

BRIEF REPORT

When the last child moves out: Continuity and convergence in spouses' housework time

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Abstract

Objective: To examine how mothers' and fathers' time allocation for routine housework changes when the last child moves out of the family household.

Background: During the transition to the empty nest, parental households are reduced to the situation before parenthood. Mothers and fathers are released from their direct parenting roles and parental time binds. This gradual transition creates a context in which housework time allocation is likely to be rearranged.

Methods: Changes in mothers' and fathers' absolute and relative routine housework hours were estimated with longitudinal fixed effects regression models, using data from the German Socio-Economic Panel Study (1991–2020) on 890 households experiencing the transition to the empty nest.

Results: Mothers' reduced their time for routine housework by 9 minutes on regular weekdays at the transition to the empty nest, whereas fathers' routine housework hours were largely unaffected when the last child moved out of the parental household. Mothers' routine housework share was slightly below 80% in the years around this event. Separate analyses for mothers with different education revealed only minor variations in the gendered trajectories of housework time. In sum, mothers continued to do the majority of housework in this phase of the life course despite some slight convergence.

Conclusion: The transition to the empty nest contributes slightly to the life-course convergence of housework time and, thus, similar to all major life-course transitions following the birth of children, tends to reduce housework inequality in couples.

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KEYWORDS

couples, family dynamics, gender roles, inequalities, lifespan development, work-family issues

INTRODUCTION

Studying time allocation in the context and course of parenthood has been one of the most fruitful applications to assess gendered behavior in modern societies. Ample research flagged the traditional division of housework—which is largely triggered and continuously reproduced by parenthood (Baxter et al., 2008; Bianchi et al., 2000)—as a remarkable societal invariant, even despite an overall and substantial gender convergence in unpaid work times over recent decades (Leopold et al., 2018; Pailhé et al., 2021; Sullivan et al., 2018). In an ever-growing longitudinal literature on the relevance of life-course transitions for mothers' and fathers' housework time allocation, the “contracting phase” of the family cycle—that is, when the children move out of the parental household—has been notably absent.

Just like any other life-course transition, such as marriage, parenthood, unemployment, or retirement (Baxter et al., 2008; Leopold & Skopek, 2015; Voßemer & Heyne, 2019), changes activity and interaction patterns in families, these arrangements have to be adjusted when children leave the parental home (Hogg et al., 2004; Mitchell, 2019; Rexroat & Shehan, 1987; Sussman, 1955). Already before the (expected) event, the contexts of everyday life for mothers and fathers gradually shift in terms of structure, roles, and symbolic resources. When the last child eventually moves out of the parental household, the family household is transformed back to the situation before parenthood, leaving “the original pair who created it” (Sussman, 1955, p. 338). On the one hand, this process (gradually) releases parents, and particularly mothers, from their direct parenting roles and parental time binds. On the other hand, this process (gradually) creates the opportunity, but concurrently the need, to re-arrange activity patterns for oneself and within the couple (Bouchard, 2014; Mitchell, 2019; Sussman, 1955), which certainly includes a possible re-negotiation of couples' time for and division of housework (Hogg et al., 2004). This latter kind of questions about the continuity or convergence of gendered unpaid work times over the life course, and therefore issues of gender equity and couples' division of labor, are relevant for contemporary societies, in which mothers and fathers face a prolonged period of time living together in a shared couple household without their children (Bouchard, 2014; Mitchell, 2019; Sussman, 1955).

The existing empirical literature almost exclusively dealt with health and well-being issues, or the risk of separation and divorce around the transition to the empty nest (Bouchard, 2014; Lin et al., 2018). These studies commonly focused on the normative changes in parental roles and daily routines, from which fathers and especially mothers “have derived their sense of accomplishment” before the transition to the empty nest. However, (quantitative) descriptions of the changes in parents' “day-to-day physical and emotional burden of household responsibilities” (Mitchell, 2019, p. 2) are rare at present.

Concerning time allocation, Rexroat and Shehan (1987) and Anxo et al. (2011) provided the only quantitative accounts of change in housework time over different stages of the family cycle, including women's and men's behavior in the empty nest. Using cross-sectional data, both studies found that mothers in several Western countries spent considerably less time for housework after the youngest child had left the parental household compared to the previous years of childrearing. Further, both studies consistently concluded that fathers' time for housework seemed largely unaffected by family transitions. However, it remained unclear if the reported group differences indicated life-cycle effects related to the empty nest transition or if they resulted from other (unobserved) factors such as cohort change. This is because cross-sectional studies suffer from their inability to capture unobserved heterogeneity (Brüderl & Ludwig, 2015), in this case between parents with children living in their household and parents whose children have moved out.

