

The Cost of School Holidays: Mothers Pay the Price

Manuel E. Lago*

Andrea Pop-Catalisan[†]

Abstract

Every summer, parents rearrange their working lives around school holidays, yet whether this recurring disruption affects their health remains largely unexplored. Using data from the French Labour Force Survey and a Regression Discontinuity in Time design, we provide the first empirical evidence that summer school holidays significantly worsen mothers' self-reported health, with an estimated decline of 0.126 standard deviations. In contrast, fathers' health remains unaffected. This negative effect is concentrated among full-time working mothers and is not observed among parents who were on leave at the time of the interview. Likewise, non-parents are unaffected by the national school holidays. These findings are consistent with a mechanism operating through intensified unpaid caregiving burdens. Our results reveal a previously overlooked source of gender inequality in parental health, suggesting that the school calendar contributes to the disproportionate caregiving and health burden experienced by mothers, with important implications for family support and leave policies.

Keywords: School Holidays; Gender Inequalities; Self-Reported Health; France.

JEL-Codes: D10, I10, J13.

Statements and Declarations: The authors declare no competing interests.

Acknowledgments: We would like to express our gratitude to Andrew Clark and Pierre-Yves Geoffard for their invaluable guidance and support. We also extend our thanks to Orla Doyle, Stefano Falcone, Emma Howard, Elena Stancanelli, all members of the GENDHI Project, and the anonymous referees of this Journal for their help and guidance. We also acknowledge financial support from the Gender and Health Inequalities (GENDHI) project (ERC-2019-SyG). This project has received funding from the European Research Council under the European Union's Horizon 2020 research and innovation programme (grant agreement No. [856478]). The funder had no role in the study design, data collection, analysis, or interpretation, nor in the decision to publish the results.

*Corresponding Author: Paris School of Economics (PSE), Paris, France. manuel.lagorodriguez@psemail.eu. ORCID: 0000-0003-2247-3995

[†]Paris School of Economics (PSE), Paris, France. ORCID: 0009-0003-8704-3408.

1 Introduction

Every summer, families adjust their routines in response to the national school holiday calendars. The duration of summer holidays has sparked ongoing debates across Europe. Experts, policymakers, and many political leaders have questioned whether these breaks are too long, arguing that extended holidays may exacerbate educational inequalities among children (Kromydas et al., 2022). Long summer holidays are also observed to increase the childcare burden on families, especially among mothers, and to be associated with higher levels of loneliness and anxiety among children (Baxter, 2014; Morgan et al., 2019).¹ The COVID-19 school closures further intensified this debate, showing how disruptions to schooling can negatively impact both children and their parents (Pitzalis and Spanò, 2021; Yamamura and Tsustsui, 2021).

While extensive literature documents the influence of life events, household, and child characteristics on parents' health, far less is known about how national school holiday programs affect parental well-being. France's coordinated national school holiday system provides a particularly relevant context for exploring this question. French summer holidays last eight weeks, which is longer than the OECD average of five weeks. As a result, this extended duration has sparked an ongoing debate, with the French government highlighting the educational inequalities and increased childcare pressures that the current system generates (Robles, 2023).²

In this paper, we test the effects of French national school holidays on parents' self-reported health. School holidays constitute a recurring and externally determined institutional feature that temporarily shapes family organization and caregiving demands. We further examine whether these effects fall disproportionately on mothers relative to fathers, reflecting the persistent gender gap in household management and caregiving responsibilities. To the best of our knowledge, this analysis provides the first empirical evidence on this relationship, highlighting an additional mechanism through which family-related institutions shape parental health.

Given the limited attention this question has received, the direction of the effect remains theoretically unclear. On the one hand, school holidays may offer valuable family time that strengthens emotional bonds and provides rest from daily routines. For parents with flexible jobs or paid leave, these periods can improve life satisfaction and family cohesion. On the other hand, school breaks can create substantial childcare and financial pressures, particularly for disadvantaged groups such as single or low-

¹ Conversely, school holidays are associated with lower youth suicide rates and better mental health, especially among children from high-income families (Stewart, Watson, and Campbell, 2018; Hansen, Sabia, and Schaller, 2024)

² Media coverage has also raised concerns regarding lengthy summer breaks in other countries, particularly in Spain, which has some of the longest summer holidays in Europe (EL PAÍS, 2025).

income parents. As a result, parents may face higher stress levels due to children's boredom and isolation, as well as from balancing work and caregiving responsibilities.

Using data from the French Labour Force Survey (LFS), we employ a Regression Discontinuity in Time design (RDiT) to compare individuals interviewed before and after the national school holiday break. This framework is an application of the regression discontinuity, in which time is the running variable and treatment begins at a particular threshold in time (Hausman and Rapson, 2018). By doing so, we can capture the impact of an event that is not subject to experimental manipulation. The quasi-experimental nature of the timing of the interviews strengthens the internal validity of the analysis, as respondents cannot choose their interview dates to coincide with school holidays. In addition, we conduct complementary placebo tests using narrower bandwidths and adjust for baseline imbalances at the cutoff as robustness checks, further supporting the credibility of our findings.

Our results show that mothers suffer a decline of 0.126 standard deviations in self-reported health on a 5-point scale after the start of the holidays.³ This magnitude is comparable to the effects of educational attainment on women's life satisfaction and mental health, where overall improvements ranging from 0.05 to 0.20 standard deviations have been observed (Dursun and Cesur, 2016; Kondirolli and Sunder, 2022). Conversely, no significant effect is observed for fathers. These findings highlight a previously overlooked mechanism through which school holidays affect parental health and point to an additional dimension of gender disparities in household and caregiving responsibilities. Additionally, we find that full-time workers drive the negative effects on mothers' health, and that employed and unemployed parents respond differently to the start of school holidays, with unemployed mothers reporting better health. We also find that paid leave policies seem to mitigate these adverse effects, as parents who report being "on leave" at the time of the interview are unaffected. Finally, we find no evidence of heterogeneous effects between parents with children below the compulsory schooling age of 16 and those with children above that age.

These results are consistent with recent evidence that suggests that the caregiving burden on mothers extends beyond primary childcare in the early years, with on-call responsibilities such as supervision and emotional support persisting throughout childhood (Cuevas-Ruiz et al., 2025). School holidays intensify these demands by removing the structured supervision schools provide, shifting responsibility back to families. This reallocation disproportionately impacts mothers, resulting in significant health costs for those who continue to work during holiday breaks.

³ Table B1 provides a full description of the self-reported health question included in the LFS questionnaire. Our main outcome focuses on general health, as the LFS does not differentiate between mental and physical health, except for the 2013 ad hoc module.

This study makes three key contributions to the existing literature. First, our paper advances research on the determinants of parents' self-reported health. Recent studies have examined the negative impact of school closures during the COVID-19 lockdown on parents' mental health, including anxiety, depression, and sleep disturbances (Davis et al., 2021; Yamamura and Tsustsui, 2021; Li et al., 2022; Ahammer et al., 2023; Gupta, Salcedo, and Simon, 2024). However, the potential effects of regular, institutionalized school holidays on parents' health outcomes remain largely unexplored.⁴ Our findings fill this gap by identifying another mechanism through which parental self-reported health is affected: summer school holidays. To the best of our knowledge, this paper provides the first empirical evidence of such a causal relationship.

Second, we contribute to the literature on the gender dimension of parental responsibilities and the mechanisms underlying gender disparities in self-reported health (Schoonbroodt, 2018; Ruppanner, Perales, and Baxter, 2019; Bursztyn, González, and Yanagizawa-Drott, 2020; Sun, Xia, and Zhang, 2025). Moreover, the COVID-19 pandemic highlighted how school closures and lockdowns intensified the unequal gendered division of domestic and childcare tasks (Borah Hazarika and Das, 2021; Pitzalis and Spanò, 2021; Zamarro and Prados, 2021; Hanzl and Rehm, 2023). This gender gap intensifies both the mental load of managing household tasks and the pressure to ensure family self-reported health. In this paper, we find that mothers are negatively affected by school holidays, while fathers' health remains unchanged. Our results thus reveal an additional institutional mechanism that contributes to the persistence of gender gaps in parental health.

Finally, an extensive body of literature documents that parental health and well-being have a crucial impact on children's health and educational outcomes (e.g., Pedersen and Revenson, 2005; Alam, 2015; Kristiansen, 2021; Glaser and Pruckner, 2023; Wen and Huang, 2024). While we do not directly observe children's outcomes, identifying a new mechanism that negatively affects parental self-reported health allows us to contribute indirectly to the literature on child development. This connection also carries important policy implications. For instance, policy measures such as targeted financial support or partially paid leave during national school holidays could help mitigate these adverse effects, particularly for mothers who currently absorb a disproportionate share of the additional caregiving burden.

The remainder of the paper is organized as follows. Section 2 provides a detailed description of the French national summer holiday system. Section 3 describes the

⁴ For an extensive review on the effects of school holidays on children's health and well-being, see Stewart, Watson, and Campbell (2018).

data, sample construction, and the identification strategy. In Section 4, we discuss the main results, explore the heterogeneity of the estimated effects, and conduct robustness checks and alternative specifications. The paper concludes in Section 5 with final remarks and limitations.

2 Institutional Background

In France, since the last education reform in 2019, schooling has been mandatory for all children aged 3 to 16. The system begins with three years of pre-primary education in nursery schools (*école maternelle*), followed by five years of primary education (*école élémentaire*). Students then attend four years of lower secondary education at *collège* (lower secondary) and three years of upper secondary education at *lycée* (upper secondary), completing formal schooling by around age 18. Before 2019, education was mandatory starting at age 6. However, according to the Ministry of National Education, 97% of 3-year-olds (and nearly 100% of 4- and 5-year-olds) were already enrolled in pre-primary school in France in 2018.

French workers are entitled to a legal minimum of five weeks of paid leave per year, during which they receive the same wage as when working. Employers may impose leave dates only during the summer period (May–September). During school holidays, however, parents often face significant childcare challenges, and taking paid leave is the simplest and least costly solution (Georges-Kot, Goux, and Maurin, 2017). The law specifies that priority must be given to employees with children, and among workers with similar family responsibilities, to those who are more senior. In practice, however, this protection may be insufficient for parents, particularly mothers, to mitigate the adverse effects of school breaks on their mental well-being and self-reported health. Many parents may lack effective priority or bargaining power when requesting leave, as industry composition, socio-economic factors, and workforce structure shape this legal coverage.

