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Abstract

Self-determination theory suggests that satisfaction of an individual's basic psychological needs (for competence, autonomy, and relatedness) is key for wellbeing. This has gained empirical support in multiple life domains, but little is known about the way that need satisfaction interacts between work and home. Drawing from ideas of work-home compensation, we expect that the benefits of need satisfaction in the home domain are reduced when needs are satisfied in the work domain. We tested this hypothesis with a daily diary study involving 91 workers. Results showed that individuals particularly benefit from satisfaction of their need for competence in the home domain when it is not satisfied during the working day. No such interactions were found between the needs for autonomy or relatedness. Our study highlights that the interaction of need satisfaction across domains represents a boundary condition for the beneficial effects of need satisfaction.

Practitioner points

- The study examines the interplay between daily need satisfaction at work and at home and its relation to employee well-being at bedtime.
- Employees particularly benefit from competence need satisfaction at home (e.g. doing a hobby which challenges them) on days when they do not get a sense of competence from their job (e.g. if the tasks are not particularly challenging, or they are under-performing)

Compensating Need Satisfaction across Life Boundaries: A Daily Diary Study

Self-determination theory (SDT; Deci & Ryan, 2000) suggests that when individuals' basic psychological needs are satisfied, they are able to thrive and therefore experience more positive wellbeing. Individuals can satisfy their needs in multiple life domains such as the work or home (Milyavskaya et al., 2009). Although research on the work-home interface shows that these domains are closely interrelated and that experiences in one domain affect experiences in the other (Edwards & Rothbard, 2000), little is known about the interaction of need satisfaction across life domains. This is important because work-home research suggests that individuals may be able to make up for a lack of experience or satisfaction in one domain in another life domain; the compensation hypothesis (Staines, 1980). Our study furthers knowledge in this area by investigating the daily interplay of need satisfaction at work and at home on employees' wellbeing at the end of the day (i.e., positive and negative affect at bedtime). We seek to examine whether need satisfaction in the home domain is particularly beneficial when one's needs are not satisfied in the work domain.

Our study contributes to the SDT literature by adopting a work-home interface perspective. We aim to refine SDT theory by investigating boundary conditions of the beneficial effects of need satisfaction by considering the interaction of need satisfaction across work-home boundaries. In addition, we contribute to work-home research by testing the compensation hypothesis that has, so far, received little empirical attention (Edwards & Rothbard, 2000).

The present study

According to SDT, individuals have three basic psychological needs: for *autonomy* (to experience one's actions as self-determined and volitional), *competence* (to feel effective in the way one interacts with the environment), and *relatedness* (to feel connected to those around one and to develop meaningful interpersonal relationships (Deci & Ryan, 2000). The

interaction between individuals and their environment is central to the concept of need satisfaction as aspects of the environment can either satisfy or thwart the satisfaction of these needs (Deci & Ryan, 2000). Individuals can fulfill their needs in several domains, such as work and home (Milyaskava et al. 2009). For example, the need for competence can be satisfied at home by engaging in challenging activities, such as mastering a hobby, or at work by accomplishing one's work tasks. Empirical research suggests that, when individuals' needs are satisfied in the home domain, they experience better wellbeing (Mojza, Sonnentag & Bornemann, 2011; van Hooff & Geurts, 2014). Likewise, need satisfaction at work stimulates positive outcomes (e.g., positive affect, engagement) and negatively predicts negative affect, burnout and strain (Van den Broeck et al., 2016).

However, these previous studies do not consider the possibility that need satisfaction can be interactive across life domains. In work-home research, the compensation hypothesis suggests that people may make up for a negative or lack of positive experience in one domain with experiences in another domain (Edwards & Rothbard, 2000). The compensation hypothesis is empirically supported by Evans and Bartolomé (1986) who found that managers experiencing disappointment at work compensated this through fulfillment in their family lives. Likewise, Rothbard (2001) found that women experiencing negative affect at work were more engaged at home, thereby indicating compensation. Several scholars have suggested that need satisfaction could be compensated across life domains (Edwards & Rothbard, 2000; Vallerand, 2000) but this has not been empirically tested. The principle of compensation suggests that (1) if a need cannot be fulfilled by one domain, it may be fulfilled by another (Edwards & Rothbard, 2000) and (2) if a need has not been fulfilled by one domain, the fulfillment by another domain can be particularly beneficial (van Hooff & Geurts, 2015). Applying these principles to the work-home domains, we expect that if employees' needs were satisfied in the work domain, satisfaction of these needs in the home

domain is less beneficial for wellbeing at bedtime. We examine this proposition with a daily diary study. This design allows us to test the satisfaction of needs in work and home domains on specific days. In line with previous diary research (e.g., Mojza et al., 2011), we use positive and negative affect at bedtime as indicators of wellbeing as these should be sensitive to daily fluctuations.

