and correlations among the study variables for Men ( $N = 191$ ) and Women ( $N = 191$ )

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
<i>Men</i>														
1. Work pressure M	3.24	.77	.83											
2. Emotional demands M	2.01	.58	.38**	.81										
3. WFI (other rating) M	2.06	.73	.34**	.38**	.73									
4. WFI (self-reports) M	1.98	.67	.39**	.56**	.57**	.78								
5. Exhaustion M	1.48	.78	.21**	.36**	.31**	.45**	.78							
6. Life satisfaction M	7.86	1.13	-.12	-.13	-.28**	-.23**	-.32**	—						
<i>Women</i>														
7. Work pressure W	2.96	.88	.18	.08	.09	.08	.05	.04	.86					
8. Emotional demands W	2.12	.66	.11	.25**	.15*	.22**	.16*	-.05	.32**	.83				
9. WFI (other rating) W	1.76	.70	.19**	.17*	.16*	.23**	.20**	-.13	.25**	.34**	.75			
10. WFI (self-reports) W	1.76	.61	.15*	.22**	.29**	.25**	.19**	-.14	.38**	.45**	.53**	.77		
11. Exhaustion W	1.76	1.01	-.05	.07	.09	.04	.21**	-.05	.23**	.38**	.38**	.53**	.86	
12. Life satisfaction W	7.69	1.19	-.02	-.16*	-.34**	-.17*	-.11	.44**	.07	-.10	-.12	-.24**	-.27**	—

Note. WFI, work-to-family interference; M, men; W, women.

\*  $p < .05$ .

\*\*  $p < .01$ .

(1987), for models with more than 20 variables it is very unlikely to find a well-fitting model. To control for random measurement error (for the single indicator constructs) the random error variance of job exhaustion and WFI was set equal to the product of the variance and the quantity minus the internal consistency (Jöreskog & Sörbom, 1993). Life satisfaction was also included as a latent factor with one indicator (the score on the item). Consequently, the random error variance is zero.

The hypothesized, full crossover–spillover model (displayed in Fig. 1) includes direct paths from job demands to exhaustion (cf. Hypothesis 1) and indirect paths through WFI (cf. Hypothesis 2). Moreover, job demands have indirect effects on life satisfaction, through WFI (cf. Hypothesis 3) and through exhaustion. This model also includes the crossover paths between the exhaustion of both partners and the life satisfaction of both partners (cf. Hypothesis 4 and 5). Finally, the job demands (the latent exogenous factor) and WFI as reported by the men and women were allowed to correlate. The theoretical reason for the former correlation is that the majority of the participants worked with people, which implies that they are probably confronted with similar/covarying job demands.

To test the mediation of WFI in the relationship between job demands and exhaustion, we followed the suggestions of Lehmann (2001) and compared the hypothesized model (including both direct and indirect paths from job demands to exhaustion through WFI) with a model in which the direct path from job demands to exhaustion was eliminated, i.e., the mediation model for exhaustion. In a final step, we eliminated the path from job demands to WFI and included only direct paths from job demands to exhaustion and from WFI to exhaustion (direct model for exhaustion). In a similar vein, to test the mediation of WFI in the relationship between job demands and life satisfaction, we compared the proposed model (including the indirect relationship between job demands and life satisfaction through WFI) with a model, which included additionally the direct path from job demands to life satisfaction (i.e., the partial mediation model for life satisfaction). Finally, we tested the direct model for life satisfaction, which included only the direct paths from job demands and from WFI to life satisfaction—without the path from job demands to WFI.

To test whether the crossover paths for both genders were significant, we compared the hypothesized model with two models in which we successively deleted one of the crossover paths.

### 3. Results

#### 3.1. Descriptive results

The means, standard deviations, and correlations of all study variables are presented in Table 2. Gender differences emerged for four of the five model variables. Men reported a higher work pressure than women ( $t(190) = 3.60, p < .001$ ), whereas women reported somewhat higher emotional demands than men ( $t(190) = -2.14, p < .05$ ). In addition, the WFI of men was higher than the WFI of women as rated by

partners ( $t(190)=4.39, p<.001$ ) as well as when it was self-reported ( $t(183)=4.01, p<.001$ ). Finally, women scored higher on exhaustion than men ( $t(190)=3.38, p<.05$ ). There were no significant differences between both genders regarding life satisfaction.