During school holidays, some families use formal childcare arrangements such as municipal leisure centres (*centres de loisirs*) or holiday camps (*colonies de vacances*). In fact, these institutional arrangements operate during all major holiday periods and provide structured activities, including sports, cultural, and educational programmes, primarily organized by local authorities. However, admission is subject to local availability, capacity constraints, and prior registration. As a result, parents with flexible schedules or better access to subsidized care face fewer disruptions than those without such options. According to the INJEP (French National Institute for Youth and

Popular Education), children of professionals and business owners benefit from these collective stays twice as often as children of manual workers.

To coordinate school holidays and reduce simultaneous childcare demands nationwide, France uses a three-zone system, as shown in Figure 4 in the Appendix. This system divides the country into three zones: A, B, and C. Each zone has staggered school holidays, primarily affecting winter and spring breaks, to minimize congestion in tourist areas and on transportation networks. However, summer holidays are uniform across the entire country. Generally, holidays begin on the first Saturday in July for all three zones, and the school year typically starts on the first Monday of September. In total, this corresponds to a break of approximately eight weeks (around 60 days), with slight variation across years.⁵ Given this uniformity, combined with data availability and cross-regional comparability concerns, our analysis focuses exclusively on summer school holidays.

3 Data and Stylized Facts

3.1 Sample Design

To investigate the effect of school holidays on French parental self-reported health, we employ individual-level survey data from the French Labour Force Survey (LFS). The LFS is a nationally representative household survey conducted quarterly by the French National Institute of Statistics and Economic Studies (INSEE) regardless of age. It contains detailed information on respondents' socio-economic characteristics, labour force status, household composition, and past employment history. Each household is interviewed for six consecutive quarters, with the first and last interviews conducted in person and intermediate interviews conducted by telephone. Interviewers make multiple attempts to contact households over three weeks to maximize response rates. Specifically, at least four face-to-face attempts are made for new, outgoing, or non-responding households.

The survey follows a rotating panel design, in which each household member aged 15 or older is interviewed for up to six consecutive quarters.⁶ However, health questions are collected only during the first interview, which is conducted face-to-

⁵ Figure 5 illustrates the timing of all school holidays by zone throughout the year.

⁶ The LFS uses stratified random sampling to ensure representativeness across regions, household types, and socio-demographic groups. If a respondent cannot or does not wish to answer, another household member may respond on their behalf.

face.⁷ Consequently, our analysis relies on repeated cross-sectional samples for each wave, rather than a longitudinal panel of health outcomes.

We start our analysis in 2013, the year of a major redesign of the Labor Force Survey (EU-LFS). Starting that year, the survey began recording the exact week of each interview, an important feature that allows us to determine whether interviews occurred during the school holidays. To avoid any distortions caused by the COVID-19 pandemic, the analysis is restricted to the period 2013-2019.⁸

In this paper, we provide empirical evidence on how summer school holidays influence parents' subjective health. To this end, several restrictions are imposed on the data. Following Backhaus and Barslund (2021), we restrict the sample to individuals younger than 65, as labour force participation declines sharply beyond this age across European countries. We further limit the sample to currently employed respondents, as they are directly affected by work-family strain during the summer school holidays. The French LFS provides direct information linking parents to their children when the children are under 15. For older children, we conducted several consistency checks to accurately identify parent-child relationships. Finally, we restrict our analysis to households with at least one school-aged child, aged 3 to 17. This approach ensures that the analysis considers households directly affected by the school calendar and excludes those whose childcare needs are unlikely to change during school holidays.

Two potential concerns relate to differential sample composition during the summer months, particularly in August. First, the share of respondents reporting being on leave, whether for holidays, maternity leave, or compensatory rest days, sharply increases. Specifically, it rises from an average of 13.8% in July to 20.5% in August. Parents on leave are likely to face fewer constraints in balancing childcare and work during school holidays. As a result, the estimated health effects later in the summer may be less pronounced compared to earlier weeks of the holiday period. Therefore, these results should be interpreted with caution, as they primarily reflect the experiences of parents who continue to work during school holidays and remain exposed to work-family strain.⁹ Secondly, response rates and the composition of parents and non-parents during the summer may differ due to childcare constraints. However, as shown in Figure 6 in the Appendix, while parents display higher response rates and account for a larger share of interviews, the trend across summer weeks remains consistent for both groups.

⁷ As noted by Elliott and Zong (2019), response rates in the first wave tend to be slightly higher, with higher accuracy.

⁸ We also restrict our analysis to metropolitan France. Consequently, overseas territories are excluded from our empirical analysis (Corsica, Guadeloupe, Guyane, Martinique, and La Réunion).

⁹ Consistent with this interpretation, the estimated effects are strongest in July and gradually weaken through August (see Figure 1).

3.2 Identification Strategy

In this paper, we test whether the French summer school holidays affect parental self-reported health. Our approach relies on a RDiT design that leverages the sharp timing shift at the start of the holiday period to identify the effect on parents' self-reported health. In this framework, respondents are assigned to each group strictly based on their interview date, thereby eliminating concerns about manipulation in the group assignment. In other words, there is no strategic sorting around the threshold.¹⁰

The main RDiT estimation relies on the following specification:

$$H_{irt}^g = \rho D_{irt}^g + f(SH_{irt}^g) + \beta X_{irt}^g + \alpha' T_t + \zeta' R_r + \epsilon_{irt}^g, \quad (1)$$

where H_{irt}^g is the self-reported health of parent i of gender g in region r reported on date t . D_{irt}^g captures whether the respondent is interviewed before or after the start of the summer holidays, taking the value 1 if the respondent is interviewed after the start of the holiday period and 0 otherwise. In this analysis, the beginning of holidays is defined as the first Monday after the official start date of the national holiday (usually the first Saturday of July). Thus, we compare the individual survey responses of parents interviewed before the start of the holidays $t_{\text{interview}} < t_{\text{holiday}}$ and after $t_{\text{interview}} > t_{\text{holiday}}$.¹¹

The parameter of interest $f(SH_{irt}^g)$ is a function that controls for direct effects of the running variable, defined as the distance in weeks between the respondent's interview date and the start of school holidays, on outcomes. We implement this design using a symmetric ± 7 -week bandwidth and robust bias-corrected inference following Calonico, Cattaneo, and Titiunik (2014). The cutoff is set at $SH_{irt}^g = 0$, that is, at the start of the holidays. βX_{irt}^g are a set of the characteristics of the respondent that may confound our estimated effects, thus improving the precision of our main estimate. $\alpha' T_t$ is a vector of time fixed effects (week and year fixed effects) while $\zeta' R_r$ are region fixed effects. Finally, ϵ_{irt}^g represents the error term.

The goal of the RDiT approach is to estimate the parameter ρ on D_{irt} to capture the effect of school holidays on the outcome variable through the group assignment dummy. Since this approach relies on the assumption that survey respondents are interviewed before or after the start of the school holidays, independent of the timing

¹⁰Therefore, since the density of the running variable is uniform, there is no need to conduct density tests to determine whether treated units have sorted across the threshold (Hausman and Rapson, 2018).

¹¹This natural randomization of respondents into pre- and post-holiday start, independent of time t , strengthens the internal validity of the study by minimizing biases from unobserved confounders or reverse causality. As such, the group assignment can be interpreted to be as-if experimental, similar to the local randomization framework used in RD designs (Cattaneo, Idrobo, and Titiunik, 2020).

of the event, this ρ coefficient yields an unbiased estimate of the local average treatment effect. This is because the timing of each respondent's interview is effectively random with respect to the start (Cattaneo, Idrobo, and Titiunik, 2020). Moreover, the interview dates vary across respondents, creating a staggered design in terms of the calendar but aligned in “event time” around the start of holidays. Since the timing of the interviews is determined by the survey schedule rather than individual choice, group assignment around the cutoff can be considered as-good-as-random within the local window. Identification relies on the standard RD continuity assumption that, in the absence of holidays, potential outcomes would evolve smoothly in SH_{irt} at zero.

To further assess the validity of our estimation strategy, we conduct placebo tests using narrower bandwidths within the main RDiT framework (see Table D1 in the Appendix). These placebo checks provide additional evidence that school holidays are exogenous and unrelated to the outcome variable.

3.3 Variables and Descriptive Statistics

In this paper, our main outcome variable is self-reported health. Previous work shows that self-reported health is a strong predictor of future health that effectively captures the impact of social factors on well-being, which are often overlooked by purely biomedical measures (Doiron et al., 2015; EuroHealthNet and for Health Equity Analytics, 2025). This variable captures temporary health problems across multiple dimensions, including physical and emotional functioning, and mental health. In the LFS, respondents personally assess their overall health on a five-point scale, where ‘1’ corresponds to *Very Good Health* and ‘5’ to *Very Bad Health*. The scale is reversed so that higher scores indicate better self-reported health, and it is collected only once during a respondent's participation.¹²

With respect to the covariates, parental educational attainment is included in the model given its well-established association with well-being (Crespo, López-Noval, and Mira, 2014; Brunello et al., 2016). Including education improves the precision of our estimates, but it is unlikely to confound the main estimates because it does not affect the timing of the interview. To measure education, we classify respondents into three ordered categories: low education (no diploma through lower secondary), medium education (upper secondary through post-secondary non-tertiary), and high education (tertiary and above). We also control for labour intensity by including five dummy variables representing the number of weekly hours worked in the primary

¹²As noted in Section 3.1, the first LFS interview is conducted in person at the respondent's primary residence, meaning the self-reported health question is never asked at a secondary or holiday home. The original survey question is displayed in Table B1 in the Appendix.

job, ranging from ‘1’ (fewer than 15 hours) to ‘5’ (40 hours or more), with one category serving as the reference group. Labour intensity is closely associated with both individuals’ health perceptions and their economic and time constraints (Sparks et al., 2018; Berniell and Bietenbeck, 2020). Finally, we include marital status as a dummy variable indicating whether the interviewed parent is married, as this factor can influence well-being through social support and shared household resources (Wood, Avellar, and Goesling, 2009).