Hypothesis 1: Satisfaction of individuals' need for a) autonomy, b) competence and c) relatedness at work moderates the relationship between satisfaction of the corresponding need and affect at bedtime, such that the positive relationship between need satisfaction and positive affect and the negative relationship with negative affect at bedtime are stronger when need satisfaction at work is low compared to high.

Methods

Participants and Procedure

Participants were recruited through the networks of the researchers and were employees from the UK ($N = 20$), Belgium ($N = 29$), Denmark ($N = 19$), Germany ($N = 23$). To be eligible for participation, respondents had to be working at least half-time in service industry jobs. The sample was 67% female ($M_{\text{age}} = 42$, $SD = 11.03$). Most (84%) respondents were employed, rather than self-employed, had a university degree (68%) and the largest groups worked in healthcare (34%) (e.g., chemists, community nurses) and government (18%) (e.g. policy, museums). Their average weekly working hours were 36 ($SD = 9.37$). Most lived with a partner (34%) or partner and children (32%).

Paper diaries were administered in the dominant language for that country. Scales were translated into the different languages and back translated into English to ensure consistency. Diaries were completed twice a day for five workdays at the end of the working day (on average at 17:38) and before going to bed (on average at 22:52). Participants self-

reported the time and date of diary completion on each diary. Fourteen diaries which were completed at wrong times (e.g. bedtime surveys completed the next morning) were excluded. Participants completing fewer than three diary days were also excluded. The average number of days completed was 4.57 (range = 3 to 5) with a total of 416 diary days.

Measures

Need satisfaction at work was measured at the end of the working day with the 18-item scale from Van den Broeck et al. (2010) containing 6 items for each of the 3 basic psychological needs. Item wording was adapted to apply to daily work activities, for example; “Today I felt free to do my job the way I think it could best be done” (autonomy). These were scored on a Likert scale from “*does not apply to me at all*” (1) to “*totally applies to me*” (5).

Need satisfaction at home was measured before going to bed with 10 items (4 autonomy, and 3 each for competence and relatedness) adapted from Van den Broeck et al.’s (2010) scale, for example; “Since I came home from work today I did not really feel connected with other people.” (relatedness; item reverse coded). Some items of Van den Broeck et al.’s scale were dropped because they were irrelevant for the home situation (e.g. “some people I worked with were close friends of mine”). Items were scored on the same scale as work need satisfaction.

Positive and negative affect after work and at bedtime were measured with items from the scale from Van Katwyk and colleagues (2000). Example positive affect adjectives (7 items) were “at ease”, “enthusiastic” and “inspired”. Negative affect (8 items) included “angry”, “worried” and “fatigued”. The question stem was “At the moment I feel...” and adjectives were rated on a Likert scale from “*not at all*” (1) to “*very*” (7).

Control variables. As previous research has indicated cultural differences in the way that individuals experience and report affective experience we included dummy variables to control for national differences within our sample. We also tested gender, age, job tenure, marital status and living situation (e.g. living alone, with partner) as potential controls but as no significant variance was explained by these, they were excluded.

Results

Means, standard deviations, Cronbach alpha and correlation coefficients are presented in Table 1. We first tested with intraclass correlation coefficients (ICC) whether a significant proportion of total variance in our dependent variables was explained at the within-person level, to support the assumption that these are not entirely person-level constructs (Spence, Ferris, Brown, & Heller, 2011). Results showed that 34% of the variance of positive affect at bedtime, 52% of negative affect at bedtime, and between 29% and 58% of need satisfaction is accounted for at the within-person level.

Table 1 about here

In order to test our hypotheses, multi-level models were estimated using HLM version 7 to account for the nested data structure. As we were concerned only within-person relationships, the level 1 predictors were person-mean centered. We estimated models for positive and negative affect at bedtime, respectively. To ensure that we could discount spillover effects of either affect in our model, we included work affect as a control (negative affect at work predicting negative affect at home, and likewise for positive affect).

