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A Longitudinal Panel Study on Antecedents and Outcomes of Work-Home

Interference

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Abstract

Theoretical models of the antecedents and outcomes of work-home interference (WHI) suggest that work characteristics (e.g., job stressors, working hours) increase the probability that an individual experiences work-home interference. Since work-home interference is considered as a role stressor, these experiences should be detrimental for long-term well-being. In this 2-wave panel study, the authors compared this suggested pathway with competing models that propose reverse causation and reciprocal effects in a sample of 365 employees (N at T2 = 130) from the German workforce using structural equation modeling. In particular, a model with two proposed antecedents (job stressors, working hours) of WHI and two proposed consequences (depression, turnover motivation) was analyzed in alternative configurations. The results support a cyclical model with a job stressors $\rightarrow$ depression $\rightarrow$ WHI $\rightarrow$ job stressors pathway. Furthermore, working hours affected WHI, and turnover motivation emerged as an outcome of WHI.

A Longitudinal Panel Study on Antecedents and Outcomes of Work-Home Interference

Work-home interference (WHI), that is, the experience of incompatibilities between work and nonwork roles, has become a concern for employees, companies, and scientists. In order to understand antecedents and consequences of WHI, scholars have developed a number of theoretical models (Carlson & Perrewé, 1999; Frone, Russell, & Cooper, 1992; Frone, Yardley, & Markel, 1997b; Kopelman, Greenhaus, & Connolly, 1983). Although these models focus on different details (e.g., predictive value of work stress, job involvement, or social support), they agree in their assumption that certain work characteristics lead to difficulties to enact in private or family activities (Burke & Greenglass, 1987; Edwards & Rothbard, 2000; Kahn, Wolfe, Quinn, & Snoek, 1964). Fortunately, at least a dozen longitudinal analyses (e.g., Demerouti, Bakker, & Bulters, 2004; Frone, Russell, & Cooper, 1997a; Kelloway, Gottlieb, & Barham, 1999) have increased the knowledge about causal dynamics in the WHI process. However, the studies had some limitations (e.g., the focus on outcomes of WHI instead of antecedents, and on individuals with partner and/or children), and thus, work-family conflict) which the present study attempts to overcome.

The present study tests a longitudinal model of antecedents (*working hours* and *job stressors*) and outcomes (*depression* and *turnover motivation*) of WHI and compares this model with four alternative models which propose different causal directions among the study variables (see Figure 1). The study extends prior longitudinal research by specifying a more complex model whereas former studies focused on single relationships such as the relationship between WHI and well-being or job stressors and WHI. Second, the study tests for both lagged and synchronous effects whereas the former studies only analyzed lagged effects. In the following sections, we first present a brief review of prior longitudinal research and then describe the theoretical models tested in this study. Table 1 presents the characteristics and results of prior longitudinal WHI studies relevant for our study.

Longitudinal research on WHI

Research focus

Of the 11 studies, three studies analyzed antecedents (e.g., work overload) and

outcomes (e.g., well-being) of WHI in combination (Demerouti et al., 2004; Leiter & Durup,

1996; Peeters, de Jonge, Janssen, & van der Linden, 2004). Of the remaining eight studies,

six only focused on the effects of WHI on well-being (Frone et al., 1997a; Grant-Vallone &

Donaldson, 2001; Hammer, Cullen, Neal, Sinclair, & Shafiro, 2005a; Kelloway et al., 1999;

Kinnunen, Geurts, & Mauno, 2004; van Hooff et al., 2005). With regard to possible

antecedents, four studies investigated job stressors as antecedents (Britt & Dawson, 2005;

Demerouti et al., 2004; Leiter & Durup, 1996; Peeters et al., 2004) and two analyzed working

hours (Britt & Dawson, 2005; Hammer, Neal, Newsom, Brockwood, & Colton, 2005b).

Time lag

Half of the studies applied a time lag of one year. The remaining used lags of six

months (Grant-Vallone & Donaldson, 2001; Kelloway et al., 1999), four months (Britt &

Dawson, 2005), three months (Leiter & Durup, 1996), and six weeks (Demerouti et al.,

2004). The longest time lag of four years was used by Frone et al. (1997a). Furthermore, with

the exception of two studies (Hammer et al., 2005a; Peeters et al., 2004), the studies

investigated only lagged effects. In analyses of lagged effects, the outcome measured at time

2 (T2) is regressed on the predictors measured at time 1 (T1) controlling for the outcome at

T1. Consequently, predictors explain the change of the outcome from T1 to T2. In contrast,

analyses of *synchronous* effects are adequate if the time the predictor needs to cause a change

is shorter than the investigated time lag (Finkel, 1995). In an analysis of synchronous effects,

the outcome at T2 is regressed on the predictors at T2 (instead of T1) controlling for the

outcome at T1. As the studies investigating lagged effects during a short time lag (Demerouti

et al., 2004; Grant-Vallone & Donaldson, 2001; Kelloway et al., 1999; Leiter & Durup, 1996)

found effects for antecedents and/or outcomes of WHI, analyses of synchronous effects could be fruitful in addition to lagged effects when applying longer time lags.