To ensure that the interview date is unrelated to pre-holiday respondent characteristics, such as geographic conditions and accessibility, we test for potential imbalances between respondents interviewed before and after the start of the school holidays. Although assignment to this categorization is as good as random, we include several covariates that may affect our estimated effects to provide more precise estimates.¹³ Table 1 presents the descriptive statistics for parents, along with T-tests, to assess whether the means of the two groups are equal:

Table 1 Descriptive Statistics

	Fathers			Mothers		
	Before	During	T-test	Before	During	T-test
Outcome Variables						
Self-reported health (1-5)	4.090	4.081	0.775	4.051	4.044	0.684
Individual Covariates						
Age (years)	44.972	44.857	1.206	42.404	42.225	2.211**
Educational level (1-3)	2.181	2.157	2.455***	2.228	2.214	1.563
Married	0.703	0.690	1.946	0.592	0.581	1.820
Number of Children	2.013	2.023	-0.876	2.001	2.014	-1.234
Hours Worked (1-5)	4.384	4.379	0.508	3.661	3.695	-2.171**
Sample Size	10,139	10,770		12,627	13,500	

Note– The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. *Educational level* is recoded as an ordinal categorical variable, equal to 1 for no diploma through lower secondary education, 2 for upper secondary through post-secondary non-tertiary education, and 3 for tertiary education and above. *Married* is a dummy variable that captures whether the interviewed parent is married or not. *Hours Worked* is a categorical question from 1 to 5, where respondents are asked to report the number of average weekly hours worked at their primary employment, where 1 corresponds to fewer than 15 hours, and 5 corresponds to 40 hours or more. Finally, in the last column, we report t-tests for differences in mean values between the two groups. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 1 shows that the mean response on self-reported health for the group interviewed before the start of the school holidays is 4.090 for fathers and 4.051 for mothers. After the start of the summer holidays, the average scores show a decrease for both fathers and mothers (4.081 and 4.044, respectively). Across the full sample, the standard deviation of self-reported health is 0.840 for respondents interviewed before the start of the holidays and 0.848 for those interviewed after. The standard deviation of the outcome variable is 0.825 for fathers interviewed before the start of the school holidays and 0.833 for those interviewed after. In comparison, the standard deviation for mothers is 0.851 for those interviewed before the start of the holidays and 0.860 for those interviewed after.

¹³ Additionally, Figure 7 displays the age distribution of the youngest children in households.

We observe minor differences in baseline characteristics between the two groups. Fathers interviewed before the holidays have slightly lower levels of education. This pattern may reflect the fact that fathers with lower educational attainment tend to have more rigid work schedules and are therefore more likely to be reachable during school holidays, while more highly educated fathers may be more able to take leave during this period. Among mothers, those interviewed before the holidays are slightly younger and report working more hours, possibly reflecting that mothers who work longer hours are more likely to remain in employment and thus reachable during the holiday period. To improve the precision of our estimates, we include all these covariates in our main RDiT specification.

While Table 1 compares means across the two groups using t-tests, Table 2 provides a more formal test by estimating discontinuities in baseline covariates at the cutoff using local linear RD regression. For mothers, we find no statistically significant discontinuities in covariates. For fathers, we detect small but statistically significant jumps in marital status and educational level. These differences are accounted for in our preferred specification, which includes the full set of baseline covariates to capture any residual imbalance at the cutoff.

Table 2 Balance Covariate Tests

	Age (1)	Educational Level (2)	Married (3)	# Children (4)	Hours Worked (5)
RD estimate mothers	-0.137 (0.323)	-0.049 (0.035)	-0.010 (0.024)	-0.006 (0.044)	0.013 (0.061)
Observations	26,127	26,127	26,127	26,127	20,319
RD estimate fathers	-0.437 (0.374)	-0.059** (0.038)	0.007** (0.026)	-0.001 (0.049)	-0.022 (0.043)
Observations	20,909	20,909	20,909	20,909	18,585

Note— Each cell reports the reduced form estimate of the impact of the school holidays on baseline covariates. Estimates are taken from separate local linear RD regressions which use a bandwidth of 7 weeks and a triangular kernel. The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

We also conduct complementary formal validity tests to rule out manipulation of the running variable, even though group assignment is as good as random by construction. Figure 9 in the Appendix shows no discontinuity in the density of the running variable at the cutoff. Taken together, these checks provide evidence that our main results are not driven by baseline imbalances or sorting around the threshold, thus supporting the internal validity of the RDiT design.

4 Results and Discussion

4.1 Baseline Results

Table 3 presents the main RDiT estimates of the effect of the French national summer holidays on parents' self-reported health using our main specification (see Equation 1).¹⁴ Results are presented separately for mothers and fathers across three specifications. In Columns (1) and (4) we display the baseline results with no controls or fixed effects. In Columns (2) and (5) we include region and time fixed effects, while in Columns (3) and (6) we further include individual-level controls.

In the baseline specification, the effect of school holidays on self-reported health is negative for both mothers (-0.052) and fathers (-0.018). However, these estimates are not statistically significant. When region- and time-fixed effects are included, the effect for mothers becomes larger and statistically significant, showing a decline of 0.136 points on the 5-point self-reported health scale (see Column 2). Adding individual-level controls slightly reduces the estimate for mothers to 0.107 points (see Column 3), which corresponds to a decrease of 0.126 standard deviations. In contrast, fathers do not exhibit any significant effects across all specifications.

These findings reveal a previously unexplored gendered dimension of parental health. The pattern aligns with recent evidence suggesting that school-age children create ongoing caregiving demands, including the need for supervision, availability, and emotional support, which disproportionately affect mothers. These demands become even more pronounced when institutional childcare options are temporarily unavailable (Cuevas-Ruiz et al., 2025).

Table 3 Main RDiT estimation on Parents' Self-Reported Health

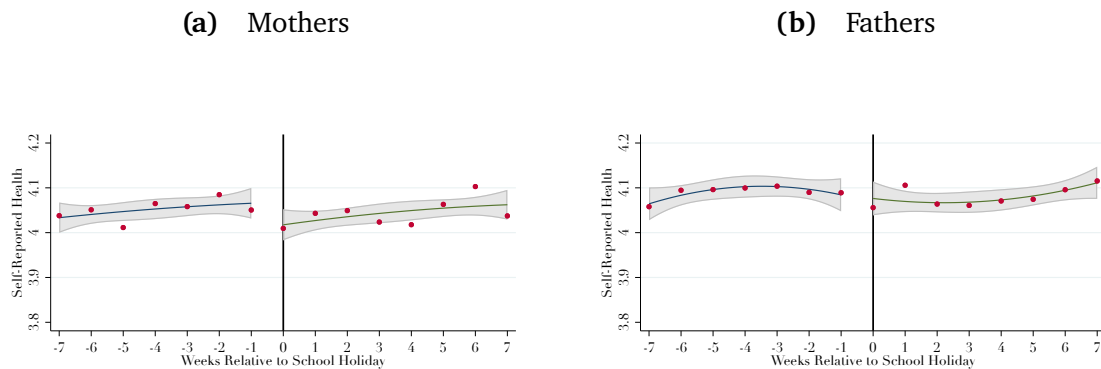
	Mothers			Fathers		
	(1)	(2)	(3)	(4)	(5)	(6)
Self-reported health	-0.052 (0.042)	-0.136*** (0.042)	-0.107** (0.041)	-0.018 (0.045)	-0.055 (0.045)	-0.047 (0.043)
Observations	26,127	26,127	20,271	20,909	20,909	18,530
Region and Time Fixed Effects	No	Yes	Yes	No	Yes	Yes
Controls	No	No	Yes	No	No	Yes

Note— Estimates correspond to Equation 1, using separate local linear RDiT regressions with a triangular kernel. The dependent variable is a continuous measure (1–5) of parents' self-reported health. The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. Estimates are obtained from separate local linear RD regressions using a triangular kernel. Columns 1 and 4 estimate the main equation (Equation 1). Columns 2 and 5 week, year and regional fixed effects. In Columns 3 and 6, we include covariates from Table 1. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

¹⁴All estimates are obtained from separate local linear RD regressions using a triangular kernel. A triangular kernel is a commonly employed weighting function that assigns more weight to units closer to the cutoff, thus reducing bias (Calonico, Cattaneo, and Titiunik, 2014).

Figure 1 provides a visual representation of the main RDiT estimates reported in Table 3. Consistent with the regression results, the figure shows a decline in self-reported health for mothers following the start of the holidays, whereas no significant change is observed for fathers.

Fig. 1 Effect of School Holidays on Parents' Self-Reported Health



Note– The different panels show the outcomes as a function of the distance between individuals' week-year of interview and the start of the summer school holidays. Each red dot is a weekly average. The grey area represents the 95% confidence interval of a second-degree polynomial regression, separately estimated left and right of the cut-off. The local linear regression discontinuity estimates are based on a 7-week bandwidth at both sides of the threshold. The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. The set of covariates corresponds to those specified in Table 1.

In Section E.2 of the Appendix, we explore how the main effect varies across the health distribution using cumulative binary indicators that assign a value of 1 to individuals reporting health above a given threshold. We find that the negative effect on mothers is concentrated in the middle of the health distribution, reflecting a shift from fairly good to poor health rather than a decline at the top of the distribution.

We also investigate whether the impact of school holidays on mothers' health changes over the course of the weeks (see Table E6). We thus include an interaction term (Start of Holidays $\times$ Weeks) to determine if the initial health effects lessen as the holidays continue. The coefficient on the interaction term is negative but not statistically significant. This result indicates that the adverse health effect of school holidays on mothers is mainly concentrated around the start of the holidays rather than accumulating over time.

Finally, we also examine the effect of school holidays on parents' chronic health conditions. This outcome is measured by respondents' answer to whether they are subject to a chronic or long-term illness or health problem, where *Yes* is coded as 1, and *No* is coded as 0. However, our findings reveal no significant association between the onset of school holidays and the prevalence of chronic conditions (see Section E3 in the Appendix).

4.2 Heterogeneity Analyses

We extend our main analysis by examining potential heterogeneous effects. First, we examine whether the hours of work might shape our findings. We classify individuals who work at least 35 hours per week as full-time workers, and those who work fewer than 35 hours per week as part-time workers. This threshold corresponds to the legal definition of full-time employment in France, where 35 hours per week constitutes the statutory reference for full-time work. Results are displayed in Table 4.

We observe that full-time workers drive the negative effect on mothers' self-reported health, while part-time workers show a negative but non-statistically significant effect. This pattern aligns with recent evidence suggesting that full-time working mothers face the greatest conflict between work responsibilities and caregiving, especially when institutional childcare support is insufficient (Cuevas-Ruiz et al., 2025).¹⁵

Table 4 Heterogeneous Effects by Employment Intensity

	Part-Time		Full Time	
	Mothers (1)	Fathers (2)	Mothers (3)	Fathers (4)
Self-reported health	-0.132 (0.078)	-0.099 (0.190)	-0.089* (0.049)	-0.052 (0.044)
Observations	6,424	1,127	13,847	17,403
Region and Time Fixed Effects	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Note— Estimates correspond to Equation 1, using separate local linear RDIT regressions with a triangular kernel. The dependent variable is a continuous measure (1–5) of parents' self-reported health. The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. Estimates are obtained from separate local linear RD regressions using a triangular kernel. The sample is split into those mothers and fathers who report being "par-time" workers at the time of the interview (Columns 1 and 2), and those parents who report being "full-time" workers (3 and 4). Controls include covariates from Table 1. All regressions include week, year and region fixed effects. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

As shown in Figure 8, data from the French Gender and Generation Survey confirm that French mothers disproportionately bear child-related tasks across the main caregiving dimensions, including dressing, bedtime, illness, leisure, homework, and transportation. This unequal distribution determines how households respond to the childcare demands created by school holidays. In consequence, when institutional childcare is removed, the adjustment falls mainly on mothers, thus aggravating the conflict between work and caregiving, particularly for workers with the least temporal flexibility. Fathers, by contrast, experience no health loss regardless of employment in-

¹⁵We also examine whether the estimated effects differ between employed and unemployed parents, thus expanding our original sample beyond the main analysis. Unemployed mothers report a positive and statistically significant effect following the start of the school holidays, while unemployed fathers report a negative and statistically significant effect. Results are presented in Table E3 in the Appendix.

tensity, consistent with a mechanism in which caregiving reallocation during holiday periods falls asymmetrically on mothers.