We used a stepwise approach and entered need satisfaction at work and at home before entering the interaction terms of the matching work and home needs (e.g. competence

need satisfaction at work and at home)¹. We used the person-mean centered variables to calculate the interaction term to reduce the risk of multicollinearity and to aid interpretation. Results are displayed in Table 2 (positive affect at bedtime as outcome) and Table 3 (negative affect at bedtime as outcome). The interaction was not significant with respect to the needs for autonomy or relatedness so hypothesis 1a and 1c are not supported. It was, however, significant with respect to competence. Simple slopes analysis (Figure 1, using values for $\pm 1 SD$) revealed a positive relationship between competence need satisfaction at home and positive affect when competence need satisfaction at work is low (estimate = .44, $t = 2.78$, $p < .01$) but no significant relationship when competence need satisfaction at work is high (estimate = -.17, $t = -1.23$, $p = 0.26$). The opposite relationship is evident with respect to negative affect at bedtime (Figure 2): the relationship between competence satisfaction and negative affect is negative when work competence satisfaction is low (estimate = -.40, $t = -3.64$, $p < .001$) but not significant when it is high (estimate = .11, $t = 1.11$, $p = .27$). In other words, individuals benefit from competence need satisfaction at home on days when their need for competence was not satisfied at work, providing support for Hypothesis 1b. Additionally, all three needs satisfaction at home and need for autonomy at work were related to affect at bedtime.

Table 2 and 3, and Figure 1 and 2 about here

Discussion

In line with our predictions, we found that individuals particularly benefited from satisfaction of their need for competence at home when their need for competence was not satisfied at work. This was not the case on days when their need for competence was already

¹ We also tested interactions between non-matched needs (e.g. autonomy at work with relatedness at home) but found no significant relationships with positive or negative affect at bedtime.

satisfied through work. This supports our suggestion that experience of competence at work represents a boundary condition for the beneficial effects of competence need satisfaction at home. Although the concept of compensation is seen a key theoretical explanation for the work–family interface (Edwards & Rothbard, 2000; Staines, 1980), our study is among the first to empirically demonstrate the compensation mechanism. Whereas previous studies illustrated that need satisfaction operates in multiple domains (Milyavskaya et al., 2009) and that there is spillover of need satisfaction between domains (Mojza et al., 2011), we contribute to the SDT literature by suggesting that the interaction of need satisfaction across domains develops our understanding of affective wellbeing and thriving.

Unexpectedly, the cross-domain interactions of autonomy and relatedness need satisfaction were not significant. Although the needs for autonomy and relatedness in the home domain were positively related to high positive affect and low negative affect at bedtime, these relations were not qualified by previous need satisfaction in the work domain. Our results therefore suggest that the mechanism of compensation does not work uniformly for all needs. There may be several possible explanations for this. Firstly, in our study we focused on the work and home domains. However, one could take a finer-grained look at the home domain by distinguishing between, for example, family, friends or voluntary work contexts (Milyavskaya & Koestner, 2011). Possibly, the more similar two contexts are, the more effective compensation would be. For example, voluntary work during off-job time may be more effective for compensating for experiences in paid work as there is greater similarity between these contexts.

It could also be that the lack of significant interactions is due to specific characteristics of our sample. For example, individuals in service-sector jobs may experience satisfactory levels of autonomy and relatedness at work to make compensation unnecessary. Perhaps this would not be the case for individuals working alone (in our sample 90% worked

in teams), or in tightly controlled jobs, where more compensation would be necessary. A final explanation may be due to individual differences in attitudes towards work. For example, having a weak work-identity might mean that individuals' experiences at work are less central to their lives as a whole (Kossek, Ruderman, Braddy, & Hannum, 2012) so someone for whom family-identity is central may not feel the need to have a strong bond to their work colleagues so might not need to compensate for a lack of relatedness need satisfaction at work. Overall, our study underscores Vallerand's (2000) proposition that cross-domain effects of need satisfaction warrant further research attention. Particularly, future research should replicate our findings and examine boundary conditions of need compensation across similar life domains.

