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# Gender Gaps in Job-Related Training during COVID-19?

## Longitudinal Evidence on Supply and Demand Changes from Germany

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### Abstract

The COVID-19 pandemic has exacerbated gender inequalities in the labour market. Less is known about its impact on gender gaps in training. Drawing on theories of labour market segmentation, time availability and gender roles, this study examines gender differences in pandemic-related changes in job-related training. Using panel data from the German National Educational Panel Study (2018–2022, N=7,857), results from fixed-effects regressions indicate an overall decline in training participation. Contrary to the expectations, mothers' participation did not decline more than that of fathers and childless women and men. For all groups, declines in training were partly attributed to work-related changes and the regional severity of COVID-19, but for parents these declines were more closely linked to changes in private and family life. The findings highlight the complex impact of demand- and supply-side factors influencing job-related training and show that gender disparities in unpaid work did not translate into wider training gaps.

**Keywords:** adult education, gender inequality, non-formal training, work-family conflict

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## Introduction

The COVID-19 pandemic has had a profound impact on work and family life, particularly through the prolonged closure of childcare facilities, schools and businesses, which blurred the boundaries between these spheres (Sun et al., 2023; Wheatley et al., 2023). Evidence suggests that this sudden need for reorganisation disproportionately affected women, reinforcing gender inequalities in the division of paid and unpaid work (Hipp and Bünning, 2021; Liu and Gan, 2024; Zoch et al., 2021). Relatedly, the decline in life, family and work satisfaction was more pronounced for women than for men (Hiekel and Kühn, 2022; Zoch et al., 2022).

Despite numerous studies on the gendered division of paid and unpaid work during the COVID-19 pandemic, few highlight its negative impact on gender equality in the labour market. Existing evidence shows that women were more likely than men to reduce their working hours and take unpaid leave, highlighting increased challenges in reconciling work and family responsibilities (Andrew et al., 2022; Collins et al., 2021; Mertehikian and Gonalons-Pons, 2022). Studies focusing on direct measures of productivity, such as scientific publications or software development output, i.e. programmed code, revealed that female IT specialists and researchers experienced significant productivity losses (Cui et al., 2022; Hipp and Konrad, 2022; Rusconi et al., 2020). Taken together, these findings suggest that women have often had to prioritize essential tasks over their professional advancement, leaving far less time to invest in their careers and long-term professional prospects. This highlights the potential for growing gender inequalities in the labour market during the pandemic, which may have had enduring implications for women's economic and career trajectories.

Expanding research to examine gender differences in job-related training is particularly important, given the increased gendered labour market inequalities during the pandemic and the profound changes in the dynamics of supply and demand for training opportunities (Kleinert and Zoch, 2023). In today's rapidly changing world of work, continuous adaptation to technological, occupational and organisational change is critical, making lifelong learning a crucial prerequisite for employment stability and career development (Van Nieuwenhove and De Wever, 2022). Previous research has shown mixed results regarding gender differences in general training participation, with smaller gaps observed in contexts with more supportive work-family policies (Dämmrich et al., 2015; Dieckhoff and Steiber, 2011; Massing and Gauly, 2017; Wotschack, 2019; Zoch, 2023). The COVID-19 pandemic reshaped training opportunities, as social distancing measures and reduced corporate investment led to a decline in traditional training opportunities, especially during the early months of the pandemic (Bellmann et al., 2021; Flake et al., 2021; Hoening and Molzberger, 2021). At the same time, the pandemic also accelerated the digitization of training (Denninger and Käßplinger, 2021; Kleinert et al., 2021). These shifts—combined with increased gender inequalities in the labour market—suggest that

gender training gaps may have widened. To date, however, longitudinal empirical evidence on the medium- to long-term impact of the COVID-19 pandemic on gender inequalities in job-related training remains scarce.

This study contributes to the literature on gendered labour market inequalities by examining whether and how the pandemic altered gender differences in participation in job-related non-formal training (hereafter simply referred to as ‘training’).<sup>i</sup> It starts from the assumption that gender inequalities in the division of paid and unpaid work during the pandemic have spilled over into the sphere of training. Drawing on theories of labour market segmentation, work-family conflict and gender roles, it hypothesizes that the pandemic led to a greater decline in training among parents, with mothers being particularly affected. Focusing on the German context, this study uses rich individual-level panel data from the German National Educational Panel Study (Adult Cohort), including annual measures of training participation. Four panel waves (2018/19–2021/22) are used to capture the development of training participation among working adults, comparing training during the two years of the pandemic with pre-crisis patterns. By estimating the individual change in training participation over the course of the pandemic using linear probability models with individual fixed effects and controlling for potential time-varying confounders, a robust within-person estimator of altered training is provided. The exceptionally rich survey data, including individual-level changes in work and family life, combined with unique administrative information on COVID-19 incidence rates and government restrictions at respondents’ district level, allows to examine a rich set of demand- and supply-side factors that may have affected training behaviour differently for men and women with and without children.

Germany provides an ideal case study for examining the impact of the COVID-19 pandemic on gender inequalities in job-related training. As one of the largest economies in Europe, Germany combines a strong labour market with progressive employment-oriented family policies that have significantly increased maternal employment in recent decades. However, persistent gender inequalities in paid and unpaid work remain (e. g., Matteazzi and Scherer, 2021; Penner et al., 2023; Zoch and Heyne, 2023). With the onset of the pandemic in early 2020, Germany imposed severe restrictions but, unlike other countries, avoided nationwide curfews, relying instead on strict social distancing measures and extended closures of childcare facilities and schools. This created unique pressures on working parents, particularly mothers with young children, who were suddenly faced with the challenge of balancing increased childcare and homeschooling responsibilities with (remote) work (Hiekel and Kühn, 2022; Zoch et al., 2022). These dynamics, set against Germany’s progressive policy framework and strong labour market, provide a compelling context for understanding the intersection of gender, parenthood and job-related training, offering valuable lessons for building resilient and equitable lifelong learning systems beyond crises.

## Gender-specific changes in training supply and demand during the pandemic

Understanding group-specific changes in training participation during the COVID-19 pandemic requires addressing the barriers that shape access to and demand for job-related training. Cross (1992) identified three major obstacles to participation in job-related training: (1) institutional barriers, such as a lack of employer support or encouragement for training, (2) situational barriers, including individual circumstances, and (3) dispositional barriers, which refer to personal attitudes and motivation towards learning and training. The COVID-19 pandemic has exacerbated institutional barriers by limiting training opportunities and situational barriers by increasing employees' work and family burdens. In contrast, changes in employees' general motivation towards training (i.e., dispositional barriers) due to the pandemic may be less relevant. Accordingly, this study focuses on shifts in labour market-related supply-side factors and the impact of increased work-family demands as situational barriers to workers' participation in training, which are discussed in the following two sections.

### *Institutional barriers: changes in training opportunities in segmented labour markets*

According to human capital theory, employees and employers invest in training when the expected utility gain exceeds the costs of participation. While employees may seek to improve their career prospects or reduce the risk of being laid off, employers invest in employee training to secure future firm-specific productivity gains (Becker, 1964; Becker, 2018). In Germany, employers play an important role in shaping institutional barriers and opportunities by determining the availability of and access to training (Wotschack, 2019; Wotschack and Samtleben, 2024). According to the German Adult Education Survey, nearly three-quarters of all training activities in the years before the pandemic were company-related, i.e. occurring during working hours and/or financed by the employer, while only about 1 out of 10 job-related training activities were independently organised by employees (BMBF, 2022: 22).