Comprehensiveness of the causal analyses

Zapf et al. (1996) criticized that many longitudinal studies on job stress did not fully utilize the longitudinal design and only investigate one causal direction - the traditionally hypothesized stressor - strain direction. The authors recommended to also investigate reverse causation and reciprocal effects. Of the 11 longitudinal studies, five studies investigated either the effects of antecedents (e.g., work hours, work overload) of WHI (Britt & Dawson, 2005; Hammer et al., 2005b) or the effects of WHI on outcomes (Frone et al., 1997a; Grant-Vallone & Donaldson, 2001; Hammer et al., 2005b). Six longitudinal studies also examined reverse causation (Demerouti et al., 2004; Kelloway et al., 1999; Kinnunen et al., 2004; Leiter & Durup, 1996; Peeters et al., 2004; van Hooff et al., 2005).

Method of analysis

Finally, 10 out of the 11 studies used either multiple regression or path analysis. Both methods use composite scores that imply attenuation of the relationships between variables. Additionally, it is not possible to consider over-time correlated measurement errors which are typical in longitudinal analyses. As a consequence, the autoregressions (i.e., stabilities) of the constructs are overestimated as the overall covariance between T1 and T2 is not separated into error covariance and covariance between the latent variables. There were only two studies (Demerouti et al., 2004; Hammer et al., 2005b) that used latent variable modeling and, hence, were able to address measurement error and correlated errors.

A further methodological topic not addressed is measurement invariance over time. Golembiewski, Billingsley, and Yeager (1976) among others argued that the comparison of constructs over time requires a consistency of measurement. Changes of measurement parameters are an indication of a change of meaning and validity of the used measures.

Therefore, panel analyses should examine measurement invariance over time.

The present study attempts to contribute to the field by applying a research design that addresses these topics (i.e., research focus, time lag, comprehensiveness, and method of analysis): First, we compare five theoretically plausible models that contain both antecedents (working hours and job stressors) and outcomes (depression and turnover motivation) of WHI and address reverse causation and reciprocal effects (see Figure 1). We focus on working hours and job stressors because these two are viewed as the most prevalent causes of WHI (i.e., time-based and strain-based interference; Greenhaus & Beutell, 1985). Second, we analyze lagged and synchronous effects using a time lag of one year. Third, by using latent variable modeling, we address correlated measurement errors and measurement invariance.

Theoretical models

The present study compares five models which propose a different causal sequence of working hours, job stressors, WHI, depression, and turnover motivation (see Figure 1). Before the models are explained, it should be noted that the models often differ only by some details (e.g., does WHI affect depression or vice versa) whereas other parts remain constant: For instance, we regard working hours as a predictor and turnover as a consequence of the respective mediator (WHI, depression, or stressors). Although it is possible that WHI, depression, or stressors influence working hours, we did not especially investigate working hours as a dependent variable. The same holds for turnover motivation which we only analyzed as a dependent variable. The reason was to keep the number of tested models at a reasonable limit. To avoid overlooking potential relationships not addressed in the theoretical models, we inspected information provided by the software about neglected paths. In order to avoid redundancy, the following description of the models is limited to those elements that differ across the models instead of describing every component.

Model A represents traditional theorizing about causes and consequences of WHI (see

Figure 1). With regard to the effects of working time and job stressors on WHI, Greenhaus and Beutell (1985) referred to the first form as time-based WHI and to the second as strain-based. Strain-based WHI occurs when "strain reduces personal resources (e.g., energy and physical or mental capacity)" (Edwards & Rothbard, 2000, p. 182) which makes it difficult to meet demands of the other domain. As WHI itself functions as a stressor, outcomes of WHI are mostly hypothesized within the classical stressor-strain framework (Kahn & Byosiere, 1992). In this regard, research on WHI has focused on well-being or behavioral outcomes of strain like turnover intentions or absenteeism (Allen, Herst, Bruck, & Sutton, 2000). Whereas most studies did not rely on explicit theory, those who did, most often draw from role stress theory (Kahn et al., 1964) which describes interrole conflict as resulting from incompatible role demands in two or more domains. In contrast, a minority of the studies (e.g., Grandey & Cropanzano, 1999) relied on theories, such as the conservation of resources theory (Hobfoll, 1989), which describes stress in terms of loss of resources. Applied to WHI, long working hours and job stressors make it difficult to fulfil private demands. Because meeting private role demands is associated with rewards (e.g., praise, positive self-esteem), WHI implies the loss of these rewards (Edwards & Rothbard, 2000).Similarly, identity theory (Burke, 1991; Thoits, 1983) suggests that WHI threatens social identities by impeding opportunities to meet role demands. The literature provides a number of theoretical models on antecedents and outcomes of WHI (e.g., Carlson & Perrewé, 1999; Frone et al., 1992; Frone et al., 1997b; Kopelman et al., 1983) which – although focusing on different specific antecedents and outcomes of WHI – can be traced back to the traditional stressor-strain framework.