We addressed this situation of inconclusive knowledge, and provide the first longitudinal study examining if and how spouses adjust their time use for routine housework when their last child leaves the parental home. Based on large-scale panel data from the German Socio-Economic Panel Study (Goebel et al., 2019), we assessed the effect of the transition to the empty nest on mothers' and fathers' routine housework hours in a short and longer-term view around the event, applying fixed-effects regression models on 890 households experiencing this transition, and 1366 households of a control sample. We accounted for time-constant and time-varying confounding to estimate the total causal effect of the actual transition and several years pre- and succeeding the event, that is, the total amount of change in routine housework time that might be triggered by the entry into the empty nest phase. We further explored possible effect heterogeneity of the empty nest transition by education, fueling the debate about the process of gender convergence or continuity in housework time. Assessing educational differences accounts for the common observation that education is arguably one of the major predictors of demographic processes, human capital, and gender role attitudes and practices (Esping-Andersen & Billari, 2015). Studying Germany in particular fits well with the existing literature on housework behavior in the empty nest, because it was not covered in previous studies (Anxo et al., 2011; Rexroat & Shehan, 1987), adding evidence for a society with an at least moderate separate spheres family model as well as prevailing traditional gender ideologies and gendered behavior in the family.

BACKGROUND

Gendered time allocation for housework in couples has long been recognized as a dynamic process that develops between changing resource relations, changing gender roles, and changing demands for paid and unpaid labor (Artis & Pavalko, 2003; Lam et al., 2012). Recent longitudinal research highlighted a slow and steady life-course and cohort convergence of women's and men's unpaid work times over decades, which was largely driven by major reductions of women's housework time combined with at most slightly increased time budgets of men (Leopold et al., 2018; Skopek & Leopold, 2019). Further, women continue to do much more housework than men do, and are generally held responsible for this kind of labor. This well-documented concurrence of convergence and continuity is characteristic for contemporary Western societies in general, and Germany—the context of our study—in particular (Leopold et al., 2018; Pailhé et al., 2021; Sullivan et al., 2018).

Previous life-course research has further highlighted that the gender gap in housework has been largest in early midlife (Leopold et al., 2018), particularly triggered by the transition to parenthood and its path-dependent impact on gender inequality (Baxter et al., 2008). Over the life course, this gap is slightly reduced, as later stages of the life course open a window for renegotiating gendered roles and quotidian practices (Artis & Pavalko, 2003; Lam et al., 2012; Leopold et al., 2018; Leopold & Skopek, 2015). Overall, research has suggested that women's time allocation seems to be more responsive to family transitions than men's (Anxo et al., 2011; Rexroat & Shehan, 1987), whereas men rather respond to employment changes, such as retirement (Leopold & Skopek, 2015), and then rather respond in a more fluctuating, less long-lasting way.

From a life-course perspective, the transition to the empty nest is arguably the major family transition for mothers and fathers in mid-adulthood besides transitions of family dissolution. Usually, this transition is approaching gradually, as the children grow older and as parents are starting to anticipate their children's departure. When the last child eventually leaves home, the household structure changes fundamentally, and the family household is reduced to its initial couple. Commonly, this reduction in size has been associated with a reduction in demand for necessary routine housework for parents (Artis & Pavalko, 2003; Rexroat & Shehan, 1987).

The declining demand typically does not occur abruptly, but rather gradually while advancing toward the actual event. This is, because children tend to increase their contributions to housework with age (Dotti Sani, 2016) and presumably in anticipation of the forthcoming event of home leaving. However, the amount of this reduction for parents might be smaller than initially expected, because the majority of children does not move far away from their parents (Leopold et al., 2012), and because parents may still do some washing or cooking for their nearby children. Still, it is plausible to assume that the demand for housework is smaller compared to a situation in which the children still live in the parental home. The time relief associated with the transition to the empty nest might be further diminished by the fact that children no longer contribute to housework. It has been shown, however, that even despite children increasing their housework hours with age, they still only take a small share of total housework and usually do housework rather for themselves than for others in the family (Craig & Powell, 2018; Schulz, 2021). Thus, we first expect that total housework hours, as reported by mothers and fathers together, will be declining when the last child has moved out of the parental household. Second, we expect that housework hours start declining well before the eventual event, presumably in anticipation of less demand, or children's increasing contributions to housework with age, even if this increase might be negligible compared to the overall workload of parents.

The two main theoretical perspectives of empty-nest research, which were usually applied to well-being (Bouchard, 2014), do also supply contrary expectations about the gendered development of time use for routine housework. First, the *role loss* perspective argues that parental roles are essential for mothers' and fathers' identity formation and well-being. Not least from a traditional point of view, mothers in particular, and in sharp contrast to fathers, draw a massive sense of accomplishment from caring for the household, the family, and the children (Bielby & Bielby, 1989; Hogg et al., 2004). Losing this role when children move out, therefore, leaves a gap that eventually triggers processes of adjustment to this new situation, or compensation to fill this hole with new and gendered symbolic meaning (Hogg et al., 2004).

In this sense, the gender perspective emphasizes the importance of symbolic exchange for the division of labor in the household. Women and men "do gender" by allocating time to gender-stereotyped activities—that is, women doing unpaid work, and men doing paid work and avoiding unpaid work—largely independent from relative productivities, resources, or time binds on the labor market (Bielby & Bielby, 1989; West & Zimmerman, 1987). With the departure of the last child, the active parenting role loses much of its importance. According to the doing gender approach this should mainly affect women and we expect that they should be quite hesitant to reduce their housework contributions, even despite a lower demand, because this would further violate traditional gender role expectations. In turn, we expect men to be much less affected and to reproduce their traditional gender identity by either maintaining their modest level of contributions or by seizing the opportunity to further reduce their contributions to routine housework. These predictions resemble the continuity argument in housework research, which posits that women and men maintain a considerable gender gap in housework over the life course because of still prevailing traditional gender settings (Bianchi et al., 2000).