The pandemic profoundly altered the institutional barriers to participation in job-related training, particularly employer-sponsored training, leading to a reduction in average participation rates in the first phase of the crisis. On the one hand, on-site training was either cancelled or replaced by online formats during periods of contact restrictions (Christ et al., 2021; Flake et al., 2021), creating challenges for participation. In the first year of the pandemic, only a small proportion of training was delivered remotely, limiting its reach and accessibility, with increased training capacity only in the second year (Koscheck et al., 2022). In addition, many employers, faced with heightened economic uncertainty and financial pressures across a range of sectors, responded by cutting their training expenditures (Kruppe et al., 2022). In addition, changes in the workplace—such as sudden increases in workload, short-time

work, temporary lay-offs or the inability to work remotely and to participate in online training formats—are likely to have contributed to a decline in training opportunities.<sup>ii</sup> On the other hand, the sudden shift to remote work, coupled with the introduction of new digitized tools and tasks, significantly increased the demand for training in the early months of the pandemic, as employees needed additional skills to perform their job tasks from home (Kleinert et al., 2021; Kruppe and Lang, 2023). However, the new demands did not make up for the decline in training opportunities, but overall participation rates declined during the early phase of the pandemic as a result of the altered institutional barriers to job-related training (Flake et al., 2021; Kleinert and Zoch, 2023).

Within segmented labour markets, such as Germany (Sengenberger, 1981), two different scenarios can be distinguished in terms of employer support for the provision of training for different groups of workers during the pandemic.

The first scenario assumes that employers reduced investment across the board, leading to a general decline in training opportunities for all employees. Given that training participation in the pre-pandemic period was characterized by strong Matthew effects, i.e. those with higher levels of education and job-related skills were more likely to receive additional training (Kilpi-Jakonen et al., 2015), it can be assumed that individuals with pre-existing training privileges experienced a larger decline during the pandemic than others. In this *universal reduction scenario*, the decline in training participation would be as pronounced for women as for men. Although women have historically been disadvantaged in terms of access to training (Dieckhoff and Steiber, 2011; Hubert and Wolf, 2007), their participation in training has increased significantly in recent decades (Autor:innengruppe Bildungsberichterstattung, 2022; Käßlinger, 2022). According to large-scale surveys in the pre-pandemic years in Germany, female employees participated in both general and in-company job-related training as much or even more than their male counterparts (BMBF, 2022; Janssen and Leber, 2015; Kleinert and Zoch, 2023). Therefore, under the universal reduction scenario, the gender training gap is not expected to change as a consequence of the pandemic.

In contrast, the second scenario suggests that economic crises, such as the pandemic, perpetuate or even exacerbate existing inequalities through selective cuts in training (Cordes and von Haaren, 2015), thereby widening gender and parenthood training gaps. Inspired by human capital theory, this scenario assumes that employers, faced with increased economic uncertainty during the pandemic, adopted the risk-averse strategy of prioritizing training provision for core employees—those expected to contribute most to future firm productivity. In contrast, part-time workers, those in non-permanent positions, the recently unemployed and other less privileged groups may have been excluded from training opportunities. In this *selective investment scenario*, women should have experienced a greater

decline in training than men. Given the disproportionate share of domestic and caring responsibilities borne by women, especially mothers, and the higher share of part-time work, they are often perceived as less available for career advancement and thus for strategic training investment by employers (Zoch, 2023). This perception, rooted in gendered expectations, is not necessarily based on actual performance or potential (Purcell et al., 2010). The onset of the pandemic is likely to have exacerbated gender disparities in training, as work-family conflicts increased due to the closure of childcare facilities and schools. Employers may therefore have perceived women, particularly mothers, as less available and less fully engaged, and therefore less likely to take up and benefit from additional training. As a result, women, already navigating a work environment where their productivity is often undervalued due to gendered expectations, may have faced additional disadvantages in the allocation of training opportunities during the pandemic. Thus, under the selective investment scenario, the decline in training is expected to be more pronounced for women, particularly mothers, than for men.

#### *Situational barriers: changes in private and family life*

The second argument of the theoretical framework focuses on situational barriers to training participation, i.e. individual circumstances that affect workers' demand for training, such as time availability constraints and other family- or private-life-related stressors.

Allocating personal time to job-related training inherently competes with work, family, or leisure activities—a conflict that has been well documented (Rüter, 2022; Rüter and Martin, 2022; Schmidt-Lauff, 2018; Wotschack, 2012). In their pre-pandemic study, Massing and Gauly (2017) reported that men's primary reasons for refraining from training were related to a high workload, while women more often reported family responsibilities and cost issues. Similarly, Zoch (2023) found stronger reductions in job-related training among mothers than fathers, attributing these declines to increased family work following childbirth. The onset of the COVID-19 pandemic further exacerbated time availability constraints due to sudden and substantial changes in private and family life. In particular, mothers experienced increased family-work conflicts, as they often bore the brunt of the additional family work resulting from the closure of schools and kindergartens (Boll et al., 2021; Globisch et al., 2022; Hipp and Bünning, 2021; Kohlrausch and Zucco, 2020; Zoch et al., 2021).

The increased involvement of mothers during the pandemic is consistent with the household bargaining theory (Lundberg and Pollak, 1996), which explains mothers' increased care responsibilities as a consequence of their typically lower earnings. It is also consistent with the doing gender approach (West and Zimmerman, 1987), which sees gender roles and cultural norms associated with parenthood and family work as the cause of mothers' increased involvement in care work, regardless of their share of household income or work engagement. Accordingly, women may have felt more responsible for

taking on additional childcare and housework responsibilities, leading couples to revert to more specialized, i.e. traditional, behaviours. Thus, women may have increasingly embraced their family role, while men may have emphasized their role as the primary financial provider, particularly when both partners worked from home. Overall, both perspectives suggest that men may have responded to the economic and financial uncertainties of the pandemic by investing in their skills portfolio, while women may have felt particularly obliged to manage the organization of increased domestic and childcare responsibilities.

With these constraints, parents, and mothers in particular, faced a stark trade-off between addressing family needs and engaging in work-related tasks that could benefit long-term career prospects, such as job-related training. Recent research highlights that the dramatic increase in women's family responsibilities during the pandemic led to a prioritization of immediate and essential tasks, widening the gender gap in labour productivity (e.g., Cui et al., 2022; Hipp and Konrad, 2022). In addition, studies indicated that women reduced their working hours more than men during the pandemic (UK: Andrew et al., 2022; Zamberlan et al., 2021; USA: Collins et al., 2021; Mertehikian and Gonalons-Pons, 2022; Netherlands: Meeke et al., 2023; Germany, Singapore and USA: Reichelt et al., 2021).<sup>iii</sup> As a result, women may have had less time and resources to invest in career-related activities such as training. In this context, a study from the early stage of the pandemic found that mothers in particular postponed their initial plans to participate in training (Flake et al., 2021). In the context of these shifts in work-family dynamics, mothers were more likely to report feelings of exhaustion, emotional distress and declines in mental health and well-being (Czymara et al., 2020; Huebener et al., 2021; Meyer et al., 2021; Zwar et al., 2023).

This study therefore presumes that reduced time availability due to additional caring responsibilities, as well as increased stress caused by personal and family-related changes during the pandemic, may be key factors explaining the changing gender gap in training. Specifically, it is expected that women, particularly mothers, prioritized family responsibilities over professional development activities, such as job-related training, leading to lower participation in training during the COVID-19 pandemic compared to men with and without children. Therefore, following this line of argumentation, the largest declines in training are expected to be found among women with children compared to childless women and men.

## Data and Methods

### *Data and analysis sample*

This study examined gender- and family-related differences in changes in job-related training due to the COVID-19 pandemic by estimating linear probability models with individual fixed effects using annual longitudinal data from the adult cohort of the National Educational Panel Study (NEPS SC6:14.0.0; Blossfeld and Roßbach, 2019; NEPS Network, 2023). Since 2008, the NEPS Adult Cohort had been collecting detailed individual-level data on educational pathways and competence development, including formal, non-formal and informal learning within and outside the labour market context. The data represent adults born between 1944 and 1986 living in Germany. Respondents were identified by randomly selecting individuals from registration offices at three points in time (2007/08; 2009/10; 2011/12). Subsequently, respondents were interviewed annually between October and March in different modes depending on the focus of the interview (telephone or face-to-face; see FDZ-LifBi, 2023). As the NEPS is the only large-scale panel study in Germany that includes detailed longitudinal information on non-formal job-related education (Janik et al., 2016), it is particularly well suited to comparing individual training participation before and during the COVID-19 pandemic.

