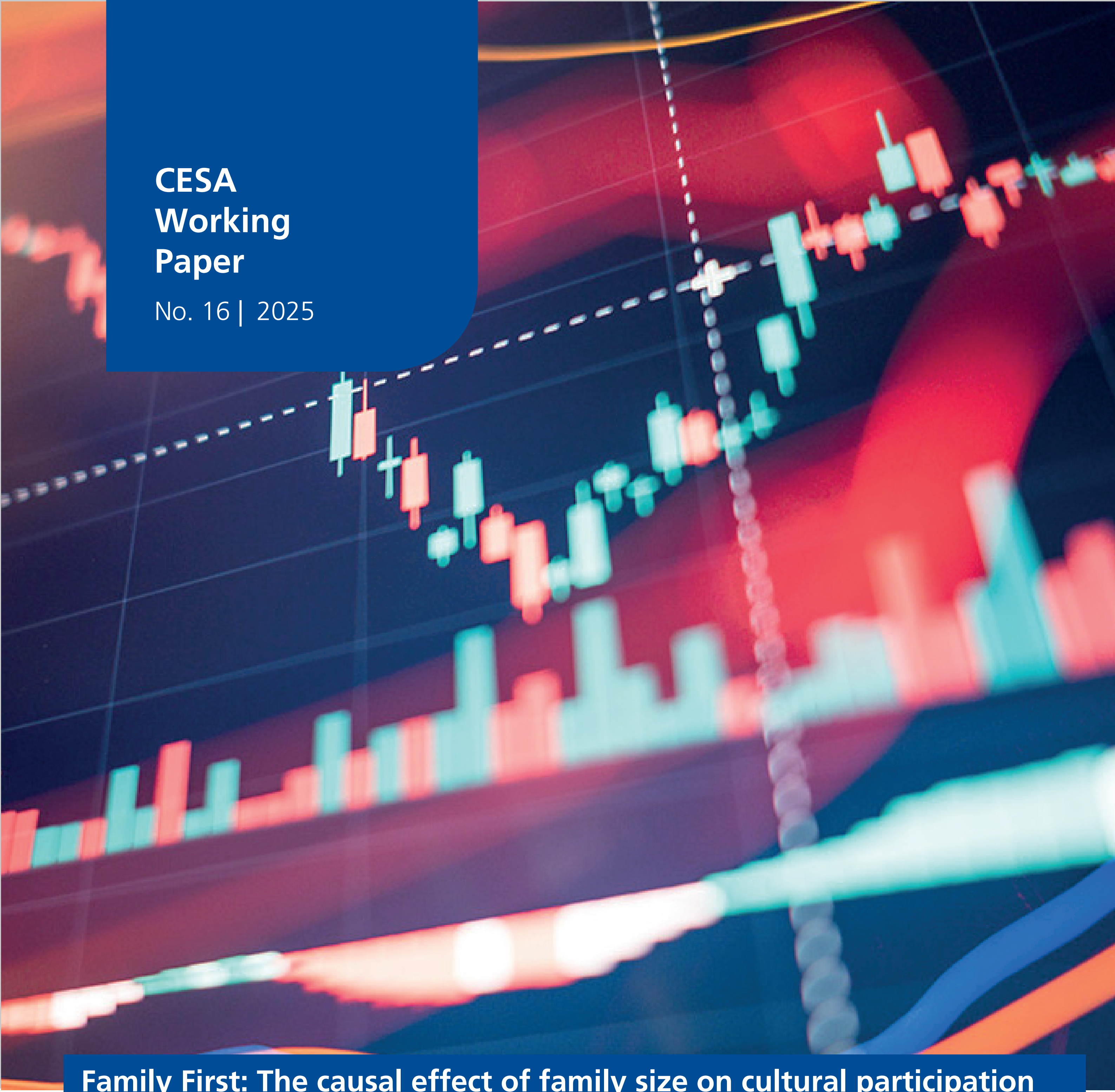

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Family First: The causal effect of family size on cultural participation

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Abstract

Using longitudinal data from the German Socio-Economic Panel (SOEP), we estimate how having children affects parents' participation in arts, high- and lowbrow cultural activities, and sports. Identification combines three complementary, well-established strategies: (i) an event-study design around first births; (ii) twin births as exogenous shocks to second and third births; and (iii) sex-composition preferences as an exogenous driver of third births. Following first births, average participation falls by 13–54%, with event-study dynamics showing large short-run drops and a slow, incomplete recovery within ten years. We also document pronounced gender heterogeneity: mothers experience larger immediate declines, while fathers' adjustments occur primarily on the extensive margin (any participation). By contrast, effects of second and third births are mixed; when present, they are modest and tend to fade as children age.

Keywords: JEL Codes: C36, J13, J16, Z1

JEL Classification: *cultural participation, artistic activities, fertility, gender*

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1 Introduction

Cultural activities reflect a society's shared values, beliefs, traditions, and way of life. Therefore, cultural participation must be important to well-being, social cohesion, social integration, and belonging. Politics also acknowledges this view, as, for instance, emphasized in the German Commissioner for Cultural and Media Affairs (2024) report. Similarly, the 'Seoul Agenda' of the United Nations Educational, Scientific and Cultural Organization (UNESCO) declares that "[...] cultural education [...] must be understood as the basis for the balanced cognitive, emotional, aesthetic and social development of children and young people" (UNESCO, 2010). Moreover, previous research suggests that the consumption of cultural goods and as one's own artistic activity is positively associated with people's well-being (e.g., Lomas, 2016; Bille et al., 2013; Giovanis, 2021). Consequently, identifying the determinants of cultural activities is of great interest.

In this study, we focus on a factor that, despite its omnipresence, has received little attention so far: parenthood. While prior research has focused on the role of parents in stimulating their children's interest in cultural activities (e.g., Van Hek and Kraaykamp, 2015), little is known about the other direction: how parenthood affects cultural participation. On the one hand, this effect may be mechanical: due to children, time is scarce, and parents can devote less time to cultural activities. On the other hand, the long-run result, when children grow up, may be more ambiguous. We take both perspectives and estimate causal short- to long-run effects. Ultimately, our results can be important for understanding how family formation shapes community and social life in modern societies.

Prior studies aiming to uncover determinants of cultural participation have examined the role of education (e.g., Suarez-Fernandez et al., 2020), prices (Zieba, 2009), crime (Iachan et al., 2023), and the COVID-19 pandemic (Bakhshi et al., 2023). Moreover, some studies explored the role of partnership and children as one factor among many that correlate with cultural participation. For instance, using survey data from different European countries, Falk and Katz-Gerro (2016) estimate a model of cultural participation (i.e., visits to historical monuments, museums, art galleries, etc.) finding that single status does not explain the cultural participation. On the contrary, Lazzaro and Frateschi (2017) find that the presence of 14 to 17-year-old children is negatively associated with the time spent on arts activities in Italy, but not for younger children. Finally, in Ateca-Amestoy and Ugidos (2021), the number of young children below four correlates negatively with participation in cultural activities in Spain.

Besides these mixed results, the prior work does not allow for a causal interpretation. In this paper, we work to close this gap: Using data from the German Socio-Economic Panel (SOEP), we examine the causal effect of family size on parents' participation in high- and lowbrow cultural events, sports, and artistic and musical activities. A priori, a reduction, an expansion, and no effect are conceivable. For instance, the reduction in leisure time – especially synchronous leisure (Hallberg, 2003) – could be overcompensated by experiencing cultural activities together with children, possibly as an 'educational mission'.

Our analysis is based on three established methods of causal inference, which are primarily used in labor market economics: an event study approach combined with two instrumental variable estimations based on twin births and parents' mixed-sex preferences. As these methods target different fertility margins, i.e., parents with different preferred numbers of children, they provide a more comprehensive picture of how an additional child affects the parents' cultural participation.

We find that the first child substantially decreases cultural activities for mothers and fathers on the extensive and intensive margin throughout all of our dimensions within ten years. The negative effect is most prominent for the attendance of cultural events which couples usually do together. Moreover, mothers are more affected on the intensive margin, whereas the opposite is true for the extensive margin. Event study analyses reveal that the most negative effects occur in the first years after birth. Thereafter, the effects fade out, but never reach the pre-birth level. The effect of the second child is mixed and non-existent after the first ten years after the first birth. For the third child, we find mild negative or even positive effects, depending on the identification method. Since our three different identification methods capture different populations of parents, these effect differences could also stem from general effect heterogeneity, not the number of children per se.

The remainder of the study is structured as follows. Section 2 briefly outlines the data set, before Section 3 presents the empirical strategy. The results are presented and discussed in Section 4, while Section 5 concludes.

2 Data

We draw on data from the German Socio-Economic Panel (SOEP, version 38.1), a nationally representative longitudinal panel of private households in Germany (see Goebel et al., 2019, for details). Launched in 1984, the SOEP currently interviews approximately 30,000 individuals in 22,000 households on nearly all aspects of life. Of particular relevance to our study, it includes detailed questions on parental fertility histories and leisure activities.