Regarding practical implications, employees can be advised to engage in competence satisfying activities during non-work time (e.g., a hobby or stimulating activity at which individuals can feel effective), particularly on days when they do not feel very competent at work. Thereby, they might compensate for unfavorable work experiences. This is supported by research on leisure crafting, which suggests that people can actively shape their private life and influence their need satisfaction (Petrou & Bakker, 2016).

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Table 1: Means, standard deviations, alpha coefficients, and correlation coefficients for study variables.

	Mean	SD	1	2	3	4	5	6	7	8	9	10	
Level 1 (within person) N = 416													
1	Autonomy work	3.71	0.69	(.75)									
2	Competence work	3.81	0.79	.54***	(.85)								
3	Relatedness work	3.49	0.69	.30***	.39***	(.74)							
4	Positive affect work	4.06	1.09	.34***	.12*	.07	(.88)						
5	Negative affect work	1.85	0.93	-.48***	-.57***	-.27***	-.31***	(.87)					
6	Autonomy home	3.89	0.73	.31***	.12*	.08	.34***	-.19***	(.74)				
7	Competence home	3.52	0.87	.14**	.27***	.09	.19***	-.08	.33***	(.82)			
8	Relatedness home	3.72	0.91	.10*	.01	.16**	.22***	-.09	.29***	.18***	(.60)		
9	Positive affect at bedtime	4.25	1.09	.15**	-.05	-.04	.59***	-.05	.47***	.32***	.30***	(.84)	
10	Negative affect at bedtime	1.44	0.64	-.31***	-.24***	-.14**	-.29***	.54***	-.39***	-.26***	-.22***	-.37***	(.83)
Level 2 (between-person) N = 91													
11	UK			-.02	.04	.13	-.01	-.05	-.06	-.22*	.22*	.03	.15
12	Belgium			.19	.30**	-.05	.12	-.39**	.00	-.02	-.14	-.01	-.25*
13	Denmark			-.32**	-.54***	-.23*	.17	.45***	.12	.11	.24*	.26*	-.01
14	Germany			.13	.14	.14	-.28**	.04	-.05	.13	-.28**	-.26*	.14

Note. Cronbach's alpha coefficient is reported on the diagonal. Alpha coefficients were calculated for each variables per day and the mean across day is reported.

*** $p < .001$. ** $p < .01$. * $p < .05$.

Table 2: Multi-level models of the relationship between need satisfaction and positive affect at bedtime and the interaction of need satisfaction across domains on positive affect at bedtime

	Model 1		Model 2		Model 3	
	Est.	SE	Est.	SE	Est.	SE
Intercept	3.82***	0.158	3.82***	0.18	3.81***	0.18
Step 1: Controls						
UK ^a	0.46	0.27	0.46	0.27	0.49	0.27
Belgium ^a	0.41	0.25	0.41	0.25	0.42	0.25
Denmark ^a	0.89**	0.27	0.89**	0.27	0.91**	0.27
Positive affect at work	0.19***	0.04	0.15***	0.05	0.16***	0.06
Step 2: Need satisfaction						
At work						
Autonomy			0.25**	0.09	0.26**	0.09
Competence			-0.17	0.10	-0.14	0.10
Relatedness			-0.09	0.08	-0.10	0.08
At home						
Autonomy			0.15*	0.06	0.16*	0.06
Competence			0.13*	0.06	0.14**	0.06
Relatedness			0.14**	0.05	0.13**	0.05
Step 3: Paired interactions						
Autonomy					0.07	0.18
Competence					-0.39*	0.18
Relatedness					-0.14	0.12
Model statistics						
-2LL	983.52		948.52		942.56	
Δ -2LL	27.50***		35.00**		5.97	
Δdf	4		6		3	

Note. N = 416 days (91 persons). Unstandardized coefficients are displayed. ^a 0 = not from this country, 1 = from this country.