To compare individuals' participation in training over time, two pre-pandemic survey waves (2018 and 2019) and two survey waves conducted during the pandemic (2020 and 2021) were used (cf. Appendix Table A1; N=7,857). This initial sample was restricted to individuals who participated in both pandemic survey waves and in at least one of the two pre-pandemic waves (N=5,462). Due to the study's focus on job-related training, the sample was further restricted to respondents who had not yet retired and not reached the statutory retirement age (-1,650) and to those who were employed at all time points (-527). After excluding persons without complete information (-183), the final sample consisted of 12,341 person-year observations from 3,102 persons.

### *Analytic strategy and variables*

The impact of the COVID-19 pandemic on training participation was investigated by estimating linear probability models with individual fixed effects (FE). The main advantage of FE models is their ability to reduce the risk of omitted variable bias by focusing exclusively on within-person changes over time. Hence, these models compare the likelihood of participating in job-related training during the two COVID-19 pandemic years with the individual probability of participating in training in all pre-pandemic years. In doing so, they assess the individual change in training participation over time. By design, these models account for any observed or unobserved time-constant characteristics (Ludwig and Brüderl, 2021), allowing for a comparison of differences in training behaviour only within individuals over time, rather than between groups. Consequently, there is no need to account for potential time-invariant

between-person factors, such as heterogeneity in labour market position or job characteristics. Instead, the analyses focus solely on time-varying factors. Effectively, the estimator concentrates on changes in training participation, disregarding individuals who consistently participated or never participated in job-related training activities.

The binary dependent variable in the models indicated whether respondents had participated in at least one job-related training activity since the last interview, which covered a time span of approximately one year (for descriptive information on variables, cf. Table 1). The analysis focused on non-formal job-related training, including courses, seminars and training programs, which were asked about repeatedly in the context of different life course states to support recall (for details see Janik et al., 2016). Only job-related training was considered, excluding activities undertaken solely for private reasons. In about one third of the person-year observations, participation in at least one job-related training activity was reported in the months preceding the survey (cf. Appendix Table 2). Most respondents reported years in which they participated in training as well as years in which they did not participate, indicating sufficient within-person variation in training participation over time to justify estimating fixed effects models (cf. Appendix Table 2).

- TABLE 1 here -

The models included two key independent variables. The first was a time indicator, measured by two dummy variables for the pandemic years 2020 and 2021, using the pre-pandemic years 2018/19 as the reference period. The second was a four-category gender/parenthood variable, distinguishing between men and women with and without children under the age of 18 at the start of the pandemic in 2021.<sup>iv</sup>

A two-step estimation strategy was implemented. First, the effect of the COVID-19 pandemic on the probability of participating in training was examined by including the time dummies. Given the study's main interest in estimating heterogeneous group effects, these dummies were interacted with the gender/parenthood variable to estimate whether the impact of each pandemic year differed for men and women, with and without children, respectively. This approach allowed to compare group-specific training participation during the two COVID years with their average training behaviour in the pre-pandemic period, thus capturing the individual change in training participation for each pandemic year.

As described above, the baseline models required adjustment for only a small number of time-varying confounders, namely those that could influence respondents' training participation behaviour independently of the Covid-19 pandemic. First, the respondents' age was included (in two-year steps), assuming that participation in job-related training declines over the professional life course. Second, to account for the variation in time between two interviews (approximately twelve months, with small

fluctuations of usually a few weeks), the time between two survey waves was included (cf. Table 1), as longer intervals may have allowed respondents to experience more training activities. To account for the nested structure of repeatedly observed individuals in the analysis data, all models were estimated with clustered standard errors at the individual level.

In a second step, time-varying mediating variables were progressively added (described in Table 1) to unpack the mechanisms behind group-specific changes in training participation due to the COVID-19 pandemic. These variables comprised *work-related changes*, such as changes in the respondents' employment situation or work environment, specifically including contractual working hours, overtime hours, job tenure, unemployment status, frequency of remote work, months of short-time work and whether training courses at work were cancelled. In addition, *changes in private and family life* that were likely to have reduced training demand due to changes in time resources and increased stress during the pandemic were taken into account. These variables included objective factors, such as changes in hours dedicated to care work and changes in household income, as well as self-reported measures of health, life satisfaction and perceived negative consequences of the pandemic, such as time conflicts and family stress, which were newly added to the survey during the pandemic.

Finally, the *regional and temporal intensity of the pandemic* were added to the models to explicitly link the overall pandemic-related decline in training participation to the evolution of regional infection risk and related restriction measures, which presumably influenced both the supply of and demand for training opportunities.<sup>v</sup> Exposure intensity was determined by the proportion of days between two interviews during which a district experienced above-average infection levels, measured as the proportion of time during which the 7-day incidence rate per 100,000 inhabitants exceeded the national median. Higher values indicate prolonged periods of a particularly high infection risk, possibly altering supply and demand of training. The second indicator captured the regional severity of official protection measures, which were closely related to regional incidence rates, especially during the first year of the crisis. Protection measures in two important areas of life were included: restrictions at work and restrictions on contact or meeting in private spaces. Since the original measures were binary (0: measure not applied; 1: measure applied), they were averaged over the reference period and the average of the two values was taken. This variable also ranged from 0 to 1, with higher values indicating more frequent restriction measures. The decision to use relative indicators rather than absolute measures (e.g., incidence rates on the day of the interview) to capture the strength of the pandemic throughout the potential training period was made because the meaning and people's responses to the absolute number of people infected with COVID has changed as the pandemic progressed.<sup>vi</sup>

## Results

### *How did non-formal job-related training develop over the course of the pandemic?*

Descriptive findings reveal that before the pandemic, 39 percent of all employed respondents participated in job-related training (41 percent in 2018, 38 percent in 2019). This rate dropped to 27 percent during the COVID pandemic, indicating a significant decline in training participation. Surprisingly, training participation did not recover in the second year of the pandemic: in 2021, the participation rate was 29 percent.

As demonstrated in Figure 1, which illustrates group-specific participation rates by year, men, particular childless men, exhibited consistently lower participation rates than women with and without children, both before and during the COVID pandemic. In 2020, the first year of the pandemic, training participation declined about 10 to 11 percentage points in all four groups. One year later, it increased only marginally—with one notable and surprising exception: mothers' participation rates increased by 5 percentage points between 2020 and 2021.

- FIGURE 1 here -

These descriptive findings challenge the study's theoretical expectations. Contrary to the assumption that mothers would have experienced the steepest declines in training due to increased work-family conflict during the pandemic, their declines were comparatively less pronounced, both in relative and absolute terms, than those observed for the other three groups. In the following, fixed effects models are used to show whether these patterns change when systematic group differences are taken into account.

### *Group-specific declines in training and its determinants: results of fixed-effect models*

Figure 2 shows the coefficients of changes in job-related training in 2020 and 2021, compared to the pre-pandemic years, separately by respondent group, together with 95% confidence intervals. These estimates are from fixed effects models that include an interaction effect of the time dummy variable and the four-category grouping variable on the probability of respondents participating in job-related training. The full results of the models are shown in Table 2.

- FIGURE 2 here -

- TABLE 2 here -

The baseline model in Figure 2 (marked by squares; Model 1 in Table 2) confirms the descriptive patterns: in the first year of the pandemic (2020), the probability of participating in job-related training declined significantly for all four groups. Again, the declines were fairly uniform across groups, ranging

from 9.3 percentage points for parents with minor children to 10.9 percentage points for childless women. In 2021, the second year of the pandemic, the probability of participating in training was still significantly reduced for all groups except mothers. However, in contrast to 2020, declines in the probability of training were less pronounced, suggesting a moderate recovery in training participation, especially among mothers, who showed a very small and statistically insignificant estimate. Overall, this model neither confirmed a gender-specific decline in training participation nor a more pronounced decline among parents compared to childless workers during the COVID-19 pandemic. Thus, these results are more consistent with the universal cut scenario, which suggested uniform restrictions on access to training for all workers. They do not support the assumption that reduced time availability due to additional caring responsibilities and stress led to a greater decline in training participation among women and especially mothers.

