

Do new ways of working foster work engagement?

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Although New Ways of Working (NWW) are increasingly implemented in organizational practice, few studies have addressed its pros and cons for employee outcomes. NWW enable employees to choose when and where to work, while being supported by electronic communication. We examined the effects of NWW on work engagement and exhaustion, and investigated whether communication quality mediated these relationships. The results of a five-day diary study (n= 550) showed that daily use of NWW was positively related to daily engagement and negatively to daily exhaustion due to increased effective and efficient communication. In addition, NWW enhanced connectivity among co-workers, resulting in enhanced daily engagement and reduced exhaustion. However, we also found a positive relationship between NWW and exhaustion, because NWW increased interruptions during the work process. Although some caution is needed, we conclude that NWW have the potential to foster work engagement.

¿Fomentan las nuevas formas de organización del trabajo el engagement? A pesar de que las Nuevas Formas de Organización del Trabajo (NFOT) son cada día más frecuentes en las organizaciones, apenas existen estudios que hayan investigado sus ventajas e inconvenientes sobre los empleados. Con el apoyo de la comunicación electrónica, las NFOT permiten a los empleados elegir cuándo y dónde trabajar. Se examinaron los efectos de las NFOT en el engagement y el agotamiento, y si la calidad en la comunicación mediaba dichas relaciones. Los resultados de un estudio diario de cinco días (n= 550) mostraron que el uso diario de NFOT se relacionaba positivamente con el engagement y negativamente con el agotamiento, ambos medidos diariamente, debido a una comunicación más eficaz y eficiente. Además, las NFOT incrementaban la conectividad entre los compañeros de trabajo, dando como resultado un mayor engagement diario y un menor nivel de agotamiento. Sin embargo, también se encontró una relación positiva entre las NFOT y el agotamiento, debido a que incrementaban las interrupciones durante el trabajo. Aunque es necesaria cierta cautela al respecto, se puede concluir que las NFOT tienen el potencial para fomentar el engagement.

In line with the idea of Positive Occupational Health Psychology to create inspiring work environments (Bakker, Rodríguez-Muñoz, & Derks, 2012), an increasing number of organizations has started to redesign their approach of work. Central to this new approach is that employees can organize their work flexibly; whereby employees can decide themselves when they work (schedule flexibility), where they work (telecommuting), and via which communication medium (smart-phone, e-mail, videoconference) they work (Baarne, Houtkamp, & Knotter, 2010). These flexible work designs, also referred to as 'new ways of working' (NWW) have been applauded thus far, as they would lead to more efficient work processes, while simultaneously reducing organizational costs (Rennecker & Godwin, 2005).

Whereas the organizational benefits of NWW have been emphasized in previous studies (Sánchez, Pérez, De Luis Carnicer, & Vela Jiménez, 2007), less is known about the consequences for

employee attitudes and well-being. It is possible that NWW boost employee work engagement as NWW offer employees more control over their work process and facilitate efficient communication between co-workers (Gajendran & Harrison, 2007). However, it is equally possible that NWW exhaust employees at the end of the working day because work never stops due to the 24 hour connectivity (Derks & Bakker, 2010). Therefore, our first aim is to examine whether NWW have only positive consequences for employees, enhancing work engagement, or whether some drawbacks can be detected as well, indicated by increased exhaustion.

Second, we will examine *why* NWW increase or decrease work engagement and exhaustion. The idea behind its success is that NWW improve the communication processes between co-workers, such as high pace information sharing and constant connectivity (Katz & Aarhus, 2002). At the same time, changes in communication (i.e., continuous connectivity, interruptions) may be responsible for negative side-effects of NWW (Spiegelman & Detsky, 2008). Our second aim is to investigate whether three indicators of communication —connectivity, effectiveness, and interruptions— mediate the relationship between NWW on the one hand, and work engagement and exhaustion on the other.

Finally, a contribution to previous studies is that we examine the relationship between NWW and engagement on a daily

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level. Diary studies are used to depict precisely whether levels of engagement and exhaustion differ on days that employees adopt the NWW work style to a greater or lesser extent.

New ways of working

NWW have three key characteristics (Baarne et al., 2010). First, the *timing* of work has become more flexible. Employees have more autonomy in deciding when they work. This implies that there are no fixed work schedules as was common in 9AM to 5PM jobs. Second, NWW offer the employee various options for the *place* of work, including the office, home, and during commuting time (e.g., in the train). At the office, employees no longer have fixed work spaces (Kelliher & Anderson, 2008). Instead, plain office-spaces are provided that are suitable and accessible for every employee who comes to the office. Third, NWW are facilitated by *new media technologies*, such as e-mail, smart-phones, and videoconferences. Thus, NWW offer the employee various options for communicating with co-workers, supervisors, and clients, including making phone calls, online messaging, and having digital meetings (Baarne et al., 2010). Combining these three characteristics we define NWW as a work design in which employees can control the timing and place of their work, while being supported by electronic communication.