The outcome variables are defined as answers to the question "Please indicate for each activity how often you do this: daily, at least once a week, at least once a month, rarely or never?" combined with the items "Artistic and musical activities (painting, music, photography, theater, dance)", "Attending events such as opera, classical concerts, theaters, exhibitions", and "Going to the cinema, pop concerts, dance events, clubs", and "Taking part in sports (active)".[1] We refer to these items as *art activities*, *highbrow* (culture), *lowbrow* (culture), and *sports*, respectively. Moreover, all variables are measured on a five-point scale, where the values from zero to four mean in ascending order: "never," "rarely," "at least once a month," "at least once a week," and "daily."[2] We use the total number of children and their birth years to derive our main explanatory (or treatment) variables of interest. Depending on the exact specification and research design, these indicate parenthood (or first birth) and indicators of having two or more, or three or more, respectively. Variables that carry arguably exogenous variation in fertility that we later use for instrumental variable specification are twin birth indicators at the mother's first birth and indicators that capture whether the first two children of the parents have the same sex.

Table 1: Descriptive statistics

		All[a]	Parents before birth of first child		Families with one child		Families with two or more children	
			Mothers	**Fathers**	**Mothers**	**Fathers**	**Mothers**	**Fathers**
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Art activities								
	Mean	0.821	1.200	0.862	0.887	0.661	0.875	0.681
		(1.093)	(1.163)	(1.085)	(1.080)	(0.977)	(1.103)	(1.004)
Highbrow								
	Mean	0.751	0.925	0.852	0.718	0.655	0.678	0.641
		(0.713)	(0.724)	(0.736)	(0.642)	(0.642)	(0.660)	(0.654)
Lowbrow								
	Mean	0.933	1.701	1.771	1.012	1.006	0.843	0.868
		(0.865)	(0.859)	(0.872)	(0.699)	(0.734)	(0.715)	(0.747)
Sports								
	Mean	1.386	1.744	1.969	1.388	1.415	1.296	1.363
		(1.393)	(1.282)	(1.248)	(1.351)	(1.333)	(1.372)	(1.346)

Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). Columns (3) - (6): Age of the youngest child does not exceed 18. [a]: Average values for the unrestricted SOEP data. The number of observations ranges from 328,035 to 430,833 (column 1), 5,824 to 10,924 (columns 2 and 3), 11,391 to 19,200 (columns 4 and 5), and 36,981 to 55,262 (columns 6 and 7). The number of individuals ranges from 83,006 to 86,249 (column 1), 2,454 to 2,966 (column 2), 2,163 to 2,638 (column 3), 5,112 to 5,589 (column 4), 4,193 to 4,700 (column 5), 13,863 to 14,976 (column 6), and 12,442 to 13,381 (column 7).

Table 1 presents descriptive statistics. Each column shows overall means and standard deviations for our outcomes of interest and different subgroups. The table suggests that while parents, on average, do not seem to have lower cultural activity levels than the average population (column (1)), there is a substantial drop for mothers and fathers after the birth of their first child, most pronounced for lowbrow cultural activities. This is the first descriptive evidence supporting the idea that having children decreases cultural

[1]One might argue that participation in sports is not an obvious component of cultural participation. However, because organized sports in Germany are frequently club-based and foster social integration and a sense of belonging (e.g., Breuer et al., 2015), we include sports participation in our analysis.

[2]Note that we excluded data from 1984 as the SOEP had different categories for *highbrow* and *sports* that year.

participation. However, there is less of a difference between parents with only one child and parents with two or more children (columns (4) to (7)). Except for sports, the outcomes have means below 1, indicating that most individuals never engage in these activities. We therefore also use binary indicator variables ("any activity") in the empirical analyses (see Table B.1 in Appendix B for descriptive statistics). Finally, the table documents a moderate gender gap in art activities and sports.

3 Empirical strategy

Childbirth, timing, and the number of children are choice variables. Hence, simple regressions of cultural participation on the number of children are endogenous. To overcome this problem, we employ three complementary identification strategies that we present in turn.

3.1 Event study

To start the analysis, we estimate a two-way fixed effect model (TWFE) in an event study specification defined by

$$Y_{i,t} \;=\; \alpha_0 + \sum_{\substack{k > -4 \\ k \neq -2}} \alpha_k \times I\left[t = k\right] + \xi' \mathbf{X} + \phi_i + \gamma_t + \epsilon_{i,t} \tag{1}$$

where $Y_{i,t}$ is the outcome of interest for individual i in year t, ϕ_i are individual fixed effects, γ_t are year fixed effects, and $\mathbf{X}$ is a vector of indicator variables including age, age at childbirth, education (less, equal to, more than high school degree), and region type (urban, rural). The model includes all event-time dummies after four years before childbirth. With the reference period set to $k = -2$ to rule out any mechanical anticipation of birth through gestation, we show coefficients four years before to ten years after the first childbirth in $t = 0$ (controlling for relative years thereafter prevents contamination with the reference category). With individual and year fixed effects, identification comes from within-individual changes, comparing outcomes k periods after (or before) birth to the same individual two years before birth.

The coefficients α_k have a causal interpretation under the assumption that, in the absence of childbirth, parents would have followed the same trend in the outcome variables as individuals who did not (yet) become parents. Although not directly testable as this assumption is on counterfactual outcomes, we will present supportive evidence for this assumption by testing whether pre-birth trends differ between the treated and not-yet-treated groups. Robust standard errors are clustered at the household level.

We complement this estimation strategy with quasi-experimental evidence using two well-established instrumental variables, which improves our analysis in two dimensions. First, because of the common trend assumption, we can only credibly assess the effects of the first birth. The effects of the second and third childbirths could potentially differ significantly. Second, the event-study estimation limits identifying the long-run effects ten years after childbirth, which is particularly interesting.

3.2 Twin birth

We use twin births as an exogenous variation to examine the causal effect of family size on cultural participation. This estimation strategy is well-established in the labor economics literature and one of the very few sources of credible identification of fertility effects (Angrist and Evans, 1998; Angrist et al., 2010; Mogstad and Wiswall, 2016). For this strategy to work, we restrict the sample to mothers and fathers of at least one child. Additionally, we restrict to individuals whose oldest child is not older than 18. Our general estimation strategy is outlined as follows:

$$\begin{aligned} D_{i,t} &= \pi_0^{2+} + \pi_1^{2+} Twin_i + \pi_2^{2+}\mathbf{X} + \delta_t^{2+} + v_{i,t}^{2+} && (2)\\ Y_{i,t} &= \delta_0^{2+} + \delta_1^{2+}\widehat{D}_i + \delta_2^{2+}\mathbf{X} + \gamma_t^{2+} + \varepsilon_{i,t}^{2+}\ . && (3)\end{aligned}$$

The superscript $^{2+}$ on the coefficients indicates that the estimation pertains to the fertility margin of having two or more children, distinguishing it from the alternative specification presented later, focusing on three or more children. The first equation represents the first stage of the instrumental variable (IV) approach, where we estimate the effect of having a twin birth – captured by the indicator variable $Twin_i$ – on the probability of having two or more children, denoted by the binary variable $D_{i,t}$. Provided that twin births are exogenous conditional on the control variables $\mathbf{X}$, the predicted values $\widehat{D}_i$ from this regression can be used to identify the causal effect of having two or more children on the outcome variable $Y_{i,t}$. This is done in the second stage, where we regress $Y_{i,t}$ on $\widehat{D}_i$ and the same set of controls. These include year fixed effects δ_t^{2+} and γ_t^{2+} in the first and second stages, respectively, and the vector $\mathbf{X}$ as defined in Section 3.1, which comprises age and age-at-birth fixed effects, among others.[3]

The parameter of interest, δ_1^{2+}, is a well-defined causal effect of two or more children on $Y_{i,t}$ for individuals who exceed their preferred family size due to a twin birth (i.e., the local average treatment effect) if three conditions hold. First, the instrument – twin births –

[3]Note that the treatment and the control group differ significantly only in the parents' age at the birth of the first child, see column (1) in Table B.4 in Appendix B. This should not bias our estimates since our model includes age-at-birth fixed effects.

must be exogenous. This assumption is plausible, as prospective parents generally cannot control whether they conceive twins, making twin births effectively random conditional on observable characteristics. Second, the exclusion restriction must hold: the effect of twin births should operate solely through the number of children, not through alternative channels such as birth spacing and changes in parental behavior. While this assumption may be more contentious in the short run, it is likely less problematic in the long run and for the types of outcome variables we consider. Third, the monotonicity assumption must be satisfied. This requires that no family ends up with fewer children as a result of having twins – that is, twin births should not reduce overall fertility. Although this assumption may not hold universally, minor violations are unlikely to substantially affect the interpretation of the estimated effect (De Chaisemartin, 2017). We also present a variant of the model designed to analyze the effect of having three children, i.e., if the second birth was a twin birth.