Second, the *role strain (relief)* perspective argues that parental roles not only generate benefits for mothers and fathers, but concurrently expose spouses to stressors in everyday interaction and the organization of daily living (Bouchard, 2014). In this sense, parents—and, again, mothers in particular—are relieved from the demands and the time binds of direct parenting and family caring when their children leave home. Thus, the empty nest is rather framed as an opportunity to reduce role strain and to engage in fewer roles, but also evokes the need to renegotiating gendered arrangements in the household (Hogg et al., 2004). *Ceteris paribus* and in contrast to the role loss perspective, the empty nest should increase mothers' scope of action to a larger extent than fathers', because of mothers traditionally higher attachment and commitment to family roles. Under these circumstances, we expect mothers to reduce their time for routine housework to a greater extent than fathers. These predictions are basically in line with

the convergence argument in housework research, which usually draws on relative resources or time availability to explain housework patterns through bargaining or specialization (Bianchi et al., 2000). In this respect, fewer demands, roles, or time binds should rather strengthen the positions of mothers and reduce fathers' leading edge in resources, which should result in a smaller gender gap in housework.

Beyond these two basic mechanisms, recent longitudinal research has mapped women's education as one important moderator of life-course change in routine housework time (Bianchi et al., 2000; Skopek & Leopold, 2019; Sullivan et al., 2018). Education deserves special attention not least because of its double meaning in the theoretical discussion: From an economic perspective, higher education increases labor market productivity and gains from paid work, which implies less attachment to housework. From a normative perspective, higher education correlates with a more liberal approach to gender role attitudes and a more egalitarian division of housework in couples. Both perspectives suggest marked level differences between higher and lower educated mothers over the life course, that is, lower educated mothers spend more time on housework and share routine chores less equally with their partners than higher educated mothers. Consequently, we expect lower educated mothers to have a greater scope of action regarding a possible reduction of housework time than higher educated mothers, because the latter start on a higher level. Then again, we expect higher educated mothers to be more inclined to further reduce their contributions to housework than lower educated mothers, because of their stronger disapproval of traditional gendered housework patterns. In this case, we expect higher educated mothers to react more strongly to the transition to the empty nest than lower educated mothers. In our analysis, we explored which of these competing expectations better fitted the behavior observed among German couples.

METHODS

Data and sample

For the present report, we used data from the German Socio-Economic Panel Study (SOEP, version 37, <https://www.doi.org/10.5684/soep.core.v37eu>; Goebel et al., 2019). The SOEP data were ideally suited to study changes in time allocation around the transition to the empty nest, because yearly data on the household composition and housework time of partners living in a joint household was available for the period between 1991 and 2020.

Our baseline sample comprised 9621 heterosexual German couples, observed in at least two panel waves, and at least once with a child living in their household. Given the small number of couples' transitions into the empty nest stage among migrants, we restricted the analyses to respondents without migration background. We constructed the analysis sample to represent a clearly defined group of couple households, who were at risk of experiencing the transition to the empty nest. For that reason, we excluded complex households (e.g., with grandparents or other adult persons). Instead, our sampling focused exclusively on couple households, who either lived together with children, or on their own after the last child had left the parental household ($n = 9500$). We identified both couple and parent-child relationships through a variable indicating each household member's relationship to the household head (i.e., the partner who responded to the household-questionnaire). The male partner was the household head in 70% of the couples our sample. 96% of the children in the household were the biological or adoptive child of the household head.

Because parents' division of household labor has been studied in detail elsewhere, we focused on parents with children of at least 16 years of age ($n = 4103$). In addition, we dropped couples with gap years, that is, temporary nonresponse, during the transition into the empty nest stage ($n = 3951$), because gap years did not allow an exact identification of the transition

to the empty nest. To deal with left-censoring and to ensure an exclusive focus on first-time empty-nest transitions, we further restricted the analysis sample to couple households who were observed living together with a child aged 16 ($n = 2256$). Without this restriction, the sample would also include re-exits of adult children who already left the parental home for the first time before the couple households entered the survey.

Our final sample comprised two groups. First, our event sample included 890 couples whose last child moved out of their household and did not return during the observation period. We followed couples for up to 3 years after the event of the empty nest to additionally cover the immediate period after the transition. On average, we observed couples in the event sample for around 10 years, yielding 9057 observations in the analysis sample. Second, our control sample included 1366 couples with 7201 observations, who were at risk of experiencing the transition to the empty nest, but were right-censored before the (possible) event occurred. We included these cases into the fixed effects panel regression models to account for potential age effects when estimating the effect of the empty nest transition on time spent on housework (Brüderl & Ludwig, 2015).

