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8-3-2022

# Gender Differences in Parental Leave Before and After the Introduction of a Paid Parental Leave Policy: A Sequence Analysis of Administrative Time-Keeping Records

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## Citation Details

Goodman, Julia M.; Poma, Lisset Dumet; Hurtado, David; Steeves-Reece, Anna; and Richardson, Dawn M., "Gender Differences in Parental Leave Before and After the Introduction of a Paid Parental Leave Policy: A Sequence Analysis of Administrative Time-Keeping Records" (2022). *OHSU-PSU School of Public Health Faculty Publications and Presentations*. 494.

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1 **Gender differences in response to a paid parental leave policy: A sequence analysis of**  
2 **administrative time-keeping records**

3  
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20 Suggested running head: Gender differences in paid parental leave

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## Abstract

Paid leave confers health benefits to new parents and their children, but the absence of a national paid family leave policy in the United States has left workers to navigate a patchwork of paid and unpaid parental leave benefits accessed through their employers. As public and private paid leave policies expand across the US, it is imperative to determine how these benefits impact leave taking behaviors among new parents. We use sequence and cluster analyses of administrative time-keeping records to detail parental leave-taking during the first 180 days after adding a child among employees of a large public-sector organization with a new paid parental leave policy. Results show that the additional paid leave benefits replaced some the unpaid leave women were taking and also lengthened their total leave duration. For men, who were only taking paid leave, the additional benefits allowed them to save their sick leave but left total leave duration unaffected. This study highlights the complex ways paid leave policies impact leave-taking among new parents. As more state and municipal governments consider paid family leave policies, understanding the interplay between these policies and existing organizational structures is critical to maximize the benefits across the workplace and limit unintended consequences.

*Keywords:* paid parental leave, workplace benefits, gender differences, public employers, sequence analysis

## 50 **1. Introduction**

51 An expanding body of evidence suggests that paid family leave provides health benefits to  
52 families by protecting employment benefits and income and securing time for this important  
53 family and personal transition (Aitken et al., 2015; Andres et al., 2016; Hewitt et al., 2017; Nandi  
54 et al., 2018). Paid family leave has also been linked to improvements in infant, child, and  
55 maternal health (Chatterji & Markowitz, 2012; Hamad et al., 2018; Pac et al., 2019; Rossin,  
56 2011); increased participation in childrearing by fathers (Bartel et al., 2018; Bünning, 2015;  
57 Nepomnyaschy & Waldfogel, 2007); and increased labor force attachment among women  
58 (Baum & Ruhm, 2016). These benefits of paid parental leave have been examined primarily  
59 utilizing survey data which provide basic information on leave availability, but are not able to  
60 disentangle the various types of leave arrangements (e.g., parental leave, sick leave, vacation)  
61 that new parents must navigate. Moreover, the extent to which these policies reach  
62 heterogeneous workers (i.e., non-birth parents, racial and ethnic minorities, low-wage workers)  
63 and differentially affect their leave-taking trajectories remains unclear. We use sequence  
64 analysis of a unique source of administrative human resources data to identify and detail leave-  
65 taking trajectories among employees of a large organization, and how these vary by gender,  
66 before and after the implementation of a paid parental leave policy. Sequence analysis allows  
67 us to describe patterns in leave-taking arrangements over time for each individual leave-taker,  
68 and to examine how these patterns correlate with employee characteristics. Understanding  
69 these leave patterns will inform organizational and public policy decision makers about  
70 employees' leave preferences, and how these preferences may vary by gender, individual and  
71 job characteristics, and in response to policy change.

72

### 73 *1.1. Study aim and research questions*

74 While a majority of workers in the U.S. are not covered by any paid family leave policy, most  
75 workers take some amount of leave after the birth of a child by combining unpaid time, sick,

76 vacation, and other paid time off (Laughlin, 2011). Paid parental leave policies—whether at the  
77 public or organizational level—interact with these policies to impact individuals’ actual leave-  
78 taking behavior (i.e., leave trajectories), yet these have not been explicitly considered when  
79 examining the effects of paid leave policies on individuals. Whether policies originate in the  
80 public sphere and require compliance from organizations, or originate within organizations, paid  
81 leave policies will have differential effects on workers depending on their preferences and  
82 access to resources that enable utilization of leave.

83

84 The aim of our study is to understand how policy changes interact with the organizational  
85 context to affect leave-taking among workers. We examine how the introduction of a new paid  
86 parental leave policy changed both the duration and the types of leave taken by women and  
87 men<sup>1</sup> within a single, large organization using administrative time-keeping records. Our  
88 approach allows us to identify and describe distinct leave-taking trajectories to capture variation  
89 across workers in terms of demographic and job characteristics. The use of administrative time-  
90 keeping records reduces response bias and reporting errors, and focusing on a single  
91 organization eliminates variation in employer-provided benefits which are difficult to measure  
92 accurately. Specifically, we address the following research questions:

- 93 a) What are the different leave-taking trajectories in terms of type (sick, vacation, unpaid  
94 leave, paid parental leave), duration, and timing of leave for women and men in the year  
95 surrounding birth or placement of a new child?
- 96 b) How do these leave-taking trajectories change in response to the introduction of a paid  
97 parental leave policy?
- 98 c) What demographic and job characteristics predict membership in each leave-taking  
99 trajectory?

100

---

<sup>1</sup> Our analysis is based on binary gender, as defined in the organization’s human resources records.

101 1.2. Policy context

102 The United States is one of only two countries without any mandated paid leave for new  
103 mothers, and one of only two high-income countries without any paid leave for fathers (Raub et  
104 al., 2018). Outside the United States, access to extended periods of paid leave for new mothers  
105 and, in many cases, new fathers are commonplace (Raub et al., 2018). Of 34 OECD countries,  
106 25 guarantee at least 6 months of paid leave for new mothers and 21 guarantee this amount for  
107 new fathers (Raub et al., 2018). The average duration of paid maternity leave available across  
108 OECD countries is just over 18 weeks (OECD, 2021).

109  
110 In the United States, the Family and Medical Leave Act (FMLA), enacted in 1993, is the only  
111 federal leave law and mandates that employers with at least 50 employees within a 75-mile  
112 radius of all worksites provide up to 12 weeks of *unpaid*, job-protected leave to care for a new  
113 child, a seriously ill family member, or one's own serious illness. To be eligible for FMLA, one  
114 must have worked for their employer for at least 12 months before taking leave, and for at least  
115 1,250 hours in the past 12 months. Taking these coverage and eligibility restrictions together, 59  
116 percent of U.S. workers are eligible for job-protected unpaid leave through the FMLA (Klerman,  
117 2012). To address these gaps in coverage and the lack of paid leave policies at the federal  
118 level, many state and local governments have enacted paid leave policies. Since California  
119 passed the nation's first paid family and medical leave law in 2002, ten other states (New  
120 Jersey, Rhode Island, New York, Washington, Massachusetts, Connecticut, Oregon, Colorado,  
121 Maryland, and Delaware) and the District of Columbia have passed similar paid family and  
122 medical leave legislation that provide between five (Rhode Island) and 24 (Maryland) weeks of  
123 leave, with wage replacement ranging from approximately 60-100% of usual wages. Moreover,  
124 more than 100 municipal governmental agencies in 31 states have implemented paid leave  
125 policies for their employees (National Partnership for Women & Families, 2020).

126

127 This policy landscape has led to most workers relying on their employers, rather than  
128 government programs, for paid leave, but merely 23 percent of all workers have access to paid  
129 family leave through their employers (U.S. Bureau of Labor Statistics & U.S. Department of  
130 Labor, 2021). The majority of working parents must piece together different types of leave (e.g.,  
131 short-term disability, vacation, sick leave, unpaid leave) to attain their target leave duration  
132 without substantial income loss. Using U.S. census data from 1961 to 2008 to study  
133 employment and leave-taking among first-time mothers, Laughlin (2011) found that women  
134 used a variety of leave arrangements both before and after birth, including combinations of paid  
135 and unpaid leave, disability leave, and job changes (e.g., quitting job and becoming self-  
136 employed, in addition to being fired).