As can be seen in Table 2, both genders' exhaustion ( $r=.22, p<.01$ ) and life satisfaction ( $r=.46, p<.01$ ) correlated significantly, providing a first indication of covariation between the partners' responses. As Kenny (1996) suggests Pearson correlation or intraclass correlation can be utilized to investigate dyadic non-independence. The intraclass correlation is for exhaustion  $\rho=.20, p<.01$  and for life satisfaction  $\rho=.35, p<.001$ . Therefore, the data of the partners are non-independent, and the dyads instead of individuals separately should be analyzed to investigate the degree to which the partners influence one another regarding exhaustion and life satisfaction [i.e., reciprocal causation or mutual influence according to Kenny (1996)].

### 3.2. Test of the spillover and crossover model

We first report the findings for the hypothesized Spillover and Crossover Model using partners' ratings for WFI. As can be seen in Table 3, the model fitted reasonably well to the data. Inspection of the AMOS-output revealed that, for both genders and consistent with Hypothesis 1, job demands were positively related to exhaustion (Men:  $\beta=.43, p<.05$ ; Women:  $\beta=.43, p<.05$ ). In addition, job demands were strongly and positively related to other ratings of WFI (Men:  $\beta=.65, p<.001$ ;

Table 3

Fit indices for the spillover and crossover models using partner ratings for work-to-family conflict, maximum likelihood estimates,  $N=191$  couples

Model number and type	$\chi^2$	$df$	$p$	GFI	RMSEA	TLI	CFI	Comparison	$\Delta\chi^2$	$df$
1. Crossover-spillover	45.79	25	.007	.96	.07	.88	.93			
2. Mediation-exhaustion	61.61	27	.001	.94	.08	.81	.89	2 vs. 1	15.82**	2
3. Direct-exhaustion	107.86	27	.001	.91	.13	.55	.73	3 vs. 1	62.07**	2
4. Partial mediation-life satisfaction	43.04	23	.007	.96	.07	.87	.93	1 vs. 4	2.75	2
5. Direct-life satisfaction	106.97	25	.001	.91	.13	.51	.73	5 vs. 4	63.93**	2
6. Without exhaustion women → exhaustion men	50.75	26	.003	.95	.07	.86	.92	6 vs. 1	4.96*	1
7. Without crossover exhaustion	51.79	27	.003	.95	.07	.96	.92	7 vs. 6	1.04	1
8. Without life satisfaction women → life satisfaction men	47.45	26	.006	.91	.07	.88	.93	8 vs. 1	1.66	1
9. Without crossover life satisfaction	88.31	27	.001	.92	.11	.66	.80	9 vs. 8	40.86**	1
Null Model	346.87	45	—	.68	.19	—	—			

Note.  $\chi^2$ , chi-square;  $df$ , degrees of freedom; GFI, goodness-of-fit index; RMSEA, root mean square error of approximation; TLI, Tucker-Lewis index; CFI, comparative fit index; and  $\Delta\chi^2$ , chi-square difference. Exhaustion constrained = full crossover model in which the crossover paths between men's and women's exhaustion are constrained to be equal. Life satisfaction constrained = full crossover model in which the crossover paths between males' and females' life satisfaction are constrained to be equal.

\*  $p<.05$ .

\*\*  $p<.01$ .

Table 4

Fit indices for the spillover and crossover models using self-reports for work-to-family conflict, maximum likelihood estimates,  $N = 191$  couples

Model number and type	$\chi^2$	$df$	$p$	GFI	RMSEA	TLI	CFI	Comparison	$\Delta\chi^2$	$df$
1. Crossover–spillover	37.31	25	.054	.96	.05	.94	.97			
2. Mediation–exhaustion	37.37	27	.088	.96	.05	.96	.97	2 vs. 1	.06	2
3. Direct–exhaustion	168.87	27	.001	.87	.17	.41	.64	3 vs. 1	134.56**	2
4. Partial mediation– life satisfaction	34.02	23	.065	.97	.05	.95	.97	1 vs. 4	3.29	2
5. Direct–life satisfaction	167.76	25	.001	.87	.17	.36	.64	5 vs. 4	133.74**	2
6. Without exhaustion women → exhaustion men	43.92	26	.015	.96	.07	.92	.96	6 vs. 1	6.61**	1
7. Without crossover exhaustion	44.70	27	.017	.96	.06	.93	.96	7 vs. 6	.78	1
8. Without life satisfaction women → life satisfaction men	37.49	26	.067	.96	.05	.95	.97	8 vs. 1	.18	1
9. Without crossover life satisfaction	76.83	27	.001	.93	.10	.79	.88	9 vs. 8	39.34**	1
Null model	443.38	45	—	.63	.22	—	—			