We next examine whether access to being on leave moderates these effects. Parents who report being away from work at the time of the interview, for any reason, are identified regardless of leave duration.¹⁶ We observe that being away from work appears to mitigate these adverse effects for both mothers and fathers (Table 5). Specifically, parents who report being on leave at the time of the interview experience a positive change in self-reported health following the start of the holidays. However, these effects are not statistically significant. In contrast, mothers who are working during the interview report a statistically significant decline of 0.092 points. This asymmetry suggests that leave policies may partially protect mothers from the adverse health consequences of school holidays, highlighting the expansion of accessible leave during holiday periods as a potentially effective policy intervention.¹⁷

Table 5 Heterogeneous Effects by On Leave status

	On Leave		Not On Leave	
	Mothers (1)	Fathers (2)	Mothers (3)	Fathers (4)
Self-reported health	0.110 (0.137)	0.151 (0.151)	-0.092* (0.045)	-0.043 (0.047)
Observations	2,568	2,349	13,057	12,431
Region and Time Fixed Effects	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Note— Estimates correspond to Equation 1, using separate local linear RDIT regressions with a triangular kernel. The dependent variable is a continuous measure (1–5) of parents' self-reported health. The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. Estimates are obtained from separate local linear RD regressions using a triangular kernel. The sample is split into those mothers and fathers who report being "on leave" at the time of the interview (Columns 1 and 2), and those parents who do not (3 and 4). This leave status includes maternity leave and other forms of absence from the workforce, such as compensatory rest day, bridge days and public holidays. Controls include covariates from Table 1. All regressions include week, year and regional fixed effects. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

We additionally examine heterogeneous effects among single parents. The corresponding estimates are reported in Appendix Table E4. Overall, single parents experience a statistically significant negative effect of school holidays on self-reported health. By contrast, for married fathers, the estimated effect becomes positive, although it is not statistically significant. This pattern is again consistent with an unequal allocation of childcare and household responsibilities, which continue to fall disproportionately on women.

We further restrict the analysis to parents of children under the compulsory school age of 16, excluding households in which the youngest child is 16 or older. This restriction focuses the sample on families most directly affected by school holidays and

¹⁶ Leave status includes maternity leave, compensatory rest days, bridge days, and public holidays.

¹⁷ Figures 15 and 16 in the Appendix graphically illustrate these findings.

childcare responsibilities, since older children are more likely to be independent or have entered the labour market. The results are presented in Table 6. For mothers with at least one child aged 16 or younger, summer holidays negatively affected their self-reported health by 0.092. In contrast, the effect for fathers is small and not statistically significant. For parents whose youngest child is older than 16, the estimated effects are larger in magnitude but less precisely estimated. In particular, mothers exhibit a negative and weakly statistically significant effect (-0.300), while the estimate for fathers remains statistically insignificant. This supports the interpretation that the observed health costs arise from the active demands of childcare rather than from seasonal factors unrelated to schooling.¹⁸

Table 6 Heterogeneous Effects by Compulsory Schooling

	Compulsory		Non-Compulsory	
	Mothers (1)	Fathers (2)	Mothers (3)	Fathers (4)
Self-reported health	-0.092* (0.043)	-0.045 (0.044)	-0.300* (0.157)	-0.135 (0.175)
Observations	18,925	17,447	1,346	1,083
Region and Time Fixed Effects	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

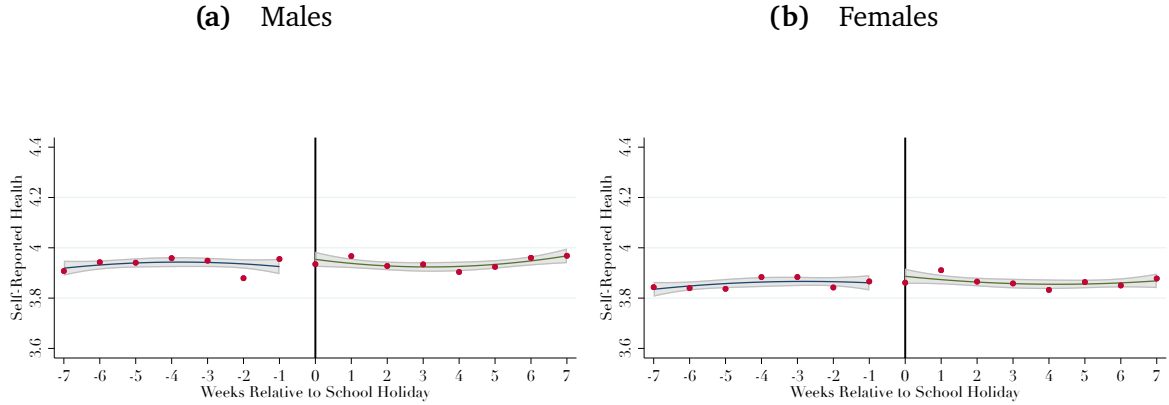
Note— Estimates correspond to Equation 1, using separate local linear RDIT regressions with a triangular kernel. The dependent variable is a continuous measure (1–5) of parents' self-reported health. Estimates are obtained from separate local linear RD regressions using a triangular kernel. The sample includes only individuals younger than 65 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. This sample is split into those parents whose youngest child has a compulsory schooling age (16 or younger) and those parents whose youngest child is over 16 (Columns 3 and 4). Controls include covariates from Table 1. All regressions include week, year and regional fixed effects. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Finally, as an additional placebo test, we examine whether self-reported health differs between couples with and without children. Table E5 in the Appendix reports these results. We split the sample by age group, as non-parents may differ systematically over the life cycle. As expected, school holidays have no effect on individuals aged 30–55 without children, as they are not exposed to childcare-related constraints. However, individuals aged 55 and older report a decline in self-reported health during this period.

We also provide a visual illustration of the overall impact across all age groups by comparing parents and non-parents. Figure 2 displays the estimated effects during the school holiday period, emphasizing the differing patterns in self-reported health between these two groups.

¹⁸We also examine whether place of residence moderates the effect of school holidays on parental health, comparing parents in rural communes with those in urban areas. Our findings indicate that urban parents experience a more pronounced negative effect on their health, likely due to the greater challenges they face in balancing work and household responsibilities. In contrast, the effect on rural parents is positive and statistically non-significant.

Fig. 2 Self-Reported Health - Sample Without Children



Note- The dependent variable is a continuous measure (1–5) of respondents' self-reported health. The sample includes only individuals younger than 65 without children and who are interviewed within 7 weeks on either side of the summer school holidays cutoff. Estimates are obtained from separate local linear RD regressions using a triangular kernel. Controls include covariates from Table 1. All regressions include week, year and regional fixed effects. Robust standard errors are reported in parentheses.

4.3 Alternative Specification

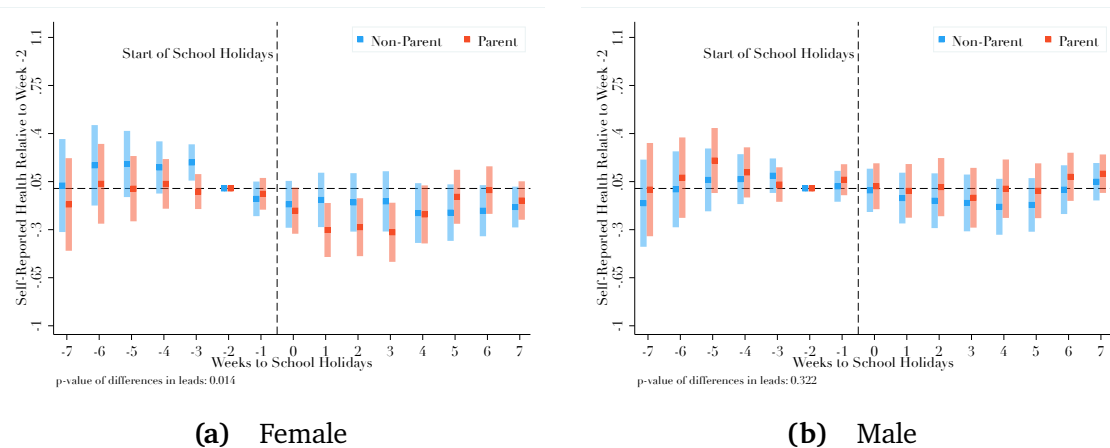
In this section, we provide complementary evidence on the effects of school holidays on parents' self-reported health. For each individual, the week when the school holidays start is denoted by $t = 0$, and all other weeks are indexed relative to that week. Let $K_{irt} = t - E_i$ denote the number of weeks before and after the event; then, the indicator variable to denote the effect of school holidays can be written as $D_{irt} = \mathbf{I}\{t \geq E_{irt}\} = \mathbf{I}\{K_{irt} \geq 0\}$. Formally, H_{irt}^g denotes the self-reported health for individual i in date t at event time j for gender g in region r . Specifically, we estimate the following two-way fixed effects (TWFE) model separately for parents and non-parents:

$$H_{irt}^g = \sum_{j=-7}^7 \gamma_j^g \mathbf{I}\{j = t\} + \beta' \text{Age}_{irt}^g + \kappa X'_{irt}{}^g + \delta'_i + \alpha' T_t + \zeta' R_r + \epsilon_{irt}^g, \quad (2)$$

where $\sum_{j=-7}^7 \gamma_j^g \mathbf{I}\{j = t\}$ includes a full set of event time dummies from 7 weeks before the school holidays to seven weeks after.