Measures

Outcomes—spouses' routine housework time

We used “stylized measures” of time use as our outcome variables, which are routinely collected in large panel surveys to provide longitudinal information on time use. In the SOEP, time use for housework was measured with the annual survey question: “What is a typical weekday like for you? How many hours per normal workday do you spend on the following activities?” One response category was “routine housework” (washing, cooking, and cleaning), and the respondents were asked to reply in full hours. This variable was available for mothers and fathers in each survey year between 1991 and 2020. We did not include other housework tasks, such as errands or repairs, in the analysis, because previous estimations basically revealed no change for these activities around the transition to the empty nest (Schulz & Raab, 2021). Neither did we include childcare as an outcome, because of its different meaning compared to routine chores: whereas routine housework is often regarded as “onerous,” at least specific childcare activities are related to joy (Sullivan, 2013). In addition to mother's and father's routine housework hours, we assessed total hours and the relative contribution of mothers' routine housework hours to the couple's total hours as two further outcome variables.

Compared to diary-based estimates of housework time, the stylized measures used in this study may lead to inflated assessments of time use (Kan, 2008). Stylized measures, however, have been shown to adequately reflect relative gender gaps and individual change in time use (Kan & Pudney, 2008). Kan and Pudney (2008) demonstrated that using a stylized instead of a diary-based time-use variable as an outcome measure in regression models leads to negligible and nonsystematic coefficient biases. Furthermore, Gough & Killewald (2011, p. 1090) noted that fixed effects longitudinal models “absorb” classical measurement error and couples' reporting bias in housework time, creating confidence that the within estimates capture actual changes.

Transition to the empty nest

We identified the transition process by utilizing annual information on the household composition, that is, household members' relation to the head of the household. Once the last child moved out, the parental household consisted of only two adults, and the child was no longer

flagged as a household member. The transition process was captured with eight dummy variables: (1) 4 or more years before (including the complete control sample, that is, those households without an event), (2) 3 years before, (3) 2 years before, (4) 1 year before the transition (i.e., last observation before the transition), (5) year of transition (i.e., first observation after the transition), (6) 1 year after, (7) 2 years after, and (8) 3 years after the transition. Beyond the focus on the actual transition, this allowed us to assess how housework time developed before or after the event.

Age

We regressed the changes in absolute or relative housework hours net of age effects by considering respondents' age in years as a time-varying control variable. Respondents' age also captures the age of children, which was perfectly collinear when measured on a yearly basis. If age was not controlled, the total causal effect might pick up the age effect and, thus, would be distorted.

Child's routine housework time

We included this indicator to assess possible anticipation effects of the transition to the empty nest on spouses' housework time. Identically to mothers' and fathers' time use, it was measured in hours per typical weekday contributed by the youngest (control sample) or last child (event sample) in the household.

Education

We captured the moderating role of education on spouses' time allocation with a binary variable indicating if the mother completed tertiary education compared to lower than tertiary education. Several other variables of education (father's tertiary education; relative education and educational homogamy; highest educational attainment in the household) were tested, but did not change the conclusions concerning the relevance of education.

After constructing the final event and control samples, the small set of variables used in the analyses contained only few missing values in the event sample (Table 1). Therefore, we estimated all models with listwise deletion of incomplete observations.

Analytical strategy

We used fixed effects panel regression models (Brüderl & Ludwig, 2015) to examine, first, how the empty nest transition affects (a) total routine housework time, (b) mother's routine housework time, (c) father's routine housework time, and (d) mother's within-couple share of routine housework time (Models 1–4 in Table 2 and Figure 1). Second, we estimated these models separately for households with mothers with or without a tertiary degree (Models 5–12 in Table 2 and Figure 2). Replication code for this article is available from <https://doi.org/10.17605/osf.io/as75r>.

All models focused exclusively on within-person or within-couple change over time, relating temporal variation in the outcome measures only to temporal variation in the independent variables. Because only characteristics varying over time entered the fixed effects model, all time-constant variables were eliminated from the equation and time-constant heterogeneity (observed and unobserved) was rendered inconsequential (Brüderl & Ludwig, 2015). Whereas

TABLE 1 Descriptives of the control and the event sample

	Control sample					Event sample				
	M	SD	Min	Max	N	M	SD	Min	Max	N
Age										
Mother	46.24	5.30	23	68	1366	45.11	5.34	27	66	890
Father	49.02	6.19	26	80	1366	47.81	6.35	31	72	890
Age at transition										
Mother						52.15	6.40	30	73	890
Father						54.84	7.32	35	85	890
Mother's education (in %)										
No Tertiary	80.16				1095	73.82				657
Tertiary	19.77				270	25.96				231
Missing values	0.07				1	0.22				2
Routine housework										
Couple's total hours	3.36	1.68	0	14	1366	3.27	1.68	0	11	888
Mother's share ^a	0.80	0.22	0	1	1358	0.80	0.23	0	1	883
Mother's hours	2.68	1.53	0	10	1366	2.60	1.57	0	10	888
Father's hours	0.68	0.86	0	6	1366	0.67	0.85	0	6	890
Child's hours ^b	0.66	0.70	0	3	93	0.67	0.79	0	4	115

Note: For 809 couples of the control sample and 875 couples of the event sample, child's hours were observed at least two times. If not stated otherwise, the statistics were calculated for couples' first observation in the panel. German Socio-Economic Panel Study, v37, 1991–2020; own calculations.