Note.  $\chi^2$ , chi-square;  $df$ , degrees of freedom; GFI, goodness-of-fit index; RMSEA, root mean square error of approximation; TLI, Tucker–Lewis index; CFI, comparative fit index; and  $\Delta\chi^2$ , chi-square difference. Exhaustion constrained = full crossover model in which the crossover paths between men's and women's exhaustion are constrained to be equal. Life satisfaction constrained = full crossover model in which the crossover paths between males' and females' life satisfaction are constrained to be equal.

\*\*  $p < .01$ .

Women:  $\beta = .60$ ,  $p < .001$ ). WFI, in turn, was positively related to exhaustion only for women ( $\beta = .26$ ,  $p < .05$ ); for men, this path was not significant ( $\beta = .10$ ,  $ns$ ). This is preliminary evidence that Hypothesis 2 holds only for women. Moreover, for both men and women, exhaustion was negatively related to life satisfaction,  $\beta = -.27$ ,  $p < .05$ ;  $\beta = -.30$ ,  $p < .01$ , respectively. The path from WFI to life satisfaction was significant for men ( $\beta = -.32$ ,  $p < .01$ ) and non-significant for women ( $\beta = .10$ ,  $ns$ ), suggesting that Hypothesis 3 was confirmed only for men. Thus, the results showed that there were gender differences regarding the paths that initiated from WFI as rated by partners.

Calculating the proposed model using *self-reported* WFI showed comparable findings with some exceptions (cf. Table 4). First, WFI was significantly and positive related to exhaustion for both genders (instead for women only as was the case in the previous analysis). Second, WFI was unrelated to life satisfaction, while in the previous analysis we found a significant path for men. Finally, in contrast with the previous analyses, job demands were unrelated to exhaustion for both genders and their effect was completely mediated by WFI.

The proposed model as calculated using both partners' ratings and self-reports had standardized residuals  $< |2.00|$ , which indicates that there were no misspecifications in the model. Moreover, the modification indices suggested the addition of non-meaningful paths (e.g., between the errors of men's work pressure and women's exhaustion) again indicating that important relationships were not missing.

AMOS provides the so-called stability index for each reciprocal relationship. In general, stability indices below the value one indicate that the non-recursive model

has an admissible solution (Arbuckle, 1997). In the hypothesized model as calculated for partners' ratings and self-reported WFI, both stability indices regarding the reciprocal relationships between husbands' and wives' exhaustion as well as between husbands' and wives' life satisfaction were far below the value one. Of the two included crossover paths of exhaustion, only the path from wives' exhaustion to husbands' exhaustion was significant ( $\beta = .28, p < .05$ , in the model using partners' ratings of WFI;  $\beta = .26, p < .01$ , for the self-reports). Additionally, of the two crossover paths of life satisfaction, only the path from husbands' life satisfaction to wives' life satisfaction was (highly) significant ( $\beta = .64, p < .001$ , for partners' ratings;  $\beta = .35, p < .01$  for self-reports). Thus, Hypothesis 4 and 5 do not seem to hold.

### 3.3. Specific tests of mediation

To examine the mediating role of WFI in the job demands–exhaustion link (cf. Hypothesis 2), we compared the hypothesized model (Model 1) with the mediation–exhaustion model (Model 2), in which we eliminated the direct path from job demands to exhaustion for both genders. Using the partners' ratings of WFI, the comparison of Model 1 with Model 2 resulted in a significant deterioration of the model fit ( $\Delta\chi^2(2) = 15.82, p < .001$ ), supporting the direct *and* indirect relationship between job demands and exhaustion for both genders (see Table 3). Moreover, the proposed model was significantly better than the direct–exhaustion model (Model 3), in which the path from job demands to WFI was eliminated for both genders ( $\Delta\chi^2(2) = 62.07, p < .001$ ). Results for self-reported WFI were different (cf. Table 4), since the mediation–exhaustion model (Model 2) was not significantly worse than the proposed model (Model 1). This indicates that self-reported WFI fully mediated the job demands–exhaustion link. Moreover, the direct–exhaustion model (Model 3) was significantly worse than the proposed model. Thus, Hypothesis 1 was supported when using partners' ratings of WFI, but rejected when using self-reports of WFI. Hypothesis 2 was supported with both sources of information: job demands have an indirect effect on exhaustion through WFI.