We employ the same set of controls as in Equation (1). $\beta' \text{Age}_{irt}^g$ represents the age of the respondent, $\alpha' T_t$ is a vector of time fixed effects (week and year fixed effects) while $\zeta' R_r$ are region fixed effects. $X'_{irt}{}^g$ is a vector of variables including the respondent's education level, marital status, hours worked, and number of children. Finally, ϵ_{ir} is a conditionally mean-zero error term. The event-time indicator at $t = -2$ is omitted from the specification, so all estimated coefficients are interpreted relative to the outcome two weeks before the school holidays. In consequence, the key coefficients, represented by the pattern in $\sum_{j=-7}^7 \gamma_j^g$, capture deviations in self-reported health at each event time t relative to this baseline.

Fig. 3 Differences between Parents and Non-Parents



Note— These point estimates show the interaction terms $\sum_{j=-7}^7 \theta_j(I\{j=t\})$, calculated relative to the reference week $t = -2$ over the event window from seven weeks before to seven weeks after the school holidays. The results are estimated using an OLS specification, based on Equation (3). Controls include all covariates include in the main specification (Table 3). The sample includes only individuals younger than 65 who are interviewed within seven weeks on either side of the summer school holidays cutoff. Parental sample includes individuals whose youngest child is aged 3–17. Standard errors are clustered at the individual level.

As shown in Figure 3, there is clear evidence of differences in self-reported health between mothers with school-aged children and women without children. Specifically, self-reported health among mothers declines immediately following the start of school holidays, relative to the baseline. This pattern suggests that the transition back to routine childcare and household responsibilities after the start of the holidays negatively affects mothers' well-being. In contrast, male respondents do not experience any significant changes in self-reported health during the holiday period, regardless of whether or not they have children. This supports the idea that the health effects of school holidays are gender-specific and driven by the unequal distribution of caregiving responsibilities.

Notably, the estimated decline in health attenuates later in the summer, with coefficients gradually returning to pre-holiday levels. This suggests that the estimated coefficients may understate the actual health impact of school holidays on mothers who continue working throughout the summer. This pattern is consistent with a greater number of parents taking leave during the summer, which may reduce their exposure to work-family strain.

5 Concluding Remarks

In this paper, we examine the impact of French summer school holidays on parents' self-reported health. Using data from French LFS and a RDiT framework, we find that mothers experience a statistically significant decline in self-reported health of 0.126 standard deviations on a 5-point scale following the start of the holidays. However,

we observe no significant effect for fathers. These findings identify school holidays as a previously overlooked mechanism through which the unequal distribution of household and caregiving responsibilities generates persistent gender disparities in parental health.

The heterogeneity analyses reinforce this interpretation. The negative effects are concentrated among full-time working mothers, while parents on leave report a positive change in self-reported health. This suggests that leave entitlements can help alleviate some of the health burdens. These patterns are consistent with a mechanism in which intensified caregiving demands disproportionately fall on mothers when institutional childcare structures are temporarily removed (Cuevas-Ruiz et al., 2025). The decrease in negative effects observed later in the summer aligns with more parents taking leave in August and a gradual adjustment to new routines after the initial holiday coordination challenges.

Caregiving responsibilities persist throughout childhood, and flexible arrangements may inadvertently reinforce the unequal distribution of caregiving tasks within households. Therefore, merely offering leave entitlements is unlikely to be sufficient. A broader set of policy tools is needed to reduce the unequal burden of unpaid care work on mothers (Brussevich and Flores, 2025). Potential solutions include universal supervised holiday activities, differentiated leave entitlements for various absences, and promoting equitable caregiving within households.

There are some limitations to this study. First, the effect sizes we observe may be conservative. Self-reported health is measured on a 5-point scale, and many respondents report relatively high baseline values. As a result, the observed declines following the start of summer holidays may underestimate the true impact on parents' health. In addition, mental health tends to be lower during winter and higher in summer, implying that positive seasonal effects may partially offset the decline associated with school holidays (Rehdanz and Maddison, 2005). Therefore, our estimated effects for mothers may represent a lower bound, indicating that the true impact could be even greater without these seasonal improvements.

Second, our group assignment relies on the timing of interviews relative to the start of the national school holidays. While this provides a quasi-experimental source of variation, we cannot ensure that all parents are equally exposed to the additional childcare burden or stress associated with holidays. Moreover, the health effects we document for parents may extend to children through parental stress or changes in household routines. Although the French LFS collects data on children's self-reported health, the limited number of observations during the summer months prevents a credible causal analysis of this channel. Future research with longitudinal household

surveys and detailed family structure information could help explore these intrahousehold dynamics.

Finally, our findings are specific to the French institutional context, which features a uniformly organized school holiday calendar. This uniformity is precisely what enables our identification strategy. However, it also limits the generalizability of our findings to countries with varied holiday schedules. Additionally, differences in household task distribution and gender norms may affect the impact of school holidays on parental health. Comparative analyses exploiting cross-country differences in holiday structures and childcare support systems could provide valuable insights into the broader relationship between household responsibilities and parental health.

Data Availability Statement

The data that support the findings of this study are available from the INSEE portal (<https://data.progedo.fr/series/adisp/enquete-emploi-enquete-emploi-en-continu-ee-ec>). The data are produced by INSEE and disseminated by Progedo-ADISP. However, access restrictions apply: the data used in this study are not available to the public due to licensing.

Author Contributions

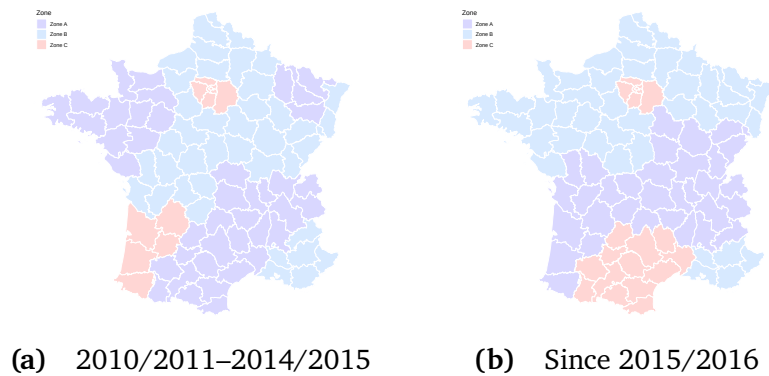
Both authors contributed to the conception and design of the study. They were responsible for preparing materials, collecting data, and conducting the analysis. After completing the study, the authors collaborated to review the manuscript, offering feedback and suggestions to enhance its quality. They both reviewed and approved the final version of the manuscript.

Appendix

A Stylized Facts

This section provides a visual overview of the French school holiday system described in Section 2. We start with a representation of the school zones in France (Figure 4), highlighting the 2015 revision that changed the composition of the zones.

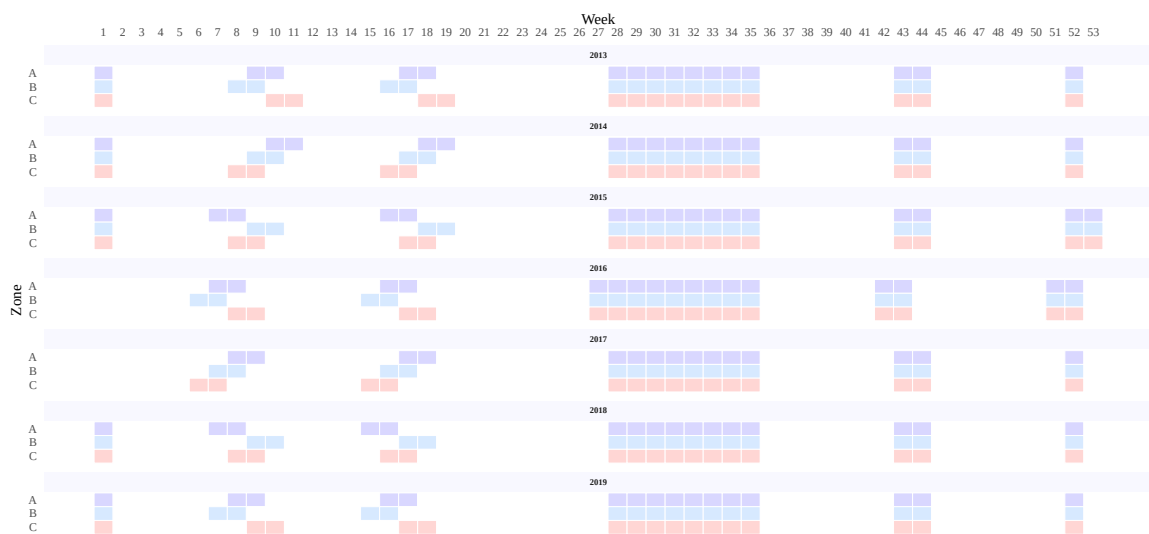
Fig. 4 French School Holidays Zones



Note– Own calculations based on data from the French Ministry of Education (education.gouv.fr). Since the 2015 revision, Zone A encompasses much of the central region of the country, as well as the far southwest, including Besançon, Bordeaux, Clermont-Ferrand, Dijon, Grenoble, Limoges, Lyon, and Poitiers. The majority of the north forms zone B, plus the south-east: Aix-Marseille, Amiens, Caen, Lille, Nancy-Metz, Nantes, Nice, Orléans-Tours, Reims, Rennes, and Strasbourg. Finally, Zone C contains Paris and most of the south, including Créteil, Montpellier, Toulouse, and Versailles. Notably, we exclude from our analysis non-metropolitan areas (Corsica, Guadeloupe, Guyane, Martinique and La Réunion).

Next, we provide a detailed calendar of school holidays organized by zone and year (see Figure 5).

Fig. 5 Holidays by Zone and Year



Note– Own calculations based on data from the French Ministry of Education (education.gouv.fr).