Subsequent models (marked with diamonds, dots and triangles in Figure 2; M2 – M4 in Table 2) examined the role of mediating variables and suppressor effects. Model 2 (diamonds) shows that work-related changes, such as changes in working hours and overtime, in the job situation (periods of unemployment, remote work and short-time work) and training cancellations partially explained the COVID-related declines in all groups, as indicated by reduced coefficients, compared to Model 1. Among these, on-site training cancellations emerged as a crucial determinant (cf. Table 2 and Appendix Table A3). Conversely, changes in the job situation, including adjustments to working hours or remote work, did not have a significant effect on participation in training. These findings suggest that institutional barriers, in particular the provision of training at the workplace, were key factors affecting participation in training during the pandemic.

Model 3 (marked with dots) includes indicators of changes in private life. Changes in the coefficients between models 2 and 3 were only observed for parents, while they remained relatively stable across models for those without children. This suggests that situational barriers due to time constraints only affected participation in training among parents. The reduction in effect size was mainly due to increased time conflicts, perceived stress, reduced life satisfaction and lower household income during the pandemic. In contrast, changes in caregiving hours and self-perceived health did not show any significant additional effects (cf. Table 2 and Appendix Table A3).

Finally, model 4 (marked with triangles) included regional COVID-19 incidence and restriction measures to assess whether the observed declines in the probability of training over time could be directly attributed to regional variation in the severity of the pandemic. After including these variables, the year coefficients no longer show a significant decline in training participation, suggesting that regional differences in the severity of the pandemic also played a role in explaining the declines in

training participation. Models in which both COVID-19 indicators are introduced separately (cf. Appendix Table A3) show that the reduction in effect size is due to a similar extent to both incidence and restriction measures.

#### *Sensitivity and robustness checks*

To further support the findings several robustness checks were conducted. First, as the models compared individual training participation in 2020 and 2021 with 2018/2019, a baseline model contrasting training participation during the pandemic with pre-pandemic patterns in 2018 and 2019 was run as well. Consistent with the theoretical expectations, training participation in 2019 was not significantly different from 2018, yielding similar results to those presented above (cf. Appendix Table A4).

As an alternative estimation strategy, the FE models were run separately for each gender/parenthood group rather than including interaction terms, which confirmed the results presented above. In particular, training course cancellations were more relevant in explaining the decline in training participation among childless employees than among parents with minor children.

To address the debate on universal versus selective training cuts, the models were replicated with a restricted sample of full-time employees, excluding individuals working 30 hours or less. The pandemic-related declines in training were slightly larger across all four groups, but mirrored the patterns presented (cf. Appendix Figure A1). This can be interpreted as tentative evidence against the selective cut scenario—suggesting that the pandemic broadly affected the training participation of all employees. There is no evidence that employers “reserved” training opportunities for core employees. Instead, the larger declines among full-time employees may indicate that core employees, who were likely to have participated regularly in training before the pandemic, were unable to do so during the crisis. However, in the restricted sample of full-time employees, the mediating effect of private-life related changes was more pronounced for parents, compared to childless employees.

Furthermore, as a relatively high age threshold for children was chosen, it was examined whether lower thresholds would affect the results, as younger children typically require more help, supervision and care (cf. Appendix Figures A2 and A3). When the age threshold for children was set at 14, the decrease in the probability of training was slightly higher for mothers (-0.117 compared to -0.093 in 2020), but remained unchanged for fathers (-0.084 compared to -0.093 in 2020). Conversely, when the threshold was set at age 10, the decline was slightly larger for fathers (-0.121 compared to -0.093 in 2020), but substantially smaller for mothers (-0.049 compared to -0.093 in 2020). This suggests that the training participation of mothers with younger children, who are typically less engaged in training (Zoch 2023), was less affected during the COVID-19 pandemic. However, it has to be taken into account

that the group of mothers with young children in the sample gave birth to their children at a relatively late age and therefore probably represents a very selective group.

## Discussion

This study provides novel longitudinal evidence on gender- and family-related differences in the impact of the COVID-19 pandemic on participation in non-formal job-related training. Using rich longitudinal data from Germany (2018–2021), it is the first study to examine whether and how the impact of the COVID-19 pandemic on respondents' training behaviour has evolved over two crisis years. Together with broad information on the individual, household and regional context, this study extends previous research on changes in gender labour market inequalities during the pandemic as well as studies examining overall changes in job-related training behaviour.

Contrary to the theoretical expectations, the increased gender inequalities in the division of paid and unpaid work and the documented increased stress levels experienced by mothers during the pandemic did not have spillover effects on participation in job-related training. The results highlight that mothers did not experience a greater decline in training participation compared to childless women and men with or without children. Instead, the findings reveal relatively uniform patterns of decline across all these groups, with larger decreases in 2020, the first year of the pandemic, compared to 2021. Interestingly, mothers' participation in training appeared to recover slightly more than that of other groups in 2021, which may be related to lower baseline levels of training, particularly when children were young. Among the explanatory factors for the decline in training, workplace training cancellations emerged as a key determinant, while other workplace changes did not have a substantial explanatory effect. Regional COVID-19 incidence and restriction measures also played a significant role. As expected, private- and family-life-related determinants partly mitigated the decline for parents but had no effect for childless workers.

Overall, these findings tentatively support the universal cut scenario, suggesting that institutional barriers—in particular reduced workplace training supply—had a significant impact on all workers regardless of gender or having children. Private-life and family-life related changes partly explained the decline in training for parents. However, these effects were observed for both fathers and mothers, contrary to expectations of greater situational barriers for mothers. It can be concluded that participation in job-related training during the pandemic was primarily shaped by reduced training provision, cancelled courses at the workplace and regional pandemic exposure. This finding is in line with previous literature showing that in Germany employers have a large influence on employees' participation in training.

The impact of additional time constraints and family-work conflicts on training demand may not have been fully identified in the data, given the severe reduction in training opportunities during the COVID-19 pandemic. In fact, the effects of the pandemic on training behaviour may be more nuanced than the results suggest. The chosen methodological approach—focusing on within-person changes in training participation—does not account for pre-existing differences between the four groups considered in this article, such as demographic characteristics or employment attributes. For example, men without children are on average older and less educated than men with children, and these characteristics might explain their lower training participation rates before the pandemic. Against this background, the finding of relatively uniform declines in training participation across groups seems even more surprising. Furthermore, this study is based on a rough indicator of whether workers participated in job-related training over a full year. Other forms of adult education, such as informal learning, or finer grained indicators of training intensity, such as hours of learning per year, may have been more susceptible to situational barriers such as stress and time pressure. In addition, the use of unique panel data for Germany has its limitations, as the sample consists of long-term survey participants, who were relatively old and selective. Participants with very young children or from disadvantaged groups, e.g. with a migrant background or lower educational attainment, are underrepresented, while highly educated respondents are overrepresented, especially among parents (as children in lower-educated groups are on average older). Thus, the overall and group-specific decline in training participation may be underestimated, especially for groups with lower training participation before the pandemic, such as young mothers.