To test whether WFI mediated the relationship between job demands and life satisfaction (Hypothesis 3) for both genders, we compared the partial mediation–life satisfaction model (Model 4) including both direct and indirect relationships with the proposed model (Model 1) including only indirect relationships. The comparison yielded a non-significant  $\chi^2$  difference value ( $\Delta\chi^2(2) = 2.75, ns$ ), suggesting complete mediation of partners' ratings of WFI in the relationship between job demands and life satisfaction. Additionally, the direct–life satisfaction model (Model 5) was significantly worse than Model 4, suggesting again full mediation. As can be seen in Table 4, results for self-reported WFI were identical suggesting again the superiority of the proposed model. More specifically, Model 4 was not significantly better than Model 1 for self-reported WFI ( $\Delta\chi^2(2) = 3.29, ns$ ). Thus, the tests of mediation provide support for Hypothesis 3 for both partners' ratings of WFI and self-reported WFI, suggesting that job demands influence life satisfaction through WFI.

3.4. Crossover relationships

According to Hypotheses 4 and 5, there is bi-directional crossover of exhaustion and life satisfaction between both partners. To further test whether exhaustion crosses over from women to men, we compared the hypothesized model (including all crossover paths) with a model without the crossover path of exhaustion from women to men (Model 6; see Tables 3 and 4). This comparison yielded a significant result ( $\Delta\chi^2(1) = 4.96, p < .05$  for partners' ratings;  $\Delta\chi^2(1) = 6.61, p < .01$  for self-reports), indicating that exhaustion indeed transfers from women to men. Eliminating additionally the crossover path of exhaustion from men to women did not result in a worse fit (Model 7–Model 6;  $\Delta\chi^2(1) = 1.04, ns$  for partners' ratings;  $\Delta\chi^2(1) = .78, ns$  for self-reports) suggesting that this path is not substantial. This indicates that exhaustion is crossing over from women to men. Thus, Hypothesis 4 is only partially supported.

The results regarding the crossover of life satisfaction are different. The comparison of the hypothesized model with the model without the crossover path of life satisfaction from women to men (Model 8) was non-significant ( $\Delta\chi^2(1) = 1.66, ns$  for partners' ratings;  $\Delta\chi^2(1) = .18, ns$  for self-reports) indicating that this path is not substantial. The model in which the crossover path of life satisfaction from men to women was also deleted (Model 9) yielded a highly significant result in comparison to Model 8, which included this path ( $\Delta\chi^2(1) = 40.86, p < .01$  for partners' ratings;

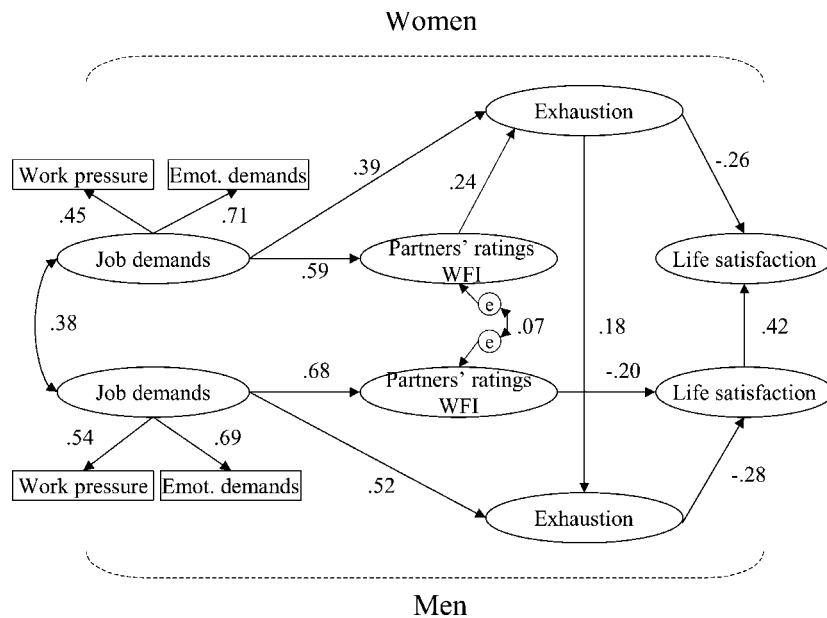


Fig. 2. Standardized solution (maximum likelihood estimates) of the spillover and crossover model for partners' ratings of WFI,  $N = 191$  couples. Note.  $\chi^2 = 49.49; df = 29; p = .010; GFI = .95; RMSEA = .06; TLI = .90; and CFI = .93.$



$\Delta\chi^2(1) = 39.34, p < .01$  for self-reports). This indicates that life satisfaction is crossing over from men to women. Thus, Hypothesis 5 is also partially supported.