137

### 138 *1.3. Methodological challenges studying impacts of paid leave*

139 There is substantial evidence that the expansion of paid parental leave has beneficial health  
140 and labor market impacts, particularly for mothers. However, the existing body of research  
141 suffers from several limitations that make it difficult to predict how paid leave policies actually  
142 affect leave-taking trajectories and subsequent outcomes among diverse U.S. workers. These  
143 limitations include: 1) little is known about how policies are differentially accessed across a  
144 population due to factors such as job role, gender dynamics, and socioeconomic status; 2)  
145 many studies lack the necessary data granularity to understand how individuals are actually  
146 piecing different forms of leave together; and 3) much less is known about the leave-taking  
147 patterns and subsequent health and labor market outcomes for non-birth parents, including  
148 fathers, and people who build their families through fostering and adoption.

149

150 Furthermore, parental leave research that applies survey data is limited in accurately capturing  
151 the different benefits (e.g., disability and vacation leave) that parents have to patch together to  
152 prolong their leave. Administrative datasets from human resources can illuminate how and when

153 parents use different leave-related mechanisms. We identified two published studies that use  
154 administrative data to examine parental leave among mothers and fathers. Examining claims for  
155 California's Paid Family Leave program from the state's Employment Development Department,  
156 Bana, Bedard, and Rossin-Slater (2018) found that the average parental leave duration for  
157 women was 12 weeks, while most men took between two and six weeks of leave. This study  
158 relies on claims made through the state programs, so does not capture additional leave that was  
159 taken as part of an employer-provided parental leave program. Another study, by Zhelyazkova  
160 and Ritschard (2017), examined social security records in Luxembourg for workers who added a  
161 child to their household in 2003. Importantly, like many other OECD countries, Luxembourg  
162 provides generous paid leave for new parents (46 weeks are available for new mothers and 28  
163 weeks for new fathers) (OECD, 2021). The authors used sequence analysis to trace parents'  
164 employment and leave trajectories three years prior and five years after the birth of the child.  
165 The sequence analysis revealed higher uptake for parental leave among women than men, and  
166 lower rates of returning to work among mothers following parental leave. The authors concluded  
167 that childbirth is a clear "turning point" for female, but not male, trajectories. Zhelyazkova and  
168 Ritschard (2017) further argue that using sequence analysis to examine trajectories, rather than  
169 specific events, allows for a holistic approach that, while descriptive, captures the richness of  
170 qualitative data using a larger number of individuals.

171

#### 172 *1.4. Theoretical framework and hypotheses*

173 We draw upon two frameworks from the literature in developing our hypotheses. First, Andres  
174 and colleagues (2016) apply a health care access framework to the study of paid leave and its  
175 health implications. This framework, previously used to study access to health care (Aday &  
176 Andersen, 1974, 1981; Andersen, 1968), considers three indicators of access: 1) potential  
177 access, which focuses on enabling resources that increase the likelihood that leave utilization  
178 will occur; 2) realized access, which is the actual utilization of leave; and 3) access outcomes



179 (the downstream health effects of leave-taking). Based on their synthesis of a systematic  
180 literature review, Andres et al. (2016) identify several employment and personal indicators of  
181 potential access, including leave statute, position type (e.g., managerial), paid sick or personal  
182 leave available, job tenure, income, marital status, education, and race. Importantly, this  
183 framework recognizes that paid leave statute (i.e., being employed by an organization that  
184 offers paid leave or residing in a state with a paid leave law) does not necessarily translate into  
185 utilization, but rather is one of several indicators that span employment and personal domains.  
186 Instead, factors such as individual job characteristics, financial security, and workplace culture  
187 can facilitate or impede leave-taking.

188

189 Second, to further organize these multilevel indicators of potential access, we follow Barcus,  
190 Tigges, & Kim (2019) framework that considers the “individual, family, and workplace resources  
191 that either provide [parents] with the opportunity to take paid time off or make it feasible to take  
192 unpaid leave,” with gender operating across each of these levels. This framework is particularly  
193 relevant to our study because it was developed to examine gender differences in the factors  
194 associated with parental leave-taking in the context of a single municipal employer – in their  
195 case, the City of Madison, Wisconsin – in order to inform the development of a paid parental  
196 leave policy. In this framework, individual characteristics consist of socioeconomic resources  
197 that may enable leave-taking through either economic or cultural capital, including financial  
198 resources, educational attainment, and race. Family context refers to inputs that influence  
199 leave-taking through financial means (e.g., the presence of another household earner) in  
200 addition to the supply of available caregivers. Barcus, Tigges, & Kim (2019) hypothesize that  
201 sole earners, whether because they are single parents or have a non-employed partner, will  
202 take shorter leaves. Together, these individual and family resources reinforce the individual  
203 indicators of potential access described by Andres et al. (2016). Finally, Barcus, Tigges, & Kim  
204 (2019) refer to workplace factors beyond paid leave policy availability itself that may influence

205 the use of these policies. Conceptually, this aligns with the employment indicators of potential  
206 access described by Andres et al. (2016), but their focus is more on the workplace culture (e.g.,  
207 working in a department with a greater ratio of women or having a female supervisor) than  
208 individual job characteristics.

209

210 While Barcus, Tigges, & Kim (2019) were not able to capture the detailed, daily leave-taking  
211 data that we leverage from administrative data, their use of survey data enabled measurement  
212 of a richer set of socioeconomic characteristics, such as education, sexual orientation, whether  
213 they had a co-parent, and the employment status of their co-parent. Combining these theoretical  
214 frameworks allows us to examine the multilevel factors that influence the extent to which the  
215 introduction of a paid leave policy (an increase in potential access) translates into changes in  
216 leave utilization (realized access) and related work patterns.

217

#### 218 *1.4.1. Workplace resources*

219 The introduction of a new paid leave policy represents an expansion in potential access to paid  
220 leave, but requires interaction with other available workplace resources in order to translate into  
221 realized access and improved outcomes. Even within organizations that offer paid leave,  
222 workplace culture exerts additional influence on workers' leave-taking. Workplace policies and  
223 practices shape the benefits workers have available to them (e.g., amount of sick/vacation time  
224 accrued, wait time for benefits eligibility) and workplace culture influences whether workers feel  
225 comfortable utilizing these benefits without negative repercussions. Expanding paid or job-  
226 protected leave allowance should increase leave-taking, all else being equal, and the empirical  
227 literature confirms that being offered job-protected and paid leave predicts actual leave-taking.  
228 Expansions in access to job-protected, unpaid leave through the FMLA had small but positive  
229 effects on the uptake and duration of leave among women (Han & Waldfogel, 2003) and  
230 increased leave-taking for fathers in the month after birth, particularly among more highly

231 educated men (Han et al., 2009). Several studies of new or expanded paid leave policies show  
232 increases in the average duration of leave taken among women (for a review, see (Rossin-  
233 Slater, 2017)) and men (Bartel et al., 2018; Baum & Ruhm, 2016), though none of the data  
234 sources used in these studies include information on actual leave duration and type of leave  
235 being used that our data feature.

236

237 Hypothesis 1: The introduction of a new paid parental leave policy will increase paid  
238 leave-taking.

239

#### 240 1.4.2. *Individual and family characteristics*

241 Within an organizational setting, individual and family characteristics shape how a worker  
242 perceives the accessibility and suitability of available leave. We expect that characteristics that  
243 indicate a workers' social and economic status—such as income—will influence leave-taking,  
244 such that individuals with greater resources and standing will take longer leave. Job  
245 characteristics also influence the accessibility of leave. Specifically, when leave benefits are  
246 accrued based on job tenure (as sick and vacation time often are), longer-employed workers will  
247 on average have accrued more time to put toward their parental leave. Importantly, workers  
248 deplete these leave banks at different rates; workers who experience pregnancy and childbirth  
249 typically require sick leave for medical appointments and physical recovery, so birth- and non-  
250 birth parents with similar leave banks before a pregnancy would likely have vastly different  
251 amounts of leave to use for caregiving and bonding with a new child. Thus, job tenure, which  
252 influences accrued leave, will be particularly important for birth parents.