In contrast to the few studies examining the cross-sectional link between the COVID-19 pandemic and job-related training, this study used high-quality panel data to assess the impact of the pandemic by directly comparing training participation with individual pre-pandemic participation patterns. Contrary to expectations of group-specific declines, the findings reveal relatively uniform declines in training participation among women and men with and without children, supporting a universal cut scenario. However, some of the determinants of these declines varied, with family-related factors—such as time conflicts and stress—playing a greater role for parents than for childless workers. While disruptions in training provision emerged as a key factor affecting all groups, the results also somewhat underlined the importance of childcare facilities in mitigating work-family conflict for parents. These findings highlight the wider vulnerability of job-related training systems to institutional and situational barriers. The long-term consequences of pandemic-related shifts, such as reduced training opportunities and increased digital learning, remain uncertain and merit further investigation. Future research should examine changes in training participation among specific socio-demographic groups and work contexts to uncover more nuanced effects. For example, single-parent households, which were

disproportionately affected by the pandemic (Meekes et al., 2023), could not be adequately analysed due to sample size limitations. In addition, it might be fruitful to distinguish between different forms of training and to consider training intensity. Examining these variations would provide deeper insights into how training participation is shaped under crisis conditions.

## Notes

<sup>i</sup> Job-related non-formal training refers to structured learning activities that provide job-related knowledge or skills in an organized setting, usually involving a teacher or trainer, such as courses, trainings, seminars or tutoring. These activities are usually of relatively short duration and do not lead to an accredited educational certificate.

<sup>ii</sup> Periods of short-time work—widely used in Germany to mitigate the negative economic impact of the pandemic on businesses—could have been used by employers to provide training, but in fact this was only rarely done (Bellmann et al., 2021).

<sup>iii</sup> With regard to the German context, recent studies suggest that this was not the case in Germany (Fervers et al., 2023; Knize et al., 2022), as most working hour reductions took place under the short-time work (*Kurzarbeit*) scheme, which was more common in predominantly male sectors (Globisch et al., 2022).

<sup>iv</sup> Due to the long-term nature of the panel study and the associated high average age of the respondents (cf. Table 3), the transition to parenthood did not occur frequently among the survey participants considered during the observation period. In 89% of all cases, their status remained constant until 2021; 2% transitioned to parenthood; in 9% of all cases, children turned 18 or moved out.

<sup>v</sup> This study hypothesizes that regional exposure to the COVID-19 pandemic contributed to reductions in training participation, particularly as on-site training was often cancelled during periods of contact restrictions. However, no specific theoretical expectations were developed about how these variables may have influenced group-specific declines in training participation. Instead, it is expected that regional differences in the severity of the pandemic and corresponding policy responses affected all groups similarly.

<sup>vi</sup> The Covid-19 incidence rates and restrictions imposed by authorities were measured on a daily basis at the district level and are accessible via the infas 360 healthcare data platform (<https://www.healthcare-datenplattform.de>). They include a range of protective measures, including different types of social distancing, restrictions in public or educational institutions, or travel restrictions. At the beginning of the pandemic, the same measures applied nationwide, but as the

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pandemic progressed, they were refined to apply only to areas particularly affected by the pandemic. The two indicators were added to the data set using respondents' resident district and year as identifiers.

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Table 1. Variable description.

Variable		Total (mean/SD)				By gender/having children (mean)							
		Pre-Covid (2018-2019)		Covid (2020-2021)		Pre-Covid (2018-2019)				Covid (2020-2021)			
		M, children	no children	M, children	F, children	M, children	no children	F, children	no children	M, children	no children	F, children	no children
Dependent variable	Non-formal job-related training participation (in previous year, d)	0.39	0.49	0.28	0.45	0.35	0.39	0.43	0.43	0.23	0.28	0.30	0.34
Gender/ having children	Male, no children	0.36	0.48	0.36	0.48	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
	Male with child(ren) below age 18	0.16	0.37	0.16	0.37	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
	Female, no children	0.35	0.48	0.35	0.48	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
	Female with child(ren) below age 18	0.13	0.34	0.13	0.33	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
Work	Weekly contractual working hours	34.84	10.27	34.52	10.02	38.79	39.27	31.54	27.43	38.03	38.94	31.33	27.97
	Overtime (previous month)	8.74	13.40	7.71	12.74	9.91	10.68	7.33	6.94	7.84	10.33	6.58	7.17
	Job tenure (in months)	144.03	119.50	157.27	124.64	168.16	117.46	152.40	87.98	180.23	130.06	166.14	103.41
	Months unemployed (previous year)	0.09	0.85	0.10	0.87	0.12	0.04	0.08	0.08	0.16	0.04	0.09	0.07
	Remote work frequency (d)	0.24	0.43	0.47	0.50	0.24	0.32	0.20	0.28	0.46	0.60	0.41	0.51
	Short-time work (in months)	0.00	0.00	0.46	1.61	0.00	0.00	0.00	0.00	0.44	0.47	0.46	0.51
	Training courses at work cancelled due to Covid (d)	0.00	0.00	0.19	0.39	0.00	0.00	0.00	0.00	0.15	0.16	0.21	0.25
	Care for relatives and children (daily hours)	2.20	3.56	2.05	3.43	0.89	3.24	1.38	6.76	0.71	3.44	1.28	6.18
Private life	Life dissatisfaction (lagged; range 1-10)	2.22	1.22	2.33	1.25	2.31	2.07	2.25	2.13	2.38	2.14	2.40	2.25
	Subjective health (lagged; range 1-5)	2.16	0.74	2.23	0.71	2.21	2.01	2.21	2.06	2.29	2.11	2.28	2.06
	Log household income (net, equivalized)	7.78	0.45	7.84	0.46	7.86	7.75	7.77	7.64	7.92	7.79	7.83	7.69
	Material consequences of the pandemic (scale; range: 1-5)	1.00	0.00	1.69	0.74	1.00	1.00	1.00	1.00	1.69	1.65	1.71	1.73
	Private life/emotional consequences of the pandemic (scale; range: 1-5)	1.00	0.00	1.63	0.60	1.00	1.00	1.00	1.00	1.52	1.71	1.61	1.93
Covid-19	Time conflict/stress consequences (scale; range: 1-5)	1.00	0.00	1.50	0.79	1.00	1.00	1.00	1.00	1.28	1.97	1.30	2.08
	Intensity of Covid-19 incidence at district level (range: 0-1)	0.00	0.00	0.46	0.22	0.00	0.00	0.00	0.00	0.47	0.46	0.46	0.46
	Intensity of Covid-19 protection measures at district level (range: 0-1)	0.00	0.00	0.42	0.24	0.00	0.00	0.00	0.00	0.42	0.42	0.41	0.42
Control	Age in two-year steps	50.29	7.78	52.34	7.78	52.52	44.97	52.78	44.01	54.54	47.03	54.83	46.11
	N weeks between current interview - previous interview	53.48	7.23	52.80	8.22	53.54	53.57	53.54	53.06	52.71	52.89	52.76	53.02

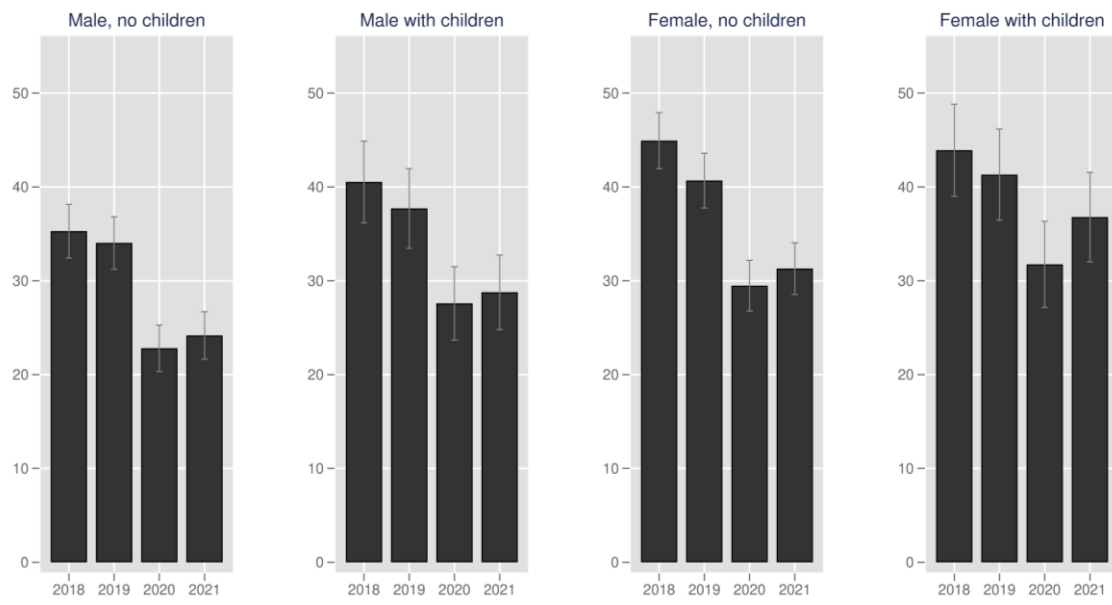
Note: d=dummy; SD = standard deviation; M = male; F = Female. Source: NEPS:SC6:14.0.0.

