Rieder, Kerstin

Effects of hybrid work on psychological detachment

Zeitschrift für Arbeitswissenschaft

Provided in Cooperation with:
Springer Nature

Suggested Citation: Rieder, Kerstin (2024) : Effects of hybrid work on psychological detachment, Zeitschrift für Arbeitswissenschaft, ISSN 2366-4681, Springer, Berlin, Heidelberg, Vol. 79, Iss. 1, pp. 64-73,
https://doi.org/10.1007/s41449-024-00445-2

Zeitschrift für Arbeitswissenschaft (2025) 79:64–73
https://doi.org/10.1007/s41449-024-00445-2

WISSENSCHAFTLICHE BEITRÄGE

Effects of hybrid work on psychological detachment

Kerstin Rieder[1]

Accepted: 8 October 2024 / Published online: 8 November 2024

Abstract

After the coronavirus pandemic, hybrid work has become firmly established in many companies. This study investigated the relation of hybrid work and relevant working conditions with the psychological detachment of employees. A written online survey was conducted among 250 employees of a company in the mechanical engineering industry in Germany who worked from home at least part of the time. Multiple hierarchical regression was used for the analysis. The results show that, as expected, the quality of manager-employee communication has a positive ($\beta = 0.13$, $p < 0.05$) and extended work availability a negative effect ($\beta = -0.35$, $p < 0.001$) on psychological detachment. Contrary to the assumptions, however, the proportion of work from home has a positive effect on detachment ($\beta = 0.15$, $p < 0.05$). Regarding the demographic variables, female employees are better able to detach from work ($\beta = -0.36$, $p < 0.01$). The quantitative demands initially show a significant effect, but this disappears as soon as the extended work availability and the proportion of work from home are included in the analysis. The included predictors explain 19% ($p < 0.001$) of the total variance.
Practical Relevance Hybrid work offers the opportunity to organize work more flexibly and thus to adapt it more closely to the needs of employees. The results of this study show that work from home can foster psychological detachment from work, provided that health-promoting working conditions are in place.

Keywords Hybrid work · Extended work availability · Psychological detachment · Occupational health

Auswirkungen von hybrider Arbeit auf das Abschalten von der Arbeit

Zusammenfassung

Nach der Corona-Pandemie hat sich hybride Arbeit in vielen Unternehmen etabliert. Die vorliegende Studie untersucht die Bedeutung hybrider Arbeit und relevanter Arbeitsbedingungen für das Abschalten von der Arbeit. Es wurde eine schriftliche Online-Befragung unter 250 Mitarbeitenden eines Unternehmens der Maschinenbaubranche in Deutschland durchgeführt, die zumindest einen Teil der Zeit im Homeoffice arbeiteten. Für die Auswertung wurde eine multiple hierarchische Regression durchgeführt. Die Ergebnisse zeigen, dass erwartungsgemäß die Qualität der Kommunikation zwischen Führungskräften und Mitarbeitenden einen positiven ($\beta = 13$; $p < 0{,}05$) und die erweiterte Erreichbarkeit einen negativen Effekt ($\beta = -0{,}35$; $p < 0{,}001$) auf das Abschalten von der Arbeit hat. Entgegen den Annahmen hat der Anteil der Arbeit im Homeoffice einen positiven Effekt auf das Abschalten von der Arbeit ($\beta = 0{,}15$; $p < 0{,}05$). Hinsichtlich der demografischen Variablen wird ersichtlich, dass weibliche Beschäftigte besser von der Arbeit abschalten können ($\beta = -0{,}36$; $p < 0{,}01$). Die quantitativen Belastungen zeigen zunächst einen signifikanten Effekt, der jedoch verschwindet, sobald die erweiterte Erreichbarkeit sowie der Anteil an Homeoffice in die Analyse einbezogen werden. Die einbezogenen Prädiktoren erklären 19 % der Gesamtvarianz ($p < 0{,}001$).
Praktische Relevanz Hybride Arbeit bietet die Möglichkeit, die Arbeit flexibler zu gestalten und damit besser an die Bedürfnisse der Beschäftigten anzupassen. Die Ergebnisse dieser Studie zeigen, dass Homeoffice das Abschalten von der Arbeit fördern kann, sofern gesundheitsförderliche Arbeitsbedingungen gegeben sind.

Schlüsselwörter Hybride Arbeit · Erweiterte Erreichbarkeit · Abschalten von der Arbeit · Betriebliches Gesundheitsmanagement

✉ Prof. Dr. Kerstin Rieder
Kerstin.rieder@hs-aalen.de

[1] Hochschule Aalen, Beethovenstraße 1, 73430 Aalen, Germany

1 Introduction

Psychological detachment from work is a key prerequisite for recovery because it allows the recovery process to begin (Sonnentag and Bayer 2005). It forms one of four recovery experiences which were shown to be related to health outcomes of employees (Sonnentag et al. 2017; Headrick et al. 2023). Psychological detachment means, on the one hand, not performing work-related activities during non-work time and, on the other hand, not thinking about work during this time (Sonnentag and Bayer 2005). Additionally, it can also be understood as the presence of non-workrelated activities and thoughts (Sonnentag and Fritz 2015).

However, current trends in the world of work are making psychological detachment more difficult. A key challenge here is the dissolution of boundaries between work and private life. This dissolution is triggered by developments such as new forms of management (indirect control practices, see Knecht et al. 2017) and the flexibilization of work (Carstensen et al. 2022).

The flexibilization of work and its possible consequences for psychological detachment from work are the focus of this study. The coronavirus pandemic has contributed significantly to the spread of spatial flexibilization of work. In Germany, the proportion of employees working from home at least some of the time has moved from 24% in June 2019 to an initial 45% in spring 2021 and 38% in fall 2021 (Flüter-Hoffmann and Stettes 2022). Since that time, the proportion of employees with a hybrid work arrangement has risen again to 42% (Initiative D21 2024).