Work engagement and exhaustion

Work engagement is most often defined as a positive, fulfilling, work-related state that is characterized by vigor, dedication, and absorption (Schaufeli, Bakker, & Salanova, 2006). Vigor refers to high levels of energy and resilience while working. Dedication is characterized by being strongly involved in one's work and experiencing a sense of significance and enthusiasm. Absorption is the state of being fully concentrated and happily engrossed in one's work. In short, engaged employees have high levels of energy and are enthusiastically involved in their work.

The underpinning theoretical rationale and dimensionality of work engagement and exhaustion as a sub-dimension of burnout is offered by Russel's (2003) circumplex model of affective well-being. This model proposes that affective states arise from two fundamental neurophysiological systems, one related to a pleasure-displeasure continuum (the horizontal axis) and the other to activation (the vertical axis). Accordingly, work engagement can be positioned in the upper right quadrant of the circumplex model as it resemblances high levels of pleasure and activation. Burnout can be positioned in the lower left quadrant as it resemblances low levels of pleasure and activation. Whereas burned-out individuals are exhausted and cynical about work, engaged employees are full with energy and enthusiasm.

The implication of this analysis is that in order to facilitate work engagement and to prevent exhaustion, employers should try to create a work environment and work processes where employees feel enthusiastic, energized and motivated because their jobs are both 'active' and 'pleasurable.' A possible way to accomplish this is to offer employees more flexibility in when and where they work, combined with adequate communication technologies such as e-mail and smart-phones. Below, we will clarify our predictions about the possible effects of NWW on daily engagement and daily exhaustion.

Pros of NWW

Although, to our knowledge, no previous studies have evaluated the consequences of NWW for work attitudes, extensive research exists on its individual components: flexible schedules, telecommuting, and electronic communication. Therefore, before each hypothesis, we will successively discuss the findings of studies on flexible work arrangements (flexible schedules and telecommuting) and electronic communication.

Flexibility regarding when and where to work is thought to enhance employees' job quality because it gives employees more control and enables them to use time more efficiently (Kelliher & Anderson, 2008). Haddock, Ziemba, and Lyness (2006) reported that employees who decided themselves when their working day started and ended, were better able to keep pace at work and to finish additional work. Similarly, telecommuting has been reported to foster efficiency of the work process, because it saves commuting time (Gajendran & Harrison, 2007). Moreover, telecommuting has been related with reduced levels of time pressure and job stress (Raghuram & Wiesenfeld, 2004; Peters & Van der Lippe, 2007).

Likewise, the use of new media technology (e.g., smart-phone, e-mail) is suggested to facilitate efficient time use and the coordination of work tasks (Hurme, 2005). Electronic communication is used in a more structured and selective way than face-to-face meetings (Kraut, Fish, Root, & Chalfonte, 1993). Moreover, face-to-face interactions often take more time than electronic communication because of the informal conversations inherent to meeting colleagues in person (Kraut et al., 1993). Also, communication via e-mail enhances the quality of the communication, enabling employees to reflect on the received message and to carefully formulate their response (Warkentin, Sayeed, & Hightower, 1997). In line with these ideas, Warkentin et al., (1997) found that communication was more effective in virtual teams than in face-to-face teams.

The above studies suggest that employees use their time more efficient and communicate more effectively on days that they engage in new ways of working. Consequently, effective and efficient communication enable employees to keep work flow, while enhancing pleasure in conducting tasks and diminishing stress (Rennecker & Godwin, 2005). Therefore, we predict that effective and efficient communication enables employees to stay focused at work (absorption) but also motivates them for their work tasks, increasing dedication and vigor at work, while reducing feelings of exhaustion.

Hypotheses 1. Daily use of NWW will be (a) positively related to daily work engagement and (b) negatively related to daily work exhaustion due to enhanced daily effective and efficient communication.

In addition, NWW may particularly boost work engagement as it offers new ways for employees to build interpersonal relationships. NWW combine the use of flexible work arrangements with electronic availability, whereby connections between employees are guaranteed (Van Dyne, Kossek, & Lobel, 2007; Walther, 1992, 1995). Because employees using smart-phone and e-mail are for longer periods of time and quicker available for co-workers (Derks & Bakker, 2010), co-worker relationships may even flourish. Preliminary research confirms that social bonding between co-workers, as well as task coordination can be maintained when

employees stay connected electronically (Lee & Kossek, 2004). Likewise, Walther's (1992) Social Information Processing theory posits that relationship quality will be the same among employees using electronic communication, provided that sufficient time and message exchanges are given for relational development to accrue. In a study comparing computer-mediated versus face-to-face teams, Walther (1995) found that relationships were even more positive (e.g., higher affection, more relaxed) in teams using computer-mediated communication. These results suggest that employees have higher dedication and vigor on days on which they use the communication media offered by NWW, because this guarantees close connections between employees, and satisfies their basic need for belongingness (Baumeister & Leary, 1995).

Hypothesis 2a. Daily use of NWW will be positively related to daily work engagement due to enhanced daily connectivity.