3.3 Mixed-sex preferences

In our final estimation strategy, we use an alternative instrument to identify the effect of having three or more children. Following Angrist and Evans (1998), we exploit the widespread preference for mixed-sex siblings in Western societies and the quasi-random assignment of child sex at birth. Specifically, among families with at least two children, we compare those whose first two children are of the same sex (two boys or two girls) with those whose first two are of mixed sex (one boy and one girl).

The instrument is relevant if parents who value a mixed-sex sibship are more likely to have a third child when their first two children are the same sex, whereas mixed-sex families feel less compelled to continue childbearing. Apart from the instrument itself, the empirical specification (including the set of control variables and fixed effects) mirrors the twin-IV analysis.

The key differences lie in the treatment variable and the sample. The treatment indicator E_i identifies individuals with more than two children. The sample is restricted to mothers and fathers with at least two children, where the second-oldest child is no older than 18 years. With these exceptions, the first and second stage regressions mirror those used in the twin-birth strategy:

$$E_{i,t} = \pi_0^{3+} + \pi_1^{3+} SameSex_i + \pi_2^{3+} \mathbf{X} + \delta_t^{3+} + v_{i,t}^{3+} \tag{4}$$
$$Y_{i,t} = \delta_0^{3+} + \delta_1^{3+} E_i + \delta_2^{3+} \mathbf{X} + \gamma_t^{3+} + \epsilon_{i,t}^{3+}, \tag{5}$$

where the superscript $^{3+}$ indexes the three-or-more-children margin.

The identifying assumptions largely parallel those of the twin instrument. First, in the absence of fertility control, the sex composition of the first two children is as good as random at conception. The remaining two assumptions are more difficult to verify. One concern is a potential direct effect of child sex composition on parental behavior. For example, families with same-sex children may engage more intensively in gender-aligned cultural or recreational activities (e.g., two boys both playing football), which could directly influence the outcome variable. Second, the monotonicity assumption may be violated if some families actively prefer a balanced sex composition, thus reducing fertility when that preference is met. Despite these caveats, we interpret the estimated effects as causal. Any residual violations are likely small and unlikely to overturn the estimated effect of having three or more children. Moreover, Table B.4 in the Appendix B indicates no statistical differences between the treatment and the control group for characteristics such as education and age at birth of the first child. We also benchmark our results against those from our alternative strategy based on twin births at second parity—that is, when parents of one child have twins as their second birth.

Finally, note that our estimates for the first (α_k), second (δ_1^{2+}), and third birth (δ_1^{3+}) differ in two more respects than only the birth margin. First, α_k presents the estimates relative to the age k of the first child, whereas the other strategies estimate an average effect for the first 18 years after the previous birth (we will also present average treatment effect on the treated for the first margin of fertility). Second, while α_k is the causal effect for all parents, δ_1^{2+} and δ_1^{3+} estimate effects for a more specific subpopulation: the compliers, who get an additional child because of a twin birth, or due to their particular preference of having children of different sexes. These differences limit external validity, but taken together, the estimates are complementary and provide a more comprehensive picture of the effects of additional children.

4 Results

4.1 Event study

We begin our analysis by estimating a 'static' version of the TWFE model (1), in which a single indicator variable captures all post-treatment periods. In this specification, the coefficient can be interpreted as the average treatment effect on the treated (ATT). Table B.2 in Appendix B shows that cultural participation declines significantly following the first child's birth across all activity categories, with mothers experiencing larger reductions than fathers. Relative to the sample mean, we observe the most pronounced declines in lowbrow activities (-54% and -43% for mothers and fathers, respectively) and highbrow activities (-45% for mothers, -38% for fathers). Sports participation also drops substantially, particularly for mothers (-36% compared to -22% for fathers). Even art activities, which may be more accessible or home-based, show a notable decline (-26% for mothers, -13% for fathers).

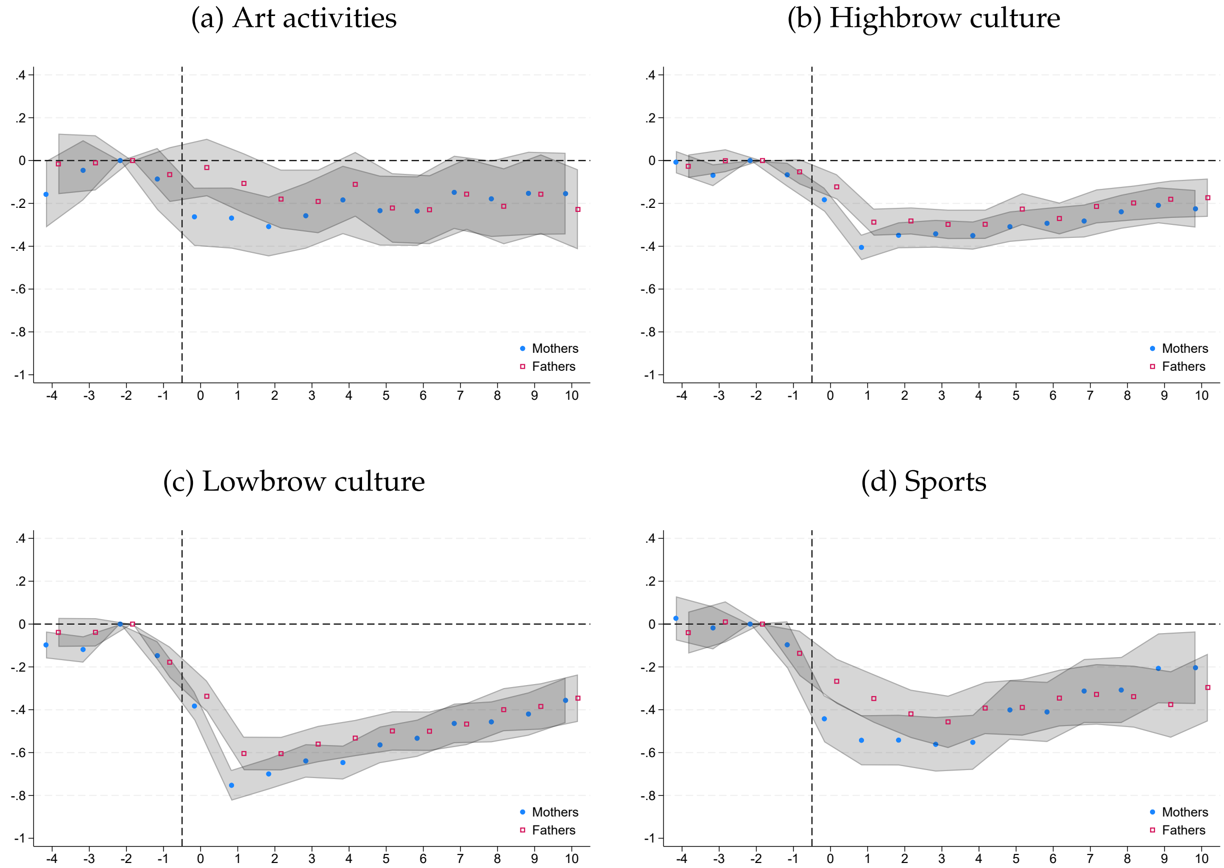
To explore the temporal dynamics of these effects, we next present event-study estimates ($\alpha_{-4}, \ldots, \alpha_{10}$) along with 95% confidence intervals in Figure 1. Panel 1a displays the results for art activities, while Panels 1b, 1c, and 1d show the corresponding estimates for highbrow, lowbrow, and sports participation. A consistent pattern emerges across all panels: no significant pre-treatment trends are detected, suggesting prospective parents do not systematically adjust their cultural engagement before childbirth. Except for art activities, we find significant effects after birth, with a substantial initial drop and only a slow and incomplete recovery within ten years. However, while mothers are more affected in the first two years (probably explaining the gender difference documented in Table B.2), we do not find significant differences between genders thereafter.

Figure A.1 in the Appendix presents estimates from a variant of Eq. (1) where we use binary outcomes indicating the respective cultural activity. The results suggest that the extensive margin, i.e., the shift from no to some cultural activity, drives the overall effect. The effects on this margin are more persistent and substantial – a significant fraction of parents abstains from cultural activities after the first child's birth. For instance, a 20 percentage points (pp) decrease in the probability to engage in art activities translates into a 31% decrease for mothers when evaluated at the sample mean before the birth of the first child (which can be found in Table B.1 in Appendix B). In the same way, a 30 pp reduction in fathers' probability of attending highbrow culture events means a 45% decrease. Overall, the estimates suggest that fathers exhibit a greater effect on the extensive margin than mothers.

4.1.1 Heterogeneity: Income

Since households differ in their ability to pay for external childcare, a relevant question is whether the cultural participation of parents with more resources is less affected by the first child's birth. In Figure A.2 in Appendix A, we divide mothers and fathers into groups with a net household income above and below the median of 2,301€. The figure suggests that high-income parents do not restrict their cultural participation less than low-income parents. If any, high-income parents are *more* affected, given that they tend to participate more in cultural activities, see Table B.3 in Appendix B. A prime example is the highbrow cultural activities of fathers presented in Panel (d).