The spread of mobile information and communication technologies has been another important prerequisite for the spatial and also the temporal flexibilization of work. It has made it possible to work virtually anywhere and at any time, often involving work-related extended availability (Thörel et al. 2022). A recent study also shows that the better the information and communication technology equipment at home, the less willing employees are to return to the company (Bockstahler et al. 2022).

As a result, home is no longer the place reserved for leisure, family and friends. And time outside of working hours is no longer reserved for recreation and domestic and family chores. Rather, it is increasingly dominated by work-related activities (Barbieri et al. 2021). There is also first evidence that work from home poses a risk for psychological detachment (Sonnentag et al. 2010).

It is not yet clear exactly what factors might reduce psychological detachment in the context of hybrid work. Drawing from the theoretical assumptions of the extended *Stressor-Detachment model* (Sonnentag and Fritz 2015), the Job Demands-Resources Theory (Bakker and Demerouti 2017; Bakker et al. 2023) as well as Action Regulation Theory (Oesterreich et al. 2000; Zapf and Semmer 2004; Zacher and Frese 2018), the aim of the present study is to address this knowledge gap. This study is the first to examine the relationship of the proportion of work from home with employees' psychological detachment. As such, it contributes to the body of knowledge on the consequences of hybrid work for recovery. In addition, it contributes to research on boundaryless work by providing evidence on which aspects of work in particular are associated with the risk for (less) psychological detachment. The results can also be used for practical purposes, as they provide concrete indications for a health-promoting design of working from home that allows for external and internal detachment from work.

2 Working conditions, work from home and psychological detachment

2.1 High quantitative demands make psychological detachment difficult

Stressors play a central role in the *Stressor-Detachment model* in explaining impaired detachment from work. Stressors generate negative activation (Sonnentag and Fritz 2015). This is associated with the danger that stressful experiences continue to have an effect after working hours, so that the inner detachment from work is impaired. However, stressors do not only have an effect by impairing the recovery phase that follows their occurrence. There may also be an anticipation of future stress, which then triggers a mental and emotional continuation of work (ibid.). Moreover, Smit (2016) argues that stressors can contribute to the failure to achieve goals sought during working hours. This is consistent with the Action Regulation Theory conceptualization of demands, which states that they arise from contradictions between goals and implementation conditions at work (Oesterreich et al. 2000, p. 54; Zapf and Semmer 2004; Zacher and Frese 2018). The failure to achieve goals can then lead to a mental and affective continuation of work outside of working hours.

The Stress Report shows that *quantitative demands* are the most common source of stress in Germany (BAuA 2020). Quantitative demands occur when the amount of work is very high. Accordingly, work is often performed at high speed or working hours are extended (Kristensen et al. 2004; Sonnentag and Bayer 2005). A meta-analysis confirms the importance of quantitative demands in impairing work detachment (Wendsche and Lohmann-Haislah 2017a, p. 7ff.). It shows that job demands are negatively related to detachment. The closest correlation is between quantitative demands and detachment. This is confirmed by another meta-analysis, which showed that challenge demands, which include time pressure and high workload, have the

strongest negative relationship with detachment (Bennett et al. 2018).

Hypothesis 1 Quantitative demands relate negatively to psychological detachment from work.

2.2 The quality of manager-employee communication fosters psychological detachment

In addition to demands, the meta-analyses by Wendsche and Lohmann-Haislah (2017a) and by Bennett et al. (2018) also highlights the role of *resources* in psychological detachment. While Bennett et al. (2018) yielded a positive but nonsignificant relationship, Wendsche and Lohmann-Haislah (2017a) showed that resources such as social support have significant positive associations with psychological detachment. However, these turns out to be smaller than the correlations with stressors. An explanation for the positive associations of resources with detachment is offered by the *Job Demands-Resources Theory* (Bakker and Demerouti 2017). In this theory, job resources are characterized as functional in achieving work goals. As mentioned in Sect. 2.1, unfinished goals are assumed to affect detachment (Smit 2016). Therefore, it can be inferred that aspects that promote goal achievement at work contribute to successful detachment. Additionally, in the *extended Stressor-Detachment Model* (Sonnentag and Fritz 2015), resources are assumed to moderate the effect of stressors on detachment. The assumption of a buffering function against job demands is also found in the Job Demands-Resources Theory (Bakker and Demerouti 2017). It offers an additional explanation for the positive function of resources in the process of recovery.

During the coronavirus pandemic, leadership support was particularly important for the health of mobile workers (Klebe et al. 2021). One of the key challenges of mobile work is maintaining effective communication between employees and their managers (Contreras et al. 2020; Cortellazzo et al. 2019). Such communication processes have been shown to be predictors of employee mental health in a meta-analysis (Montano et al. 2017). Therefore, a good quality of manager-employee communication is considered a key resource and facilitates the psychological detachment at work from home.

Hypothesis 2 The quality of manager-employee communication relates positively to psychological detachment from work.

2.3 Making work more flexible makes psychological detachment more difficult

In addition to job demands and job resources, the meta-analysis by Wendsche and Lohmann-Haislah (2017a) also considers employees' work-related activities. The results show that work-related activities during non-work time are negatively related to detachment. Thus, it becomes clear that a temporal flexibilization of work represents a risk for detachment.

However, if only work-related activities are examined, it remains an open question to what extent they are due to the employees' personal working style or to corresponding requirements and thus working conditions. This argues in favor of actually examining the extended work availability required by the company (Dettmers 2017). *Extended work availability* means that employees cannot be sure that non-work time is actually available for private matters (ibid.). Rather, they must always expect to be asked to perform work. This uncertainty makes it difficult to disengage from work. This is reflected in effects of extended work availability on the daily start-of-day mood and cortisol awakening response (Dettmers et al. 2016a). Accordingly, negative effects of extended work availability on detachment are found in cross-sectional studies (Dettmers et al. 2016b; Vieten et al. 2022) as well as in longitudinal studies (Dettmers 2017; Thörel et al. 2021).