253

254 Hypothesis 2: Employees with higher income and longer job tenure will take longer  
255 leave.

256

257 Family characteristics like marital or partner status should influence a worker's financial ability to  
258 take leave, particularly if leave-taking results in a pay reduction. Studies of the unpaid FMLA  
259 have found the most pronounced effects on college-educated or married women who are most  
260 likely to be covered by the law and able to afford unpaid leave (Han et al., 2009). Public policy  
261 expansions in access to paid leave suggest that increases in leave-taking are largest among the  
262 least advantaged mothers (i.e., those who are unmarried, Black or Hispanic, or non-college-  
263 educated) who may not have had access to paid leave through their employers (Rossin-Slater  
264 et al., 2013). Other family characteristics, including other caregiving responsibilities and the  
265 presence of alternative caregivers, should also influence a worker's perceived need to take  
266 leave or, stated another way, their preferences for taking leave to care for a new child  
267 themselves versus returning to work and placing their child in the care of someone else.  
268 Individual and family characteristics are likely to additionally influence leave-taking through  
269 workplace norms and stigma. Black workers face discrimination in the U.S. labor market  
270 (Bertrand & Mullainathan, 2004) and may face greater penalties than white workers when  
271 requesting leave (Rudman & Mescher, 2013). We expect leave-taking to be positively correlated  
272 with being white, older, and in a managerial position because these workers may experience  
273 reduced fear of negative repercussions for taking leave, such as commitment penalties, wage  
274 penalties, negative performance evaluations, or being passed over for promotions. Our data do  
275 not allow us to examine other relevant family characteristics.

276

277 Hypothesis 3: Employees who are white, older, and in managerial positions will take  
278 longer leave.

279

### 280 1.4.3. *Gender*

281 Based on prior research, we expect that employees identified as women will take longer  
282 parental leaves, and will be more likely to take leave all at once immediately around the birth of

283 a child, while those identified as men may take intermittent leave spread over several months.  
284 We anticipate these findings for two reasons. First, we use administrative data which, like most  
285 surveys, do not allow for the determination of whether an individual was the birth parent, so  
286 binary gender is used as a proxy for whether or not the individual experienced pregnancy and  
287 childbirth. Birth parents bear the physical, physiologic, and psychological challenges of carrying  
288 a pregnancy and giving birth and therefore require more time off for both medical appointments  
289 and physical recovery, and birth parents are most likely to be the parent responsible for  
290 breastfeeding (McGovern et al., 2007, 2011). While we expect most parent employees who are  
291 identified as women gave birth and most who are identified as men did not, this estimation may  
292 disproportionately exclude members of the LGBTQ+ community, especially parents who are  
293 transgender or non-binary. Second, gendered expectations influence the societal and workplace  
294 ideals that an individual is held to, with men often facing additional stigma around their desire to  
295 take parental leave (e.g., “flexibility stigma” or “commitment penalty”) (Petts et al., 2018, 2022;  
296 Rudman & Mescher, 2013). Fathers, in particular, may be more strongly influenced by  
297 workplace norms that prevent them from taking long periods of leave (Goodman et al., 2019;  
298 Petts et al., 2018).

299

300 Hypothesis 4: Women will take longer leave than men.

301

## 302 **2. Data and sample**

### 303 *2.1. Setting*

304 This study was conducted in partnership with Multnomah County, a public sector employer in  
305 Portland, Oregon with approximately 5,000 regular (i.e., non-temporary) employees annually.  
306 Multnomah County has 10 departments, serving in multiple areas including tax assessment and  
307 collection, human services, health, public safety, and libraries.

308

309 In October 2015, the Multnomah County Board of Commissioners, a five-member elected board  
310 that governs Multnomah County, passed a resolution to provide paid parental leave (PPL) for  
311 County employees. The PPL policy, which went into effect the following month, provides up to  
312 six weeks of continuous or intermittent fully paid leave that can be used within 12 months of the  
313 birth, adoption, or foster placement of a child. All full- and part-time employees become eligible  
314 after 180 days of employment. The PPL policy builds on a set of existing benefits; prior to the  
315 PPL policy, employees could use a combination of unpaid leave and accrued sick and vacation  
316 leave to care for new children. At the time the PPL policy went into effect, full-time County  
317 employees could accrue 12 sick days per year (with no maximal accrual) and, in most positions,  
318 began with 12 paid vacation days per year (increasing with years of service) (Goodman et al.,  
319 2019).

320

## 321 *2.2. Data collection and measures*

322 We used administrative time-keeping records provided by the central human resources  
323 department to explore the leave patterns of employees before and after the policy was  
324 implemented, and to identify sub-groups within parent employees based on their leave behavior.  
325 Human resources records contained daily occurrences of leave-taking for all employees who  
326 added a child and were benefits-eligible between January 1, 2013 and December 31, 2017  
327 (N=566). We identified employees who added a child during the study period using two  
328 strategies: (1) employees who took leave to care for a new child and reported it as such to  
329 human resources and (2) employees who added a new dependent child to their employer-  
330 sponsored health insurance plan and whose child's date of birth occurred during the study  
331 period. For employees who added more than one child during the study period, we use the first

332 child only and drop records for subsequent children. This study was approved by the [Blinded  
333 for Review] Institutional Review Board.

334

335 The leave period of the study includes 30 days before the child's birth, and 180 days after. We  
336 focus on this period because we anticipated and observed that the vast majority of leave-taking  
337 for both men and women occurs within this window. We excluded 73 employees who had  
338 incomplete records, and 51 employees who either had a child before their hiring date or who  
339 had a child in the period just before the policy was enacted and had their leave status  
340 retrospectively updated to a paid parental leave status (this update changed their available sick  
341 and vacation leave in the ensuing months and therefore does not reflect a typical scenario either  
342 before or after the policy was enacted). The final analytical sample consisted of 442 employees  
343 with complete data who added a child during the study period.

344

345 We used binary gender (male, female) and race/ethnicity (white, Black or African American,  
346 Hispanic/Latino, Asian, Native Hawaiian or Other Pacific Islander, Native American/Alaskan, or  
347 Two or More Races) as listed in the human resources records. Because of small sample sizes  
348 in some clusters, we combine the Asian, Native Hawaiian or Other Pacific Islander, Native  
349 American/Alaskan, and Two or More Races groups into a single group labeled "Combined  
350 groups not otherwise listed" for the cluster and regression analyses. We calculated age at the  
351 time of the child's birth (in years) as the difference between the employee's and their  
352 dependent's date of birth. Managers were identified as those who were listed as "management  
353 employees" under their bargaining unit and consists of employees who are in charge of a unit or  
354 a project and are supervising other employees. We identified full time work status (at least 40  
355 hours per week) and annual salary from the year the dependent was born. Job tenure (in years)  
356 was calculated based on the difference between the employee's hire date and their dependent's

357 date of birth. See data transparency table (Appendix Table A1) for description of overlap with  
358 data in a previously published manuscript.

359

### 360 **3. Empirical analysis**

361 The empirical analysis of administrative leave records consisted of three steps: descriptive  
362 statistics and sequence analysis, cluster analysis based on sequences, and regression analysis  
363 to predict cluster membership. The sequence analysis, which is exploratory, allows us to identify  
364 leave patterns by converting the sequence data into interactive graphics. The descriptive  
365 statistics help us to summarize the demographic, job, and leave duration characteristics of our  
366 sample and to test if differences are found before and after the PPL policy was implemented for  
367 men and women. The cluster analysis identifies subgroups within the pre-PPL and post-PPL  
368 samples that share similar leave-taking trajectories. Finally, the regression analysis compares  
369 the clusters identified in the previous step using demographic and job characteristics. Because  
370 each of these analyses builds on results of the previous analysis, we present methods and  
371 results for each analysis in sequence.