Cons of NWW

While previous studies generally agree on the positive effect of flexible work arrangements on performance, efficiency, and job satisfaction (see for an overview Baltes, Briggs, Huff, Wright, & Neumann, 1999), a diminishing effect on feelings of stress and exhaustion has not been convincingly reported (see for an overview Glass & Finley, 2002). Besides providing employees with more control, flexible work arrangements may also blur the work-family boundary. For instance, Hill, Hawkins, and Miller (1996) reported in their qualitative study that some telecommuters experienced more work-family interference, which increased stress.

Blurring of work-family boundaries may particularly occur when flexible work arrangements are combined with increased electronic communication (Katz & Aarhus, 2002). Working at home while staying connected through e-mail and phone implies that work never stops and work intrudes into the family domain. Empirical studies have shown that employees who had autonomy in scheduling time and place of work made longer workweeks (Van Echteld, Glebbeek, & Lindenberg, 2006). Also, electronic communication often results in compulsive routines of e-mail checking, increasing stress at the end of a working day (Mazmanian, Orlikowski, & Yates, 2005). These studies suggest that being continuously connected to work consumes a lot of energy. We expect that employees feel more exhausted on days on which they adopt a NWW style, due to their continuous connectivity with work.

Hypothesis 2b. Daily use of NWW will be positively related to daily work exhaustion due to enhanced daily connectivity.

In addition, the unanticipated consequences of electronic communication may be explained by increased interruptions at work. An interruption refers to «a synchronous interaction which is not initiated by the recipient, is unscheduled, and results in the recipient discontinuing the current activity» (O'Conaill & Frohlich, 1995). An example is a phone-call from a colleague while the employee is writing a report. Whereas new communication technologies such as e-mail and smart-phones are designed to reduce communication delays, in practice, they also enhance work

interruptions (Rennecker & Godwin, 2005). Interruptions from the task at hand are energy consuming, as it takes time and effort to shift one's focus from one task to the other (Beal, Weiss, Barros, & MacDermid, 2005). Moreover, interruptions often generate additional thoughts and may cause feelings of frustration and irritation. Such feelings consume cognitive resources, consequently increasing exhaustion (e.g., Cropley & Purvis, 2003). In addition, interruptions disrupt employees from being absorbed in their work and may be de-motivating because employees are impeded in getting the task at hand done (Beal et al., 2005).

We expect that NWW go together with increased interruption from incoming e-mails and phone-calls. As those interruptions consume a lot of energy and disrupt employees in their workflow, we predict that employees will feel more exhausted at the end of the day, while feeling less work engagement.

Hypotheses 3. Daily use of NWW will be (a) negatively related to work engagement and (b) positively related to daily work exhaustion due to enhanced daily interruptions.

Figure 1 provides an overview of the expected relationships between daily NWW, and work engagement and exhaustion.

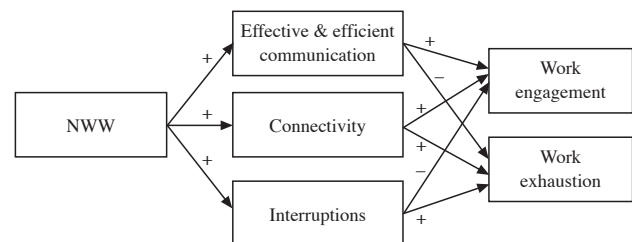


Figure 1. Hypothesized effects of daily new ways of working on daily engagement and daily exhaustion via communication

Method

Sample and procedure

This study was conducted at a large telecom company in the Netherlands. New Ways of Working was introduced in this company in 2009. Two divisions with comparable work settings were included in this study. Although the exact work tasks differed, both divisions employed knowledge workers. In the week before the study, employees were informed by e-mail about the aim and the procedure of the upcoming survey. On Monday morning, the respondents received an online general questionnaire by mail including questions about background characteristics (e.g., age, gender) and the variables of enduring work engagement and enduring exhaustion (these were used as controls in the analyses). In the afternoon (at 17 PM), the first diary questionnaire was sent by e-mail, including daily measures of among others use of NWW and work engagement. All questions referred to the working day that just finished. The respondents were reminded by e-mail to fill in the daily web questionnaire on five subsequent days (Monday to Friday).

Of the 400 contacted employees 110 completed the five-day diary questionnaire (a response rate of 28%). This is a good response rate for diary research, as this type of research is time consuming for participants (Bolger, Davis, & Rafaeli, 2003). Sixty-five percent of the respondents were male and the mean age of our

sample was 42.5 years ($SD=8.9$). The average of job experience was 20.1 years ($SD=10.4$), whereas the mean contractual weekly working hours were 38.2 ($SD=3.1$). A large majority (73.6%) of the respondents finished higher education or held a university degree. Most employees had a partner (75.5%) and 54% of the respondents had children living at home.

Measures

Enduring *Work engagement* (trait variable) was assessed with the nine-item version of the Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2006). Example items are: «At my job I feel strong and vigorous», «I am enthusiastic about my job», and «I am immersed in my work». All items were scored on a seven-point rating scale ranging from 0 ('never') to 6 ('always'). Cronbach's alpha was $\alpha=.91$. For the daily measurement of work engagement (state variable), we used a shortened, five-item version of the scale. Example items are: «Today I felt strong and vigorous», «Today I felt happy during my work», and «Today, I was immersed in my work». The mean of the Cronbach's alpha over five days was .87 (range .83 – .90).