Figure 1: First childbirth and cultural participation



Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). (a): N = 9,035 and 7,887. (b): N = 12,648 and 11,665. (c): N = 12,643 and 11,663. (d): N = 12,866 and 11,832.

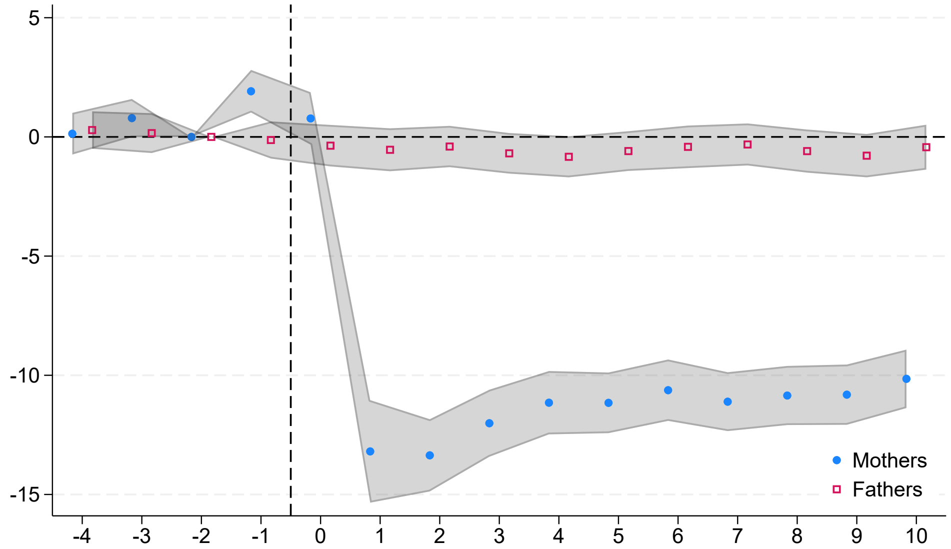
4.1.2 Time allocation

Where do parents allocate their time? Based on estimates of Eq. (1) for different outcomes, Figure 3 documents that the time used for childcare on the weekend massively increases, but about three times as much for mothers. Additionally, while fathers' time for housework on Saturday and Sunday is hardly affected by the birth of a child, mothers' involvement increases by more than one additional hour. Furthermore Figure 2 indicates that while mothers' weekly working hours are massively reduced after childbirth, they do change for fathers.

This raises the question of why there is not much of a difference between mothers' and fathers' postnatal decline in cultural activities on the intensive margin, and even a gender difference to the disadvantage of fathers on the extensive margin. Parents may organize events such as going to the theater and cinema together, but one partner's absence may also prevent the other from participating. For sports, fixed and regular appointments in team sports that conflict with childcare may explain the fathers' lower activity level.

Do parents switch to other leisure activities, such as media consumption? The graphs presented in panels (e) and (f) of Figure 3 suggest that TV/video and private pc consumption

Figure 2: First childbirth and working hours per week



Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). $N = 140,950$ and $148,436$ for mothers and fathers, respectively.

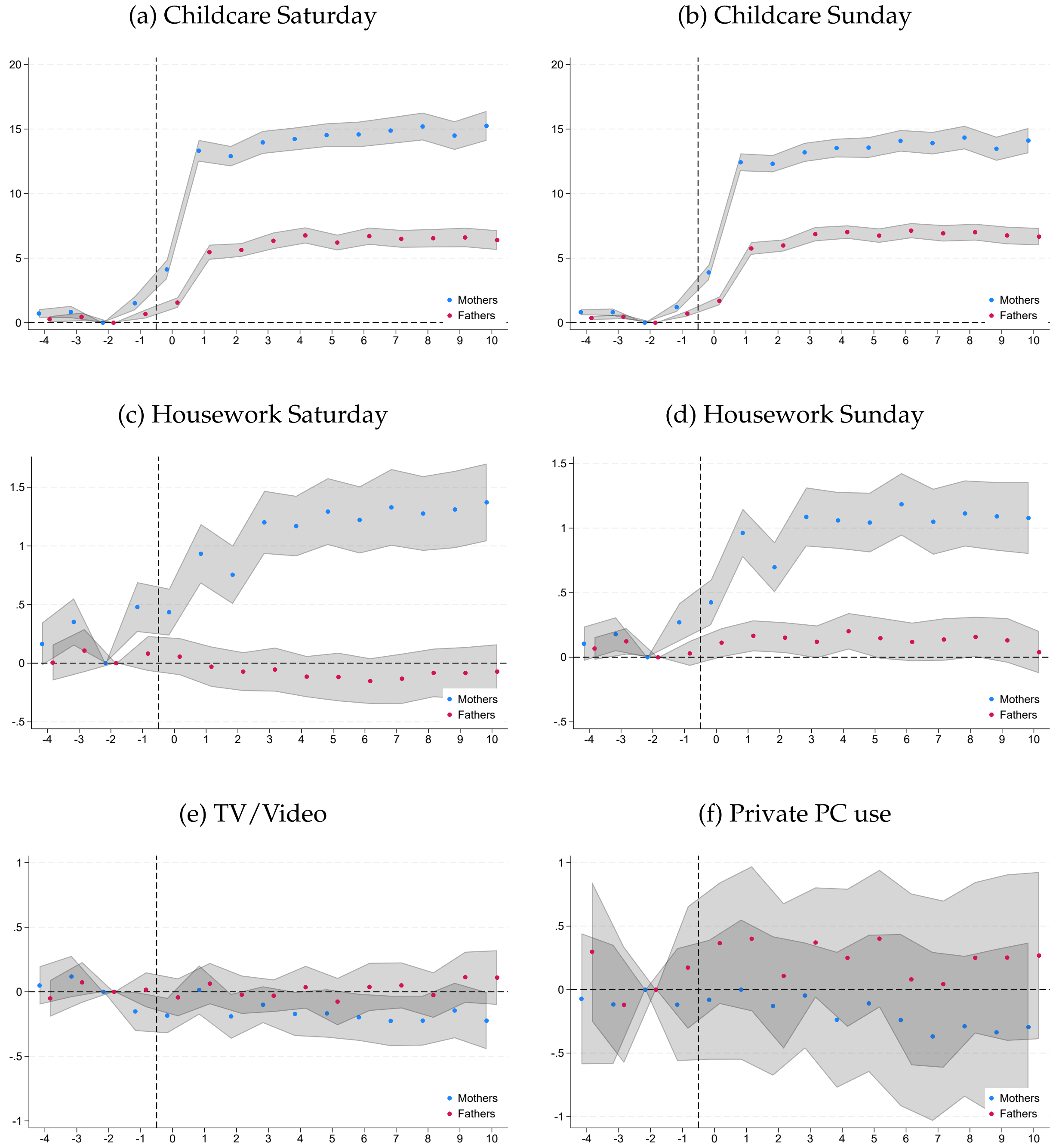
do not change significantly after child birth, and hence, do not explain our result. However, we treat this result with caution, because the item is only part of the SOEP irregularly and does not allow for variation in daily consumption. Taken together, a plausible explanation is that fathers may reallocate time from observed categories toward residual, unobserved forms of leisure. In contrast, mothers' time is reallocated toward childcare, housework, and reduced paid work.

Our main results suggest that children greatly affect cultural activities, and recovery is slow but steady. Nonetheless, our event-study specification prevents us from exploring this, as we need to rely on long panel data that lets us extend the event time to more than 10 post-birth years. Additionally, the event-study estimates only assess the effects of shifting the fertility margin from no births to one birth. Next, we present the results of two instrumental variable designs to extend our analysis of these two dimensions.

4.2 Twin birth: Two children

Since twins at the first birth shift parents' total number of children from one to two, we restrict our sample to families with at least one child for all the results that we present in Table 2. We also aim to achieve comparability with the previous analysis by limiting the age of the first-born child to 0-10 years. We start in Panel A with a simple OLS regression of the outcome on a more-than-one-child indicator plus the respective set of controls. Again, we present the results jointly for both parents and mothers for all outcomes. The correlation is slightly positive for mothers' art activities and statistically indistinguishable

Figure 3: First childbirth and time use



Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). Dependent variable is one if the individual participates on any level, zero for non-participation. (a) Dependent variable: Saturday childcare (in hours). N = 9,549 and 8,494. (b) Dependent variable: Sunday childcare (in hours). N = 11,551 and 10,788. (c) Dependent variable: Saturday housework (in hours). N = 9,544 and 8,501. (d) Dependent variable: Saturday housework (in hours). N = 11,691 and 10,865. (e) Dependent variable: Watch television, video (Likert scale from 1 (daily) to 5 (never)). N = 4,385 and 3,903. (f) Dependent variable: Private PC usage (Likert scale from 1 (daily) to 5 (never)). N = 2,711 and 2,363.

from zero for sports for both parents, but negative and statistically significant for the remaining two outcomes, suggesting that having more than one child is associated with lower participation in both highbrow and lowbrow activities.