*** $p < .001$. ** $p < .01$. * $p < .05$.

Table 3: Multi-level models of the relationship between need satisfaction and negative affect at bedtime and the interaction of need satisfaction across domains on negative affect at bedtime

	Model 1		Model 2		Model 3	
	Est.	SE	Est.	SE	Est.	SE
Intercept	1.55***	0.10	1.55***	0.10	1.55***	0.10
Step 1: Controls						
UK ^a	0.02	0.14	0.02	0.14	0.01	0.14
Belgium ^a	-0.30*	0.13	-0.29*	0.13	-0.31*	0.13
Denmark ^a	-0.13	0.15	-0.15	0.13	-0.13	0.15
Negative affect at work	0.25***	0.04	0.23***	0.04	0.24***	0.04
Step 2: Need satisfaction						
At work						
Autonomy			-0.12*	0.06	-0.13*	0.06
Competence			0.12	0.07	0.09	0.07
Relatedness			0.06	0.05	0.05	0.05
At home						
Autonomy			-0.12	0.05	-0.11*	0.04
Competence			-0.13***	0.04	-0.14***	0.04
Relatedness			-0.10**	0.03	-0.10**	0.03
Step 3: Paired interactions						
Autonomy					-0.04	0.12
Competence					0.33*	0.16
Relatedness					-0.08	0.08
Model statistics						
-2LL	640.88		601.09		586.01	
Δ -2LL	44.56***		39.79***		6.07	
Δdf	4		6		3	

Note. N = 416 days (91 persons). Unstandardized coefficients are displayed. ^a 0 = not from this country, 1 = from this country.

*** $p < .001$. ** $p < .01$. * $p < .05$

Figure 1: Simple slopes of the interaction between competence need satisfaction at work and at home on positive affect at bedtime

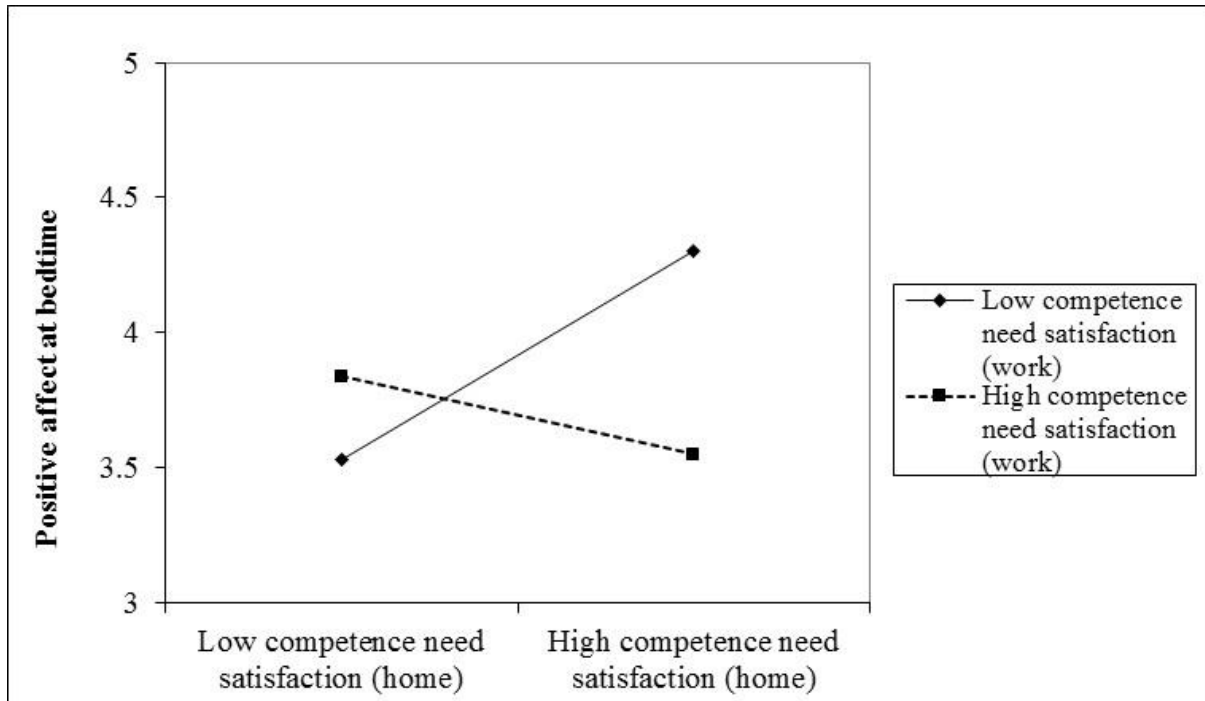


Figure 2: Simple slopes of the interaction between competence need satisfaction at work and at home on negative affect at bedtime