The trait variable of *exhaustion* was measured with the subscale of the Dutch version of the Utrecht Burnout Scale (UBOS) (Schaufeli & Van Dierendonck, 2001). The scale consisted of five items, such as «I feel used up at the end of my workday» and «I feel emotionally drained because of my work». Cronbach's alpha for this trait exhaustion scale was $\alpha=.93$. The state variable of exhaustion was measured with a shortened version of the scale including the three items, «Today, I felt exhausted due to my work», «At the end of the working day I felt emotionally drained», and «I felt used up at the end of my workday». The mean of Cronbach's alpha over five days was .94 (range .80 – .97).

Given that no suitable instrument was identified for the measurement of communication quality in the context of new ways of working, we decided to construct a specific Communication Quality Scale for the purpose of this study. We distinguished between the sub-dimensions 'effective and efficient communication', 'connectivity', and 'interruptions'. *Effective and efficient communication* was conceptualized as the extent to which the communication was necessary for achieving work goals. The three-item scale included the items «The phone-calls I had today were useful», «The communication I had today with my co-workers was efficient», and «The e-mail conversations I had today were necessary for completing my work tasks». The mean of the Cronbach's alpha over five days was .75 (range .63 – .82).

Connectivity refers to the how easy, and how fast, the employee could be reached by co-workers. Examples of this four-item scale were, «Today, I answered incoming e-mails within two hours», and «Today, co-workers could easily reach me». The mean of the Cronbach's alpha over five days was .80 (range .71 – .89).

Interruptions refer to communication by which the employee is interrupted in doing his or her main tasks. The three-item scale consisted of the items «Today incoming e-mails kept me from doing my job», «Today, I was called at an inconvenient moment several times», and «Today, phone calls disturbed me in doing my work several times». The mean of the Cronbach's alpha over five days was .81 (range .74 – .85).

A principal component analysis (EFA) confirmed the CQS's three-dimensional factor structure of with no cross loadings and Eigen values larger than 1. A confirmatory factor analysis (CFA)

confirmed that unlike a 1-factor model ($\chi^2(35)=919.00$, $RMSEA=.214$, $GFI=.74$, $CFI=.59$, $TLI=.47$), a 3-factor model ($\chi^2(32)=142.90$, $RMSEA=.079$, $GFI=.95$, $CFI=.95$, $TLI=.92$) fit well to the data ($\Delta\chi^2(3)=776.10$, $p<.001$).

Before developing the *New Ways of Working* measure, we interviewed the HR-manager who was responsible for the enrolment about the most characteristics components of NWW in this company. On the basis of this interview and the written information material about the company's NWW policy, we decided to measure NWW as the hours using 1) remote access, 2) working at home, 3) e-mail, and 4) phone. Flextime was not an item, because we measured the time spent on the NWW components, which gives a more reliable measure of the actual use of NWW. Nevertheless, according to the HR-manager, flextime was common practice among employees. The items formed a NWW scale with an adequate reliability (Cronbach's $\alpha=.70$). Since the data were positively skewed (skewness=1.31, $SE=0.10$; kurtosis=1.51, $SE=0.21$), we conducted log transformations. This resulting distribution of the NWW scale approached a normal distribution (skewness=.23, $SE=0.10$; kurtosis=-0.56, $SE=0.21$).

We took into account several background characteristics as control variables. *Gender* was entered as a dummy variable (0= male, 1= female) and for *educational level* we used a 6-point scale ranging from 1 (primary school) to 6 (university degree). *Employee's age*, *contractually weekly working hours*, and *years of work experience* were measured as continuous variables.

Analysis

Our repeated measures data can be viewed as multi-level data, with repeated measurements nested within individuals. This leads to a two-level model with the repeated measures (days) at the first-level ($n=550$ study occasions) and the individual persons at the second-level ($n=110$ participants). Multi-level analysis with the MLwiN program (Rashbash, Browne, Healy, Cameron, & Charlton, 2000) was applied. Predictor variables at the day-level (Level 1, i.e. NWW) were centred to the individual mean and person-level (Level 2) predictor variables (i.e. age) were centred to the grand mean. As age and years of work experience (control variables) caused problems of multicollinearity ($r=.97$), we excluded years of work experience from all further analysis.

In order to test mediated relationship in multilevel models, we followed the Monte Carlo Method for assessing mediation as described by Bauer, Preacher, and Gil (2006). For each mediated effect we calculated the distribution of the mediation effect using the estimate and the standard error of the effect of the predictor (x) on the mediator (m), as well as the estimate and the standard error of m on the outcome variable (y). The 0 hypothesis that m does not significantly mediate the relationship between x and y is rejected when the distribution of possible estimates for m lies above or below zero.

Results

Descriptive statistics

Table 1 presents the means, standard deviations, and correlations among the study variables. In order to examine the proportion of variance that is attributed to the different levels of analysis, we calculated the intra-class correlation for each day-level variable.