These estimates, however, suffer from an endogeneity bias, since parents with preferences for a large family size may, for instance, not engage in high levels of cultural activities in the first place, independent of children. We therefore aim to purge this bias by employing twin births as instruments. To this end, we present the results of the first stage in Panel B of Table 2, i.e., the effect of twin births on the likelihood of having more than one child. It shows that, irrespective of the outcome and the sample, twin births increase this likelihood by a third. This effect is precisely estimated with F-statistics exceeding 500, demonstrating the instrument's relevance. The quasi-experimental nature of twin birth suggests that parents with and without twins are comparable. In that case, our IV estimates are the local average treatment effects (LATE) of shifting fertility from one to more children for families that would have preferred one child had they not conceived twins.[4]

Table 2: Twin births (first birth, oldest child between 0 and 10).

	Art activities		*Highbrow*		*Lowbrow*		*Sports*	
	All	Mothers	All	Mothers	All	Mothers	All	Mothers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: OLS								
more than one child	-0.001	0.052**	-0.036***	-0.032***	-0.142***	-0.159***	-0.024	-0.028
	(0.017)	(0.022)	(0.010)	(0.011)	(0.011)	(0.013)	(0.020)	(0.024)
Panel B: Twin First Stage								
Twin birth	0.356***	0.381***	0.353***	0.377***	0.353***	0.377***	0.354***	0.377***
	(0.014)	(0.016)	(0.015)	(0.017)	(0.014)	(0.017)	(0.014)	(0.016)
F-Statistic[a]	640.963	576.895	591.052	519.327	595.500	520.198	603.137	540.188
Panel C: Twin IV								
more than one child	0.086	0.112	-0.017	-0.026	-0.055	-0.119	-0.340*	-0.239
	(0.150)	(0.202)	(0.090)	(0.098)	(0.089)	(0.101)	(0.175)	(0.194)
Sample mean	0.772	0.872	0.619	0.633	0.880	0.866	1.328	1.264
Observations	65,072	34,636	82,080	43,422	82,085	43,425	84,693	44,828
R^2	0.028	0.022	0.068	0.059	0.040	0.045	0.028	0.028

Data from the German Socio-Economic Panel (SOEP, version 38.1). Sample restricted to parents with more than one child and whose oldest child is not older than 10. Standard errors (clustered on the household level) in parentheses, * p<0.1, ** p<0.05, *** p<0.01. Additional controls: Indicator variables for age, age at birth, education, and type of region. [a] Kleibergen–Paap F-statistic for weak identification (Kleibergen and Paap, 2006).

Finally, we present these causal effects in Panel C. For art activities, we find a small and insignificant positive effect for both parents and mothers alone. Except for sports, the other outcomes show negative effects, yet again not precisely estimated. For sports, the negative effect of increasing the family size from one to two children is driven by fathers. For the extensive margin of cultural activities, the estimates presented in Table B.6 in Appendix B give a similar picture. Finally, for parents whose oldest child is between 11

[4]For the exclusion restriction, we need to assume that bearing and raising two births at the same time (twins) have similar effects to raising two children who are born apart. If this assumption is violated, the effects are still causal, but specific to twin births.

and 18, all estimates at the intensive and extensive margin of cultural activities, including sports, are insignificant (Tables B.5 and B.7 in Appendix B). We conclude that the birth of a first child is life-changing and is associated with a substantial decline in cultural participation. Increasing family size further by one child does not seem to have a clear additional negative effect, except for the engagement in sports of fathers of younger children. This interpretation assumes that the populations underlying the ATT for the event study (all parents) and the LATE are comparable (for all parents with twins). We consider the two parameters comparable because no parent is immune to getting twins a priori.[5]

4.3 Twin birth: Three children

Analogously, Table 3 shows how cultural activities are affected if family size increases by another child, from two to three, using a twin birth at the second birth as an instrument. While OLS estimates again suggest a negative correlation except for art activities (Panel A), IV estimates are negative and significantly different from zero only for highbrow activities (driven by the fathers, column (3)). However, with stricter age restrictions for the oldest child, Table B.8 in Appendix B documents a negative effect of having more than two children for all outcome variables except for lowbrow cultural activities, where the estimates indicate a precise zero effect. These adverse effects weaken significantly when the children grow older, as Table B.9 suggests.

4.4 Mixed-sex preferences

For the last piece of evidence that completes our analysis by shifting the fertility margin from two to three children using the same-sex instrument, we condition our sample on families with at least two children. We use the (arguably random) sex composition as our instrument. Table 4 reports the corresponding results. OLS results in Panel A are similar to those in Table 2. However, the first stage in Panel B is considerably smaller than that of twins. Mixed-sex preferences are not pervasive: only six percent of families with two children of the same sex opt for a third child that would otherwise remain at two children. Nonetheless, the F-statistic is large enough to consider it a strong instrument.

Panel C completes the analysis by presenting the main results for this fertility margin: the effects on cultural activities. The effects are consistently positive but are precisely estimated only for mothers' engagement in activities connected to sports. Moreover, Tables B.10 and B.11 in Appendix B reveal that this is driven by mothers with young children.

[5]However, the probability of twin births increases with age (which we control for) and through in-vitro fertilization (which we do not observe), for instance. However, the latter is scarce, particularly for the cohorts we study.

Table 3: Twin births (second birth): Results.

	Art activities		*Highbrow*		*Lowbrow*		*Sports*	
	All (1)	Mothers (2)	All (3)	Mothers (4)	All (5)	Mothers (6)	All (7)	Mothers (8)
Panel A: OLS								
more than two children	0.023	0.071***	-0.066***	-0.052***	-0.143***	-0.147***	-0.113***	-0.096***
	(0.015)	(0.018)	(0.009)	(0.010)	(0.010)	(0.011)	(0.018)	(0.021)
Panel B: Twin First Stage								
Twin birth	0.609***	0.629***	0.628***	0.644***	0.629***	0.645***	0.627***	0.644***
	(0.013)	(0.014)	(0.013)	(0.014)	(0.013)	(0.014)	(0.013)	(0.013)
F-Statistic[a]	2261.880	2238.890	2383.894	2383.079	2431.830	2387.528	2458.591	2437.096
Panel C: Twin IV								
more than two children	-0.043	-0.069	-0.100*	-0.069	0.043	0.048	-0.124	-0.177
	(0.092)	(0.106)	(0.051)	(0.056)	(0.060)	(0.068)	(0.095)	(0.115)
Sample mean	0.790	0.882	0.669	0.687	0.866	0.854	1.341	1.313
Observations	77,544	41,442	98,106	52,044	98,077	52,027	101,733	54,029
R^2	0.036	0.028	0.090	0.077	0.043	0.041	0.051	0.041

Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). Sample restricted to parents with at least two children and whose second-oldest child is not older than 18. Standard errors (clustered on the household level) in parentheses, * p<0.1, ** p<0.05, *** p<0.01. Additional controls: Indicator variables for age, age at birth, education, and type of region. [a] Kleibergen–Paap F-statistic for weak identification (Kleibergen and Paap, 2006).

Table 4: The causal effect of family size on cultural participation – Mixed sex preferences.

	Art activities		*Highbrow*		*Lowbrow*		*Sports*	
	All (1)	Mothers (2)	All (3)	Mothers (4)	All (5)	Mothers (6)	All (7)	Mothers (8)
Panel A: OLS								
more than two children	0.023	0.072***	-0.066***	-0.052***	-0.144***	-0.147***	-0.113***	-0.096***
	(0.015)	(0.018)	(0.009)	(0.010)	(0.010)	(0.011)	(0.018)	(0.021)
Panel B: Same Sex First Stage								
Same sex siblings	0.055***	0.056***	0.062***	0.064***	0.063***	0.064***	0.063***	0.063***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
F-Statistic[a]	38.524	36.348	48.460	46.350	48.713	46.320	50.298	47.796
Panel C: Same Sex IV								
more than two children	0.316	0.072	0.210	0.201	0.124	0.149	0.452	0.644**
	(0.250)	(0.300)	(0.132)	(0.146)	(0.147)	(0.161)	(0.276)	(0.320)
Sample mean	0.790	0.882	0.669	0.687	0.866	0.854	1.341	1.313
Observations	77,510	41,417	98,044	51,992	98,015	51,975	101,671	53,977
R^2	0.031	0.040	0.073	0.059	0.052	0.043	0.027	-0.011

Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). Sample restricted to parents with at least two children and whose second-oldest child is not older than 18. Standard errors (clustered on the household level) in parentheses, * p<0.1, ** p<0.05, *** p<0.01. Additional controls: Indicator variables for age, age at birth, education, and type of region. [a] : Kleibergen–Paap F-statistic for weak identification (Kleibergen and Paap, 2006).

These positive effects can be explained by the fact that parents with two children are already limited in their possibilities of cultural activities. Parents whose sex preferences make them get a third child do this deliberately and may afford to do so. Possibly, these parents cut down their working hours, which facilitates a higher level of cultural activities.