Hypothesis 3a Extended work availability relates negatively to psychological detachment from work.

The flexibilization of work includes not only the temporal dimension, but also the spatial dimension. Since the beginning of the coronavirus pandemic, numerous studies have been conducted on the consequences of the expansion of work from home. On the one hand, many of them have shown positive consequences from the employee's point of view, such as time saved by not having to commute, greater control over working hours, fewer disruptions and interruptions, more selfcare, better recovery and higher productivity (Barrero et al. 2021; Becker et al., 2022; Bockstahler et al. 2022; Krick et al. 2024; Larsen 2024; Wöhrmann and Ebner 2021). On the other hand, there are negative effects, especially the loss of social contacts with colleagues and superiors, as well as boundaryless working hours (ibid.). *Hybrid work*, combined with the availability of mobile information and communication technologies, makes it possible to be available to work anywhere, anytime (Dettmers 2017). In addition, the study by Sonnentag et al. (2010) showed that low spatial work-home boundaries (the availability of a workplace at home) are associated with less psychological detachment from work. A systematic review of home office working conditions found that many employees use

spaces that are also used for other purposes (Wütschert et al. 2022). Therefore, it is assumed that working from home makes detachment more difficult.

Hypothesis 3b The proportion of work from home is negatively related to psychological detachment from work.

3 Materials and methods

3.1 Participants

A cross-sectional survey was conducted online in November 2021. The sample consisted of a total of 250 employees of a mechanical engineering company in Germany who work at least partially from home. The majority of respondents (71%) were male, reflecting the nature of the industry. About a quarter of each respondent was 25–34 years old (27%), 35–44 (25%) or 45–54 years old (23%). Eight percent of participants were 24 years of age or younger and 17% were 55 years of age or older. 19% held management positions and 36% had responsibilities for caring for children or dependents. The amount of work from home varied from 10 to 100%, with 40% being the most common.

3.2 Measures

Demographic characteristics and the proportion of work from home were assessed using self-developed items. All other variables were assessed using validated instruments. In all cases, 5-point Likert scales were used.

3.2.1 Psychological detachment

The scale of Sonnentag and Fritz (2007) was used for the assessment. It includes four items (Cronbach's alpha: 0.86 in this study). An example item is "At the end of the day, I forget about work." Response options ranged from "strongly agree" to "strongly disagree."

3.2.2 Quantitative demands

The Copenhagen Psychosocial Questionnaire scale (COPSOQ, Lincke et al. 2021) was used. It includes four items (Cronbach's alpha: 0.77 in this study). An example item is "Do you have to work very fast"? Response options ranged from "always" to "never."

3.2.3 Quality of manager-employee communication

The scale of Mohr et al. (2004) with a total of eight items was used (Cronbach's alpha: 0.90 in this study). The scale assesses the quality of leadership-related communication without reference to a specific leadership style. However, the results show high correlations with instruments for measuring transformational leadership and the Leader-Member-Exchange (ibid.). An example item is "I can get things off my chest directly with my supervisor(s)." Response options ranged from "strongly disagree" to "strongly agree."

3.2.4 Extended work availability

Dettmers and Krause's (2020) scale was used. It comprises three items, whereby the wording of two items was slightly adapted for the present study (instead of "One", the questions begin with "I"). An example item reads, "It is often necessary to be available outside of regular working hours." The internal consistency (Cronbach's alpha) of the scale in this study was 0.67. Response options ranged from "strongly agree" to "strongly disagree."

3.3 Proportion of work from home

The proportion of work from home was assessed with a self-developed item. Response options ranged from 0–100% and were divided into increments of ten. Only individuals who reported at least 10% work from home were included in the analysis.

3.4 Statistical analysis

All analyses were performed with Jamovi version 2.2.5.0. For descriptive statistics, means, standard deviations, and intercorrelations were calculated. *Multiple hierarchical regression* with psychological detachment as the criterion was used to test the hypotheses. First of all, the prerequisites were checked. The Shapiro-Wilk test showed a normal distribution of the residuals ($W = 0.993$, $p = 0.290$). This was checked and confirmed graphically using residual plots and Q—Q plots. The residual plots also showed that the correlations of the regression analyses were linear and that there was homogeneity of variance. The Cook's distance analyses revealed no evidence of outliers. In addition, there was no multicollinearity of the predictors (tolerance 0.75–0.96; VIF 1.04–1.33). In the first step of the multiple hierarchical regression, the demographic variable gender was introduced. In the second step, quantitative demands and the quality of manager-employee communication were included in the analysis. Finally, in step three, aspects of work flexibility (extended work availability and proportion of remote work) were added. To protect employee anonymity, departmental affiliation was not included in the multiple hierarchical regression because some of the 13 departments had a small number of employees. To interpret the results of the multiple hierarchical regression, associations between gender and departmental affiliation were calculated using

Table 1 Means, standard deviations and correlations between the study variables
Tab. 1 Mittelwerte, Standardabweichungen und Korrelationen zwischen den Studienvariablen

		M	*SD*	1	2	3	4	5	6	7	8	9
1	Gender[a]	–	–	–	–	–	–	–	–	–	–	–
2	Age	–	–	0.05	–	–	–	–	–	–	–	–
3	Leadership Role[b]	–	–	–0.22***	–0.25***	–	–	–	–	–	–	–
4	Care at home[c]	–	–	–0.07	0.07	0.17**	–	–	–	–	–	–
5	Quantitative demands	3.40	0.72	0.04	0.12	0.09	0.04	–	–	–	–	–
6	Quality of communication[d]	3.67	0.75	0.02	–0.11	0.01	0.05	–0.02	–	–	–	–
7	Extended work availability	2.76	0.90	0.07	0.02	–0.22***	0.08	0.45***	0.04	–	–	–
8	Proportion of remote work	51.2	26.9	–0.08	0.03	0.08	0.05	0.11	0.16*	0.07	–	–
9	Psychological detachment	3.25	0.87	–0.20**	0.02	0.12	0.11	–0.15*	0.17**	–0.36***	0.16*	–

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$
[a]1 = female, 2 = male
[b]1 = leadership role, 2 = no leadership role
[c]1 = Care, 2 = No Care
[d]Quality of communication between managers and employees

the Chi-square test and Cramér's V. The Kruskall-Wallis test was used to examine whether different departments differed significantly in terms of detachment.