^aMother's share of housework hours is missing, if either information on one of the two partner's housework hours is missing or if both report zero hours.

^bNumber of missings at first observations are very high, because children often were not interviewed yet.

fixed effects models account for time-constant confounding by design, we tackled time-varying confounding by including spouses' age and housework hours of the youngest or last child in the household. Both increasing parental age and children's housework hours are antecedents of the empty nest transition and potentially reduce the amount of parental housework time. Thus, we included both variables in our models to reduce the risk of biased estimates of the total causal effect of the empty nest transition on parent's time allocation for routine housework.

RESULTS

Figure 1 shows the development of total (black markers), mothers' (red markers), and fathers' (blue markers) hours for routine housework (left y-axis) and mothers' share of total hours of routine housework in couples (green markers, right y-axis). In the observation window, spouses' total time for routine housework was on average between 3.09 and 3.35 hours per regular week-day. Mothers spent between 2.37 and 2.65 hours on average for routine housework, and fathers' hours amounted between 0.70 and 0.81 hours. This translated into a slightly oscillating mothers' share of routine housework hours between 76% and 80%.

In the years before the transition to the empty nest ($t \leq -4/-1$), spouses' total hours for routine housework were higher than in the year after the event ($t = 0$). Another year later, total housework hours were again lower than in the year before, but then slightly increased in the succeeding years. Yet, only the coefficients for two and more years before the event were statistically significant. This indicates a higher parental housework load prior to the last

TABLE 2 Fixed effects regression models of total, mother's, and father's hours for routine housework, and mother's share of total routine housework time around the transition to the empty nest, for the whole sample and by mother's education

	Whole sample (Figure 1)				Mothers with tertiary education (Figure 2)				Mothers with no tertiary education (Figure 2)			
	Total hours	Mother's hours	Father's hours	Mother's share	Total hours	Mother's hours	Father's hours	Mother's share	Total hours	Mother's hours	Father's hours	Mother's share
Time around the empty nest												
Min./–4 years	0.20** (0.06)	0.27*** (0.05)	–0.07* (0.04)	0.03** (0.01)	0.21* (0.11)	0.18* (0.08)	0.05 (0.07)	0.03 (0.02)	0.19* (0.08)	0.30*** (0.07)	–0.11** (0.04)	0.03** (0.01)
–3 years	0.14* (0.07)	0.20*** (0.06)	–0.06 (0.04)	0.01 (0.01)	0.20+ (0.11)	0.17* (0.09)	0.04 (0.07)	0.00 (0.02)	0.12 (0.08)	0.21** (0.07)	–0.09* (0.04)	0.02 (0.01)
–2 years	0.18** (0.07)	0.21*** (0.06)	–0.03 (0.04)	0.01 (0.01)	0.20+ (0.11)	0.20* (0.08)	0.00 (0.07)	0.02 (0.02)	0.17* (0.08)	0.21** (0.07)	–0.04 (0.04)	0.01 (0.01)
–1 year	0.11+ (0.06)	0.15** (0.06)	–0.04 (0.04)	0.01 (0.01)	0.12 (0.11)	0.05 (0.08)	0.08 (0.07)	0.00 (0.02)	0.10 (0.08)	0.18** (0.07)	–0.08+ (0.04)	0.01 (0.01)
Transition	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
+1 year	–0.06 (0.06)	–0.02 (0.05)	–0.05 (0.03)	0.01 (0.01)	–0.08 (0.10)	0.04 (0.08)	–0.13+ (0.06)	0.04* (0.02)	–0.06 (0.07)	–0.04 (0.06)	–0.02 (0.04)	–0.01 (0.01)
+2 years	0.03 (0.06)	0.06 (0.05)	–0.03 (0.04)	0.01 (0.01)	–0.00 (0.10)	0.12 (0.08)	–0.12+ (0.07)	0.04* (0.02)	0.04 (0.08)	0.04 (0.07)	0.00 (0.04)	–0.01 (0.01)
+3 years	0.10 (0.07)	0.06 (0.06)	0.04 (0.04)	–0.01 (0.01)	0.04 (0.11)	0.13 (0.08)	–0.09 (0.07)	0.03 (0.02)	0.11 (0.08)	0.02 (0.07)	0.09+ (0.04)	–0.02+ (0.01)
Mother's age	–0.01 (0.01)	–0.02*** (0.00)	0.02*** (0.00)	–0.00*** (0.00)	0.02* (0.01)	–0.01+ (0.01)	0.07 (0.01)	–0.01*** (0.00)	–0.02* (0.01)	–0.02*** (0.01)	0.04 (0.01)	–0.00*** (0.00)
Father's age			0.02*** (0.00)				0.04*** (0.01)				0.01* (0.00)	
Child's routine housework time	–0.01 (0.02)	–0.03+ (0.02)	0.02 (0.01)	–0.00 (0.00)	0.03 (0.04)	0.03 (0.03)	–0.00 (0.02)	0.00 (0.01)	–0.02 (0.02)	–0.04* (0.02)	0.02+ (0.01)	–0.00 (0.00)