5 Conclusions

Using a long panel study from Germany and different quasi-experimental research designs, this study provides robust causal evidence that the transition to parenthood leads to a substantial and persistent decline in cultural participation, measured by different indicators for art, sports, and high- and lowbrow activities. Beyond the first child, however, children do not affect most dimensions of cultural participation any further. Using event-study regressions and two instrumental variable strategies for different birth margins, we show that this effect is strongest in the early years after childbirth (ranging from a 13 to 54% decline) and particularly pronounced for mothers in the first years after birth. Fathers, however, are more affected on the extensive margin. Cultural engagement does not return to pre-parenthood levels even ten years after the first birth.

In contrast, additional children have more nuanced effects. While the second child shows only mild and often insignificant impacts, the third child – especially for parents with preferences for mixed-sex children – may even be associated with increased participation in certain cultural domains. This points to the importance of heterogeneous effects of children: families who can afford to expand their family size because of an inherent mixed-sex preference may cope differently with the challenges associated with a third child (e.g., through different preferences, resources, and time allocation strategies). However, given that the negative effects are also attenuated for individuals with twins at the first or second birth, this also suggests that the negative effect of children on cultural activities generally attenuates beyond the first birth.

These findings have important implications for cultural and family policies and suggest that first-time parents should be targeted. If cultural participation is to remain inclusive and socially embedded, parents – especially those with young children – must be better supported. This is especially true given that all the dimensions of cultural participation considered in this study positively correlate with reported life and health satisfaction in the unrestricted SOEP data and among parents of non-adult children (correlation coefficients between 0.05 and 0.20, p-values < 0.01). Support may include family-friendly cultural formats (e.g., flexible scheduling, childcare at venues), local and low-threshold access to cultural offerings, joint cultural education programs for parents and children, and targeted communication strategies to reach families across income groups.

In short, cultural policy must recognize that family formation is a key turning point in cultural engagement, and act accordingly to ensure that parenthood does not mean cultural withdrawal or unintended social isolation beyond the family.

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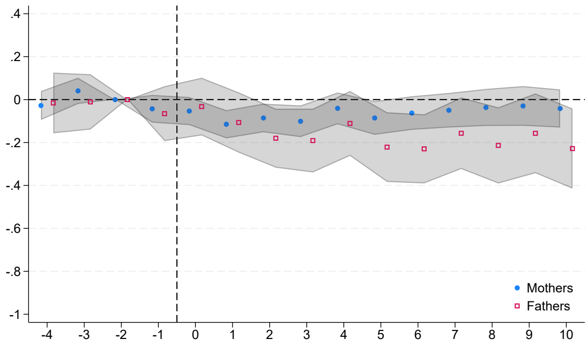
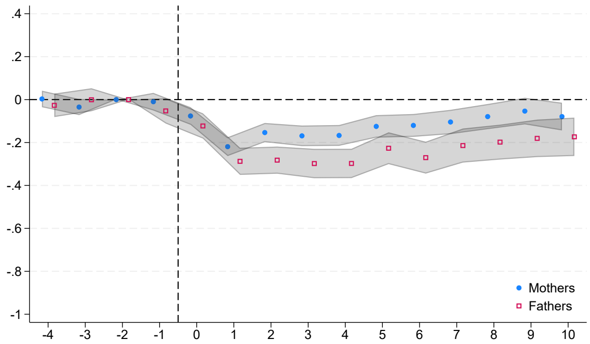
A Additional Figures

Figure A.1: First childbirth and cultural participation – binary dependent variable

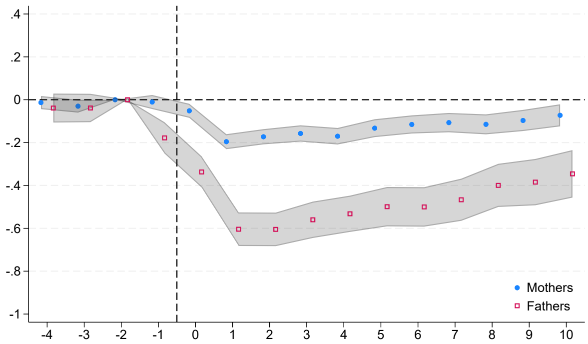
(a) Art activities



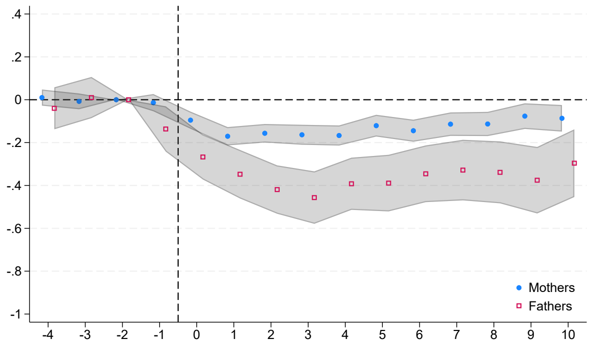
(b) Highbrow culture



(c) Lowbrow culture



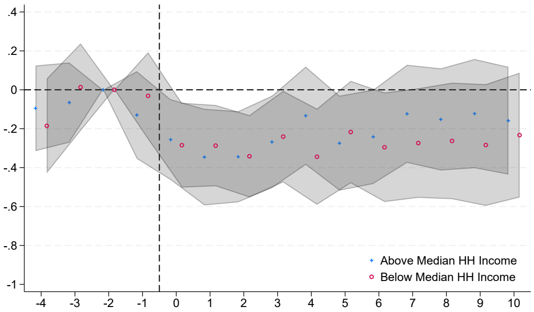
(d) Sports



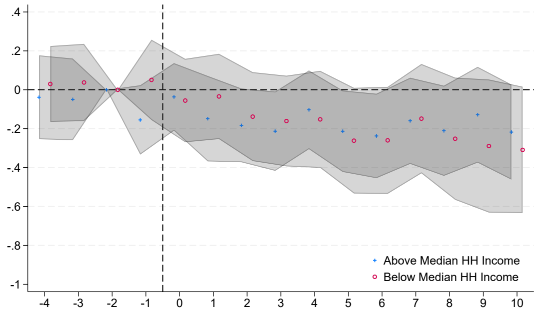
Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). Sample restricted to parents with more than children and whose oldest child is not older than 10. Standard errors (clustered on the household level) in parentheses, * p<0.1, ** p<0.05, *** p<0.01. Additional controls: Indicator variables for age, age at birth, education, and type of region. [a] Kleibergen–Paap F-statistic for weak identification (Kleibergen and Paap, 2006).