### 3.5. Summary of findings

All significant relationships were included in a final model, which is graphically displayed in Fig. 2 (for partners' ratings) and Fig. 3 (for self-reports). The findings support Hypothesis 1 by showing that job demands have a negative relationship with exhaustion for both genders only when WFI is rated by the partner. When WFI is self-reported, job demands are unrelated to exhaustion. The relationship between job demands and exhaustion is mediated by WFI (cf. Hypothesis 2), for both partners' ratings and self-reported WFI, but only for women. For men, partners' ratings of WFI did not mediate the above-mentioned relationship since WFI and exhaustion were unrelated. While the tests of mediation provide support for Hypothesis 3, assuming that WFI fully mediates the job demands–life satisfaction relationship, the inspection of the paths suggests that Hypothesis 3 was supported only for men using the partners' ratings of WFI. This was due to the fact that the WFI–life satisfaction relationship was non-significant for women using partners' ratings of WHI and for both genders using self-reported WHI. Finally, as can be seen in Figs. 2 and 3, results showed that crossover of positive and negative feelings takes place among partners, but the relationships are *one-directional* instead of bi-directional. Women's exhaus-

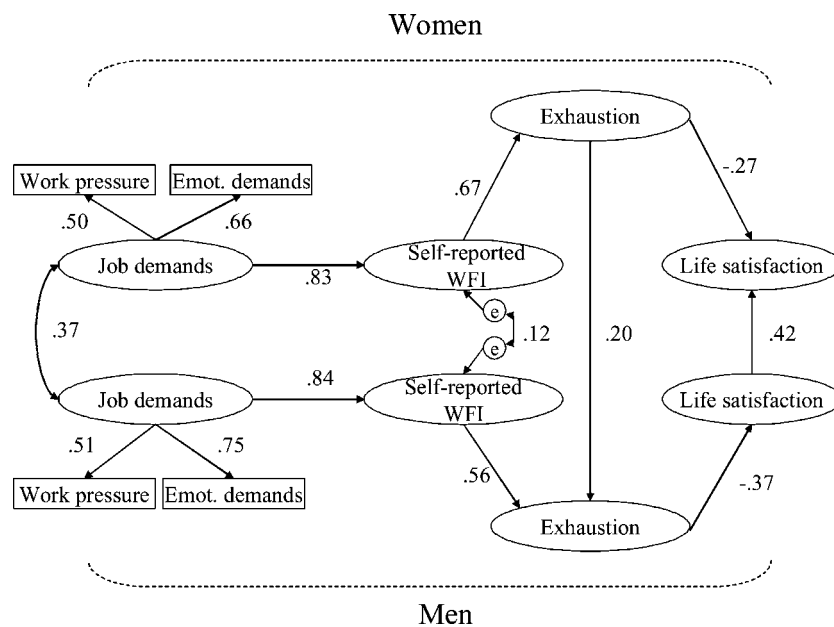


Fig. 3. Standardized solution (maximum likelihood estimates) of the spillover and crossover model for self-reported WFI,  $N = 191$  couples. Note.  $\chi^2 = 39.15$ ;  $df = 31$ ;  $p = .149$ ; GFI = .96; RMSEA = .04; TLI = .97; and CFI = .98.

tion marginally influences their husbands' exhaustion (cf. Hypothesis 4) and men's life satisfaction strongly influences their wives' life satisfaction (cf. Hypothesis 5).