Table 2. Effects on participation in job-related training (FE models).

Variable	(1)	(2)	(3)	(4)
2020	-0.097** (0.016)	-0.069** (0.017)	-0.062** (0.018)	-0.047 (0.027)
2021	-0.064** (0.020)	-0.043* (0.021)	-0.034 (0.022)	-0.014 (0.035)
Reference period (in weeks)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
2020 Male, with children	0.004 (0.027)	0.005 (0.027)	0.020 (0.027)	0.019 (0.027)
2020 Female, no children	-0.012 (0.020)	-0.007 (0.020)	-0.006 (0.020)	-0.006 (0.020)
2020 Female, with children	0.004 (0.000)	0.014 (0.000)	0.030 (0.000)	0.030 (0.000)
2021 Male, with children	0.004 (0.028)	0.002 (0.028)	0.016 (0.028)	0.015 (0.028)
2021 Female, no children	-0.008 (0.021)	-0.004 (0.021)	-0.003 (0.021)	-0.003 (0.021)
2021 Female, with children	0.049 (0.031)	0.052 (0.031)	0.061 (0.032)	0.060 (0.032)
Working hours		0.002 (0.001)	0.002* (0.001)	0.002* (0.001)
Overtime		0.001* (0.000)	0.001* (0.000)	0.001* (0.000)
Tenure (in months)		-0.000* (0.000)	-0.000* (0.000)	-0.000* (0.000)
Unemployed last year (in months)		-0.002 (0.007)	-0.001 (0.007)	-0.001 (0.007)
Remote work: regularly		-0.010 (0.015)	-0.011 (0.015)	-0.010 (0.015)
Shorttime (in months)		-0.001 (0.004)	-0.000 (0.004)	-0.001 (0.004)
Training courses cancelled		-0.114*** (0.017)	-0.113*** (0.017)	-0.113*** (0.017)
Care hrs			-0.003 (0.002)	-0.003 (0.002)
Life dissatisfaction			-0.013** (0.005)	-0.013** (0.005)
Bad health			-0.011 (0.010)	-0.011 (0.010)
Household income, equivalized (log)			-0.046* (0.018)	-0.046* (0.018)
Material consequences			-0.006 (0.009)	-0.005 (0.009)
Private life/emotional consequences			0.013 (0.012)	0.013 (0.012)
Time conflict/stress consequences			-0.026** (0.009)	-0.026** (0.009)
2020 Covid-related restrictions				-0.030 (0.050)
2021 Covid-related restrictions				0.012 (0.049)
2020 Covid incidence				-0.019 (0.045)
2021 Covid incidence				-0.053 (0.040)
R <sup>2</sup> within	0.034	0.041	0.044	0.044
N (person-years)	12.341	12.341	12.341	12.341

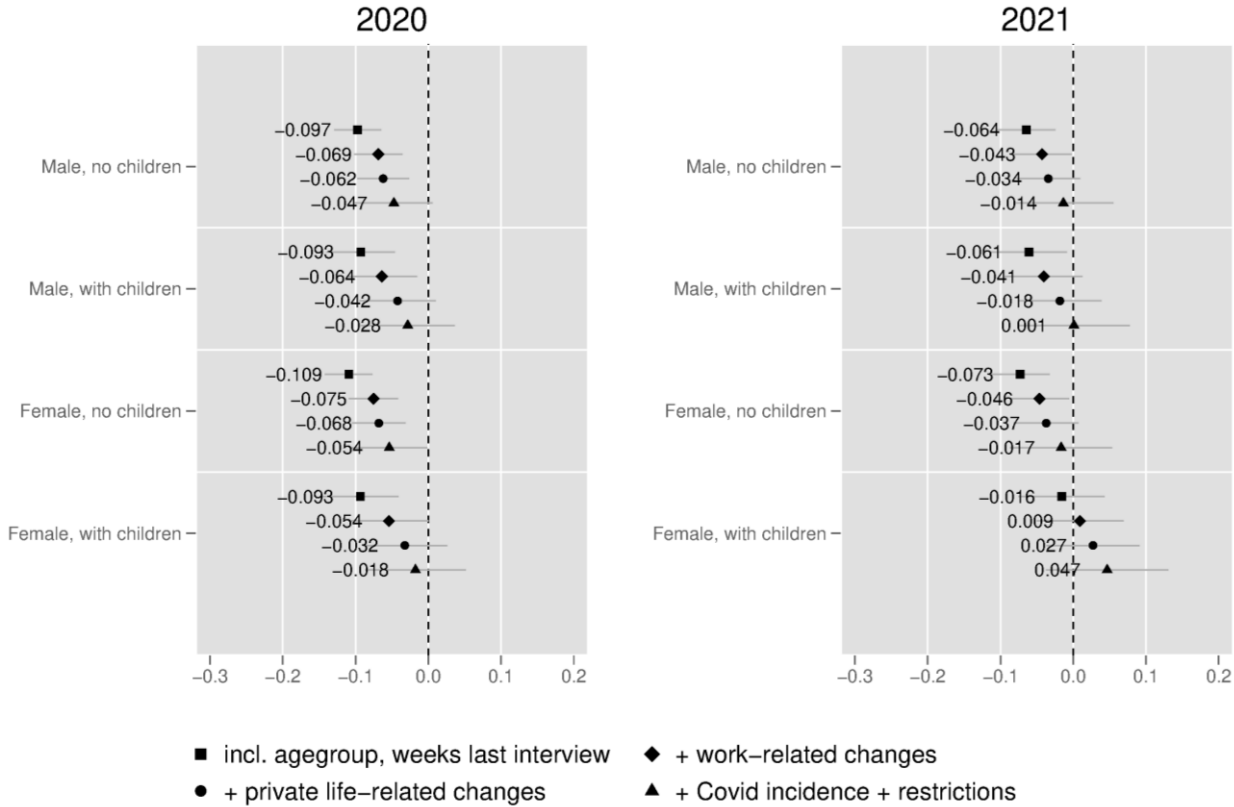
Note: Standard errors in parentheses. Not displayed: age group. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .  
Source: NEPS:SC6:14.0.0. N = 3,102.

Figure 1. Participation in job-related training by gender and having children (2018 – 2021), in %.



Note: 95% confidence intervals. Source: NEPS:SC6:14.0.0. N = 3,102.

Figure 2. Group-specific declines in job-related training participation during the Covid-19 pandemic, compared to 2018/19 (FE models, coefficients and confidence intervals).



Note: 95% confidence intervals. Source: NEPS:SC6:14.0.0. N = 3,102. Complete results cf. Appendix Table A4.