Model B differs from Model A as it proposes a reverse causal direction underlying the relationship between WHI and depression (see Figure 1). Whereas Model A proposes that WHI influences depression and, thus, mediates the effects of working hours and job stressors, Model B states that WHI is a consequence of depression (cf. Kelloway et al., 1999). Several

mechanisms for a reverse causation are likely: First, depression may function as an affective disposition that influences the perception or report of stressors such as WHI (Kelloway et al., 1999). This mechanism is similar to the role of negative affectivity in the assessment of job stressors (e.g., Spector, Zapf, Chen, & Frese, 2000). Recently, Kelloway et al. (1999) noted that "affective states (e.g., depressive mood) can increase the availability of thoughts and information that are consistent with the mood state" (p. 338). In this regard, depressive mood could heighten the salience of events where work interferes with nonwork and increases the availability of memories of such events. Second, the underlying mechanism between an effect of depression on WHI may consist of a combination of reduced effectiveness at home and attribution of this reduced effectiveness on work (Kelloway et al., 1999). Depressive individuals experience a lack of motivation (Layne, Lefton, Walters, & Merry, 1983) and tend to rumination and worries (Muris, Roelofs, Rassin, Franken, & Mayer, 2005) which implies the allocation of resources to nonaction oriented foci (Kuhl, 1992). Consequently, depression should lead to difficulties to perform private activities, which is likely to be attributed to work as a probable cause. Because Model B suggests job stressors as an antecedent of depression, this attribution may actually be correct. Given the correctness of this model, the status of depression should be interpreted within the concept of strain-based WHI (Greenhaus & Beutell, 1985) instead as an outcome of WHI. A further difference of this model to Model A is that it proposes depression as the immediate outcome of job stressors and working hours and turnover motivation as an outcome of depression.

Model C adds a second reverse causation hypothesis as it suggests an effect of WHI on stressors. Hence, Model C implies a complete reversal of the traditionally proposed stressor $\rightarrow$ WHI $\rightarrow$ depression sequence. Again, there are several possible mechanisms for such an effect. First, WHI could cause work behavior that increases stressors (e.g., absenteeism, low performance, social conflicts) or leads to the selection into jobs which are

characterized by more stressors. Demerouti et al. (2004) referred to the latter as an example of the "drift hypothesis" that states that people with health problems get worse jobs (Zapf et al., 1996). This process concerns a change in the objective work environment. Second, WHI implies a negative evaluation of the work-nonwork interface that is related to job dissatisfaction (Kossek & Ozeki, 1998). As in the case of depression and WHI, dissatisfaction could affect the perception of job stressors. In contrast to the first mechanism, this second process implies unchanged objective stressors. As a final aspect, Model C postulates an effect of stressors on depression as is proposed in models of stress at work.

According to Model D, depression affects WHI and job stressors which in turn affect turnover motivation. Whereas WHI is partly determined by the individual's working hours and, thus, is based on actual work features, the model views job stressors (and partly WHI) as a result of depression. The rationale for this reverse causation can be either seen in a bias of perceiving or reporting stressors (cf. Model B) or as a result of the aforementioned downward drift (Zapf et al., 1996), that is, the deterioration of the working conditions.

Finally, Model E proposes the most complex structure of relationships among the study variables. It relies on the traditional perspective of WHI in its proposal of a job stressors $\rightarrow$ WHI $\rightarrow$ depression sequence. In addition, Model E incorporates reciprocal effects between WHI and depression and, thus, considers not only an effect of WHI on depression but also the reverse. Finally, the model allows direct effects of job stressors on both WHI and depression in contrast to Models A and B where job stressors are allowed to either influence WHI or depression. Recently, Demerouti et al.(2004) found support for a reciprocal relationship between WHI and exhaustion in a three-wave longitudinal study.

<div align="center">Method</div>

Sample

At T1, 365 individuals participated in the study. This sample came from two sources.

The larger part (n = 248) stemmed from a research project using a survey (N = 1,677) from the German working population (Steinmetz, Schmidt, Tina-Booh, Schwartz, & Wieczorek, in press). This original sample was gained by random digit dialing (i.e., calling randomly selected individuals by telephone). The 248 individuals were the result of 515 participants of this survey who had expressed their willingness to participate in a further study. Data of these 248 individuals were gathered by mailed questionnaires. The other part of our sample (n = 117) was recruited at a local hospital and by requesting university employees and students to distribute questionnaires to working acquaintances. We pooled both data sets as multigroup confirmatory factor analyses had shown invariance of the complete set of factor loadings and latent covariances (with the exception that the covariance of working hours and job stressors was larger in the second subsample).

Sixty-two percent of the participants were women. The mean age was 39.8 years (SD = 10.5) and ranged from 17 to 61 years. At T2 (i.e., one year later), 130 of the original participants again took part in the study. The sample consisted of a variety of different occupations from various industries (e.g., public service, manufacturing, health care, craft). The sample at T2 consisted of 60% women; the mean age was 41.6 years. When comparing the individuals who participated in both waves with the individuals who dropped out after the first wave, we found a significantly lower mean age and a higher average turnover motivation for drop-out cases (effect sizes: r = .13 for age and r = .12 for turnover motivation). The rest of the model variables showed nonsignificant differences.