4 Results

4.1 Descriptive statistics

The means, standard deviations, and intercorrelations of all variables are shown in Table 1. Psychological detachment shows negative correlations with quantitative demands (r = –0.15, $p < 0.05$) and with extended work availability (r = –0.36, $p < 0.001$). In contrast, there are positive correlations with the quality of manager-employee communication (r = 0.17, $p < 0.01$) and the proportion of work from home (r = 0.16, $p < 0.05$). The demographic variables, with the exception of gender, are not significantly related to psychological detachment: male employees report lower values for than female employees (r = –0.20, $p < 0.01$).

4.2 Test of hypotheses and additional analyses

The results of the multiple hierarchical regression with psychological detachment as criterion are shown in Table 2. In the first step, a significant effect of gender on psychological detachment is found ($\beta = -0.44$, $p < 0.01$). Overall, the explanation of variance is low (corrected $R^2 = 0.04$, $p < 0.01$). In the second step, quantitative demands ($\beta = -0.14$, $p < 0.05$) as well as the quality of manager-employee communication ($\beta = 0.17$, $p < 0.01$) prove to be significant. With the introduction of extended work availability and the proportion of work from home, the effect of quantitative demands becomes insignificant ($\beta = -0.00$, n. s.). Extended work availability is negatively related to psychological detachment and shows the closest correlation with this criterion of all working conditions ($\beta = -0.35$, $p < 0.001$). In contrast, the proportion of work from home is positively related to detachment ($\beta = 0.15$, $p < 0.05$). It is noticeable that the share of explained variance increases considerably from eight to 19% with the introduction of aspects of work flexibility in the third step of the analysis (corrected $R^2 = 0.19$, $p < 0.001$).

Thus, the hypotheses can be partially confirmed (Fig. 1). In *hypothesis 1*, it was assumed that *quantitative demands* relate negatively to psychological detachment from work. However, if aspects of work flexibility are included in the

Table 2 Summary of multiple hierarchical regression analysis for psychological detachment ($n = 250$)
Tab. 2 Zusammenfassung der multiplen hierarchischen Regressionsanalyse für das Abschalten von der Arbeit ($n = 250$)

	Step 1	Step 2	Step 3
	β	β	β
Gender[a]	–0.44**	–0.43**	–0.36**
Quantitative demands	–	–0.14*	–0.00
Quality of communication[b]	–	0.17**	0.13*
Extended work availability	–	–	–0.35***
Proportion of remote work	–	–	0.15*
Adjusted R^2	0.04**	0.08***	0.19***
ΔR^2	–	0.05**	0.11***

β = standardized beta weights
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$
[a]1 = female, 2 = male
[b]Quality of manager-employee communication

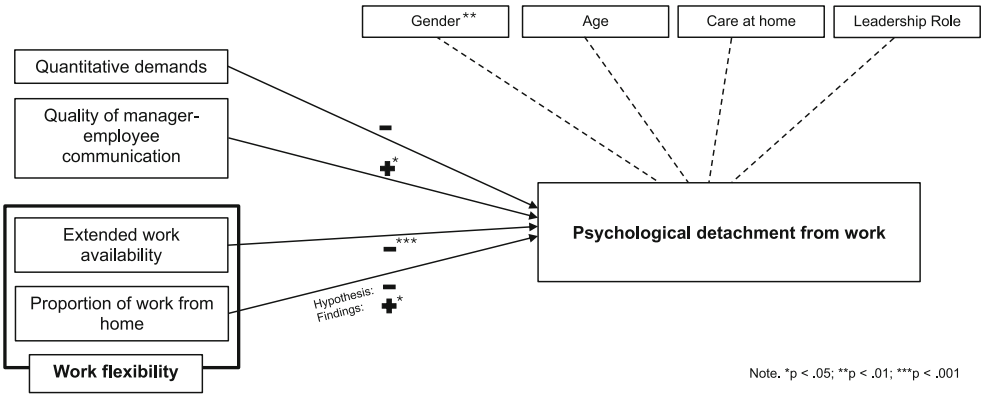

Fig. 1 Overview of the hypotheses and results
Abb. 1 Überblick über die Hypothesen und Ergebnisse

regression, there is no longer any effect of quantitative demands. Thus, the hypothesis cannot be confirmed.

In *hypothesis 2*, it was assumed that the *quality of manager-employee communication* relates positively to psychological detachment from work. In line with the hypothesis, the results of the regression analysis show a significant positive effect. Hypothesis 2 can thus be confirmed.

Hypotheses 3a and 3b were used to test whether aspects of work flexibility are related to psychological detachment. In accordance with hypothesis 3a, a highly significant negative effect was found for the *extended work availability*. However, contrary to Hypothesis 3b, there is no negative but a significant positive effect of *proportion of work from home* on psychological detachment.

The additional analyses reveal a significant association between department and gender ($\chi 2$ (12, $n = 250$) = 72.3, $p <$ 0.001, Cramér's V = 0.54). The mean values of psychological detachment in the departments range from M = 2.99 to 3.61 (SD between 0.51 and 1.73). The Kruskall-Wallis test to examine differences in detachment between departments was not significant (H (12) = 9.86, n. s.).