Results showed that 64% of the variance in day-level engagement and 59% of the variance in exhaustion was attributable to between-person variations. Thus, significant amounts of variance were left to be explained by within-person fluctuations justifying our multi-level approach. None of the control variables (gender, age, education, work hours and work experience) affected the relationships under study and were therefore excluded from further analyses.

Testing hypotheses

We first tested whether NWW significantly predicted the three indicators of communication (mediators). In line with our predictions, NWW were significantly positively related to effective and efficient communication (estimate= .62, SE= .12, $p < .001$) and connectivity (estimate= .94, SE= .17, $p < .001$). The relationship between NWW and interruptions was also positive, but only marginally significant (estimate= .28, SE= .18, $p = .058$).

In a second step, we tested the main effect of NWW on engagement. Table 2 provides these results. The Main model showed that the direct effect of NWW on work engagement was significant and positive (estimate= .42, SE= .18, $p < .001$). In a third step, we tested for mediation, adding the variables effective and efficient communication, connectivity and interruptions. The results for the Mediation model (Table 2) indicated that effective and efficient communication and connectivity fully mediated the relationship between NWW and engagement. When adding the mediators, the main effect of NWW on work engagement turned into non-significance, while connectivity and effective and efficient communication were positively and significantly related to work engagement. The Monte Carlo Method showed that the distribution interval of the indirect effect through effective and efficient communication was above zero at a 95% confidence interval (lower level (LL)= .15, upper level (UP)= .41, $p < .05$). This supports Hypothesis 1a that the relationship between NWW

Table 1
Means, standard deviations, and correlations of all model variables

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Daily work engagement	5.13	0.92												
2. Daily exhaustion	2.07	0.97	-.51**											
3. Trait work engagement	5.81	0.89	.37**	-.26**										
4. Trait exhaustion	2.63	1.31	-.47**	.57**	-.37**									
5. Gender employee (female)	1.35	0.48	-.06	.09*	-.11**	-.04								
6. Age	42.55	8.92	.23**	-.27**	.18**	-.34**	-.29**							
7. Education	4.86	1.24	-.01	.01	.04	.15**	-.07	-.32**						
8. Work experience	20.14	10.46	.19**	-.22**	.18**	-.30**	-.21**	.96**	-.43**					
9. Work hours	38.24	3.16	-.00	-.09*	-.05	.06	-.35**	-.02	.34**	-.08				
10. Daily connectivity	3.94	0.77	.36	-.29**	.16**	-.26**	-.08*	.08	-.05	.06	.01			
11. Daily effective & efficient communication	4.17	0.57	.49**	-.44**	.18**	-.35**	-.06	.20**	.00	.18**	.06	.49**		
12. Daily interruptions	2.45	0.96	-.25**	.42**	-.07	.32**	-.01	-.08	.09*	-.07	.02	-.32**	-.29**	
13. Daily use of NWW ¹	0.47	0.22	.12**	-.01	.08	.00	-.03	.10*	.04	.11**	-.01	.17**	.18**	.05

* $p < .05$; ** $p < .01$. $N = 110$ participants

Table 2
Multilevel results of the mediated relationship of NWW on work engagement through communication

	Null model		Main model		Mediation model	
	B	Std. er.	B	Std. er.	B	Std. er.
Intercept	5.13***	0.09	5.10***	0.10	5.10	0.10
Trait engagement			0.40***	0.09	0.40***	0.09
NWW			0.41**	0.18	0.05	0.18
Connectivity					0.16***	0.05
Effective & efficient communication					0.35***	0.07
Interruptions					-0.00	0.05
Variance level 1 (employee)	0.72 (64%)	0.11	0.54	0.08	0.54	0.08
Variance level 2 (day)	0.40 (36%)	0.03	0.40	0.03	0.35	0.02
-2 Log likelihood	1310.13		1276.03		1227.42	

Note: *** $p < .001$; ** $p < .01$. $N = 550$ occasions

and work engagement is mediated by effective and efficient communication. Similarly, the Monte Carlo test for mediation confirmed that connectivity was a significant mediator (LL= .12, UP= .37, $p < .05$) of the relationship between NWW and work engagement, supporting Hypothesis 2a. Hypothesis 3a was not supported because interruptions had no significant relationship with engagement.

In Table 3 the results for exhaustion are shown. As can be seen from the Main model, we did not find a significant direct effect of NWW on exhaustion. Note that in multiple mediator models, it is not always possible to find a significant direct relationship between the x and y , as two mediator variables ($m1$ and $m2$) can have opposite effects, outweighing a net effect of x on y (Preacher & Hayes, 2008). Therefore, we did analyze the Mediation Model. This model confirmed that the mediator variables had opposite effects on exhaustion. Effective and efficient communication was negatively related to exhaustion, mediating a negative effect of NWW on exhaustion (LL= -0.32, UL= -0.06, $p < .05$). This result support Hypothesis 1b. Unexpectedly, connectivity was also negatively related to exhaustion (est.= -.13, $p < .05$). The Monte Carlo test confirmed that this relationship represented significant mediation (LL= -.26, UL= -.002, $p < .06$). Hypothesis 2b was thus rejected, because, in contrast to our prediction, we found that NWW reduced exhaustion through enhanced connectivity. In line with Hypothesis 3b we found that interruptions were significantly and positively related to exhaustion. The Monte Carlo test showed that the mediated effect was significant at a confidence interval of 87% (LL= .001, UL= .10).