## Appendix

*Table A1. NEPS SC6 data collection and the Covid-19 pandemic.*

Wave	Data collection <sup>1</sup>	Reference period <sup>2</sup>	Covid pandemic covered
Wave 11	Autumn 2018 - Spring 2019	Autumn 2017 - Spring 2019	no
Wave 12	Autumn 2019 - Spring 2020	Autumn 2018 - Spring 2020	no
Wave 13	Autumn 2020 - Spring 2021	Autumn 2019 - Spring 2021	partly
Wave 14	Autumn 2021 - Spring 2022	Autumn 2020 - Spring 2022	yes

Note: <sup>1</sup>Main interview period: Autumn/Winter. <sup>2</sup> Approx. 1 year; individual variation.

*Table A2. Training participation patterns across waves.*

	Total		Male, no children		Male, with children		Female, no children		Female, with children	
Person-year level										
Training participation: no	8,190	66%	3,117	71%	1,330	66%	2,767	63%	976	62%
Training participation: yes	4,151	34%	1,275	29%	673	34%	1,594	37%	609	38%
Total (person-years)	12,341	100%	4,392	100%	2,003	100%	4,361	100%	1,585	100%
Person level										
Never participated	1,114	36%	448	41%	163	32%	376	34%	127	32%
Sometimes participated (two-three occasions)	1,726	56%	594	54%	305	61%	603	55%	224	56%
Always participated	262	8%	63	6%	36	7%	117	11%	46	12%
Total (persons)	3,102	100%	1,105	100%	504	100%	1,096	100%	397	100%
Persons reporting at least one year without training	2,835	91%	1,039	94%	467	93%	978	89%	351	88%
Persons reporting at least one year with training	1,988	64%	657	59%	341	68%	720	66%	270	68%

Source: NEPS:SC6:14.0.0.

Table A3. Effects of singular variables on participation in job-related training (FE models).

	Effect of 2020 dummy	Effect of 2021 dummy	Effect of additional predictor	R <sup>2</sup> within
Year dummies only	-0.101*** (0.012)	-0.061*** (0.016)		0.033
Working hours	-0.100*** (0.012)	-0.060*** (0.016)	0.002 (0.001)	0.033
Overtime	-0.099*** (0.012)	-0.060*** (0.016)	0.001* (0.000)	0.034
Tenure (in months)	-0.099*** (0.012)	-0.058*** (0.016)	-0.000* (0.000)	0.033
Unemployed last year (in months)	-0.101*** (0.012)	-0.061*** (0.016)	-0.003 (0.007)	0.033
Short-time work (in months)	-0.100*** (0.012)	-0.061*** (0.016)	0.000 (0.004)	0.033
Training courses cancelled	-0.075*** (0.012)	-0.044** (0.017)	-0.113*** (0.017)	0.038
Care hours	-0.101*** (0.012)	-0.062*** (0.016)	-0.003 (0.002)	0.033
Life dissatisfaction	-0.101*** (0.012)	-0.058*** (0.016)	-0.014** (0.005)	0.034
Bad health	-0.100*** (0.012)	-0.060*** (0.016)	-0.013 (0.009)	0.033
Household income, equivalized (log)	-0.100*** (0.012)	-0.059*** (0.016)	-0.040* (0.018)	0.034
Material consequences	-0.095*** (0.014)	-0.055** (0.018)	-0.008 (0.008)	0.033
Private life/emotional consequences	-0.099*** (0.013)	-0.058** (0.018)	-0.004 (0.011)	0.033
Time conflict/stress consequences	-0.089*** (0.013)	-0.050** (0.017)	-0.022** (0.009)	0.034
Remote work: regularly	-0.099*** (0.012)	-0.059*** (0.017)	-0.010 (0.015)	0.033
Covid restrictions	-0.091*** (0.017)	-0.052 (0.030)		0.033
2020			-0.036 (0.051)	
2021			-0.015 (0.045)	
Covid incidence	-0.090*** (0.021)	-0.033 (0.025)		0.033
2020			-0.028 (0.045)	
2021			-0.054 (0.037)	

Note: Effects of year dummies and single predictors in regression models only including years, age group, reference period in weeks and the predictor variable noted in column 1. Standard errors in parentheses. Not displayed: age group, reference period in weeks. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

Source: NEPS:SC6:14.0.0. N = 3,102.

Table A4. Robustness check: Baseline model with alternative wave specification.

Model	(1)
2019	-0.012 (0.018)
2020	-0.114*** (0.022)
2021	-0.088*** (0.026)
$r^2$ within	0.034
N (person-years)	12,341

Note: Standard errors in parentheses. Not displayed: age group; reference period in weeks. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

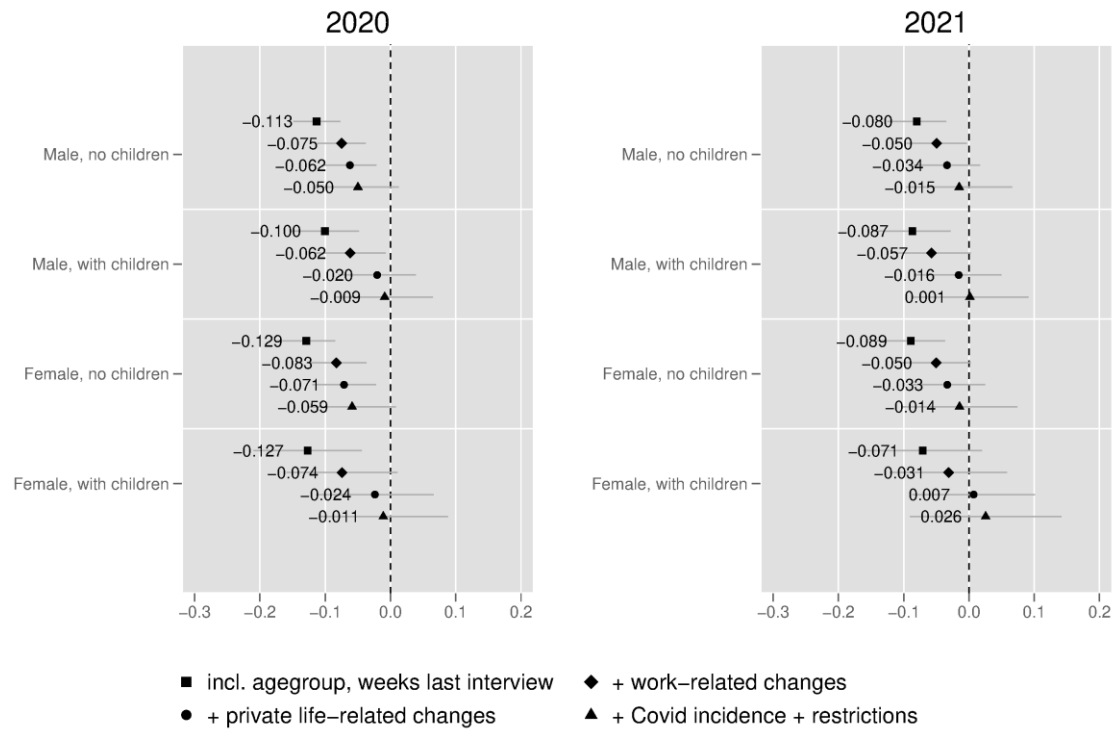
Source: NEPS:SC6:14.0.0. N = 3,102.

Table A5. Effects on participation in job-related training: group-specific models (M4 (FE models)).