5 Discussion

This cross-sectional study examined the relationship of job demands, job resources, and aspects of work flexibility (extended work availability and proportion of work from home) with psychological detachment. Quantitative demands did not emerge as a significant predictor of psychological detachment. This finding contrasts with the meta-analyses of Wendsche and Lohmann-Haislah (2017a) and Bennett et al. (2018). They found that of all work conditions, quantitative demands were most closely associated with psychological detachment. However, these meta-analyses did not include extended work availability as a predictor. In fact, Wendsche and Lohmann-Haislah (2017a) included engagement in work-related activities, an aspect of employee behavior that is closely related to extended work availability. The results showed an average correlation of –0.31 with psychological detachment. This supports the notion of a relationship between extended work availability and psychological detachment. The result of the present study suggests that quantitative demands lose relevance when extended work availability is included in the analysis.

Consistent with Hypothesis 2, there was a significant positive relationship between the *quality of manager-employee communication* and psychological detachment. This confirms the findings of existing studies showing the importance of social resources for psychological detachment (Wendsche and Lohmann-Haislah 2017a). The results also highlight the importance of the quality of manager-employee communication for homeworker detachment. It is thus in line with other studies that presented evidence for the importance of leadership behavior for the health of employees working from home (Cortellazzo et al. 2019; Klebe et al. 2021).

Extended work availability showed a significant negative relationship with psychological detachment even when quantitative demands were included in the analysis. This is in line with previous cross-sectional studies (Dettmers et al. 2016b; Mellner et al. 2017; Vieten et al. 2022) and longitudinal studies (Dettmers 2017; Thörel et al. 2021). This study therefore confirms the independent importance of extended work availability for psychological detachment.

The relationship between the *proportion of work from home* and psychological detachment was positive. This is in contrast to findings that found an increase of boundaryless working hours as a result of work from home (Wöhrmann and Ebner 2021) and therefore suggests a negative relationship with psychological detachment. It also contrasts with the study by Sonnentag et al. (2010), which showed that the availability of a home office was negatively related to psychological detachment. However, Mellner et al. (2017) found no relationship between work from home and psychological detachment. In addition, there are studies that suggest that work from home is associated with less exhaustion. For example, the longitudinal study by Shimura et al. (2021) compared employees' stress symptoms (e.g.,

irritability, fatigue, and physical complaints) before and after the introduction of work from home. They found that work from home was associated with a reduction in stress symptoms, controlling for job demands and job resources. A study by Sardeshmukh et al. (2012) also found a negative relationship between working from home and exhaustion. This was partially mediated by higher job resources (autonomy) and lower job demands (time pressure and role conflict). Since the negative relationship between psychological detachment and exhaustion is well established, these findings are in line with the present study (Wendsche and Lohmann-Haislah 2017b). One possible explanation for the mixed results could be different individual arrangements for working from home, such as the ability to leave the room used as a home office after work (Pensar and Mäkelä 2023).

Looking at the *demographic variables*, a surprising finding emerged. In this study, gender is a significant predictor of psychological detachment. Male individuals have lower levels of detachment. This finding is in contrast to other studies. For example, the meta-analysis by Wendsche and Lohmann-Haislah (2017a) showed no relationship between gender and psychological detachment. One possible explanation for the higher levels of psychological detachment among the female employees surveyed in the present study could be that the gender distribution in the company systematically differs by department. Indeed, the Chi-square test reveals a significant correlation between gender and departmental affiliation. However, the Kruskall-Wallis test shows no significant differences for detachment between departments. This suggests that gender segregation by department does not cause differences in detachment. Alternatively, working conditions not considered in this study may contribute to differences in detachment between men and women.

5.1 Limitations and implications for further research

When interpreting the results of this study, its methodological limitations must be taken into account. One limitation is the restriction to one company in the mechanical engineering sector. It remains to be seen to what extent the results are generalizable to other industries. However, the mechanical engineering sector is one of the biggest industrial sectors in Germany with around one million employees in 2024 (Statistisches Bundesamt 2024). In addition, with 13 different departments, a wide range of professional activities was covered, which strengthens the generalizability of the results.

The present study is also limited in terms of the number of predictors of detachment that were considered. Therefore, it would be desirable to conduct studies that include larger sets of job demands and job resources, as well as the proportion of work from home, as predictors of psychological detachment.

Another important limitation is the cross-sectional nature of the survey. This makes it impossible to test statements about the causal direction of the effects. However, the longitudinal studies that are already available provide evidence that extended work availability actually influences psychological detachment and not vice versa (Dettmers 2017; Thörel et al. 2021). For work from home, to the best of my knowledge, there are no longitudinal studies on the association with psychological detachment. In addition, the available studies on work from home and psychological detachment show mixed results. Therefore, longitudinal studies would be of great interest.

It should also be noted that this study was conducted during the coronavirus pandemic. The results may also be influenced by the specifics of the time. These include the potential impact of the illness, whether on the workers themselves or on their family and friends. It therefore includes the very short-term implementation of work from home, despite what may have been a limited set of appropriate conditions. Finally, the pandemic has also made it more difficult to work on site at the company, for example because of hygiene regulations. Thus, the results of this study are not easily transferable to the post-pandemic period.

Overall, the present study, in line with other studies, suggests that the consequences of the flexibilization of work in general and of work from home in particular can only be described in general terms to a limited extent. In contrast, they always depend on the specific working conditions. This is highlighted by a recent study that examined telework in terms of job requirements and its fit (in this case, privacy fit) with spatial conditions (Weber et al. 2023). Better fit was associated with less work fatigue. Future studies should therefore consider the fit between work conditions and spatial conditions when working from home.