(Continues)

TABLE 2 (Continued)

	Whole sample (Figure 1)			Mothers with tertiary education (Figure 2)			Mothers with no tertiary education (Figure 2)		
	Total hours	Mother's hours	Father's hours	Mother's share	Total hours	Mother's hours	Father's hours	Mother's share	Total hours
Constant	3.50*** (0.31)	3.49*** (0.26)	-0.05 (0.18)	0.98*** (0.04)	1.32* (0.55)	2.42*** (0.43)	-1.28*** (0.37)	1.11*** (0.10)	4.12*** (0.36)
Number of observations	11,665	11,667	11,675	11,577	2774	2774	2776	2741	8884
Number of households	1925	1925	1924	1924	438	438	437	438	1488

Note: Predicted hours and shares from Models 1–4 are plotted in Figure 1, and from Models 5–12 in Figure 2. Unstandardized B-coefficients, standard errors in parentheses, levels of significance. *** $p < .001$, ** $p < .01$, * $p < .05$, and $-p < .1$ (two-tailed). German Socio-Economic Panel Study, v37, 1991–2020; own calculations.

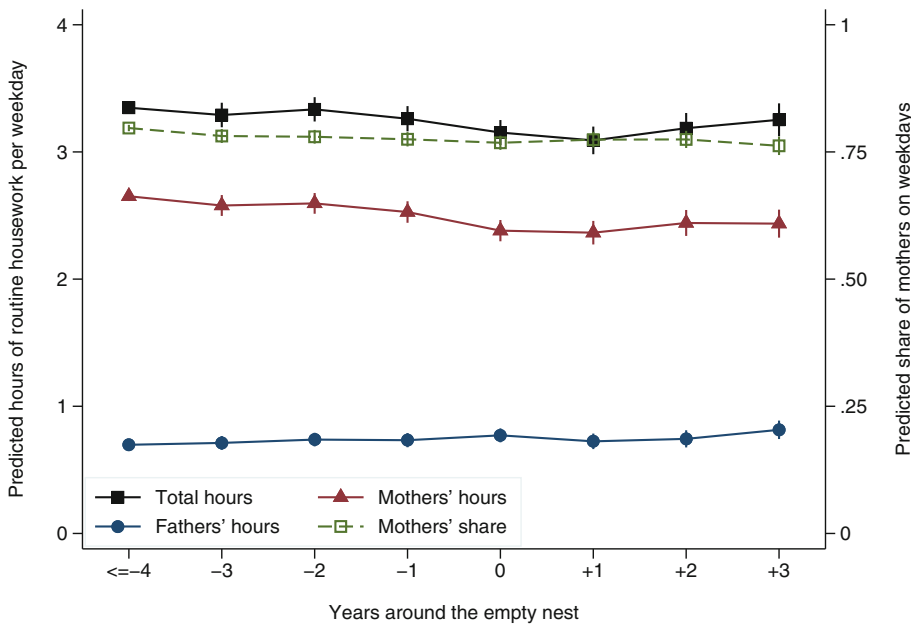


FIGURE 1 Time use of mothers and fathers for routine housework, and mother's relative shares of total routine housework time around the transition to the empty nest. Left y-axis: predicted hours of routine housework weekday (Mondays to Fridays); right y-axis: predicted share of mothers' routine housework time of total housework time in percent. Hours and shares were calculated from the regression Models 1–4 in Table 2 as margins at the means, which were adjusted by setting all covariates to the sample means. German Socio-Economic Panel Study, v37, 1991–2020; own calculations [Color figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com/doi/10.1111/jomf.12873)]

child's departure from the parental home, and speaks in favor of the anticipation argument. Yet, children's time-varying contributions to housework did not seem to influence this pattern largely.

Essentially, the mothers accounted for the observed development in routine housework time in the observation window, as their trajectory ran largely parallel to the development of total housework, and was even more pronounced than the overall household trend. Thus, other than in the model for the total housework hours, there was an additional small but significant decline in mothers' housework time of about 15% of an hour, that is, 9 minutes on average for the year preceding the transition to the empty nest. Fathers' routine housework hours, in contrast, remained rather constant in the years before, at and after the transition to the empty nest. Concerning the change of mothers' share, it tended to be 1–3 percentage points higher before the transition, and thus lower in the year when the last child moved out, but the yearly measurement points were not systematically statistically significant compared to the year of the event.