#### 372 *3.1. Sequence analysis and descriptive statistics*

##### 373 *3.1.1. Method*

374 For each employee in our sample, we received a record of the number of leave hours and the  
375 type of leave taken for each day that the employee was absent from work. Days with more than  
376 one type of leave recorded were entered into the dataset with the leave-type representing the  
377 highest number of hours for that day, and all days without any leave recorded were considered  
378 days “not on leave.” Because many employees work non-standard schedules (i.e., nights,  
379 weekends), we were unable to differentiate between work days and scheduled non-work days.  
380 After a comprehensive review of the data with the organization’s benefits manager who assisted  
381 us with the interpretation of each code, we excluded leave codes that were unlikely to have



382 been used for caregiving (e.g., leave for jury duty) and reclassified all relevant codes into five  
383 categories of leave: (1) sick leave, (2) vacation, (3) paid parental leave, (4) unpaid leave, or (5)  
384 another type of leave. “Another type of leave” includes holidays, worker’s compensation,  
385 administrative furlough, personal holiday, and paid and unpaid union time. The final data  
386 consisted of one leave code (or a code of “not on leave”) per day per employee. We linked  
387 employee records with other human resources files containing employee gender, date of birth,  
388 race/ethnicity, job title, department, union representation status, and salary to these time series.  
389

390 To process the sequence data, we used the TraMineR package (Gabadinho et al., 2011) within  
391 the statistical software R 3.6.1 that allowed us to manage the large dataset, transforming it to  
392 other formats that later were represented in plots to visualize the leave patterns. We divided our  
393 sample according to whether the child was born before or after enactment of the paid parental  
394 leave policy and by employees’ gender as identified in the administrative records. Graphical  
395 outputs from the sequence analysis show the leave in chronological order for each employee  
396 with the type of leave specified by color. The visualization helps to identify the leave trajectories  
397 and changes in response to the policy.

398  
399 Descriptive analyses examined the length of leave, demographics, and job characteristics  
400 testing for differences before and after the paid parental leave policy, by gender, using t-tests for  
401 continuous variables and chi-squared tests to assess independence between categorical  
402 variables.

403

### 404 3.1.2. Results

405 Table 1 shows descriptive statistics for women and men who added a child in the study period  
406 and who had leave data available for at least six months following their new child’s data of birth,

407 stratified by whether the leave-taking occurred before vs. after the PPL policy went into effect  
408 (n=442). Employee age and race/ethnicity were similar in the pre- and post-PPL periods for both  
409 women and men. Overall, the annual salary was higher post-PPL for men and women, although  
410 in the top tier (between \$100,000 and \$150,000), only men show increases after PPL. Most  
411 employees worked full time, however, the percentage of women who worked full-time post-PPL  
412 was higher than the pre-PPL women sample (91% vs. 81%, respectively;  $p<0.05$ ) and among  
413 men, the post-PPL sample reported lower percentage of full-time work than the pre-PPL sample  
414 (86% vs. 98%, respectively;  $p<0.05$ ). With regards to tenure, there were statistically significant  
415 differences between men in the post-PPL period versus men in the pre-PPL sample (4.9 yrs. vs.  
416 8.0 yrs., respectively;  $p<0.01$ ). Lastly, the percentage of women who held a management  
417 position in the post-PPL period was higher than the pre-PPL period sample (14% vs. 7%,  
418 respectively;  $p=0.06$ ).

419  
420 Table 2 shows the duration of paid, unpaid, and total leave in the days before and after a child's  
421 date of birth for the pre- and post-PPL periods, stratified by gender. The duration of leave before  
422 the child's date of birth was less than one week for all groups and did not change significantly  
423 over time. For the leave after the child's date of birth among women, we observed statistically  
424 significant increases in paid leave pre-PPL vs. post-PPL (from 34.0 to 59.8 days,  $p<0.01$ ) and  
425 decreases in unpaid leave (from 26.5 to 14.3 days,  $p<0.01$ ), with an overall increase of 14 days  
426 of leave in the post-PPL period. For the leave after the child's date of birth among men, the  
427 changes were much smaller. Men increased their paid leave (from 31.3 to 38.4 days,  $p<0.05$ )  
428 and decreased their unpaid leave (from 3.2 to 0.2 days,  $p<0.05$ ), with the overall leave duration  
429 staying relatively stable.

430  
431 The results from the sequence analysis are represented in four graphs (Figure 1). These graphs  
432 build on Table 2 to show the sequence of different types of paid and unpaid leave in the 30 days

433 prior to and 180 days after a child's birthdate. Panel A shows the leave patterns for women  
434 before and after the PPL went into effect; panel B shows these patterns for men. The x-axis  
435 contains the days before and after the child's date of birth (vertical dotted red line that divides  
436 the sequence), and the y-axis represents the percentage of employees who reported leave on  
437 the specific day. The grey bars, representing the combination of all leave types, indicate that  
438 overall leave patterns did not change dramatically from the pre- to post-PPL time period for  
439 either men or women. However, the composition of leave did change noticeably. For women,  
440 the introduction of PPL (blue line) pushed sick leave (green line) to later weeks, and replaced  
441 much of the unpaid leave time (red line). For men, who were almost exclusively taking sick time  
442 in the pre-PPL period, PPL replaced a large percentage of this sick time rather than shifting it  
443 out to a later period, as it did for women.

444

445 According to Figure 1, only 70% of female employees were on leave the day their child was  
446 born. While we might expect this to be close to 100%, this is likely an artifact of our data. Our  
447 data only include days that a leave was recorded in the human resources records; not all  
448 workers were scheduled to be at work the day their child was born, for example if the birth  
449 occurred on a weekend or other scheduled non-work day.

## 450 *3.2. Cluster analysis*

### 451 *3.2.1. Method*

452 To identify subgroups with similar sequence patterns within the pre-PPL and post-PPL period  
453 for women and men, we used the optimal match distances within the TraMineR package. The  
454 generated distance matrix shows the results of the minimal editing costs for transforming the  
455 sequences into each other. Consequently, we used the Cluster package to aggregate the data  
456 into agglomerative hierarchical clusters using the distance matrix. We used the dendrogram plot  
457 to diagram the hierarchical relationships between all sequences and display all generated

458 clusters. To find the adequate number of clusters for each sub-group we applied the “elbow  
459 method” which computes the intra-cluster variation for each possible total number of clusters  
460 (Ng, 2012). We selected the cluster number from the resulting plot that recommends the  
461 appropriate number of clusters where the intra-cluster variation is minimized. Lastly, we  
462 replicated our descriptive tables stratified by cluster and gender and tested for differences in the  
463 pre- vs. post-PPL periods using ANOVA for means comparisons and chi-squared tests for  
464 comparisons of categorical variables. To visually represent each cluster’s leave-taking  
465 trajectory, we identified a single exemplar from each cluster using TraMineR. The representative  
466 sequence plot displays a non-redundant set of representative sequences extracted from the  
467 main sequence object and sorted according to a representativeness criterion.

### 468 3.2.2. *Results*

469 For women, across both the pre- and post-PPL time periods, we identified three clusters of  
470 leave-takers that varied in the amount of paid, unpaid, and total leave time before and after the  
471 child’s birthdate (Table 3).

472

473 In the pre-PPL period, the three clusters identified were: 1) long leave mostly paid; 2) short  
474 leave mostly paid; 3) and long leave mostly unpaid. The women in pre-PPL clusters differed  
475 primarily on tenure and salary. Women in the “long leave, mostly paid” cluster reported longer  
476 job tenure ( $p<0.05$ ), and were more likely to earn between \$50,000 and \$100,000 ( $p<0.05$ ) and  
477 less likely to earn less than \$50,000 ( $p<0.05$ ) than the other clusters.

478

479 In the post-PPL period, the three resulting clusters for women were: long leave mostly paid;  
480 short leave mostly paid; and long leave, paid and unpaid. There were statistically significant  
481 differences between clusters in age, salary, job tenure, and the likelihood of being a manager.  
482 The “long leave, paid and unpaid” cluster was younger, did not contain any managers, and had

483 shorter job tenure than the other clusters ( $p < 0.05$ ). In contrast, the “long leave, mostly paid”  
484 cluster contained more managers (33%) and longer average job tenure than the other clusters  
485 “long leave, paid and unpaid” and “short leave, mostly paid” (5.9 years, 3.0 years, and 4.4  
486 years, respectively). Finally, both the “long leave, mostly paid” and “long leave, paid and unpaid”  
487 clusters included a higher percentage of women who earned more than \$100,000 (7% and 8%,  
488 respectively) than the cluster “short leave, mostly paid” (0%). Differences by race/ethnicity did  
489 not reach statistical significance.