5.2 Practical implications

Many findings point to the central importance of psychological detachment for the process of recovery, for well-being and health (Sonnentag and Fritz 2015; Wendsche et al. 2021). Therefore, it is of great practical importance that employees have the opportunity to distance themselves from work during non-work time. A meta-analysis (Karabinski et al. 2021) also shows that *interventions significantly improve psychological detachment* overall. Interventions that included the primary appraisal of stressors showed the strongest effects (e.g., boundary management interventions). Measures aimed at reducing job demands also showed significant effects. A newly developed intervention specifically targets employees who work from

home (Demerouti 2023). This online self-training was also able to foster detachment from work.

Overall, however, there are few studies of work-related interventions. Therefore, interventions and accompanying studies that also address working conditions are desirable. The present study confirms the importance of working conditions for psychological detachment. The quality of manager-employee communication was identified as a resource for detachment. This is an area where practical measures can be taken. For example, *training for managers can contribute to a good quality of manager-employee communication*. A meta-analysis supports the notion that leadership training has positive effects on leaders and their subordinates (Lacerenza et al. 2017). With reference to hybrid work, Brunelle's (2013) study shows that an appropriate leadership style can help reduce the negative consequences of physical and psychological distance on the quality of the supervisor-subordinate relationship.

In line with other studies (Dettmers 2017; Dettmers et al. 2016b; Thörel et al. 2022; Vieten et al. 2022), *extended work availability was shown to be an important barrier* to psychological detachment in this study. Clear regulation of work availability is particularly important for work from home, as spatial flexibility is often accompanied by temporal flexibility of work (Kortsch et al. 2022). Recommendations for reducing extended work availability address three aspects that have been identified in a study based on qualitative interviews and a written survey as typical causes of extended work availability (Pangert et al. 2017). First, extended work availability often occurs because the amount of work is too high. This is confirmed by objective condition-based work analysis, which shows that extended work availability is associated with high work intensity (Göllner and Rau 2021). It is therefore suggested that work design should focus on the causes of high work intensity (ibid.). For example, a visualization of current activities can help to obtain a realistic assessment of capacities for further tasks and thus help to define achievable goals (Pangert et al., 2017). A second reason for extended availability is that individuals have exclusive expertise and are therefore contacted in emergencies outside of working hours. An appropriate measure in this case is a targeted transfer of know-how and a representation agreement (ibid.). Third, the culture of availability can also contribute to employees being contacted by managers or colleagues outside of working hours. For example, unclear expectations about availability can be a cause of this. In this case, it makes sense to agree on explicit availability rules and to communicate them to all employees (ibid.).

Surveys demonstrate that even after the coronavirus pandemic, employees are interested in working remotely more often than before (Barrero et al. 2021; Frodermann et al. 2021). The study by Kortsch et al. (2022) also found that employees working from home reported greater job satisfaction and affective commitment than their onsite counterparts. However, the predictors of psychological detachment identified in the present study, namely the quality of manager-employee communication and extended work availability should be considered when designing health-promoting hybrid work arrangements. In this way, the opportunity to make work more responsive to employees' needs through hybrid work can be successfully realized in the future.

Acknowledgements The author would like to thank Timo Grau and Svenja Sophie Widmaier for their excellent contributions. She is also grateful to the anonymous reviewers for their valuable comments.

Funding Open Access funding enabled and organized by Projekt DEAL.

References

Bakker AB, Demerouti E (2017) Job demands-resources theory: Taking stock and looking forward. J Occup Health Psychol 22(3):273–285. https://doi.org/10.1037/ocp0000056

Bakker AB, Demerouti E, Sanz-Vergel A (2023) Job demands-resources theory: ten years later. Annu Rev Organ Psychol Organ Behav 10(1):25–53. https://doi.org/10.1146/annurev-orgpsych-120920-053933

Barbieri B, Balia S, Sulis I, Cois E, Cabras C, Atzara S, de Simone S (2021) Don't call it smart: working from home during the pandemic crisis. Front Psychol 12:741585. https://doi.org/10.3389/fpsyg.2021.741585

Barrero JM, Bloom M, Davis S (2021) Why working from home will stick. Working paper, vol 28731. National Bureau of Economic Research, Cambrigde. http://www.nber.org/papers/w28731

BAuA (2020) Stressreport Deutschland 2019: Psychische Anforderungen, Ressourcen und Befinden. Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, Dortmund (https://www.baua.de/DE/Angebote/Publikationen/Berichte/Stressreport-2019.html)

Becker C, Thörel E, Pauls N, Göritz AS (2022) Homeoffice in Corona-Zeiten – Sind Ausmaß und/oder Flexibilität wichtig für Arbeitszufriedenheit, soziale Unterstützung, Commitment und Arbeitsunterbrechungen? Gr Interakt Org 53(2):173–187. https://doi.org/10.1007/s11612-022-00630-z

Bennett AA, Bakker AB, Field JG (2018) Recovery from work-related effort: A meta-analysis. J Org Beh 39(3):262–275. https://doi.org/10.1002/job.2217

Bockstahler M, Jurecic M, Rief S (2022) Homeoffice Experience 2.0. Veränderungen, Entwicklungen und Erfahrungen zur Arbeit aus dem Homeoffice während der Corona-Pandemie. Fraunhofer Institut für Arbeitswirtschaft und Organisation, Stuttgart (https://