Discussion

The central aim of this diary study was to investigate whether the implementation of NWW creates a healthy and stimulating work atmosphere in which employees experience high work engagement and low exhaustion. New Ways of Working have been lauded for their pragmatic benefits, such as reduced costs for the employer and increased flexibility for the employee (Baarne et al., 2010). Thus far, however, empirical studies examining whether employees also find NWW motivating, or instead exhausting, were lacking. Our results showed that the NWW work design has a potential to foster

employee work engagement. However, a critical note can be made as well. We will first discuss the advantages of NWW, followed by the disadvantageous effect found in the present study.

First, we found a positive effect of daily use of NWW on daily work engagement. This beneficial effect could be partially ascribed to an increase in effective and efficient communication. At the same time, exhaustion reduced due to more efficient communication. This latter finding is in line with previous studies reporting that flexible work designs allow employees to schedule their work in a way that suits their situation best, thereby saving time and energy (Kelliher & Anderson, 2008). Our results extend the previously voiced idea that new media technologies lead to a more efficient and effective work process (Kraut et al., 1993; Warkentin et al., 1997) by showing that new media technologies also contributes to efficient and effective communication. A few examples of this enhanced effectiveness and efficiency are: making work-related phone calls while travelling, avoiding excessive informal face-to-face interruptions by working from home, and giving a structured overview of the team's task distribution by e-mail instead of arranging an office meeting.

Continuous connectivity was the second explanation for the finding that work engagement was higher when employees worked according to the NWW work design. On days on which they used NWW more, employees indicated that they could be reached more easily by colleagues, and that they responded promptly to e-mails or phone calls. Enhanced availability is likely to foster a motivating, high-pace work process (Rennecker & Godwin, 2005), resulting in high work engagement. In addition, NWW, consisting of flexibility in combination with electronic availability, seem to guarantee close connections between colleagues. Our results confirmed that the combination of flexible work arrangements and electronic communication prevented employees from feeling isolated while telecommuting, and satisfied their basic human need for relatedness (Baumeister & Leary, 1995; Walther, 1992).

Unexpectedly, we found that employees felt less exhausted on days on which they used NWW, because of enhanced connectivity. We had expected that being continuously available would consume energy, leading to fatigue at the end of the working day. A possible explanation is that the advantageous effects of being connected to work (high work pace, feeling related) outweigh disadvantageous,

Table 3
Multilevel results of the mediated relationship of NWW on work exhaustion communication

	Null model		Main model		Mediation model	
	B	Std. er.	B	Std. er.	B	Std. er.
Intercept	2.07***	0.10	2.02***	0.09	2.02***	0.09
Trait exhaustion			0.52***	0.06	0.52***	0.06
NWW			0.01	0.22	0.28	0.22
Connectivity					-0.13*	0.07
Effective & efficient communication					-0.29	0.09
Interruptions					0.12**	0.06
Variance level 1 (employee)	0.89 (59%)	0.14	0.37	0.07	0.37	0.07
Variance level 2 (day)	0.61 (41%)	0.04	0.61	0.04	0.57	0.04
-2 Log likelihood	1521.51		1441.52		1413.18	

Note: *** $p < .001$; ** $p < .01$. $N = 550$ occasions

energy-consuming effects. Moreover, being connected to work may not be harmful in itself, while the interruptions that this brings along are, as we will discuss below. Alternatively, it is conceivable that employees did not experience connectivity as energy draining because they could control when they were available for colleagues. In comparison to face-to-face communication, electronic communication provides senders and receivers more control over sending and responding to messages (Kraut et al., 1993). Our measurement of connectivity reflected a certain level of control over the communication process, asking whether employees undertook action to respond to work-related calls or e-mails. Personality characteristics may also have influenced our findings. It is possible that the implementation of NWW selects employees who are open to change, assertive, extravert, and who like social interactions with others. These employees may value frequent interactions with others, whereby engagement increases while exhaustion decreases.

Finally, we found that employees reported that they were more often interrupted in their work process by incoming e-mails and phone-calls on days on which they used more NWW. Consequently, daily work exhaustion increased. This finding supports the idea that distractions at work cost energy. Switching from one task to the other, as well as refocusing on the task at hand is energy consuming (Beal et al., 2005). We suggest that control over communication plays an important role here as well. Employees may have less control over interruptions, such as incoming e-mail and phone-calls, than over outgoing communication, such as sending an e-mail and starting a phone-conversation. Therefore, electronic *interruptions* may be particularly exhausting, whereas this is not the case for being *connected* electronically. This might also explain why interruptions did not diminish work engagement. Interruptions imply contact with others, which may motivate employees. The opposite effects of interruptions, increasing dedication and vigor, while decreasing absorption, then results in a zero net effect on work engagement.