Figure A.2: First childbirth and cultural participation – Heterogeneity analysis

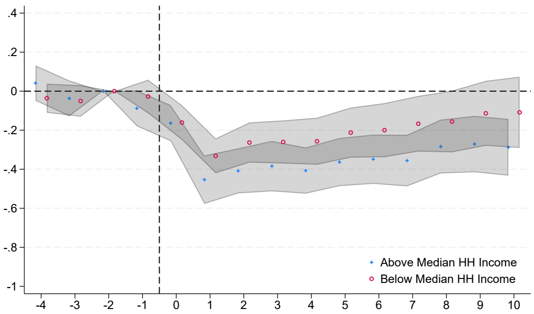
(a) Mothers – Art activities



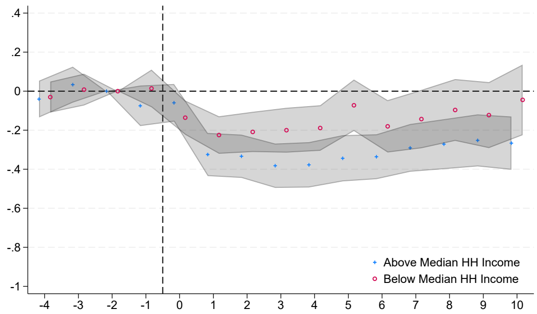
(b) Fathers – Art activities



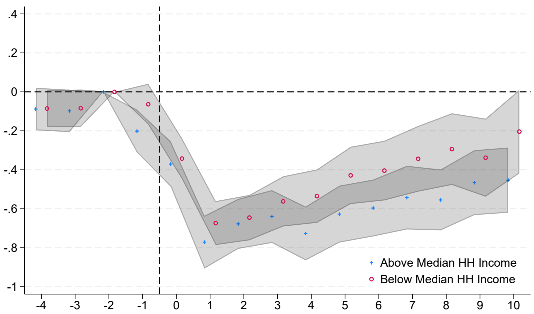
(c) Mothers – Highbrow culture



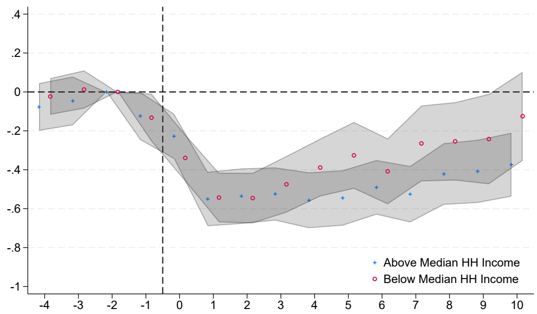
(d) Fathers – Highbrow culture



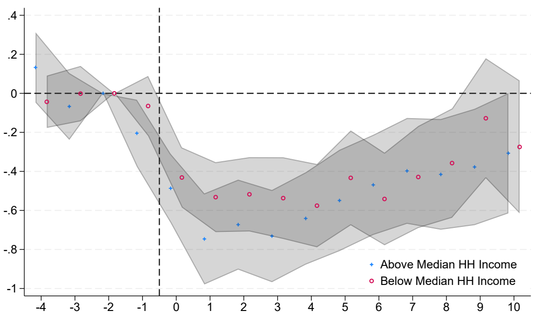
(e) Mothers – Lowbrow culture



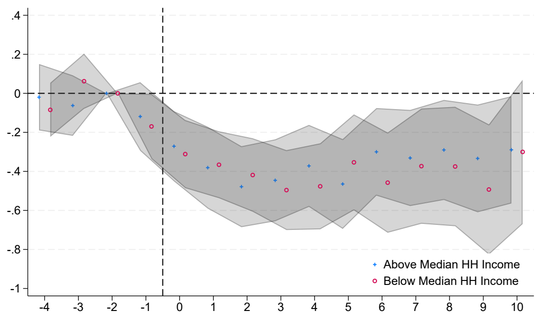
(f) Fathers – Lowbrow culture



(g) Mothers – Sports



(h) Fathers – Sports



Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). The households' median net income is 2,301€.

B Additional Tables

Table B.1: Descriptive statistics – Binary outcome variables

	All[a]	Parents before birth of first child		Families with one child		Families with two or more children	
		Mothers	Fathers	Mothers	Fathers	Mothers	Fathers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Art activities							
Mean	0.461	0.646	0.497	0.516	0.409	0.492	0.408
	(0.499)	(0.478)	(0.500)	(0.500)	(0.492)	(0.500)	(0.491)
Highbrow							
Mean	0.604	0.717	0.667	0.617	0.568	0.576	0.550
	(0.489)	(0.450)	(0.471)	(0.486)	(0.495)	(0.494)	(0.498)
Lowbrow							
Mean	0.647	0.922	0.934	0.783	0.767	0.673	0.676
	(0.478)	(0.269)	(0.249)	(0.412)	(0.423)	(0.469)	(0.468)
Sports							
Mean	0.581	0.756	0.812	0.613	0.637	0.555	0.603
	(0.493)	(0.429)	(0.391)	(0.487)	(0.481)	(0.497)	(0.489)

Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). Columns (3) - (6): Age of the youngest child does not exceed 18. [a]: Average values for the unrestricted SOEP data.

Table B.2: The birth of the first child and cultural participation: 'static' version.

	Art activities			*Highbrow*			*Lowbrow*			*Sports*		
	All	Mothers	Fathers	All	Mothers	Fathers	All	Mothers	Fathers	All	Mothers	Fathers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
after child birth	-0.177***	-0.263***	-0.094*	-0.330***	-0.359***	-0.288***	-0.635***	-0.676***	-0.577***	-0.488***	-0.570***	-0.367***
	(0.042)	(0.058)	(0.054)	(0.017)	(0.023)	(0.024)	(0.023)	(0.029)	(0.032)	(0.035)	(0.048)	(0.046)
Sample mean	0.878	1.001	0.736	0.780	0.802	0.756	1.293	1.256	1.334	1.637	1.595	1.684
N	8,846	4,747	4,098	23,310	12,118	11,186	23,305	12,114	11,185	23,696	12,338	11,353
R^2	0.597	0.581	0.617	0.454	0.469	0.442	0.469	0.468	0.475	0.478	0.461	0.512

Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). Standard errors (clustered on the household level) in parentheses, * p<0.1, ** p<0.05, *** p<0.01. Additional controls: Indicator variables for age, age at birth, education, and type of region.

Table B.3: Descriptive statistics – Below and above median HH income

	Mothers before first birth			Fathers before first birth		
	Low Income (1)	**High Income** (2)	**Diff.** (2)-(1)	**Low Income** (3)	**High Income** (4)	**Diff.** (4)-(3)
Art activities						
Mean	1.157	1.240	**0.083**	0.848	0.873	0.025
	(1.171)	(1.155)		(1.098)	(1.074)	
Highbrow						
Mean	0.867	0.997	**0.130**	0.794	0.922	**0.128**
	(0.746)	(0.689)		(0.754)	(0.708)	
Lowbrow						
Mean	1.658	1.754	**0.096**	1.737	1.811	**0.074**
	(0.891)	(0.813)		(0.904)	(0.830)	
Sports						
Mean	1.548	1.991	**0.443**	1.848	2.114	**0.266**
	(1.285)	(1.235)		(1.279)	(1.194)	

Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). Split at median net household income of 2,301€. Bold letter: $p < 0.05$.

Table B.4: Balancing checks.

	IV estimate	
	Twin birth (1)	Same-sex preferences (2)
Dependent variable		
Level of Education	0.052	0.055
	(0.112)	(0.191)
Migrant background	-0.054	0.113
	(0.076)	(0.150)
Rural/urban	0.075	-0.029
	(0.082)	(0.0.151)
Age	0.796	0.000
	(0.849)	(0.000)
Age at birth	2.290***	-0.000
	(0.858)	(0.023)
Marital status[a]	-0.266*	0.136
	(0.142)	(0.398)

[a]: 1 = married, 2 = single, 3 = widowed, 4 = divorced, 5 = seperated.

Table B.5: Twin births (first birth, oldest child between 11 and 18).

	Art activities		*Highbrow*		*Lowbrow*		*Sports*	
	All	Mothers	All	Mothers	All	Mothers	All	Mothers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: OLS								
more than	0.125***	0.166***	0.059***	0.076***	0.009	0.003	0.106***	0.158***
one child	(0.021)	(0.026)	(0.012)	(0.014)	(0.014)	(0.016)	(0.026)	(0.031)
Panel B: Twin First Stage								
Twin birth	0.382***	0.393***	0.353***	0.357***	0.353***	0.357***	0.361***	0.366***
	(0.020)	(0.023)	(0.022)	(0.025)	(0.022)	(0.025)	(0.021)	(0.024)
F-Statistic[a]	380.081	293.073	250.966	202.681	204.064	202.721	251.893	204.086
Panel C: Twin IV								
more than	0.024	0.197	0.031	0.031	-0.129	-0.132	0.135	0.183
one child	(0.192)	(0.239)	(0.117)	(0.142)	(0.111)	(0.137)	(0.230)	(0.278)
Sample mean	0.808	0.888	0.747	0.774	0.916	0.919	1.374	1.404
Observations	40,242	22,333	51,628	28,230	51,608	28,215	54,048	29,591
R^2	0.046	0.044	0.108	0.097	0.045	0.043	0.057	0.048

Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). Sample restricted to parents with more than one child and whose oldest child is between 11 and 18. Standard errors (clustered on the household level) in parentheses, * p<0.1, ** p<0.05, *** p<0.01. Additional controls: Indicator variables for age, age at birth, education, and type of region. [a] Kleibergen–Paap F-statistic for weak identification (Kleibergen and Paap, 2006).

Table B.6: Twin births (first birth, oldest child between 0 and 10): binary dependent variable.

	Art activities		*Highbrow*		*Lowbrow*		*Sports*	
	All	Mothers	All	Mothers	All	Mothers	All	Mothers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: OLS								
more than	-0.016**	0.004	-0.025***	-0.024***	-0.075***	-0.083***	-0.012*	-0.018**
	(0.008)	(0.010)	(0.007)	(0.009)	(0.007)	(0.008)	(0.007)	(0.009)
Panel B: Twin First Stage								
Twin birth	0.356***	0.381***	0.353***	0.377***	0.353***	0.377***	0.354***	0.377***
	((0.014)	(0.016)	(0.015)	(0.017)	(0.014)	(0.017)	(0.014)	(0.016)
F-Statistic[a]	640.963	576.895	591.052	519.327	595.500	520.198	603.137	540.188
Panel C: Twin IV								
more than	0.008	-0.001	-0.022	-0.023	-0.015	-0.077	-0.106*	-0.088
one child	(0.066)	(0.078)	(0.071)	(0.077)	(0.055)	(0.062)	(0.064)	(0.067)
Sample mean	0.448	0.492	0.540	0.551	0.696	0.693	0.588	0.558
Observations	65,072	34,636	82,080	43,422	82,085	43,425	84,693	44,828
R^2	0.031	0.027	0.067	0.058	0.058	0.059	0.030	0.032

Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). Sample restricted to parents with more than one child and whose oldest child is not older than 10. Standard errors (clustered on the household level) in parentheses, * p<0.1, ** p<0.05, *** p<0.01. Additional controls: Indicator variables for age, age at birth, education, and type of region. [a] Kleibergen–Paap F-statistic for weak identification (Kleibergen and Paap, 2006).