490

491 For men, across the pre- and post-PPL time periods, we identified two clusters of leave-takers  
492 that differed in the amount of paid, unpaid, and total leave after a child’s birthdate: long leave  
493 and short leave (Table 4). There were no statistically significant differences in demographic or  
494 job characteristics between clusters in either the pre- or post-PPL periods.

495

496 Figure 2 shows the proportion of each group (women and men, pre- and post-PPL) that falls into  
497 each cluster, along with an exemplar trajectory for each cluster. These visual representations  
498 illustrate how leave trajectories vary according to type, duration, and timing of leave.

499

### 500 *3.3. Regression analysis: characteristics of cluster members*

#### 501 *3.3.1. Method*

502 Lastly, we examined the association between demographic and job characteristics and the  
503 likelihood of membership in each cluster, using the “long leave, mostly paid” cluster as the  
504 female referent and the “long leave” cluster as the male referent.

505

506 Multinomial logistic regression analyses were conducted using the package ‘glm’ binomial family  
507 from R 3.6.1. We first added demographic characteristics (race/ethnicity, age, and salary) and

508 then job characteristics (full- vs. part-time work, job tenure, and managerial status) to the  
509 regression separately. Because of small sample sizes in some clusters, we combined Asian,  
510 Native American, Native Hawaiian, and those reporting two or more races into a “Combined  
511 groups not otherwise listed” category. We then incorporated both demographic and job  
512 characteristics in the regression. Results were exponentiated to odds ratios for ease of  
513 interpretation of the coefficients. We also tested and confirmed that all models met the  
514 multinomial logistic regression assumptions of independence of observations and absence of  
515 multicollinearity of independent variables.

516

### 517 3.3.2. *Results*

518 Table 5 shows results from the logistic regression models for women, stratified by pre- and post-  
519 PPL (panels A and B, respectively). In the pre-PPL period, after adjusting for demographic and  
520 job characteristics, there was a significant difference in the odds of reporting “short leave,  
521 mostly paid” (relative to “long leave, mostly paid”) for Hispanic/Latina women compared to white  
522 women (OR = 0.22; 95% CI: 0.05 - 0.81;  $p < 0.05$ ). Hispanic/Latina women were also three times  
523 more likely to report “long leave, mostly unpaid” (relative to “long leave, mostly paid”) compared  
524 to white women (OR = 3.25; 95% CI: 1.0 – 11.5;  $p < 0.10$ ).

525

526 In the post-PPL period, results show that an additional year of age among women is associated  
527 with an increase in the odds of reporting a “short leave-mostly paid” after adjusting for  
528 race/ethnicity, salary, and job characteristics (OR = 1.20; 95% CI: 1.06–1.37;  $p < 0.01$ ).  
529 Race/ethnicity was not significantly associated with leave type in the post-PPL period.

530

531 Among men in the pre- and post-PPL periods, demographic and job characteristics did not differ  
532 significantly between clusters (Appendix Table A2).

533

534 **4. Discussion**

535 Using a novel data source of administrative time-keeping records from an organization that  
536 recently enacted a paid parental leave policy, our study paints a detailed picture of the patterns  
537 of leave-taking for women and men in the period around the birth of a child. Moreover, we  
538 examined how these patterns differ by demographic and employment characteristics, and how  
539 they were affected by the introduction of a paid parental leave policy. Given the trend towards  
540 expanded paid leave policies at the state and local level across the U.S., our findings are  
541 important for understanding how these policies interact with existing leave-related benefits at  
542 the organizational level. This is critical for predicting heterogeneous effects of paid leave  
543 policies and preventing unintended consequences such as leaving new parents returning to  
544 work without any sick leave. Moreover, having a deeper understanding of leave patterns can  
545 help employers support employees based on their preferences of leave.

546

547 Overall, new parent employees used a variety of strategies to take leave, but clear patterns  
548 emerged, partly due to organizational policies regarding the order in which each leave type has  
549 to be taken. For example, once the PPL policy took effect, employees were required to use this  
550 leave before using their sick leave. This explains our observation that PPL was used almost  
551 exclusively in the first six weeks for women, and mostly in the first six weeks for men (some  
552 men used this leave intermittently over a longer time period). Similarly, employees were  
553 required to exhaust all available paid leave before using unpaid leave, explaining the rightward  
554 skew of unpaid leave among women. Consistent with the policy being focused on caregiving  
555 rather than medical leave, we did not observe any change in the amount or type of leave taken  
556 before a child's birth. Future research should be conducted under other organizational policy  
557 constraints to see how these patterns change.

558

559 Using sequence analysis allowed us to identify clusters, or leave-taking patterns that were  
560 similar to one another. This critical step allowed us to examine the different ways employees  
561 within the same organization and subject to the same benefits structure their leave, and how  
562 this changed in response to the policy. The differential leave-taking patterns likely reflect  
563 multilevel factors—some of which we were able to examine and others we were not. Our results  
564 suggest that the availability of paid leave was critically important. We found support for  
565 Hypothesis 1 - leave increased overall after PPL was introduced. We found partial support for  
566 Hypothesis 2 - job tenure predicted longer leave-taking, since accrued benefits like sick leave  
567 and vacation were frequently the foundation of leave taken. However, income was not  
568 significantly associated with leave duration. We found partial support for Hypothesis 3, that  
569 race/ethnicity, age, and managerial status would impact leave duration. Older workers were  
570 more likely to take longer, mostly paid leave than short, mostly paid leave compared to younger  
571 workers, and Hispanic workers were more likely to take longer, unpaid leave and less likely to  
572 take shorter, paid leave relative to their white counterparts. However, we did not observe  
573 significant differences in leave duration across other non-Hispanic racial groups, nor by  
574 managerial status. This could be due to small sample sizes for some subgroups (e.g., African-  
575 Americans). This could also indicate that race/ethnicity, age, and managerial status are not  
576 good proxies for fear of workplace penalties. Unfortunately, administrative data did not allow  
577 examination of preferences and need for leave (e.g., recovery from birth, health of birth parent  
578 and new baby, availability of acceptable and affordable childcare) or perceived risk of workplace  
579 penalties for taking leave. However, focus groups conducted with the same employee  
580 population confirm that these are important considerations (Richardson et al., 2019). We do not  
581 know, for example, whether employees who took relatively short leaves did so because that  
582 reflected their ideal leave duration, or because they felt they could not take longer take leave  
583 (due to financial barriers or perceived workplace penalties). Future work should more formally



584 examine power dynamics within the workplace, as well as individual employee preferences for  
585 leave, to better understand leave-taking and response to paid leave policy.

586

587 Consistent with Hypothesis 4, women across the board took longer and more concentrated  
588 leave than men. Somewhat surprising, however, was the differential response to the PPL policy:  
589 the additional paid leave benefits replaced some of the unpaid leave women were taking, but  
590 also lengthened their total leave duration; for men, who were already only taking paid leave, the  
591 additional benefits took the place of sick leave but did not affect total leave duration. This is  
592 somewhat inconsistent with research showing that father quotas in national paid family leave  
593 policies (i.e., periods of leave that are non-transferable between parents) when combined with  
594 high wage replacement increase leave uptake among fathers (Karu & Tremblay, 2018). Given  
595 that Multnomah County's PPL policy provided fully paid, non-transferable benefits, one might  
596 expect to see a greater impact on leave duration. Although men's pay and leave duration were  
597 unchanged, the policy did allow them to retain their sick leave for use later on, which may have  
598 had benefits beyond the window of our study (i.e., to care for their new baby in the second half  
599 of the first year).