Some limitations of this study should be noted. First, our study design resulted in a selective sample including employees from a single organization. Additional research should examine whether our findings can be generalized to employees in other jobs and organizations. Second, we cannot draw conclusions about the causality of the relationship under study as the predictor and outcome variables were measured at the same point in time during the day. Third, our measurement of communication quality could be improved. Future studies could explicitly distinguish between effective and efficient communication and include a measure of the availability of co-workers. The measurement of NWW could be extended by including employee's daily use of flextime and videoconferences. Despite these limitations, the strengths of our study were the use of diary studies and the relatively large number of respondents filling in the questionnaire on five consecutive days (data points $n= 550$). This study design resulted in reliable measures of NWW use, communication and experienced work engagement and exhaustion, and enabled us to examine the relationship between NWW and employee attitudes as a daily process (Bolger et al., 2003).

Our study provides suggestions for future research. It would be interesting to examine the role of control over communication more explicitly. Our results suggest that harmful effects of NWW may

be attenuated when employees can control when and where they are connected to work, while uncontrolled communication, such as interruptions, are energy consuming. Future studies are needed to test this speculation. Furthermore, a worthwhile extension of our study design would be to include lagged effects. In such a design, NWW use is related to outcomes on the next day, allowing for examining the causal direction of the relationships. In a similar vein, a longitudinal data design with a lag of several months could be used to examine the long term effects of NWW. Another suggestion for future research is to examine the role of personality characteristics. For example, it is possible that individuals who are more open to new experiences profit more from NWW, experiencing more engagement, while it cost them less energy to adopt this new work design. Finally, future studies could use a study design in which employees using NWW are compared to employees who do not use NWW (yet). Such a design enables to address more explicitly how work outcomes and communication quality differ between NWW users and non-users.

Our study indicates that NWW have multiple beneficial effects for employees thereby advocating the implementation of more flexible work designs, in which employees can decide the time and place of working. Note, however, that new media technologies, guaranteeing communication quality, are a necessary requisite for successful implementation of this new work design. Moreover, a possible pitfall of this work design is the increase in interruptions by e-mail and phone-calls. Interruptions may be prevented by clear arrangements among co-workers (and supervisors) about time periods in which they are available for phone-calls or e-mails. Also, employees could indicate when they are unavailable, and actively switch off electronic communication devices. During these periods of non-connectivity, employees can focus on one task without being interrupted. In addition, the organizational culture plays an important role in the successful implementation of NWW. In the organization where this study was conducted, all management levels advocated the use of NWW. Obviously, management support is crucial for successfully introducing a change in the work design. The organization provided employees with ample information about the new work design. Before the implementation, employees were informed about the aims and content of NWW by digital news letters and an introductory meeting. After the implementation, the organization arranged several workshops in which employees could reflect on the pros and cons of NWW, with the aim of adjusting the NWW policy if necessary. Such a supportive organizational culture, including openly expressed advocacy by top-management, adequate information, and options for feedback, are recommended for making NWW a success.

All in all, our study suggests that NWW may be a good strategy for creating (virtual) work environments in which employees can flourish. Some caution is needed however. NWW enhance engagement due to high-pace, effective and continuous communication, but also exhaust employees due to enhanced interruptions. The challenge is thus to find a balance between being available for work-related communication, while simultaneously guarding uninterrupted working time.

Footnotes

¹ Log transformed variable of daily hours use of NWW.