Measures

Job stressors. We measured role ambiguity, time pressure, and organizational obstacles as facets of a job stressors index. Each stressor was measured with three items respectively using a scale by Zapf (1991). Examples are "how often do you get unclear assignments?" (role ambiguity), and "how often do you work under time pressure?" (time

pressure). The rating format for role ambiguity ranged from 1 (*very rarely/never*) to 5 (*often - one or two times per day*) and for time pressure from 1 (*rarely/never)* to 5 (*often - almost continuously*). Organizational obstacles were measured on a bi-directional 5-point Likert scale that reflects the participant's similarity to two opposing virtual employees indicating the low pole (e.g., "employee A works with excellent material, supplies, or tools") vs. high pole (e.g., "employee B works with insufficient material, supplies, or tools") of organizational obstacles. The response options ranged from 1 (*exactly like employee A*) to 5 (*exactly like employee B*). Cronbach's alpha for role ambiguity was .76 (T1) and .77 (T2). For time pressure, Cronbach's alpha was .81 (T1) and .85 (T2). We did not calculate Cronbach's alpha for organizational obstacles which was conceptualized as a formative construct (Bollen & Lennox, 1991) determined by some facets (e.g., insufficient tools). The stability of the overall stressor index was .73.

Working hours. We asked respondents when they had started and ended working during the last two weeks and calculated average weekly working time based on these data.

Work-home interference. We used three items from Netemeyer, Boles, and McMurrian's (1996) scale to measure WHI. A sample item is "Things I want to do at home do not get done because of the demands my job puts on me". Response options ranged from 0 (*totally disagree)* to 4 (*totally agree)*. Cronbach's alpha was .88 (T1) and .89 (T2).

Depression. We measured non-pathological depression (e.g., "I experience sad moods") with three items developed by Zung (1965) adapted by Mohr (1986) on 7-point Likert scales ranging from 0 (*never*) to 6 (*almost always)*. Cronbach's alpha was .71 (T1) and .72 (T2).

Turnover motivation. We used three items addressing *turnover cognitions* ("how often do you think of quitting your job?"), *search behavior* ("how often have you recently looked for another job (e.g., by reading the newspaper or asking acquaintances)?"), and *turnover*

intention ("how probable is it that you will quit your job during the next year?"). The cognition and the intention item were developed by Schaubroeck, Cotton, and Jennings (1989); the search behavior item was self-developed. Responses for the turnover cognitions and search behavior item ranged from 0 (*almost never*) to 4 (*almost everyday*); and responses for the intention item ranged from 0 (*very unlikely*) to 4 (*very likely*). Cronbach's alpha for the three items was .78 (T1) and .81 (T2).

Modeling procedure

The various models were analyzed with LISREL 8.54 using the covariance matrix of the indicators as input matrix and maximum likelihood as estimator. The sample size was the median of the cells of the covariance matrix (N = 188).

Measurement model. We specified a longitudinal measurement model that contained the latent variables from both waves. WHI, depression, and turnover motivation were latent variables which were reflected by three manifest items, respectively. We specified covariances between the error of each measured indicator at T1 and its respective part at T2 (Kenny & Campbell, 1989). Working hours and job stressors were single indicator variables with factor loadings fixed to one and zero measurement error. Job stressors were represented by the mean of the time pressure, role ambiguity, and organizational problems measures. We tested for measurement invariance in a sequence of nested models (Golembiewski et al., 1976; Millsap & Hartog, 1988) where factor loadings, latent variances and covariances were successively restricted to be equal across both waves. Tests of invariance were conducted by investigating if this equality restriction led to a significant increase of the chi-square value.

Structural models. The five models (see Figure 1) were autoregressive models (Finkel, 1995), where the dependent variable at T2 (e.g., WHI) is regressed on the same variable at T1 in addition to an proposed antecedent (e.g., job stressors). This autoregression enables predicting the change in the dependent variable from T1 to T2. The analysis of five

models and two sorts of effects (lagged vs. synchronous) resulted in 10 analyzed models. We

evaluated the fit of each model with the chi-square statistic, the root mean square error of

approximation (RMSEA), the squared root mean residual (SRMR), the comparative fit index

(CFI), and the Akaike information criterion (AIC). Adequate fit (Hu & Bentler, 1999) was

indicated by < .06 for the RMSEA, < .08 for the SRMR, and > .95 for the CFI. Moreover, the

model with the lowest AIC was preferred.

<div align="center">Results</div>

Descriptive results

Table 2 depicts the means, standard deviations, and latent correlations of the study

variables. Job stressors, working hours, depression, and turnover motivation substantially

correlated with WHI - within and across both waves. Especially, working hours and job

stressors showed large correlations with WHI ($r = .42$ and $r = .46$, respectively). The mean of

WHI was 1.42 and remained stable during the year. The means of the other variables were

similar as they were all situated in the lower part of the scale. Finally, the stabilities of

working hours ($r = .85$), job stressors ($r = .73$), and WHI ($r = .82$) were quite large compared

to depression ($r = .62$) and turnover motivation ($r = .61$).