#### 4. Discussion

##### 4.1. Mediating role of work-to-family interference

Consistent with previous research (Geurts & Demerouti, 2003; Lee & Ashforth, 1996; Maslach et al., 2001), individuals with highest work pressure and emotional demands had most trouble with combining work and family life, and reported highest levels of exhaustion. However, the mediating role of WFI between job demands and well-being was *not* consistently supported as predicted by our hypothesis and as has been found in previous studies (Barnett et al., 1999; Geurts et al., 1999; Kinnunen & Mauno, 1998; Kirchmeyer & Cohen, 1999). Partly responsible was the finding that WFI as rated by the partner of the focal person was unrelated to either exhaustion or life satisfaction for the two genders in the structural equation model. Specifically, WFI of men (as rated by their wives) was negatively related to their own life satisfaction and unrelated to exhaustion, whereas WFI of women (as rated by their husbands) was positively related to their own feelings of exhaustion at work and unrelated to life satisfaction. An explanation for these findings may be the fact that women in our sample more often had human service jobs, which are known for being emotionally demanding; such demands make employees more vulnerable to (emotional) exhaustion (Maslach, 1993). Indeed, the findings indicated that the women in our study scored significantly higher on emotional demands than men. Moreover, while for both genders the requirements for child care were high, since they were the parents of young child(ren), it seems plausible to assume that women took more responsibility for household chores and child care (i.e., they acted according to traditional gender roles; Hochschild, 1989). Thus, the process of recovery at home was presumably less effective for women (cf. Sonnentag, 2003), and consequently they ended up feeling more fatigued at work than men.

An alternative explanation for the inadequacy of WFI to mediate the hypothesized relationships for both genders might be the use of other's ratings (spouses), which diminished the effect sizes in the respective relationships (due to lower common method variance). However, this explanation does not seem to hold. The analyses using self-reported WFI showed that for both genders WFI indeed fully mediated the relationship between job demands and exhaustion but not the job demands–life satisfaction relationship. An intriguing finding is that when WFI is self-reported, job demands and exhaustion are unrelated which cannot be defended from an empirical and theoretical point of view (Demerouti et al., 2001; Lee & Ashforth, 1996). (The most probable reason for this finding is the fact that self-reported WFI has a strong overlap with job demands—particularly emotional demands—as well as with exhaustion and therefore the true relationships are overestimated.) Similarly, self-reported WFI did *not* act as a mediator between work pressure and exhaustion over time in a rigorous three-wave study of Demerouti et al. (2004).

Taken together, this suggests that when we utilize different data sources or apply longitudinal research designs we find that WFI is not as an important predictor of diminished well-being as is generally believed and confirmed by self-report and cross-sectional studies.

#### 4.2. Crossover of job exhaustion

One notable contribution of the present study is the examination of the influence of men's and women's work-related exhaustion and life satisfaction on their partners' well-being. The exhaustion of wives significantly predicted their husbands' exhaustion after controlling for the effect of males' job demands (work pressure and emotional demands). However, this effect was relative small. Constraining the paths from husband's exhaustion to wife's exhaustion and vice versa to be equal did not result in a significant worse fit than when both crossover paths were allowed to be different ( $\Delta\chi^2(1)=2.40, ns$ ). This indicates that the effect of wives' on husbands' exhaustion should be viewed as marginal and interpreted with caution. The small crossover effect from wives to husbands found in the present study is consistent with Westman and Etzion's (1995) study, who found that wives' physical, mental, and emotional exhaustion was a slightly stronger predictor of husbands' exhaustion than vice versa, though the difference in the reported effects was not significant (in their study: husbands'  $\rightarrow$  wives' exhaustion:  $\beta = .18$ ; wives'  $\rightarrow$  husbands' exhaustion:  $\beta = .28$ ).

Spitze (1988) offers interesting speculations about the possible consequences of women's employment for other family members' physical health. Employed wives may have less time available to provide physical care (although more money to pay for it). Indeed, several findings on the distribution of household labor generally suggest that wives' employment does lead to greater participation of husbands in the household (for an overview see Spitze, 1988), thus increasing their husbands' relative contribution. For instance, Pleck (1985) found that husbands of employed wives spend 1.8 more hours per week on household activities and 2.7 times more hours on child care than other husbands. Research in the eighties (the time when the number of dual-earner couples started to increase) shows that female labor force participation may have a negative effect on the mental health of men married to employed women (Ross, Mirowsky, & Huber, 1985). To conclude, since women experience higher levels of exhaustion than men, they may disclose their feelings of exhaustion to their husbands (cf. direct crossover) or they may demand from their husbands to be more involved in the household activities, enhancing in that way also the exhaustion of the men (cf. indirect crossover).

#### 4.3. Crossover of life satisfaction

In contrast to the crossover of exhaustion, life satisfaction of males was a strong and robust predictor of their wives' life satisfaction. Thus, wives seem to be sensitive to the positive well-being of their husbands and they seem to view the life satisfaction of their partners as a precondition of their own satisfaction.