600

601 Our findings should be interpreted within the context of U.S. leave policies. Unlike most  
602 other high-income countries, the U.S. does not mandate paid leave for new parents (OECD,  
603 2021). Instead, most workers rely on their employers to provide these benefits voluntarily.  
604 Oregon, where our study takes place, has recently become one of a small set of U.S. states  
605 to have passed a paid family leave law, though our study was conducted before the law was  
606 passed. When the state's policy goes into effect in 2023, it will provide a new leave type for  
607 workers to draw on. Future research should examine how leave-taking patterns will  
608 continue to change with the addition of state-level paid leave benefits. In other states with

609 paid family and medical leave policies, lack of awareness and limited uptake have  
610 potentially limited the policies' impacts. This is quite different from the high awareness and  
611 uptake that we observed with this organizational policy (Goodman et al., 2019). This could  
612 be due to stronger pathways for communicating information about organizational policy  
613 change to employees through email, flyers, and knowledgeable human resources  
614 personnel. Furthermore, organizational policies may be perceived more positively than state  
615 policies, and may result in more uptake, because they provide a signal to workers that the  
616 organization is accepting and encouraging of leave (Begall et al., 2022; Connelly et al.,  
617 2011; Kurtessis et al., 2017; Petts et al., 2022).

618

619 Our study focuses on the factors that contribute to parental leave-taking, but does not extend to  
620 the important implications of this leave-taking for workers. A recent paper by Petts et al. (2022)  
621 introduces the concept of a "commitment penalty" and finds that workers who take longer  
622 parental leaves are perceived as less committed to their jobs. In their study, this penalty applied  
623 equally to mothers and fathers, though mothers were perceived as less committed to their jobs  
624 regardless of parental leave duration. Importantly in the context of our findings, they find that  
625 supportive organizational policies increase perceptions of employee commitment, though do not  
626 uncover evidence that this moderates the negative impact of taking longer parental leave. More  
627 research is needed to better understand the policy design features that facilitate leave-taking  
628 while limiting commitment and other penalties in the workplace.

629

630 This novel exploration of leave-taking patterns has limitations. We believe that the two methods  
631 to identify employees with a new child (HR reporting and insurance coverage in the system)  
632 include almost all employees who added a child during the study period; however, these  
633 strategies would not capture parent employees who did not add their new child to their health

634 insurance and who did not take any leave that they identified to human resources as being for a  
635 new child (e.g., a parent who took two weeks of vacation that was not flagged as being FMLA-  
636 protected would not be included in our dataset, unless they added the child to their health  
637 insurance plan). While we expect this exclusion to be small, it would disproportionately exclude  
638 fathers and other non-birth parents. Administrative data do not include information on marital  
639 status, birth order, whether the new child was adopted, or whether the employee was the birth  
640 parent. While our sample includes almost all parent employees who added a child during the  
641 study period, focusing on one organization means our sample size is still relatively small in  
642 certain subgroups. Future research should attempt to replicate these results in larger, more  
643 diverse organizations or using administrative data across organizations. Moreover, the  
644 experiences of parents in diverse family structures – such as adoptive parents, foster parents,  
645 and parents who are members of the LGBTQ+ community – merit additional research attention.

646

647 Because human resources records include only leave-taking, we cannot distinguish among  
648 days when leave was *not* taken (i.e., working days are coded the same as scheduled non-work  
649 days, like weekends). This leads to mean leave duration estimates that only include the number  
650 of days of each type of leave actually taken and, for those who took concentrated leave, do not  
651 represent total number of weeks or months away from work. As the administrative data only  
652 include leave for the correspondent work day, we are not able to discern what workers were  
653 doing on days that they were not scheduled to be at work.

654

## 655 Conclusion

656 We reveal patterns hidden in administrative datasets to illustrate the variable and nuanced ways  
657 in which the introduction of a paid parental leave policy impacts new parent employees' leave-  
658 taking trajectories. As more and more state and municipal governments consider paid leave  
659 policies, understanding the interplay between these policies and existing organizational

660 structures will be critical to maximize the benefits across the workplace and limit unintended  
661 consequences.

662  
663 **Declarations**

664  
665 *Competing Interests:* The authors have no relevant financial or non-financial interests to  
666 disclose.

667  
668 *Author Contributions:* All authors contributed to the study conception, design, and data  
669 collection. Data analysis were performed by JMG and LMD. The first draft of the manuscript was  
670 written by JMG and LMD and all authors commented on previous versions of the manuscript. All  
671 authors read and approved the final manuscript.

672  
673 *Ethics Approval:* This study was performed in line with the principles of the Declaration of  
674 Helsinki. Approval was granted by the [Blinded for Review] Institutional Review Board.  
675

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## 6. Tables & Figures

Table 1: Demographic and job characteristics for women and men who added children pre- vs. post-PPL (N=442)

	Women					Men				
	Pre PPL (n=151)		Post PPL (n=127)		<i>p-value</i> <sup>1</sup>	Pre PPL (n=93)		Post PPL (n=71)		<i>p-value</i> <sup>1</sup>
	Percent/Mean	SD	Percent/Mean	SD		Percent/Mean	SD	Percent/Mean	SD	
<b>Demographic characteristics</b>										
Age (yrs.)	34.6	5.6	33.9	6.1	0.39	36.7	6.3	36.7	6.5	0.99
Race/Ethnicity (%)										
White	73%		65%		0.35	63%		72%		0.69
Asian	6%		6%			10%		7%		
Black/African American	6%		7%			15%		11%		
Hispanic/Latino	12%		19%			6%		7%		
Native American/Alaskan	1%		1%			0%		1%		
Native Hawaiian	1%		1%			1%		0%		
Two or More Races	1%		2%			4%		1%		
<b>Job characteristics</b>										
Annual salary (%)										
Less than \$50,000	52%		43%		0.12	27%		14%		0.10
Between \$50,000 and \$100,000	42%		54%			66%		73%		
Between \$100,000 and \$150,000	7%		4%			8%		13%		
More than \$150,000	0%		0%			0%		0%		
Full time schedule <sup>2</sup> (%)	81%		91%		0.01	98%		86%		0.03
Manager <sup>4</sup> (%)	7%		14%		0.06	14%		13%		0.81
Tenure (yrs.)	5.3	4.3	4.8	3.7	0.32	8.0	6.4	4.9	5.3	0.01

Notes: <sup>1</sup> *P-values from t-tests to compare means between groups on continuous variables and chi-square tests to assess independence among groups of categorical variables*

<sup>2</sup> *Full time schedule represents working status of 40 hours a week.* <sup>4</sup> *The variable manager was constructed based on union representation information and consists of employees who are in charge of a unit or a project and are supervising other employees*

Table 2: Paid, unpaid, and total leave days for women and men who added children pre- vs. post-PPL (N=442)

	Women					Men				
	Pre PPL (n=151)		Post PPL (n=127)		<i>p-value</i> <sup>1</sup>	Pre PPL (n=93)		Post PPL (n=71)		<i>p-value</i> <sup>1</sup>
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
<b>Duration of leave (days)</b>										
Paid leave before birthdate	5.2	4.8	5.2	3.9	0.99	3.0	3.3	2.7	2.0	0.55
Unpaid leave before birthdate	0.4	2.3	0.3	1.9	0.59	0.1	0.5	0.0	0.0	0.15
Total leave before birthdate	5.7	5.3	5.5	4.1	0.83	3.1	3.4	2.7	2.0	0.42
Paid leave after birthdate	34.0	24.0	59.8	22.2	<0.01	31.3	15.9	38.4	17.0	0.01
Unpaid leave after birthdate	26.5	27.5	14.3	21.1	<0.01	3.2	10.0	0.2	1.9	0.02
Total leave after birthdate	60.5	27.6	74.1	25.2	<0.01	34.5	18.0	38.6	17.1	0.15

<sup>1</sup> *P-values from t-tests*

Table 3: Leave duration, demographic and job characteristics by cluster for women, pre- vs. post-PPL (N=278)