Measurement models

The fit of the measurement model was moderate ($\chi^2(159) = 288.63$; RMSEA = .066;

CFI = .963; SRMR = .056; AIC = 476.63) with especially the RMSEA being slightly above

the recommended .06. The modification indexes pointed to a residual covariance between one

turnover motivation item (i.e., search behavior) and the turnover intention one year later. We

specified this covariance because this relationship suggests a long-term effect of job search

behavior on the turnover intention. The resulting model was adequate ($\chi^2(158) = 257.64$;

RMSEA = .058; CFI = .968; SRMR = .055; AIC = 447.64). The model had standardized

factor loadings ranging between .55 and .92 (mean =.79). The composite reliability (Fornell

& Larcker, 1981) of the measures ranged from .78 to .92. The tests of measurement

invariance resulted in full invariance of the factor loadings (difference between the model and

the former, completely free, model: $\Delta\chi^2(6) = 9.32$, $p > .05$), latent variances ($\Delta\chi^2(5) = 6.93$, p

$>.05$), and covariances ($\Delta\chi^2(10) = 8.98$, $p > .05$). Taken together, the analyses showed a

complete stability of loadings and latent variances and covariances across both waves.

Structural Models

      Table 3 depicts the fit indexes of the structural models. Of all tested models, those

with lagged effects were inferior to the models with synchronous effects. Regarding the

synchronous effects models, Model C showed the best fit ($\chi^2(183) = 303.67$; RMSEA = .059;

CFI = .964; SRMR = .065; AIC = 443.63). Figure 1 depicts the standardized path coefficients

of the synchronous effects models. It should be noted that the coefficients refer to predictions

of change. In Model C, working time ($\beta = .12$, $p < .05$) and depression ($\beta = .19$, $p < .05$) had

effects on WHI which again led to an increase of stressors ($\beta = .19$, $p < .01$) and turnover

motivation ($\beta = .24$, $p < .01$). Furthermore, job stressors were related to depression ($\beta = .14$, p

$< .05$). The modification indexes did not point to overlooked other significant effects.

Discussion

      This study compared five longitudinal models proposing different directions of causal

effects among working hours, job stressors, WHI, depression, and turnover motivation. The

results supported a model with synchronous effects in which WHI is predicted by depression

and itself predicts the perception of job stressors. Furthermore, the results indicate a

mediation of WHI in the relationship between working hours and turnover motivation. The

effect sizes were substantial given the longitudinal design of the study. Especially, the

prediction of the highly stable WHI by working hours and depression is notable. In contrast

to common thinking (Allen et al., 2000), depression did emerge as an antecedent of WHI

instead as its outcome. The mediating position of depression linking job stressors and WHI

suggests a function of depression in the development of strain-based WHI (Greenhaus & Beutell, 1985). The most notable result was the emergence of a vicious circle of job stressors, depression, and WHI. Because WHI increased the perception of job stressors, it introduced a positive feedback loop by again increasing strain-based WHI over stressors and depression. To our knowledge, only one of the longitudinal studies (Demerouti et al., 2004) found a reverse effect of WHI on stressors. Unfortunately, given the use of subjective measures, such an effect is difficult to interpret. It is likely that WHI leads to an increase in actual stressors or only the perception of actually unchanged stressors. In any way, these results imply that WHI influences perception of the workplace. It is likely that this effect of WHI is not limited to job stressors and can also concern the psychological climate, perceived behavior of coworkers or supervisors, trust, and experienced fairness, etc. It is conceivable that individuals hold expectations about how much the organization should enable a smooth integration of work and nonwork, which when violated leads to the negative evaluation of the workplace.

To understand the relationship between WHI and well-being, the time lag should be considered. As our study, which found a synchronous effect of well-being on WHI, studies that applied short time lags (six to twelve weeks) also found an effect in the same direction (Demerouti et al., 2004; Kelloway et al., 1999; Leiter & Durup, 1996). Those studies, however, that investigated lagged effects in a one-year time lag, found an effect of WHI on well-being (Kinnunen et al., 2004; Peeters et al., 2004; van Hooff et al., 2005). Hence, the overall evidence seems to point to a short-term effect of well-being on WHI as well as a long-term effect of WHI on well-being. The short-term effect corresponds to the concept of strain-based conflict and reflects work-related strain that leads to problems in performing nonwork behavior. The long-term effect reflects a change in well-being as a reaction to durable problems in performing nonwork behavior.

The effect of WHI on turnover motivation highlights the practical importance of

considering WHI. The decrease of the mean of turnover motivation between both waves suggests that a substantial amount of individuals actually had left their firms. Therefore, the true effect is perhaps even larger. It is likely that organizational support practices will be an important issue for individuals to consider when selecting a place for work in the future. In Germany, working part-time is a strategy of expectant mothers to cope with anticipated WHI which implies, in particular for highly educated women, the loss of educational resources. It can be assumed that individuals with less rigid role duties than parents will rather lower their standards or desires for nonwork activities (Hall, 1972) than to leave the organization. In the case, however, that the number of job offers will increase during the next decades, organizational support policies could become an important competitive factor in the search for talented employees. However, practical solutions do not necessarily have to decrease working time or stressors to reduce WHI. For instance, Smith-Major, Klein, and Ehrhart (2002) showed that expectations of supervisors and coworkers about time spent at work had an indirect effect on WHI mediated by actual working time as well as a strong direct effect. The direct effect could signify that expectations per se denote a threat to desired levels of nonwork time which is reflected in the currently experienced WHI. Such a process implies that WHI not only results from an actual interference of two roles but from an anticipated interference or a perceived contradiction of different role expectations. In this regard, high expectations could turn into a doubled edged sword by increasing an employee's engagement while at the same time threatening nonwork related desires and goals. Future research should investigate the cognitive processes involved in the experience of WHI.