The differences in these crossover effects between wives and husbands may be grounded in their gender role socialization. While women are not more satisfied with their lives than their husbands, it seems that their own level of life satisfaction depends on that of their partners. In contrast, men experience higher levels of WFI, probably because they work more hours than their wives; this experience of WFI makes them less satisfied with their life in general. However, their life satisfaction is fairly independent from the life satisfaction of their partners and they seem to base their life satisfaction more on work-related matters. This is in line with the observation that men are expected to be agentic and individualistic, while women are socialized to have a nurturing, caring orientation (Block, 1973). Research also demonstrates that women are more deeply affected by the stressful life events of significant others than men (Kessler & McLeod, 1984). As Baruch, Biener, and Barnett (1987) argue, the major stressor for wives and mothers is their obligation to “see to it that another person—spouse, child—is well and happy” (p. 131). Women’s sensitivity to their social world may account for their apparent greater susceptibility to their husbands’ life satisfaction (Galambos & Silbereisen, 1989).

#### 4.4. *Limitations*

It is also important to note some limitations of the current study. First, the design of the study was cross-sectional, which impedes us from making causal inferences. Therefore, we cannot exclude, for instance, that employees report a high level of work pressure or WFI because of their feelings of exhaustion. Second, despite the fact that our study included the partners’ ratings for WFI, we measured job demands using a self-report questionnaire. This increases the possibility of contamination of the reported relationships because of common-method variance as we saw in findings using self-reported WFI. However, similar relationships between job demands and exhaustion have been found in the study of Demerouti et al. (2001) using more objective measures of job demands, i.e., ratings of external observers. Thus, single-method bias for the measurement of job demands should not be considered a major drawback of this study.

Another possible drawback is that life satisfaction was measured with the use of one item. As Spector (1987) assumes, method variance might be more of a problem with single items than with scales. However, Wanous, Reichers, and Hudy (1997) concluded in their meta-analysis that single-item measures are more robust than the scales measures of overall job satisfaction. Also Diener (1984) found convergent validity between single-item and multi-item measures of global satisfaction and suggested that single-item measures are adequate if one desires a ‘brief measure of global well-being’ (p. 544). Scarpello and Campbell (1983) argue that single-item satisfaction measures may be more inclusive measures of overall satisfaction than summations of many-facet responses. While these authors suggest that the use of a well-constructed scale makes sense, single-item scales should not be considered a fatal flaw.

Finally, it can be argued that what we called crossover effects is merely covariation and similarity between partners’ ratings. This explanation is less applicable to

exhaustion because we found crossover effects between partners in fact after controlling for the effects of two well-documented predictors of exhaustion. The critic is more applicable to life satisfaction, which was not strongly related to any of the examined predictors. We need more systematic research on the causal factors of positive, work and non-work related well-being. However, we still found gender specific effects indicating that one partner acts as sender and the other as receiver of the attribute, while covariation would imply that both partners influence each other due to similarity.

## 5. Conclusions

Despite these limitations, this is one of the first studies to simultaneously consider both spillover and crossover effects among dual-earner parents. When wives are confronted with high job demands this will negatively interfere with family life and increase their feelings of exhaustion. These feelings of exhaustion may consequently be transferred to their husbands. When husbands are confronted with high job demands this will also negatively interfere with family life and eventually diminish their life satisfaction. This experience of life satisfaction will consequently be transferred to their wives. In other words, spillover is one of the reasons why parents become exhausted or dissatisfied with their life or both, and these states, in turn, are crossing over to their partners.

A clear contribution of our study was the evidence that both positive and negative experiences can be transmitted not only between the work and non-work domain (within the individual) but also *between* individuals. Previous research has shown that negative experiences at work can be transmitted to and inhibit family life as well as the other way around (Geurts & Demerouti, 2003), and that positive experiences at the non-work domain positively influence the functioning at work (Sonnentag, 2003). Moreover, studies on crossover have shown that negative experiences may crossover to colleagues (Bakker, Demerouti, & Schaufeli, 2003) and to partners (Westman, 2001). Consistent with Westman's contention, the present study showed that positive feelings may also crossover between partners, particularly from husbands to their wives. Therefore, the crossover of positive feelings among partners should be placed more prominently on the research agenda, to further examine, whether this crossover concerns only global experiences, as was the case in our study, or whether also work or family related, positive experiences may crossover, such as work engagement or marital satisfaction.

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