Concerning educational differences in the time use trajectories around the transition to the empty nest, Figure 2 indicates notable level differences for total and mother's routine housework hours. Mothers without a tertiary degree spent about 7% more time on routine housework (2.54–2.87 hours) compared to all mothers, and about 44% more time than mothers with a tertiary degree (1.76–1.96 hours). Again, there was basically no development in fathers' routine housework hours, irrespective of the mothers' educational level. Yet, fathers with a higher educated spouse significantly decreased their housework hours on average in each of the 2 years succeeding the transition to the empty nest by 12%–13% of an hour, which logically translated into an increase in mothers' shares. Overall, mothers' shares of housework were slightly lower

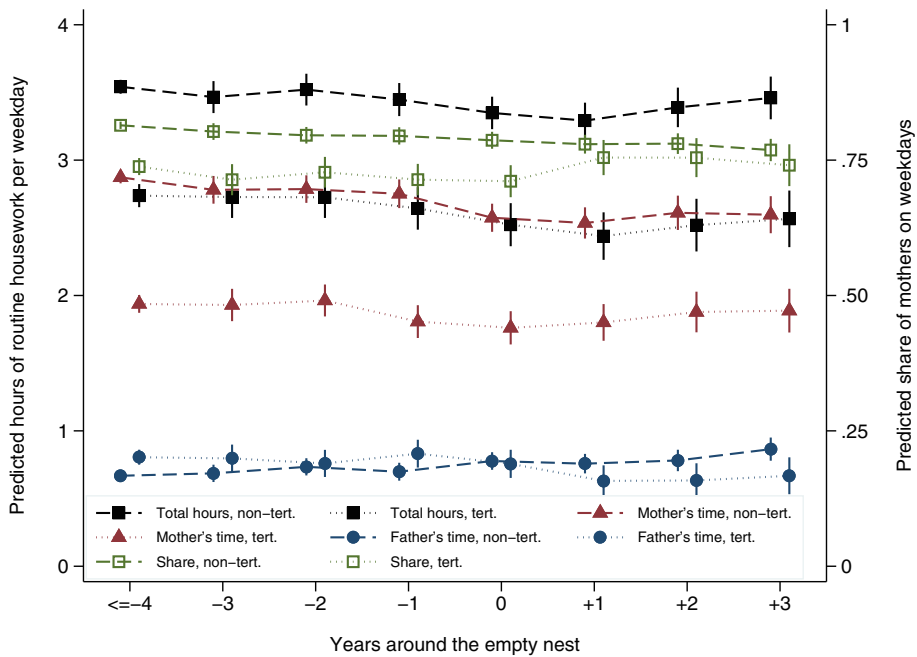


FIGURE 2 Time use of mothers and fathers for routine housework, and mother's relative shares of total routine housework time around the transition to the empty nest, by mother's education. Left y-axis: predicted hours of routine housework weekday (Mo thru Fr); right y-axis: predicted share of mothers' routine housework time of total housework time in percent. Hours and shares were calculated from the regression Models 5–12 in Table 2 as margins at the means, which were adjusted by setting all covariates to the sample means. German Socio-Economic Panel Study, v37, 1991–2020; own calculations [Color figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com/doi/10.1111/jomf.12873)]

for mothers with tertiary education than in those without; yet again, not systematically statistically significant.

Regarding the changes around the transition to the empty nest, the results of Figure 2 basically match the overall picture of the whole sample. Yet, the difference in mothers' hours between the observation before the transition and the observation after the transition was only statistically significant for mothers without a tertiary degree. This may be due to the markedly smaller sample size of higher educated mothers. This indicated that lower educated mothers indeed reduced their routine housework time to a larger extent than higher educated mothers, even though the actual quantitative differences are rather small.

We performed several sensitivity checks to assess the robustness of the presented results, for example, for less restrictive samples, for different subgroups, or with other control variables such as employment (Schulz & Raab, 2021). Yet, none of these checks proved to alter the main conclusions of the study.

CONCLUSION

The division of housework still figures as a powerful cause and consequence of gender inequality in modern societies. Despite a long-term gender convergence, traditional patterns of doing gender continue to reproduce at least moderate separate spheres models of family living over women's and men's life courses (Leopold et al., 2018; Pailhé et al., 2021; Sullivan et al., 2018). In this study, we investigated the total causal effect of the transition to the empty nest on

spouses' routine housework hours using data from the German Socio-Economic Panel Study (Goebel et al., 2019), 1991–2020, offering the first longitudinal study of its kind.

Three findings surfaced in this analysis. First, households' total hours as well as mothers' routine housework hours gradually declined in the years before and also slightly at the eventual transition to the empty nest. The latter change amounted for a 9-minute decline on regular weekdays on average. Fathers' routine housework hours were largely unaffected when the last child moved out of the parental household. These relatively small shifts did not influence the division of housework, which remained rather stable in the observed years, slightly below a mothers' share of 80%. In sum, mothers continued to do most routine housework in couples in this phase of the life course, but at the same time, spouses' time budgets converged slightly. This finding is in line with previous studies of housework time around other family events in later life, especially concerning retirement (Leopold & Skopek, 2015; Rexroat & Shehan, 1987). The results slightly counteract the changes around the transition to parenthood, which have been found to be the major inducement of gender inequality in housework in couple households (Baxter et al., 2008; Bianchi et al., 2000).

Second, more detailed analyses for educational differences revealed only minor variations in the gendered trajectories of housework time around the transition to the empty nest. Still, notable level differences were found between households with higher educated mothers compared to households with lower educated mothers. This connects to the idea that higher education goes hand in hand with a less gendered division of labor in couples, either through higher opportunity costs of unpaid labor, or through higher consent to liberal gender ideologies and disapproval of the traditional separate spheres model (Bianchi et al., 2000; Esping-Andersen & Billari, 2015; Skopek & Leopold, 2019).