Fig. 6 Response rate by gender over the weeks

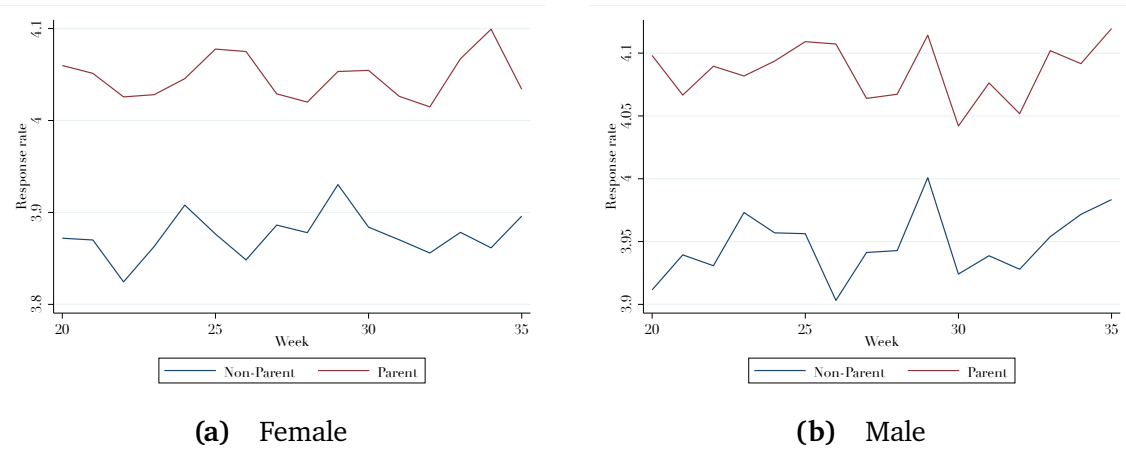
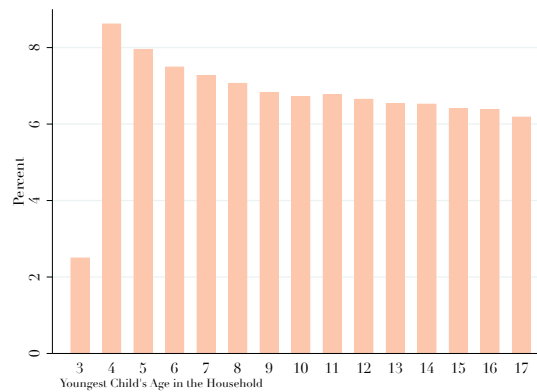
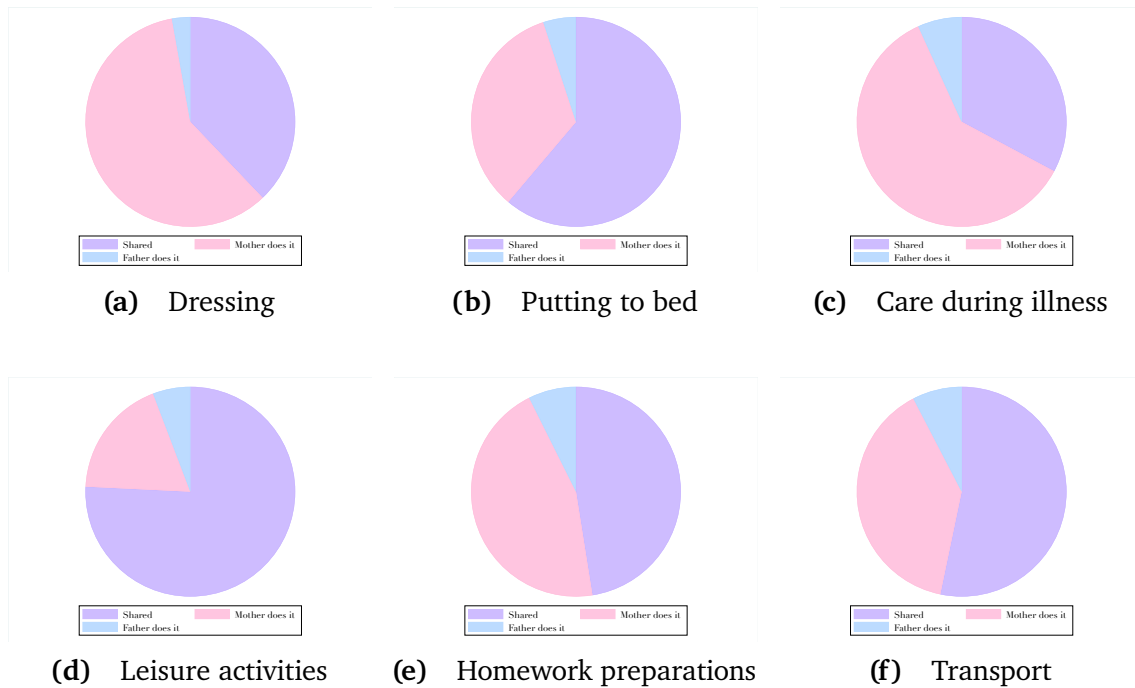


Fig. 7 Age Distribution of Youngest Child in the Household



Note– The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff.

Fig. 8 Distribution of Child-Related Tasks Across Categories



Note– The data come from the French Gender and Generation Survey (GGS), conducted between 2005 and 2012. The analysis is restricted to individuals younger than 65. Interview months run from September to December.

B Self-Reported Health Question

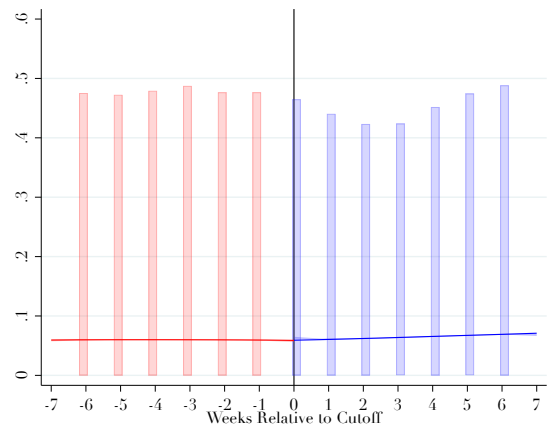
Table B1 Self-Reported Health Variable

Question: “Appréciation personnelle de l’individu sur son état de santé en général.” Translation: “Personal assessment of the individual’s general state of health.”			
Original Scale		Reversed Scale	
Code	Category	Recoded Value	Interpretation
5	Très mauvais (Very Bad)	1	Lowest self-reported health
4	Mauvais (Bad)	2	
3	Assez bon (Fairly Good)	3	
2	Bon (Good)	4	
1	Très bon (Very Good)	5	Highest self-reported health

Note– The question captures the respondent’s personal assessment of their overall health status. The original scale runs from 1 (Very Good) to 5 (Very Bad). The scale is reversed in our analysis so that higher values correspond to better self-reported health.

C Manipulation Test

Fig. 9 Test of manipulation of running variable



Note– This figure shows the distribution of the running variable for the main sample. The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. The cutoff is the start of the summer school holidays. We use a local polynomial density estimator and a t-statistic, as described in Cattaneo, Jansson, and Ma (2020) to test the hypothesis of no discontinuity in the density of the running variable at the cutoff. The corresponding t-statistic is -1.5473, and the p-value is 0.1218.

D Alternative Bandwidths

In this section, we assess the sensitivity of our results to the choice of bandwidth by re-estimating the main RD specification using narrower bandwidths around the cutoff. Restricting the sample to observations closer to the threshold reduces potential bias arising from functional form assumptions and from observations far from the cutoff.

Table D1 reports the estimated effects for bandwidths of ± 4 , ± 5 , and ± 6 weeks around the start of the summer holidays, separately for mothers and fathers. For mothers, the estimated coefficients remain negative across all bandwidths and are of similar magnitude to those obtained in the main specification. The estimates are statistically significant for the ± 6 week bandwidths, despite the smaller sample sizes, suggesting that the main results are not driven by observations farther from the cutoff. For the narrowest bandwidth (± 4 weeks), the point estimate remains comparable in size but is less precise, reflecting the limited number of observations. For fathers, on the other hand, the estimated effects are consistently smaller in magnitude and statistically insignificant across all bandwidths.

The estimated effects remain statistically significant for narrower bandwidths. These estimates are of similar magnitude to those obtained in the main specification, indicating that the results are not driven by observations far from the cutoff. The corresponding estimates are reported in Table D1.

Overall, these bandwidth sensitivity checks support the validity of the RDiT design and indicate that the estimated effects are robust to alternative bandwidth choices. The stability of the estimates across specifications strengthens confidence that the observed effects reflect a genuine discontinuity at the holiday cutoff.

Table D1 Placebo Tests using Different Bandwidths

	Mothers			Fathers		
	± 4 weeks (1)	± 5 weeks (2)	± 6 weeks (3)	± 4 weeks (4)	± 5 weeks (5)	± 6 weeks (6)
Self-reported health	-0.109 (0.088)	-0.100* (0.059)	-0.104* (0.048)	-0.081 (0.091)	-0.056* (0.062)	-0.040 (0.050)
Observations	11,961	14,600	17,375	10,924	13,357	15,897

Note— The dependent variable is a continuous measure (1–5) of parents' self-reported health. This table replicates our main RDiT estimation (see Table 2), including covariates and fixed effects across different bandwidths. The sample includes only individuals younger than 65 whose youngest child is aged 3–17. Due to sample size limitations, the minimum bandwidth for which we can replicate this analysis is 4 weeks. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

E Alternative Heterogeneity Analysis

E.1 Main RDiT estimation with whole sample

In this subsection, we present the main RDiT estimates for the full sample of parents (see Table E1). In the baseline specification (Column 1), the estimated effect of summer holidays on self-reported health is negative but statistically insignificant (-0.037). Once region and time fixed effects are included (Column 2), the effect becomes statistically significant. The fully augmented specification, including both fixed effects and individual-level controls (Column 3), yields a slightly smaller but still significant estimate of -0.079 points. This effect corresponds to a decrease of roughly 0.094 standard deviations. The stability of the coefficient across Columns 2 and 3 suggests that observable individual characteristics do not drive the main effects observed.

Table E1 Main RDiT estimation on Parents' Self-Reported Health

	All Respondents		
	(1)	(2)	(3)
Self-reported health	-0.037 (0.031)	-0.101** (0.031)	-0.079** (0.030)
Observations	47,036	47,036	38,801
Region and Time Fixed Effects	No	Yes	Yes
Controls	Yes	No	Yes

Note— Estimates correspond to Equation 1, using separate local linear RDiT regressions with a triangular kernel. The dependent variable is a continuous measure (1–5) of parents' self-reported health. The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. Estimates are obtained from separate local linear RD regressions using a triangular kernel. Columns 1 include all individuals, interviewed within 7 weeks on either side of the summer school holidays cutoff, without controls nor fixed effects. In Column 2 we include week, year and regional fixed effects while in Column 3, we include covariates from Table 1. Robust standard errors are reported in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

E.2 Self-Reported Health Alternative Specifications

In this subsection, we construct cumulative binary indicators from our main outcome variable to examine whether the health effects of school holidays vary across the distribution of health outcomes. Specifically, each indicator assigns a value of 1 to individuals reporting health above a given threshold and 0 otherwise. The first indicator, *Fairly Good*, takes a value of 1 for individuals reporting at least fairly good health (scores 3, 4, and 5 on the reversed scale), capturing any health status above the two lowest categories. The second indicator, *Good*, equals 1 for individuals reporting good or very good health (scores 4–5), distinguishing those in genuinely good health from those in fair or poor health. The third indicator, *Very Good*, equals 1 only for individuals reporting very good health (score 5), capturing effects at the very top of the health distribution.