Limitations and future research

This study has some limitations that should be discussed. As discussed in the introduction, we held the number of analyzed models small. In particular, we only considered working time duration as an antecedent and turnover motivation as an outcome. Furthermore,

we tested all effects as either lagged or synchronous and did not consider models were some variables have lagged and others have synchronous effects. During all of the analyzed models, however, we carefully inspected if there were any significant effects – for instance effects *of* turnover motivation, effects *on* working time duration, or mixtures of lagged and synchronous effects - that might have been overlooked. As the analyzes showed, the final model C was not only superior with regard to model fit but also was the only model with a complete set of significant effects (see Figure 1). None of the models revealed any lagged effects so that the possibility that a mixture of lagged and synchronous effects would have led to a better fit can be ruled out. In a similar fashion, working time only emerged as an antecedent as well as turnover motivation only emerged as outcome.

As a second methodological issue, we have to acknowledge that the sample size was small. A sufficient sample size is important for proper parameter estimation and for the significance tests (i.e., power). To establish the properness of the estimations, we limited the complexity of the models and used a minimum of indicators with high factor loadings which can compensate for a small sample size (Boomsma & Hoogland, 2001). With regard to the significance tests of the regression coefficients, there is the possibility that low power decreased the chance to find significant effects in the alternative models. However, since we did find significant effects in Model C, we regard it as unlikely that low power caused the non-significant effects in the alternative models.

We would further like to point out some theoretical aspects. Scholars agree that there are two forms of WHI, namely time-based and strain-based WHI. This study, however, only addressed an overall evaluation of WHI that comprised both forms. However, we used a well-known scale of WHI that contains items of both forms, and this scale has been shown to be unidimensional (Netemeyer et al., 1996). The three items used as indicators in this study also referred to both forms of conflict, and as our results have shown, we also found one factor

with equal factor loadings. Although a two-factor solution can be found when using subsets of items referring to both forms (e.g., Carlson, Kacmar, & Williams, 2000), it is perhaps more reasonable to expect consequences of WHI conceptualized as an overall representation of several forms of conflicts. On the other hand, it is possible that the time-based and strain-based conflict differ in their effects on well-being. For instance, individuals might experience time-based conflict in a stronger sense as an external restriction that is beyond one's control. Simply investigating differences between time-based and strain-based conflict in their relationships with outcomes, however, is questionable without controlling for stressors and strain. Otherwise, a potentially higher effect for strain-based conflict can simply be attributed to the higher strain and not to differences in conflict. In addition - although we appreciate efforts to differentiate forms of conflict - we feel that time-based vs. strain-based conflict rather refer to different causes of the conflict (time vs. strain) instead of different kinds of conflict. Future research should theoretically derive the different ways how performance in one domain can be impaired by the other. For instance, a conflict may lead to the omission of an activity or may consist in lack of enjoyment. These different kinds may be associated with time and strain but they are not the same as time-based and strain-based conflict. For instance, individuals can decide to cancel a planned activity due to work time restrictions or exhaustion. Fruitful in this regard may be evidence about most prevalent situations where conflicts occur. Diary studies and qualitative research could be helpful to shed some light in this issue. Similarly, some scholars (e.g., Premeaux, Adkins, & Mossholder, 2007) emphasize the multi-role nature of WHI and suggest that there are many activity domains which can be impaired by demands from the other domain. Results from our own qualitative pilot study suggests that the WHI of employed mothers often refers to reduced possibilities to fulfil their own needs (e.g., reading a book, visiting friends) instead of child care responsibilities. Thus, after decades of collecting data about relationships between WHI and other variables, hence,

research should re-focus on the WHI construct itself and increase its clarification. As the focus of WHI can differ in its abstraction level, the question arises how role-specific forms of conflict (e.g., child-care related conflict) are related to global forms and which forms of specific conflict have the strongest impact on global WHI. Although we argued that a global perception of conflict should be most detrimental for well-being, it is also possible that some specific forms are more harmful than others. In such a case, focusing on overall WHI would aggregate different effect sizes and, thus, lead to lower or even significant effects for overall WHI. Hence, future research should investigate the relationship between specific forms and dependent variables together with those of global forms (for instance, by building formative models with specific forms of conflict as causal indicators, cf. MacKenzie, Podsakoff, & Jarvis, 2005). In addition, future research should identify moderator variables that indicate a differential role of WHI for well-being. For instance, Carr, Boyar, and Gregory (2008) found that work vs. family centrality moderated the relationship between WHI, job satisfaction and turnover motivation. In the same manner, it is likely that individuals with high family centrality suffer from WHI while others do not.

As a final limitation of our study, we have to acknowledge that we focused on only one direction of WHI, namely work-to-home inference. This focus reflected our interest on consequences of working hours and job stressors. It is well accepted, however, that private life can also impair successful functioning at work (i.e., home-to-work interference; HWI), although the prevalence of WHI has been shown to be higher than the prevalence of HWI (Frone et al., 1992). The higher prevalence of WHI also led us focus on WHI but should not imply that it is unimportant to investigate both directions. All the aforementioned issues, of course, are valid for this direction of conflict and deserve further investigation.