WOMEN	Pre PPL							Post PPL						
	Cluster 1 (n=19)		Cluster 2 (n=77)		Cluster 3 (n=55)			Cluster 1 (n=46)		Cluster 2 (n=55)		Cluster 3 (n=26)		
	Long leave, mostly paid		Short leave, mostly paid		Long leave, mostly unpaid			Long leave, mostly paid		Short leave, mostly paid		Long leave, paid and unpaid		
	Percent/Mea n	SD	Percent/Mea n	SD	Percent/Mea n	SD	<i>P</i> - value <sup>1</sup>	Percent/Mea n	SD	Percent/Mea n	SD	Percent/Mea n	SD	<i>P</i> - value <sup>1</sup>
<b>Duration of leave</b>														
Paid leave before birthdate (dys.)	5.6	6.9	3.4	3.6	7.6	4.2	<0.01	3.7	2.7	5.9	4.2	6.6	4.5	<0.01
Unpaid leave before birthdate (dys.)	0.0	0.0	0.2	1.4	0.9	3.3	0.15	0.1	0.5	0.2	0.8	0.9	4.0	0.17
Total leave before birthdate (dys.)	5.6	6.9	3.6	4.0	8.5	5.0	<0.01	3.8	2.8	6.0	4.2	7.5	4.9	<0.01
Paid leave after birthdate (dys.)	58.5	35.4	38.0	21.2	20.0	10.4	<0.01	81.0	17.6	48.4	15.3	46.2	10.8	<0.01
Unpaid leave after birthdate (dys.)	21.1	20.2	6.9	10.2	55.8	19.7	<0.01	3.4	9.7	8.4	12.4	46.1	19.7	<0.01
Total leave after birthdate (dys.)	79.6	36.7	44.9	21.2	75.8	18.0	<0.01	84.4	21.5	56.8	19.7	92.3	18.1	<0.01
<b>Demographic characteristics</b>														
Age (yrs.)	36.5	4.4	34.8	6.2	33.6	5.0	0.15	33.6	4.6	35.5	7.2	31.3	4.7	0.01
Race/ethnicity (%) <sup>2</sup>														
White	74%		79%		64%		0.58	65%		69%		54%		0.43
Black/African American	0.0%		6.5%		5.5%			4.3%		9.1%		7.7%		
Hispanic/Latino	10.5%		6.5%		20.0%			13.0%		16.4%		34.6%		
Combined groups not otherwise listed	11%		8%		11%			17%		5%		4%		
<b>Job characteristics</b>														
Annual salary (%)														
Less than \$50,000	21%		49%		66%		0.01	28%		44%		65%		0.01
Between \$50,000 and \$100,000	74%		46%		26%			65%		56%		27%		
Between \$100,000 and \$150,000	5%		5%		9%			7%		0%		8%		
Full time schedule <sup>3</sup> (%)	79%		75%		89%		0.17	93%		89%		92%		0.98
Manager <sup>3</sup> (%)	5%		8%		7%		0.93	33%		6%		0%		<0.01
Tenure (yrs.)	8.4	5.3	5.2	4.2	4.6	3.9	0.02	5.9	4.0	4.4	3.5	3.0	2.4	0.01

<sup>1</sup> *P*-values from ANOVA to compare means between groups on continuous variables and chi-square tests to assess independence among groups of categorical variables

<sup>2</sup> Race/ethnicity: Combined groups not otherwise listed includes Asian, Native American, Native Hawaiian, and two or more races

<sup>3</sup> Full time schedule represents working status of 40 hours a week. The variable manager was constructed based on union representation information and consists of employees who are in charge of a unit or a project and are supervising other employees

Table 4: Leave duration, demographic and job characteristics by cluster for men, pre- vs. post-PPL (N=164)

MEN	Pre PPL					Post PPL				
	Cluster 1 (n=50)		Cluster 2 (n=43)		<i>p-value</i> <sup>1</sup>	Cluster 1 (n=36)		Cluster 2 (n=35)		<i>p-value</i> <sup>1</sup>
	Long leave		Short leave			Long leave		Short leave		
	Percent/Mean	SD	Percent/Mean	SD		Percent/Mean	SD	Percent/Mean	SD	
<b>Duration of leave</b>										
Paid leave before birthdate (dys.)	3.2	4.0	2.7	2.0	0.41	2.8	2.0	2.7	1.9	0.79
Unpaid leave before birthdate (dys.)	0.1	0.4	0.1	0.6	0.90	0.0	0.0	0.0	0.0	
Total leave before birthdate (dys.)	3.3	4.1	2.8	2.3	0.44	2.8	2.0	2.7	1.9	0.79
Paid leave after birthdate (dys.)	38.4	17.6	23.1	8.1	<0.01	46.9	17.8	29.5	10.6	<0.01
Unpaid leave after birthdate (dys.)	5.6	13.1	0.4	2.3	0.01	0.5	2.7	0.0	0.0	0.29
Total leave after birthdate (dys.)	44.0	18.9	23.5	7.9	<0.01	47.4	17.8	29.5	10.6	<0.01
<b>Demographic characteristics</b>										
Age (yrs.)	36.8	6.0	36.5	6.7	0.81	35.8	4.7	37.6	8.0	0.24
Race/ethnicity <sup>2</sup> (%)										
White	62%		65%		0.75	81%		63%		0.17
Black/African American	18.0%		11.6%			2.8%		20.0%		
Hispanic/Latino	6.0%		7.0%			5.6%		8.6%		
Combined groups not otherwise listed	14%		16%			11%		9%		
<b>Job Characteristics</b>										
Annual salary (%)										
Less than \$50,000	20%		35%		0.18	14%		14%		0.95
Between \$50,000 and \$100,000	74%		56%			72%		75%		
Between \$100,000 and \$150,000	6%		9%			14%		11%		
Full time schedule <sup>3</sup> (%)	98%		97%		0.91	86%		94%		0.30
Manager <sup>3</sup> (%)	10%		19%		0.23	8%		17%		0.27
Tenure (yrs.)	8.5	6.1	7.5	6.7	0.47	4.0	4.20	6.0	6.24	0.19

<sup>1</sup> *P-values from t-tests to compare means between groups on continuous variables and chi-square tests to assess independence among groups of categorical variables*

<sup>2</sup> *Race/ethnicity: Combined groups not otherwise listed includes Asian, Native American, Native Hawaiian, and two or more races*

<sup>3</sup> *Full time schedule represents working status of 40 hours a week. The variable manager was constructed based on union representation information and consists of employees who are in charge of a unit or a project and are supervising other employees*

Table 5: Logistic regression models to compare clusters within the pre- and post-PPL periods (N=442). Panel A shows regression results for women in the pre-PPL period and Panel B shows results for women in the post-PPL period.

Panel A: Pre-PPL period sample of women

	Pre-PPL					
	Cluster 2 vs 1 (short leave-mostly paid vs long leave-mostly paid)			Cluster 3 vs. 1 (long leave-mostly unpaid vs long leave-mostly paid)		
	Model 1 OR (95% CI)	Model 2 OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)	Model 5 OR (95% CI)	Model 6 OR (95% CI)
<b>Demographic</b>						
Race/ethnicity <sup>1</sup> : Black/African American vs White	1.04 (0.26, 4.46)		1.01 (0.18, 6.06)	0.82 (0.16, 3.45)		1.45 (0.24, 8.31)
Hispanic/Latino vs White	0.33 <sup>†</sup> (0.09, 0.97)		0.22* (0.05, 0.81)	2.47 (0.84, 7.55)		3.25 <sup>†</sup> (1.0, 11.5)
Combined groups not otherwise listed vs White	0.63 (0.19, 1.96)		0.88 (0.21, 3.60)	1.35 (0.40, 4.35)		0.80 (0.17, 3.29)
Age (yrs.)	1.00 (0.94, 1.07)		0.91 <sup>†</sup> (0.81, 1.01)	0.98 (0.91, 1.04)		1.05 (0.93, 1.17)
Annual salary (\$): 50k-100k vs >150k	1.37 (0.33, 6.08)		2.78 (0.35, 34.2)	0.36 (0.08, 1.57)		0.25 (0.03, 2.05)
Annual salary (\$): <50k vs >150k	1.18 (0.28, 5.23)		2.38 (0.26, 33.4)	0.93 (0.22, 3.94)		0.55 (0.05, 5.29)
<b>Job characteristics</b>						
Full time <sup>2</sup>		0.28 <sup>†</sup> (0.05, 1.03)	0.31 (0.06, 1.28)		3.27 (0.77, 22.48)	3.82 (0.83, 27.7)
Tenure (yrs.)		0.98 (0.89, 1.07)	1.01 (0.91, 1.1)		0.93 (0.84, 1.02)	0.90 <sup>†</sup> (0.80, 1.00)
Leadership status: Manager		1.63 (0.45, 6.09)	3.25 (0.61, 25.31)		0.82 (0.19, 2.97)	0.52 (0.06, 3.06)
Constant	0.97 (0.06, 14.9)	3.12 (0.79, 15.9)	28.28 (0.26, 35.30)	1.49 (0.08, 31.5)	0.33 (0.05, 1.44)	0.13 (0.01, 13.8)