Table E.2 displays the results across the three cumulative outcomes. For mothers, the effect is negative and statistically significant for the *Good* threshold. A smaller but marginally significant effect is also observed at the *Fairly Good* threshold, suggesting some deterioration even in the lower-middle part of the health distribution. Finally, no significant effect is found at the *Very Good* threshold. For fathers, a marginally significant negative effect is observed at the *Good* threshold. However, the magnitude is smaller than for mothers, and the effect disappears at both the lower and upper thresholds. Overall, these results are consistent with our main findings and suggest that the observed negative health effects of school holidays among mothers are concentrated at the middle of the health distribution, reflecting a shift from good to fairly good or poor health rather than a collapse from very good to very poor health.

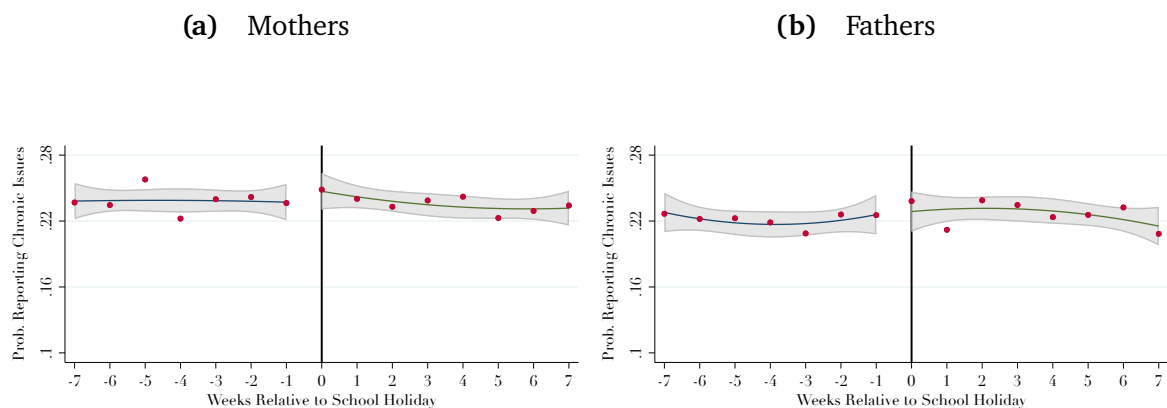
Table E2 Main RdIT with Alternative Specifications

	Fairly Good		Good		Very Good	
	Women (1)	Men (2)	Women (3)	Men (4)	Women (5)	Men (6)
Self-reported health	-0.018* (0.009)	-0.003 (0.008)	-0.050** (0.021)	-0.037* (0.022)	-0.026 (0.026)	-0.001 (0.027)
Observations	20,271	18,530	20,271	18,530	20,271	18,530
Region and Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Estimates correspond to Equation 1, using separate local linear RdIT regressions with a triangular kernel. The dependent variables are cumulative binary indicators constructed from the self-reported health scale (1–5). *Fairly Good* equals 1 if the individual reports at least fairly good health (scores 3–5); *Good* equals 1 if the individual reports good or very good health (scores 4–5); *Very Good* equals 1 only if the individual reports very good health (score 5). The sample includes individuals who are interviewed within 7 weeks on either side of the summer school holidays cutoff. Estimates are obtained from separate local linear RD regressions using a triangular kernel. Controls include covariates from Table 1. All regressions include week, year and regional fixed effects. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

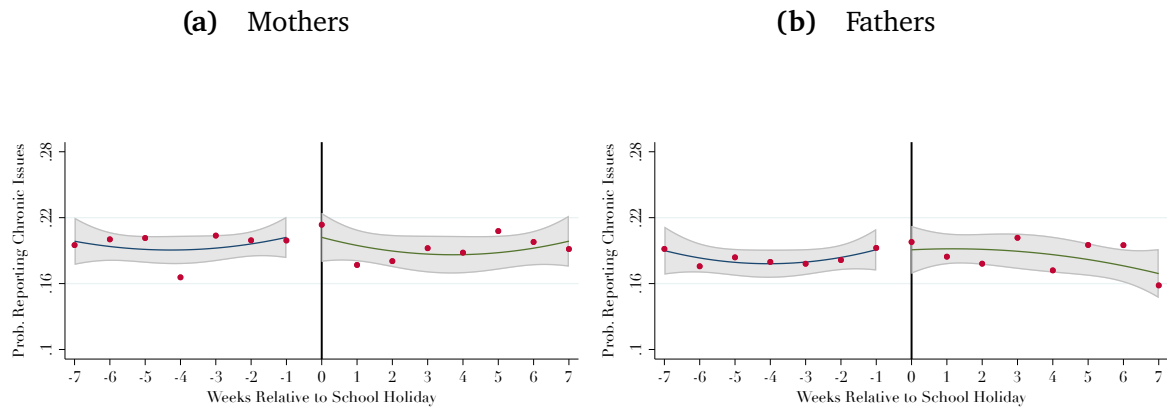
E.3 Chronic Issues

Fig. 10 Effect of School Holidays on Parents' Chronic issues



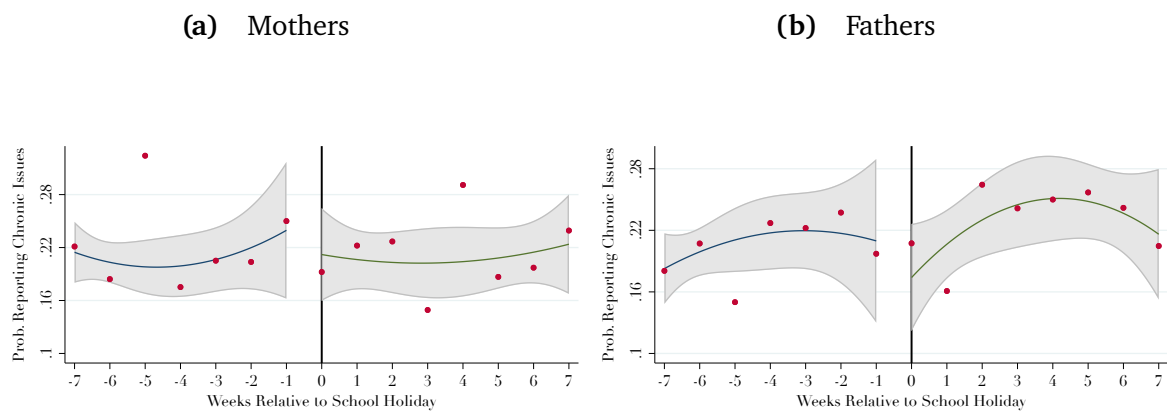
Note– The different panels show the outcomes as a function of the distance between individuals' week-year of interview and the start of the summer school holidays. Each red dot is a weekly average. The grey area represents the 95% confidence interval of a second-degree polynomial regression, separately estimated left and right of the cut-off. The local linear regression discontinuity estimates are based on a 7-week bandwidth at both sides of the threshold. The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. The set of covariates corresponds to those specified in Table 1.

Fig. 11 Effect of School Holidays on Chronic issues - Excluding Parents On Leave



Note- The different panels show the outcomes as a function of the distance between individuals' week-year of interview and the start of the summer school holidays. Each red dot is a weekly average. The grey area represents the 95% confidence interval of a second-degree polynomial regression, separately estimated left and right of the cut-off. The local linear regression discontinuity estimates are based on a 7-week bandwidth at both sides of the threshold. The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. The set of covariates corresponds to those specified in Table 1.

Fig. 12 Effect of School Holidays on Chronic issues - Parents On Leave

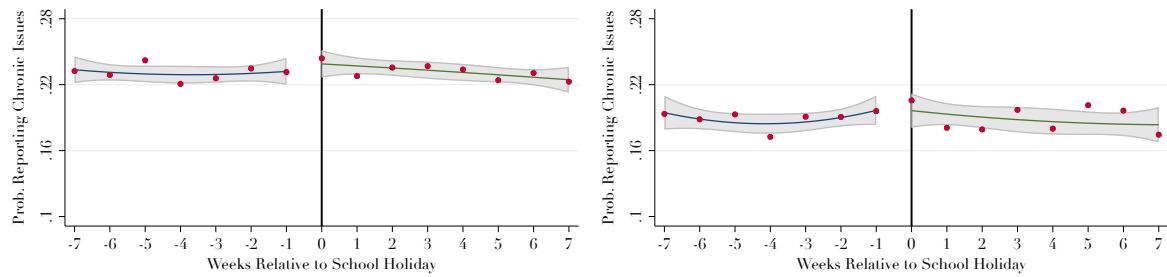


Note- The different panels show the outcomes as a function of the distance between individuals' week-year of interview and the start of the summer school holidays. Each red dot is a weekly average. The grey area represents the 95% confidence interval of a second-degree polynomial regression, separately estimated left and right of the cut-off. The local linear regression discontinuity estimates are based on a 7-week bandwidth at both sides of the threshold. The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. The set of covariates corresponds to those specified in Table 1.

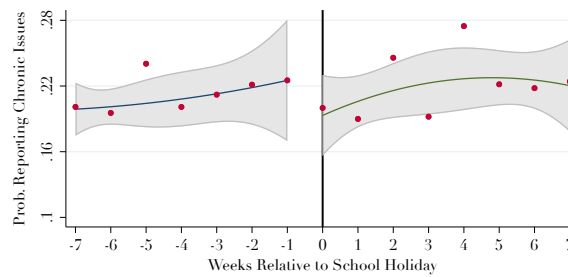
Fig. 13 Chronic Issues - Full Sample

(a) Full Sample

(b) Excluding On Leave



(c) On Leave



Note– The different panels show the outcomes as a function of the distance between individuals' week-year of interview and the start of the summer school holidays. Each red dot is a weekly average. The grey area represents the 95% confidence interval of a second-degree polynomial regression, separately estimated left and right of the cut-off. The local linear regression discontinuity estimates are based on a 7-week bandwidth at both sides of the threshold. The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. The set of covariates corresponds to those specified in Table 1.