	Male, no children	Male, with children	Female, no children	Female, with children
2020	-0.032 (0.039)	-0.076 (0.061)	-0.035 (0.041)	-0.006 (0.079)
2021	-0.039 (0.054)	-0.040 (0.080)	-0.004 (0.057)	0.160 (0.097)
Reference period (in weeks)	0.004** (0.001)	0.002 (0.001)	0.003** (0.001)	0.003* (0.001)
Working hours	0.003* (0.001)	0.002 (0.003)	0.003 (0.002)	-0.000 (0.003)
Overtime	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Tenure (in months)	-0.000* (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Unemployed last year (in months)	0.009 (0.010)	-0.020 (0.024)	-0.003 (0.014)	-0.007 (0.015)
Remote work: regularly	-0.000 (0.026)	-0.079* (0.037)	0.001 (0.027)	0.012 (0.040)
Short-time work (in months)	-0.004 (0.006)	-0.006 (0.010)	0.001 (0.007)	0.010 (0.009)
Training courses cancelled	-0.122*** (0.029)	-0.093* (0.044)	-0.129*** (0.029)	-0.089* (0.043)
Care hours	-0.001 (0.004)	0.005 (0.004)	-0.007* (0.003)	-0.004 (0.004)
Life dissatisfaction	-0.010 (0.007)	-0.035** (0.013)	-0.006 (0.007)	-0.016 (0.014)
Bad health	-0.009 (0.016)	0.013 (0.026)	-0.024 (0.016)	-0.009 (0.024)
Household income, equivalized (log)	-0.038 (0.027)	-0.081 (0.054)	-0.027 (0.030)	-0.076 (0.065)
Material consequences	-0.001 (0.013)	-0.017 (0.026)	-0.005 (0.015)	-0.029 (0.025)
Private life/emotional consequences	-0.021 (0.021)	0.037 (0.030)	0.016 (0.020)	0.041 (0.031)
Time conflict/stress consequences	-0.010 (0.019)	-0.025 (0.021)	-0.024 (0.017)	-0.029 (0.018)
2020 restrictions	-0.055 (0.082)	0.025 (0.126)	0.006 (0.087)	-0.111 (0.152)
2021 restrictions	0.066 (0.083)	-0.077 (0.114)	0.069 (0.081)	-0.107 (0.151)
2020 incidence	-0.048 (0.071)	0.052 (0.120)	-0.047 (0.074)	0.024 (0.134)
2021 incidence	-0.079 (0.068)	0.099 (0.104)	-0.099 (0.065)	-0.080 (0.128)
r <sup>2</sup> within	0.050	0.055	0.056	0.048
N (person-years)	4,392	2,003	4,361	1,585

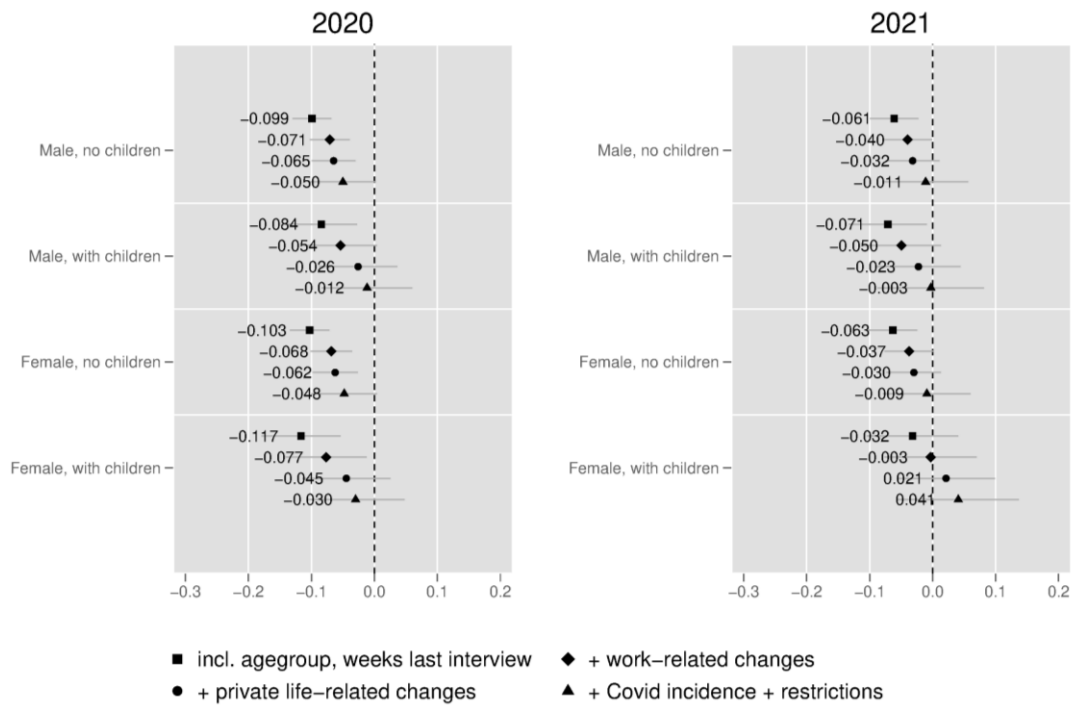
Note: Standard errors in parentheses. Not displayed: age group; \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001. NEPS:SC6:14.0.0. N = 3,102.

Figure A1. Group-specific declines in job-related training participation during the Covid-19 pandemic (FE models; full-time employees only).



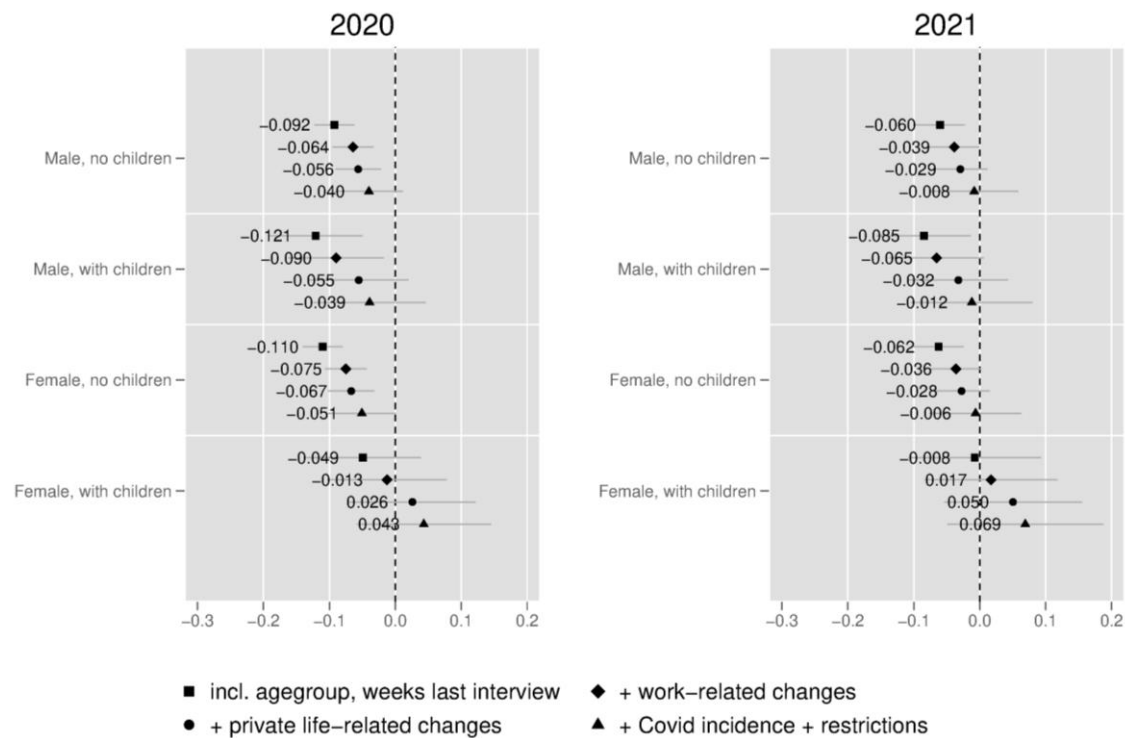
Note: 95% confidence intervals. Source: NEPS:SC6:14.0.0. N = 3,102.

Figure A2. Group-specific declines in job-related training participation during the Covid-19 pandemic (FE models; threshold children's age: 14 years).



Note: 95% confidence intervals. Source: NEPS:SC6:14.0.0. N = 3,102.

Figure A3. Group-specific declines in job-related training participation during the Covid-19 pandemic (FE models; threshold children's age: 10 years).



Note: 95% confidence intervals. Source: NEPS:SC6:14.0.0. N = 3,102.