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Table 1

Characteristics of Longitudinal Studies on WHI

Study	N	Method	Antecedents of WHI	Consequences of WHI	Time lag	Causal analyses[a]	Results
Leiter & Durup (1996)	151	Path analysis	Work overload	Dysphoric mood burnout (emotional exhaustion, depersonalization, lack of accomplishment	3 months	a), b), c)	Reciprocal effects between WHI and emotional exhaustion; effect of WHI on dysphoric mood; no effects of work overload
Frone et al. (1997a)	1933	OLS regression	not analyzed	Depression, physical well-being, hypertension, heavy alcohol use	4 years	a)	WHI was only related to alcohol use
Kelloway et al. (1999)	236	Path analysis	not analyzed	Perceived stress, turnover intention	6 months	a), b)	Reverse effects of perceived stress on WHI
Grant-Vallone & Donaldson (2001)	342	OLS regression	not analyzed	Well-being (life satisfaction)	6 months	a)	Effect of WHI on well-being
Demerouti et al. (2004)	335	SEM	Work pressure	Exhaustion	6 weeks	a), b), c)	Reciprocal effects of WHI, exhaustion, and work pressure
Kinnunen et al. (2004)	429	OLS regression	not analyzed	Work and family satisfaction, psychological and physical well-being	1 year	a), b)	Effect of WHI on all dependent variables for women; effect of satisfaction and well-being on WHI for men

Table 1-Continued

Study	N	Method	Antecedents of WHI	Consequences of WHI	Time lag	Causal analyses[a]	Results
Peeters et al. (2004)	383	OLS regression	Job stressors	Exhaustion and psychosomatic complaints	1 year	a), b)	Effect of job stressors on WHI and exhaustion Effect of WHI on exhaution No effect on psychosomatic complaints No reverse effects
Van Hooff et al. (2005)	730	Path analysis	not analyzed[b]	Depression and fatigue	1 year	a), b), c)	Effect of strain-based WHI on depression and fatigue; no effect of time-based WHI
Britt & Dawson (2005)	493	OLS regression	Work overload Work hours Days of training Hours of sleep Depression Physical symptoms Morale Job attitudes	not analyzed	4 months	a)	Overall sample: Effects of physical symptoms Subsample (married soldiers with children): Effects of physical symptoms and two job attitudes (job satisfaction and job significance)
Hammer, Cullen et al. (2005a)	468	OLS regression	not analyzed	Depression	1 year	a)	No effect
Hammer, Neal et al. (2005b)	418	SEM	Work hours Organizational support Number of children Parent care hours	not analyzed	1 year	a)	No effects on WHI

Note. Some of the studies focused on work-family conflict as a specific form of WHI but are subsumed here under the term WHI; considered variables were only those relevant for the present study; [a]Causal analysis: a) analysis of one postulated direction (i.e., analysis of either antecedents' effects on WHI, or WHI's effects on outcomes), b) analysis of reverse causation, c) analysis of reciprocal effects

Table 2

Descriptive Statistics of Model Variables

	M	SD	Range	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Working hours T1	38:35	13:59	3 – 90									
2. Job stressors T1	2.74	.67	1 – 5	.30**								
3. WHI T1	1.42	.91	0 – 4	.42**	.46**							
4. Depression T1	1.57	1.02	0 – 6	.02	.29**	.25**						
5. Turnover motivation T1	.69	.83	0 – 4	.13	.29**	.31**	.29**					
6. Working hours T2	38:41	12:50	7 – 73	.85**	.25**	.39**	.12	.20**				
7. Job stressors T2	2.71	.67	1 – 5	.34**	.73**	.48**	.25**	.33**	.32**			
8. WHI T2	1.48	.96	0 – 4	.36**	.33**	.82**	.34**	.29**	.42**	.41**		
9. Depression T2	1.66	.91	0 – 6	.07	.26**	.25**	.62**	.20*	.15*	.31**	.39**	
10. Turnover motivation T2	.59	.78	0 – 4	.24**	.28**	.36**	.21**	.61**	.29**	.40**	.39**	.33**

Note. M = manifest mean, SD = standard deviation; * $p < .05$, ** $p < .01$ (one-sided)

Table 3

Fit Indexes of the Structural Models

| Latent variable	χ^2 (df)	RMSEA	SRMR	CFI	AIC
Stability model[a]	367.77 (188)**	.072	.093	.955	497.77
Models with lagged effects					
A (stressors → WHI → depression)	346.94 (184)**	.069	.077	.958	484.94
B (stressors → depression → WHI)	354.86 (184)**	.071	.082	.956	492.86
C (feedback loop with depression, WHI, and stressors)	332.67 (183)**	.061	.070	.961	472.67
D (depression → stressors, WHI)	344.24 (183)**	.067	.075	.958	484.24
E (stressors → WHI, depression; reciprocal effect of WHI and depression)	335.23 (181)**	.068	.071	.959	479.23
Models with synchronous effects					
A (stressors → WHI → depression)	327.81 (184)**	.065	.073	.960	465.81
B (stressors → depression → WHI)	324.50 (184)**	.064	.075	.961	462.50
C (feedback loop with depression, WHI, and stressors)	303.63 (183)**	.059	.065	.964	443.63
D (depression → stressors, WHI)	310.59 (183)**	.061	.070	.963	450.59
E (stressors → WHI, depression; reciprocal effects of WHI and depression)	310.52 (181)**	.062	.069	.962	454.52