References

- Baerne, R., Houtkamp, P., & Knotter, M. (2010). *Het nieuwe werken ontrafeld [Unraveling new ways of working]*. Assen, The Netherlands: Koninklijke Van Gorcum/Stichting Management Studies.
- Baltes, B.B., Briggs, T.E., Huff, J.W., Wright, J.A., & Neuman, G.A. (1999). Flexible and compressed workweek schedules: A meta-analysis of their effects on work-related criteria. *Journal of Applied Psychology, 84*, 496-513.
- Bakker, A.B., Rodríguez-Muñoz, A., & Derks, D. (2012). La emergencia de la Psicología de la Salud Ocupacional Positiva. *Psicothema, 24*(1), 66-72.
- Beal, D.J., Weiss, H., Barros, E., & MacDermid, S.M. (2005). An episodic process model of affective influences on performance. *Journal of Applied Psychology, 90*, 1054-1068.
- Bauer, D.J., Preacher, K.J., & Gil, K.M. (2006). Conceptualizing and testing random indirect effects and moderated mediation in multilevel models: New procedures and recommendations. *Psychological Methods, 11*, 142-163.
- Baumeister, R.F., & Leary, M.R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*, 497-529.
- Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. *Annual Review of Psychology, 54*, 579-616.
- Cropley, M., & Purvis, L.J.M. (2003). Job strain and rumination about work issues during leisure time: A diary study. *European Journal of Work and Organizational Psychology, 12*, 195-207.
- Derks, D., & Bakker, A.B. (2010). The impact of e-mail communication on organizational life. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 4*, 4. <http://www.cyberpsychology.eu/view.php?cisloclanku=2010052401&article=4>.
- Gajendran, R.S., & Harrison, D.A. (2007). The good, the bad, and the unknown about telecommuting: Meta-analysis of psychological mediators and individual consequences. *Journal of Applied Psychology, 92*, 1524-1541.
- Glass, J.L., & Finley, A. (2002). Coverage and effectiveness of family-responsive workplace policies. *Human Resource Management Review, 12*, 313-337.
- Haddock, S.A., Zimmerman, T.S., Ziemba, S.J., & Lyness, K. (2006). Practices of dual earner couples successfully balancing work and family. *Journal of Family and Economic Issues, 27*, 207-234.
- Hill, E.J., Hawkins, A.J., & Miller, B.C. (1996). Work and family in the virtual office: Perceived influences of mobile telework. *Family Relations, 45*, 293-301.
- Hurme, P. (2005). Mobile communication and work practices in knowledge-based organizations. *Human Technology, 1*, 101-108.
- Katz, J.E., & Aarhus, M.A. (2002). Making meaning of mobiles: A theory of apparatusgeist. In J.E. Katz & M. Aarhus (Eds.), *Perpetual contact: Mobile communication, private talk, public performance* (pp. 301-318). Cambridge, UK: Cambridge University Press.
- Kelliher, C., & Anderson, D. (2008). For better or for worse? Analysis of how flexible working practices influence employees perceptions of job quality. *The International Journal of Human Resource Management, 19*, 419-431.
- Kraut, R.E., Fish, R.S., Root, R.W., & Chalfonte, B.L. (1993). Information communication in organizations: Form, function, and technology. In R.M. Baecker (Ed.), *Readings in groupware and computer-supported cooperative work* (pp. 287-314). San Mateo, CA: Morgan Kaufmann Publishers.
- Lee, M.D., & Kossek, E.E. (2004). Crafting lives that work: A six year retrospective on reduced load work in the careers and lives of professionals and managers. Alfred P. Sloan Foundation Study Feedback Report. Available online at: [<http://flex-work.lir.msu.edu/>].
- Mazmanian, M.A., Orlikowski, W.J., & Yates, J. (2005). Crackberries: The social implications of ubiquitous wireless e-mail devices. In C. Sorensen, K. Lyytinen, & J.I. DeGross (Eds.), *Designing ubiquitous information environments: Socio-technical issues and challenges* (pp. 337-344). Springer: Ney York.
- O'Conaill, B., & Frohlich, D. (1995). Timespace in the workplace: Dealing with interruptions. Paper presented at the CHI proceedings, short papers. Available from http://www.acm.org/sigchi/chi95/proceedings/shortppr/boc_bdy.htm.
- Peters, P., & Van der Lippe, T. (2007). The time-pressure reducing potential of telehomeworking: The Dutch case. *International Journal of Human Resource Management, 18*, 430-447.
- Preacher, K.J., & Hayes, A.F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*, 879-891.
- Raghuram, S., & Wiesenfeld, B. (2004). Work-nonwork conflict and job stress among virtual workers. *Human Resource Management, 43*, 259-277.
- Rashbash, J., Browne, W., Healy, M., Cameron, B., & Charlton, C. (2000). *MLwiN (version 1.10.006): Interactive software for multilevel analysis*. London: Multilevel Models Project, Institute of Education, University of London.
- Rennecker, J., & Godwin, L. (2005). Delays and interruptions: A self-perpetuating paradox of communication technology use. *Information and Organization, 15*, 247-266.
- Russell, J.A. (2003). Core affect and the psychological construction of emotion. *Psychological Review, 110*, 145-172.
- Sanchez, A.M., Pérez, M., De Luis Carnicer, P., & Vela Jiménez, M.J. (2007). Teleworking and workplace flexibility: A study of impact on firm performance. *Personnel Review, 36*, 42-64.
- Schaufeli, W.B., Bakker, A.B., & Salanova, M. (2006). The measurement of work engagement with a brief questionnaire: A cross-national study. *Educational and Psychological Measurement, 66*, 701-716.
- Schaufeli, W.B., & Van Dierendonck, D. (2001). Utrechtse Burnout Schaal (UBOS) [Utrecht Burnout Scale]. *De Psycholoog, 36*, 9-12.
- Spiegelman, J., & Detsky, A.S. (2008). Instant mobile communication, efficiency and quality of life. *Journal of the American Medical Association, 299*, 1179-1181.
- Van Dyne, L., Kossek, E., & Lobel, S. (2007). Less need to be there: Cross-level effects of work practices that support work-life flexibility and enhance group processes and group-level OCB. *Human Relations, 60*, 1123-1154.
- Walther, J.B. (1992). Interpersonal effects in computer-mediated interactions: A relational perspective. *Communication Research, 19*, 52-90.
- Walther, J.B. (1995). Relational aspects of computer-mediated communication: Experimental observations over time. *Organization Science, 6*, 186-203.
- Warkentin, M.E., Sayeed, L., & Hightower, R. (1997). Virtual teams versus face-to-face teams: An exploratory study of a web-based conference system. *Decision Sciences, 28*, 975-996.