publica.fraunhofer.de/entities/publication/18727132-8875-4c15-96c2-fd8d6186ca56/details)
Brunelle E (2013) Leadership and mobile working: The impact of distance on the superior-subordinate relationship and the moderating effects of leadership style. Int J Bus Soc Sci 4(11):1–14
Carstensen T, Krause C, Matuschek I, Kleemann F, Mierich S (2022) Entgrenzte Flexibilität im Homeoffice. Neuordnungen der Alltäglichen Arbeitspraxis, der Geschlechterarrangements und der Betriebsratsarbeit in der Corona-Krise. Arbeit 31(1–2):195–213. https://doi.org/10.1515/arbeit-2022-0011
Contreras F, Baykal E, Abid G (2020) E-leadership and teleworking in times of COVID-19 and beyond: what we know and where do we go. Front Psychol 11:590271. https://doi.org/10.3389/fpsyg.2020.590271
Cortellazzo L, Bruni E, Zampieri R (2019) The role of leadership in a digitalized world: a review. Front Psychol 10:456340. https://doi.org/10.3389/fpsyg.2019.01938
Demerouti E (2023) Effective employee strategies for remote working: An online self-training intervention. J Vocat Behav 142:103857. https://doi.org/10.1016/j.jvb.2023.103857
Dettmers J (2017) How extended work availability affects well-being: The mediating roles of psychological detachment and work-family-conflict. Work Stress 31:24–41. https://doi.org/10.1080/02678373.2017.1298164
Dettmers J, Krause A (2020) Der Fragebogen zur Gefährdungsbeurteilung psychischer Belastungen (FGBU). Z Arb Org Psychol 64(2):99–119. https://doi.org/10.1026/0932-4089/a000318
Dettmers J, Bamberg E, Seffzek K (2016b) Characteristics of extended availability for work: The role of demands and resources. Int J Stress Manag 23(3):276–297. https://doi.org/10.1037/str0000014
Dettmers J, Vahle-Hinz T, Bamberg E, Friedrich N, Keller M (2016a) Extended work availability and its relation with start-of-day mood and cortisol. J Occup Health Psychol 21(1):105–118. https://doi.org/10.1037/a0039602
Flüter-Hoffmann C, Stettes O (2022) Homeoffice nach fast zwei Jahren Pandemie, IW-Report Nr. 2, Köln. https://www.iwkoeln.de/studien/christiane-flueter-hoffmann-oliver-stettes-homeoffice-nach-fast-zwei-jahren-pandemie.html
Frodermann C, Grunau P, Haas GC, Müller D (2021) Homeoffice in Zeiten von Corona: Nutzung, Hindernisse und Zukunftswünsche (No. 05/2021). IAB-Kurzbericht. https://www.econstor.eu/bitstream/10419/234218/1/kb2021-05.pdf
Göllner M, Rau R (2021) Erreichbarkeit: Symptom oder Merkmal der Arbeit? Was bedeutet das Ergebnis für die Arbeitsgestaltung? Z Arb Wiss 75(1):1–14. https://doi.org/10.1007/s41449-020-00217-8
Headrick L, Newman DA, Park YA, Liang Y (2023) Recovery experiences for work and health outcomes: A meta-analysis and recovery-engagement-exhaustion model. J Bus Psychol 38(4):821–864. https://doi.org/10.1007/s10869-022-09821-3
Initiative D21 (2024) D 21 Digitalindex 2023/24. Jährliches Lagebild zur Digitalen Gesellschaft. https://initiatived21.de/publikationen/d21-digital-index/2022-2023
Karabinski T, Haun VC, Nübold A, Wendsche J, Wegge J (2021) Interventions for improving psychological detachment from work: A meta-analysis. J Occup Health Psychol 26(3):224–242. https://doi.org/10.1037/ocp0000280
Klebe L, Felfe J, Klug K (2021) Healthy leadership in turbulent times: the effectiveness of health-oriented leadership in crisis. Br J Manag 32(4):1203–1218. https://doi.org/10.1111/1467-8551.12498
Knecht M, Meier G, Krause A (2017) Endangering one's health to improve performance? How indirect control triggers social momentum in organizations. Gr Interakt Org. https://doi.org/10.1007/s11612-017-0377-3
Kortsch T, Rehwaldt R, Schwake ME, Licari C (2022) Does remote work make people happy? Effects of flexibilization of work location and working hours on happiness at work and affective commitment in the German banking sector. Int J Environ Res Public Health 19(15):9117. https://doi.org/10.3390/ijerph19159117
Krick A, Arnold M, Felfe J (2024) Selfcare when working from home: Easier but also more important. Front Organ Psychol 2:1333689. https://doi.org/10.3389/forgp.2024.1333689
Kristensen TS, Bjorner JB, Christensen KB, Borg V (2004) The distinction between work pace and working hours in the measurement of quantitative demands at work. Work Stress 18(4):305–322. https://doi.org/10.1080/02678370412331314005
Lacerenza CN, Reyes DL, Marlow SL, Joseph DL, Salas E (2017) Leadership training design, delivery, and implementation: A meta-analysis. J Appl Psychol 102(12):1686–1718. https://doi.org/10.1037/apl0000241
Larsen S (2024) In-work recovery among hybrid employees: examining the relationships between stressors, recovery experiences, and strains. https://academicworks.cuny.edu/gc_etds/5660/
Lincke H-J, Vomstein M, Lindner A, Nolle I, Häberle N, Haug A et al (2021) COPPSOQ III in Germany: validation of a standard instrument to measure psychosocial factors at work. J Occup Med Toxicol 16(50):1–15
Mellner C, Kecklund G, Kompier M, Sariaslan A, Aronsson G (2017) Boundaryless work, psychological detachment and sleep: does working 'anytime-anywhere'equal employees are 'always on'? In: Leede J (ed) New ways of working practices: antecedents and outcomes. Emerald, Bingley, pp 29–47
Mohr G, Wolfram H-J, Schyns B, Paul T, Günster AC (2004) Kommunikationsqualität zwischen Führungskräften und Mitarbeiter/inne/n aus Sicht der Mitarbeiter/inne/n (FKQ-MA). In: Elektronisches Handbuch sozialwissenschaftlicher Erhebungsinstrumente. Zentrum für Umfragen, Methoden und Analysen, https://doi.org/10.6102/ZIS27
Montano D, Reeske A, Franke F, Hüffmeier J (2017) Leadership, followers' mental health and job performance in organizations: A comprehensive meta-analysis from an occupational health perspective. J Organ Behav 38(3):327–350. https://doi.org/10.1002/job.2124
Oesterreich R, Leitner K, Resch M (2000) Analyse psychischer Anforderungen und Belastungen in der Produktionsarbeit. Das Verfahren RHIA/VERA Produktion. Manual und Antwortblätter. Hogrefe, Göttingen
Pangert B, Pauls N, Schlett C, Menz W (2017) Ständige Erreichbarkeit – Ursachen, Auswirkungen, Gestaltungsansätze. Albert-Ludwigs-Universität Freiburg, Freiburg
Pensar H, Mäkelä L (2023) Roads to recovery in remote working. Exploration of the perceptions of energy-consuming elements of remote work and self-promoted strategies toward psychological detachment. Employ Relat 45(7):140–161. https://doi.org/10.1108/ER-09-2022-0431
Sardeshmukh SR, Sharma D, Golden TD (2012) Impact of telework on exhaustion and job engagement: a job demands and job resources model. New Technol Work Empl 27:193–207. https://doi.org/10.1111/j.1468-005X.2012.00284.x
Shimura A, Yokoi K, Ishibashi Y, Akatsuka Y, Inoue T (2021) Remote work decreases psychological and physical stress responses, but full-remote work increases presenteeism. Front Psychol. https://doi.org/10.3389/fpsyg.2021.730969
Smit BW (2016) Successfully leaving work at work: The self-regulatory underpinnings of psychological detachment. J Occup Organ Psychol 89(3):493–514. https://doi.org/10.1111/joop.12137
Sonnentag S, Bayer U-V (2005) Switching off mentally: Predictors and consequences of psychological detachment from work during off-job time. J Occup Health Psychol 10(4):393–414. https://doi.org/10.1037/1076-8998.10.4.393