Panel B: Post-PPL period sample of women

	Post PPL					
	Cluster 2 vs 1 (short leave-mostly paid vs long leave-mostly paid)			Cluster 3 vs. 1 (long leave paid & unpaid vs long leave-mostly paid)		
	Model 7 OR (95% CI)	Model 8 OR (95% CI)	Model 9 OR (95% CI)	Model 10 OR (95% CI)	Model 11 OR (95% CI)	Model 12 OR (95% CI)
<b>Demographic</b>						
Race/ethnicity <sup>1</sup> : Black/African American vs White	1.04 (0.24, 4.7)		0.85 (0.12, 5.31)	1.69 (0.22, 9.09)		2.61 (0.29, 21.2)
Hispanic/Latino vs White	0.71 (0.24, 1.99)		0.68 (0.18, 2.37)	1.79 (0.57, 5.54)		3.87 (0.84, 20.5)
Other vs White	0.5 (0.09, 2.09)		0.36 (0.01, 3.62)	0.39 (0.02, 2.86)		-
Age (yrs.)	1.10** (1.02, 1.19)		1.20** (1.06, 1.37)	0.92 (0.84, 1.01)		0.91 <sup>†</sup> (0.76, 1.01)
Annual salary (\$): 50k-100k vs >150k	-		-	0.11 <sup>†</sup> (0.01, 1.00)		0.08 (0.02, 1.19)
Annual salary (\$): <50k vs >150k	-		-	0.27 (0.03, 2.69)		0.09 <sup>†</sup> (0.01, 1.59)
<b>Job characteristics</b>						

Full time <sup>2</sup>		2.17 (0.26, 44.9)	1.58 (0.11, 41.1)		0.94 (0.09, 20.8)	0.78 (0.04, 21.2)
Tenure (yrs.)		0.99 (0.88, 1.12)	0.89 (0.75, 1.04)		0.81* (0.62, 0.97)	0.78† (0.58, 0.99)
Leadership status: Manager		0.19* (0.03, 0.75)	0.28 (0.03, 1.52)		-	-
Constant	0.001 (0.01, 0.01)	0.34 (0.02, 2.82)	0.00 (0.00, 0.01)	13.3 (0.29, 29.04)	0.73 (0.03, 7.58)	55.2 (0.22, 341.30)

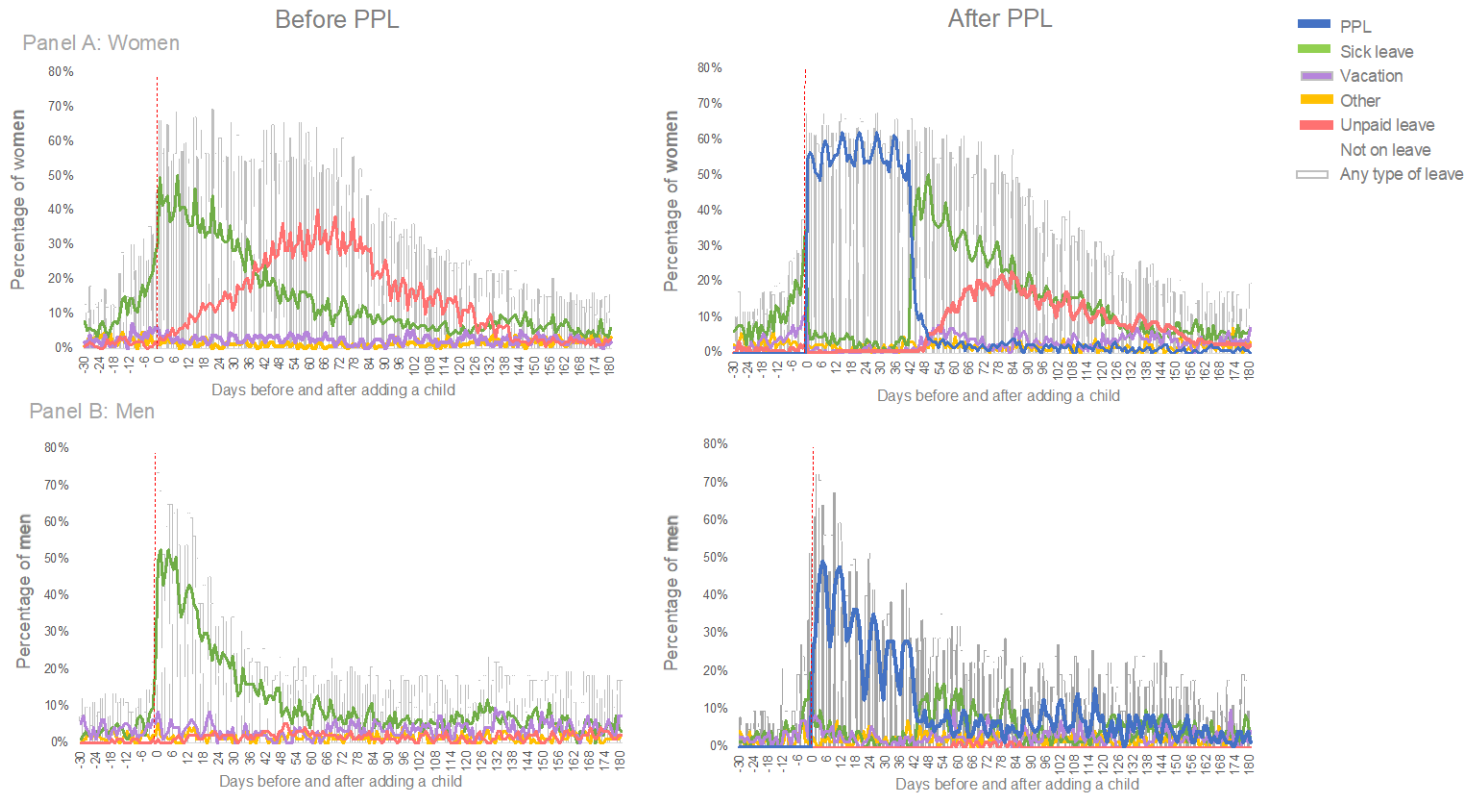
†p<0.10; \*p<0.05; \*\*p<0.01; \*\*\*p<0.001

<sup>1</sup> Race/ethnicity: Combined groups not otherwise listed category is comprised of Asian, Native American, Native Hawaiian, and two or more races

<sup>2</sup> Full time schedule represents working status of 40 hours a week. The variable manager was constructed based on union representation information and consists of employees who are in charge of a unit or a project and are supervising other employees

**Fig 1.**

*Sequence analysis for women (panel a) and men (panel b), before and after the introduction of a paid parental leave policy.*



\* The category 'Other' includes leave reported after the child was added such as holidays, worker compensation, administrative furlough, personal holiday, paid and unpaid union time. Unpaid leave refers to the unpaid, job-protected leave using FMLA/OFLA

*Note.* Figures depict types of paid and unpaid leave in the 30 days prior to and 180 days after a child's date of birth. Panel a shows the leave patterns for women before and after the paid parental leave (PPL) policy went into effect; panel B shows these patterns for men. The x-axis contains the days before and after the child's date of birth (vertical dotted red line that divides the sequence) and the y-axis represents the percentage of employees who reported leave on the specific day. The grey bars represent the combination of all leave types.



**Fig 2.**

Cluster distribution by group (women and men, pre- and post-PPL), with an exemplar trajectory for each cluster.



Note. PPL=paid parental leave