Table B.7: Twin births (first birth, oldest child between 11 and 18): binary dependent variable.

	Art activities		*Highbrow*		*Lowbrow*		*Sports*	
	All	Mothers	All	Mothers	All	Mothers	All	Mothers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: OLS								
more than	0.048***	0.057***	0.035***	0.043***	0.005	0.003	0.033***	0.036***
	(0.009)	(0.011)	(0.009)	(0.010)	(0.008)	(0.009)	(0.009)	(0.011)
Panel B: Twin First Stage								
Twin birth	0.382***	0.393***	0.353***	0.357***	0.353***	0.357***	0.361***	0.366***
	(0.020)	(0.023)	(0.022)	(0.025)	(0.022)	(0.025)	(0.021)	(0.024)
F-Statistic[a]	380.081	293.073	250.966	204.064	251.893	204.086	289.872	234.601
Panel C: Twin IV								
more than	0.002	0.011	0.015	-0.014	-0.047	-0.108	-0.008	-0.046
one child	(0.085)	(0.092)	(0.085)	(0.091)	(0.074)	(0.083)	(0.081)	(0.094)
Sample mean	0.472	0.508	0.622	0.640	0.707	0.714	0.590	0.588
Observations	40,242	22,333	51,628	28,230	51,608	28,215	54,048	29,591
R^2	0.044	0.041	0.097	0.088	0.071	0.063	0.061	0.053

Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). Sample restricted to parents with more than one child and whose oldest child is between 11 and 18. Standard errors (clustered on the household level) in parentheses, * p<0.1, ** p<0.05, *** p<0.01. Additional controls: Indicator variables for age, age at birth, education, and type of region. [a] Kleibergen–Paap F-statistic for weak identification (Kleibergen and Paap, 2006).

Table B.8: Twin births (second birth, oldest child between 0 and 10).

	Art activities		*Highbrow*		*Lowbrow*		*Sports*	
	All	Mothers	All	Mothers	All	Mothers	All	Mothers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: OLS								
more than	0.024	0.064***	-0.065***	-0.049***	-0.148***	-0.150***	-0.091***	-0.063***
two children	(0.017)	(0.022)	(0.010)	(0.011)	(0.011)	(0.013)	(0.020)	(0.024)
Panel B: Twin First Stage								
Twin birth	0.616***	0.632***	0.635***	0.646***	0.636***	0.647***	0.635***	0.648***
	(0.019)	(0.019)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
F-Statistic[a]	1106.226	1085.596	1275.178	1263.055	1317.314	1265.358	1290.123	1290.344
Panel C: Twin IV								
more than	-0.170*	-0.282***	-0.172***	-0.137**	-0.014	-0.003	-0.207**	-0.227*
two children	(0.097)	(0.104)	(0.053)	(0.061)	(0.065)	(0.074)	(0.101)	(0.123)
Sample mean	0.768	0.869	0.617	0.630	0.847	0.830	1.322	1.260
Observations	48,074	25,373	60,488	31,679	60,481	31,676	62,297	32,659
R^2	0.025	0.006	0.070	0.059	0.044	0.042	0.040	0.032

Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). Sample restricted to parents of at least two children whose second-oldest child is not older than 10. Standard errors (clustered on the household level) in parentheses, * p<0.1, ** p<0.05, *** p<0.01. Additional controls: Indicator variables for age, age at birth, education, and type of region. [a] Kleibergen–Paap F-statistic for weak identification (Kleibergen and Paap, 2006).

Table B.9: Twin births (second birth, oldest child between 11 and 18).

	Art activities		*Highbrow*		*Lowbrow*		*Sports*	
	All (1)	Mothers (2)	All (3)	Mothers (4)	All (5)	Mothers (6)	All (7)	Mothers (8)
Panel A: OLS								
more than two children	0.062***	0.116***	-0.023*	-0.023	-0.096***	-0.102***	-0.079***	-0.070**
	(0.021)	(0.027)	(0.013)	(0.015)	(0.014)	(0.016)	(0.024)	(0.030)
Panel B: Twin First Stage								
Twin birth	0.679***	0.703***	0.692***	0.714***	0.692***	0.714***	0.690***	0.712***
	(0.018)	(0.017)	(0.019)	(0.018)	(0.019)	(0.018)	(0.018)	(0.017)
F-Statistic[a]	1479.200	1605.795	1288.935	1534.230	1295.188	1534.694	1454.653	1678.500
Panel C: Twin IV								
more than two children	0.111	0.202	-0.003	0.013	0.078	0.067	-0.044	-0.176
	(0.112)	(0.140)	(0.062)	(0.067)	(0.074)	(0.084)	(0.126)	(0.149)
Sample mean	0.827	0.903	0.753	0.776	0.895	0.891	1.372	1.394
Observations	29,460	16,058	37,610	20,355	37,588	20,341	39,428	21,359
R^2	0.047	0.041	0.112	0.097	0.047	0.046	0.062	0.048

Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). Sample restricted to parents of at least two children whose oldest child is between 11 and 18. Standard errors (clustered on the household level) in parentheses, * p<0.1, ** p<0.05, *** p<0.01. Additional controls: Indicator variables for age, age at birth, education, and type of region. [a] Kleibergen–Paap F-statistic for weak identification (Kleibergen and Paap, 2006).

Table B.10: The causal effect of family size on cultural participation: Mixed-sex preferences (oldest child between 0 and 10).

	Art activities		*Highbrow*		*Lowbrow*		*Sports*	
	All (1)	Mothers (2)	All (3)	Mothers (4)	All (5)	Mothers (6)	All (7)	Mothers (8)
Panel A: OLS								
more than one child	0.024	0.064***	-0.065***	-0.049***	-0.148***	-0.151***	-0.092***	-0.063***
	(0.017)	(0.022)	(0.010)	(0.011)	(0.011)	(0.013)	(0.020)	(0.024)
Panel B: Same Sex First Stage								
Same sex siblings	0.049***	0.055***	0.064***	0.069***	0.064***	0.069***	0.064***	0.068***
	(0.009)	(0.010)	(0.009)	(0.010)	(0.009)	(0.010)	(0.009)	(0.010)
F-Statistic[a]	28.953	32.042	48.409	50.221	48.521	49.939	49.047	51.171
Panel C: Same sex IV								
more than two children	0.507	0.304	0.110	0.122	0.058	0.074	0.581*	0.854**
	(0.314)	(0.349)	(0.134)	(0.143)	(0.155)	(0.163)	(0.299)	(0.334)
Sample mean	0.768	0.869	0.617	0.630	0.847	0.830	1.322	1.260
Observations	48,057	25,362	60,453	31,650	60,446	31,647	62,262	32,630
R^2	-0.008	0.016	0.061	0.048	0.035	0.031	-0.008	-0.060

Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). Sample restricted to parents with at least two children and whose second-oldest child is not older than ten. Standard errors (clustered on the household level) in parentheses, * p<0.1, ** p<0.05, *** p<0.01. Additional controls: Indicator variables for age, age at birth, education, and type of region. [a] Kleibergen–Paap F-statistic for weak identification (Kleibergen and Paap, 2006).

Table B.11: The causal effect of family size on cultural participation: Mixed-sex preferences (oldest child between 11 and 18).

	Art activities		*Highbrow*		*Lowbrow*		*Sports*	
	All	Mothers	All	Mothers	All	Mothers	All	Mothers
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: OLS								
more than one child	0.063***	0.117***	-0.023*	-0.022	-0.095***	-0.102***	-0.079***	-0.069**
	(0.022)	(0.027)	(0.013)	(0.015)	(0.014)	(0.016)	(0.024)	(0.030)
Panel B: Same Sex First Stage								
Same sex siblings	0.052***	0.048***	0.048***	0.047***	0.049***	0.048***	0.050***	0.049***
	(0.011)	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)	(0.010)	(0.011)
F-Statistic[a]	22.652	17.191	20.994	18.378	21.451	18.812	23.644	20.378
Panel C: Same sex IV								
more than two children	0.124	-0.353	0.535**	0.410	0.374	0.399	0.404	0.364
	(0.361)	(0.504)	(0.261)	(0.293)	(0.272)	(0.311)	(0.460)	(0.549)
Sample mean	0.827	0.903	0.753	0.776	0.895	0.891	1.372	1.394
Observations	29,443	16,044	37,583	20,332	37,561	20,318	39,401	21,336
R^2	0.047	0.006	-0.018	0.017	-0.020	-0.037	0.037	0.029

Notes: Data from the German Socio-Economic Panel (SOEP, version 38.1). Sample restricted to parents with at least two children and whose second-oldest child is between 11 and 18. Standard errors (clustered on the household level) in parentheses, * p<0.1, ** p<0.05, *** p<0.01. Additional controls: Indicator variables for age, age at birth, education, and type of region. [a] Kleibergen–Paap F-statistic for weak identification (Kleibergen and Paap, 2006).

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