Sonnentag S, Fritz C (2007) The recovery experience questionnaire: Development and validation of a measure assessing recuperation and unwinding at work. J Occup Health Psychol 12:204–221. https://doi.org/10.1037/1076-8998.12.3.204

Sonnentag S, Fritz C (2015) Recovery from job stress: The stressor-detachment model as an integrative framework. J Organ Behav 36(S1):72–103. https://doi.org/10.1002/job.1924

Sonnentag S, Kuttler I, Fritz C (2010) Job stressors, emotional exhaustion, and need for recovery: A multi-source study on the benefits of psychological detachment. J Vocat Behav 76(3):355–365. https://doi.org/10.1016/j.jvb.2009.06.005

Sonnentag S, Venz L, Casper A (2017) Advances in recovery research: What have we learned? What should be done next? J Occup Health Psychol 22(3):365–380. https://doi.org/10.1037/ocp0000079

Statistisches Bundesamt (2024) Beschäftigte und Umsatz der Betriebe im Verarbeitenden Gewerbe: Deutschland, Monate, Wirtschaftszweige. https://www-genesis.destatis.de/genesis/online?sequenz=tabelleErgebnis&selectionname=42111-0004&sachmerkmal=WZ08X2&sachschluessel=WZ08-28#abreadcrumb

Thörel E, Pauls N, Göritz AS (2021) Work-related extended availability, psychological detachment, and interindividual differences: A cross-lagged panel study. Ger J Hum Resour Manage 35(2):176–198. https://doi.org/10.1177/2397002221992549

Thörel E, Pauls N, Göritz AS (2022) The association of work-related extended availability with recuperation, well-being, life domain balance and work: A meta-analysis. Organ Psychol Rev 12(4):387–427. https://doi.org/10.1177/20413866221116309

Vieten L, Wöhrmann AM, Michel A (2022) Boundaryless working hours and recovery in Germany. Int Arch Occup Environ Health 95(1):275–292. https://doi.org/10.1007/s00420-021-01748-1

Weber C, Golding SE, Yarker J, Teoh K, Lewis R, Ratcliffe E, Munir F, Wheele T, Windlinger L (2023) Work fatigue during COVID-19 lockdown teleworking: the role of psychosocial, environmental, and social working conditions. Front Psychol 14:1155118. https://doi.org/10.3389/fpsyg.2023.1155118

Wendsche J, Lohmann-Haislah A (2017a) A meta-analysis on antecedents and outcomes of detachment from work. Front Psychol 7:2072. https://doi.org/10.3389/fpsyg.2016.02072

Wendsche J, Lohmann-Haislah A (2017b) Detachment als Bindeglied zwischen psychischen Arbeitsanforderungen und ermüdungsrelevanten psychischen Beanspruchungsfolgen: Eine Metaanalyse. Z Arb Wiss 1(71):52–70. https://doi.org/10.1007/s41449-017-0044-0

Wendsche J, de Bloom J, Syrek C, Vahle-Hinz T (2021) Always on, never done? How the mind recovers after a stressful workday? Ger J Hum Res Manange 35(2):117–151. https://doi.org/10.1177/23970022211004598

Wöhrmann AM, Ebner C (2021) Understanding the bright side and the dark side of telework: An empirical analysis of working conditions and psychosomatic health complaints. New Technol Work Employ 36(3):348–370. https://doi.org/10.1111/ntwe.12208

Wütschert MS, Romano-Pereira D, Suter L, Schulze H, Elfering A (2022) A systematic review of working conditions and occupational health in home office. Work 72(3):839–852. https://doi.org/10.3233/WOR-205239

Zacher H, Frese M (2018) Action regulation theory: Foundations, current knowledge, and future directions. In: Anderson N, Ones DS, Viswesvaran C, Sinangil HK (eds) The SAGE handbook of industrial, work and organizational psychology, 2nd edn. vol 2. SAGE, London, pp 80–102

Zapf D, Semmer N (2004) Stress und Gesundheit in Organisationen. In: Schuler H (ed) Organisationspsychologie, 2nd edn. Enzyklopädie der Psychologie. Themenbereich D, Serie III, vol 3. Hogrefe, Göttingen, pp 1007–1112