Third, mothers' time use trajectories were most responsive to the empty nest transition, whereas fathers did not directly react to their children's departure from the family household. As suggested in previous research (Anxo et al., 2011; Rexroat & Shehan, 1987), women's behavior seems to be more strongly attached to family life than men's, who seem to rather respond to changes in their employment biographies. This interpretation was fueled by the idea of the persisting relevance of the traditional separate spheres-family model in a rather conservative welfare regime such as Germany.

Because no study had analyzed the total causal effect of the transition to the empty nest on mothers' and fathers' routine housework behavior before, it was an empirical question, which theoretical perspective would be supported by the data. Taking everything into account, the findings of our study supported the ideas of both role loss and role strain (relief). On the one hand, this is a continuously high gender inequality in housework time, based on the persistence of traditional doing gender and gender identities. On the other hand, this is a slight gender convergence of unpaid work times around the transition to the empty nest, based on the idea of changing contexts for the negotiation of daily routines in couples.

Going beyond the scope of our report, three limitations warrant further investigation. First, our study was limited to the German context. Although Germany is a prime example for studying the concurrence of change and stability in gender inequality, broader conclusions on spouses' housework allocation around the transition to the empty nest should rely on time use studies from other countries as well. Compared to the previous cross-sectional studies (Anxo et al., 2011; Rexroat & Shehan, 1987), the fixed effects longitudinal findings of this study revealed a much smaller gender convergence in housework time. This, again, accentuates the necessity to control for unobserved heterogeneity when assessing life-cycle dependencies of time use or other outcomes (Brüderl & Ludwig, 2015).

Second, our measures of time use were limited to "stylized time use estimates." Given the advantage that these variables were available longitudinally to study within-changes of mothers, fathers, and couples over the life course, these data are clearly less informative than diary data, which would offer a broad spectrum of more detailed analyses of time use. This

might be particularly relevant concerning time use on weekends, as the longitudinal data on weekends were surveyed every second year only in the SOEP, making it impossible to relate changes in time use to the actual event. We could not assess changes in demands for housework, or changes in mothers' and fathers' daily and weekly rhythms, activity sequences, joint activities, or the pertinence of helping children before they moved out of the parental household, all of which is likely to be of relevance in family households around a major life-course event such as the transition to parenthood.

Third, although the German Socio-Economic Panel Study provided sufficient data to investigate the allocation of housework around the transition to the empty nest, we would have needed a larger sample to spell out the analyses in more detail. Although supplementary analyses showed, for example, expected level differences between cohorts, or East and West Germany (Schulz & Raab, 2021), these analyses yielded large confidence intervals, mainly because the number of events observed for these sub-groups were very small.

Finally, we followed continuously cohabiting couples only, disregarding mothers and fathers who were separating during the transition to the empty nest. This might be the couples, in which the desire for change in housework participation is most pronounced. Thus, our findings may underestimate the actual changes in spouses' housework time, but still provide a "conservative" estimation of what is happening in later-life families. Conversely, data restrictions that lead to insufficient consideration of time-varying confounders such as parents' level of relationship conflict could yield an overestimation of the total empty nest effect. In sum, however, given the comparatively low separation rates among older couples, the lacking consideration of relationship dynamics is likely to have little impact on the total effect of the empty nest transition.

Digging deeper into the causal structure of possible confounders, moderators and mediators would be necessary for a comprehensive account of the effect of the empty nest on parents' housework time, not least to challenge the assumptions of causality that are necessary to interpret the estimated coefficients as total causal effects. Our study provided the first assessment of the magnitude of an empty nest effect, and therefore laid the foundation on which future research can build upon. This should include a closer look on spouses' employment trajectories and their labor market resources around the transition to the empty nest. Descriptive results in the course of the present study indicated relatively little change in spouses' employment status in the observation window, and controlling for employment in the sensitivity analyses did not affect the coefficients of the transition. Still, employment decisions in earlier phases of the life course may contribute to the understanding of path dependencies that either support trajectories of continuity or open the leeway for gender convergence.

Future research should further examine the role of children. Even though previous research found that children's contributions to household work is rather additive to their parents' engagement (Craig & Powell, 2018; Schulz, 2021), life-course developments of time use depending on children's gender, maturity, the age and anticipation of home leaving, or the number of siblings may affect the mothers' and fathers' scope of action at the transition to the empty nest. However, given the quantitatively small effect of the empty nest transition on mothers' routine housework behavior, that is, the reported decline of 9 minutes per regular weekday, including further moderators may not change the overall picture to a notable extent.

In conclusion, our study reaffirmed the well-known pattern of continuity and convergence in time use for housework over the life course. Covering the hitherto under-researched transition to the empty nest longitudinally, our study enhanced the understanding of the life-course dynamics of gender inequality in modern societies through the example of housework behavior. The transition to the empty nest contributes to the life-course convergence of housework time (Leopold et al., 2018), basically as well as all other major life-course transitions following the birth of children tend to reduce housework inequality in couples, yet not to such an extent to call this phase of the family life-cycle a phase of gender equity or equality.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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