E.4 Unemployed Status

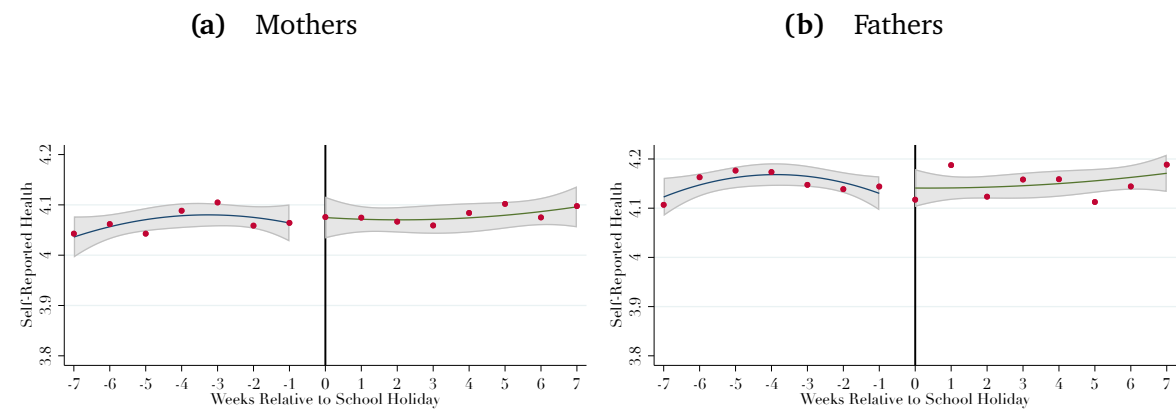
Table E3 Heterogeneous Effects by Unemployment Status

	Unemployed	
	Mothers (1)	Fathers (2)
Self-reported health	0.384** (0.182)	-0.586** (0.245)
Observations	1,538	936
Region and Time Fixed Effects	Yes	Yes
Controls	Yes	Yes

Note– Estimates correspond to Equation 1, using separate local linear RDIT regressions with a triangular kernel. The dependent variable is a continuous measure (1–5) of parents' self-reported health. The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. Estimates are obtained from separate local linear RD regressions using a triangular kernel. Controls include covariates from Table 1. All regressions include week, year and regional fixed effects. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

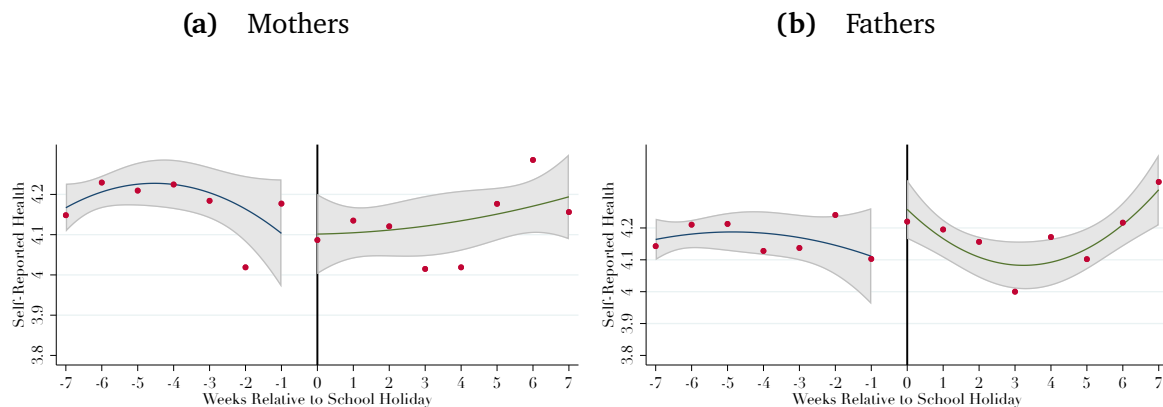
E.5 Leave Status

Fig. 14 Effect of School Holidays on Self-Reported Health - Excluding Parents On Leave



Note– The different panels show the outcomes as a function of the distance between individuals' week-year of interview and the start of the summer school holidays. Each red dot is a weekly average. The grey area represents the 95% confidence interval of a second-degree polynomial regression, separately estimated left and right of the cut-off. The local linear regression discontinuity estimates are based on a 7-week bandwidth at both sides of the threshold. The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. The set of covariates corresponds to those specified in Table 1.

Fig. 15 Effect of School Holidays on Self-Reported Health - Parents On Leave



Note– The different panels show the outcomes as a function of the distance between individuals' week-year of interview and the start of the summer school holidays. Each red dot is a weekly average. The grey area represents the 95% confidence interval of a second-degree polynomial regression, separately estimated left and right of the cut-off. The local linear regression discontinuity estimates are based on a 7-week bandwidth at both sides of the threshold. The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. The set of covariates corresponds to those specified in Table 1.

E.6 Marital Status

Table E4 Heterogeneous Effects by Marital Status

	Single		Married	
	Mothers (1)	Fathers (2)	Mothers (3)	Fathers (4)
Self-reported health	-0.242** (0.075)	-0.212** (0.087)	-0.006 (0.052)	0.029 (0.052)
Observations	5,888	4,485	12,039	13,035
Region and Time Fixed Effects	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Note– Estimates correspond to Equation 1, using separate local linear RDIT regressions with a triangular kernel. The dependent variable is a continuous measure (1–5) of parents' self-reported health. The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. Estimates are obtained from separate local linear RD regressions using a triangular kernel. Controls include covariates from Table 1. All regressions include week, year and regional fixed effects. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

E.7 Sample Without Children

As an alternative heterogeneity analysis, as mentioned in Section 4.2, we provide evidence on the effect of school holidays on self-reported health among childless individuals. To do so, we split the sample into age groups, since external factors may influence the results for younger individuals. Results are displayed in Table E5.

Table E5 Effect of School Holidays on Self-Reported Health - Sample Without Children

	Age 16-30		Age 30-55		Age 55+	
	Women (1)	Men (2)	Women (3)	Men (4)	Women (5)	Men (6)
Self-reported health	0.124** (0.092)	0.195*** (0.077)	0.047 (0.059)	-0.029 (0.054)	-0.040 (0.070)	-0.238*** (0.078)
Observations	4,372	4,524	10,828	12,858	7,976	6,777
Region and Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Estimates correspond to Equation 1, using separate local linear RDIT regressions with a triangular kernel. The dependent variable is a continuous measure (1–5) of respondents' self-reported health. The sample includes only individuals without children and who are interviewed within 7 weeks on either side of the summer school holidays cutoff. The sample of childless individuals is split into three groups (16–30, 31–55, and those older than 55). Estimates are obtained from separate local linear RD regressions using a triangular kernel. Controls include covariates from Table 1. All regressions include week, year and regional fixed effects. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

E.8 Interaction Effects

Table E6 Interaction Effects

	All Respondents		
	Mothers (1)	Fathers (2)	All (3)
Treatment	-0.226*** (0.083)	0.005 (0.084)	-0.114* (0.059)
Treatment x Running	-0.006 (0.045)	0.023 (0.042)	0.008 (0.030)
Observations	11,077	11,744	22,821
Region and Time Fixed Effects	Yes	Yes	Yes
Controls	Yes	Yes	Yes

Note— Estimates correspond to Equation 1, using separate local linear RDIT regressions with a triangular kernel. The dependent variable is a continuous measure (1–5) of parents' self-reported health. The sample includes only individuals younger than 65 whose youngest child is aged 3–17 and who are interviewed within seven weeks on either side of the summer school holiday cutoff. Estimates are obtained from separate local linear RD regressions using a triangular kernel. Columns 1 include all individuals, interviewed within 7 weeks on either side of the summer school holidays cutoff, without controls nor fixed effects. In Column 2 we include week, year and regional fixed effects while in Column 3, we include covariates from Table 1. Robust standard errors are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

F Event Study Results

Table F1 Effect of School Holidays on Self-Reported Health - Event Study Results - Female Sample

	Non-Parent Self-Reported Health	Parent Self-Reported Health
7 weeks before	0.021 (0.173)	-0.117 (0.172)
6 weeks before	0.169 (0.149)	0.034 (0.148)
5 weeks before	0.178 (0.123)	-0.001 (0.121)
4 weeks before	0.153 (0.097)	0.033 (0.092)
3 weeks before	0.189*** (0.067)	-0.023 (0.065)
1 week before	-0.076 (0.064)	-0.039 (0.059)
Start of School Holidays	-0.115 (0.087)	-0.162* (0.086)
1 weeks after	-0.083 (0.101)	-0.302*** (0.100)
2 weeks after	-0.101 (0.109)	-0.282*** (0.108)
3 weeks after	-0.094 (0.112)	-0.319*** (0.110)
4 weeks after	-0.179 (0.111)	-0.189* (0.108)
5 weeks after	-0.176* (0.105)	-0.061 (0.100)
6 weeks after	-0.162* (0.095)	-0.012 (0.088)
7 weeks after	-0.135* (0.076)	-0.088 (0.071)
Mean at t=-2	3.847	4.085
Dep. mean	3.875	4.048
Observations	15,670	14,438

Note– These point estimates show the interaction terms $\sum_{j=-7}^7 \theta_j (I\{j = t\})$, calculated relative to the reference week $t = -2$ over the event window from seven weeks before to seven weeks after the school holidays. The results are estimated using OLS, based on Equation (2). Controls include region, year and week fixed effects, age, number of children, education level, hours worked, and marital status. The sample includes only individuals younger than 65 who are interviewed within seven weeks on either side of the summer school holiday cutoff. Parental sample includes individuals whose youngest child is aged 3–17. Standard errors are clustered at the individual level.

Table F2 Effect of School Holidays on Self-Reported Health - Event Study Results - Male Sample

	Non-Parent Self-Reported Health	Parent Self-Reported Health
7 weeks before	-0.107 (0.162)	-0.008 (0.173)
6 weeks before	-0.006 (0.141)	0.079 (0.149)
5 weeks before	0.062 (0.117)	0.204* (0.121)
4 weeks before	0.068 (0.093)	0.117 (0.093)
3 weeks before	0.093 (0.064)	0.028 (0.064)
1 week before	0.016 (0.057)	0.064 (0.058)
Start of School Holidays	-0.014 (0.080)	0.016 (0.085)
1 weeks after	-0.070 (0.094)	-0.017 (0.100)
2 weeks after	-0.089 (0.102)	0.010 (0.108)
3 weeks after	-0.105 (0.105)	-0.068 (0.111)
4 weeks after	-0.133 (0.104)	-0.002 (0.109)
5 weeks after	-0.120 (0.100)	-0.017 (0.102)
6 weeks after	-0.009 (0.091)	0.085 (0.089)
7 weeks after	0.049 (0.070)	0.108 (0.071)
Mean at t=-2	3.891	4.090
Dep. mean	3.949	4.085
Observations	16,346	13,234

Note- These point estimates show the interaction terms $\sum_{j=-7}^7 \theta_j (\mathbf{1}\{j = t\})$, calculated relative to the reference week $t = -2$ over the event window from seven weeks before to seven weeks after the school holidays. The results are estimated using OLS, based on Equation (2). Controls include region, year and week fixed effects, age, number of children, education level, hours worked, and marital status. The sample includes only individuals younger than 65 who are interviewed within seven weeks on either side of the summer school holiday cutoff. Parental sample includes individuals whose youngest child is aged 3–17. Standard errors are clustered at the individual level.