*Note.***p* < .01; [a]The stability model only contains the stabilities of the latent variables but no lagged or synchronous effects; RMSEA = root mean square of approximation, SRMR = square root mean error of approximation; CFI = comparative fit index; AIC = Akaike information criterion
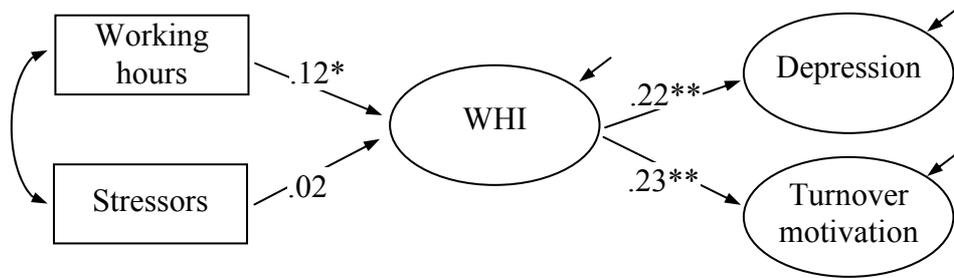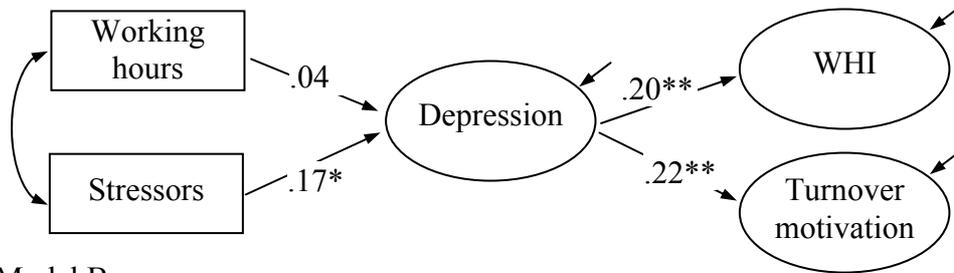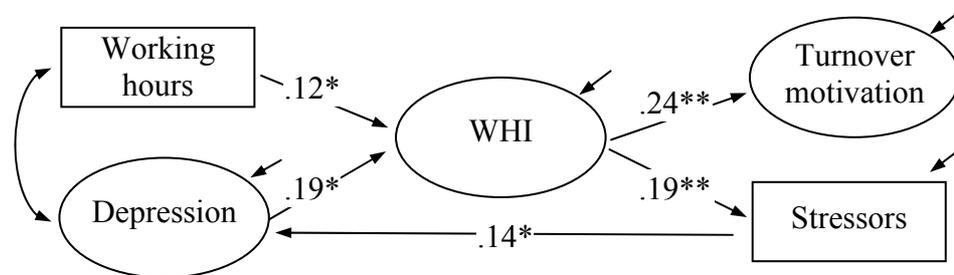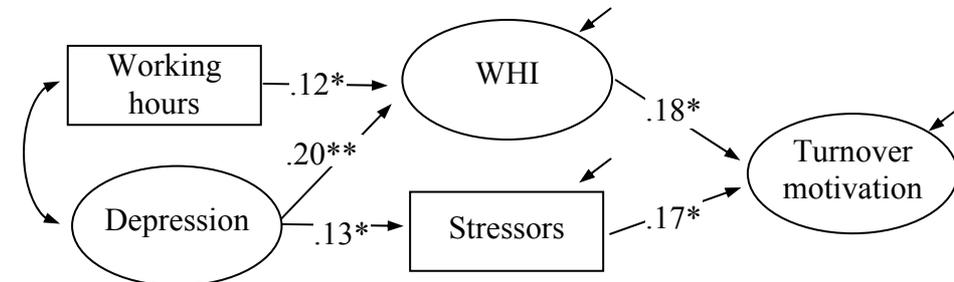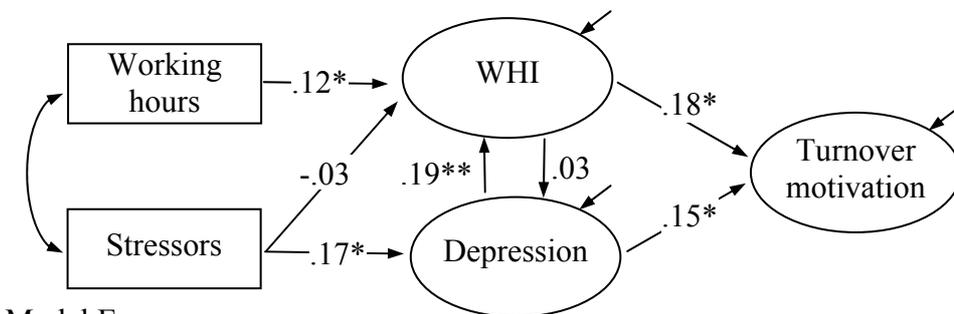
Figure 1: Path diagrams of analyzed models; WHI = work-home interference (coefficients

are from the synchronous effects models)