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# The risk of being Giovanni or Maria: Naming practices and child mortality during the demographic transition

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*In the past, the choice of children's names was closely linked to life trajectories. This paper investigates the connection between children's names and child mortality during the demographic transition. Analysing data from the Veneto region (Northern Italy) and the Venetian parish of San Marco between 1816 and 1869, we find that traditional names are associated with higher neonatal mortality, particularly among girls. In contrast, children with unconventional names—those not named after grandparents or godparents or given the most frequent traditional names—face a lower risk of dying within the first month of life. Our findings underscore the importance of names in historical demography as predictors of demographic trajectories. Moreover, they suggest that naming practices may mirror varying levels of parental attention or a shift towards more modern concepts of childcare.*

**Keywords:** child mortality; naming practices; demographic transition; culture; neonatal mortality; Italy

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## Introduction

Within the framework of social and cultural structures, naming practices play an essential role, serving as markers of patterns in migration, social mobility, marriage, social identity, and demographic assimilation. Studying naming practices 'may prove to be the single most nearly ideal measure for analysing spatial and temporal variation in total cultural systems' (Zelinsky 1970, p. 743). These practices reveal deeper layers of social and cultural realities. The act of naming a child is influenced, whether consciously or unconsciously, by the choices and social identities of others (Bush 2023), thereby reflecting the mindsets, values, and identities that societies foster and preserve.

From this perspective, the intersection of naming practices and demographics has recently garnered attention for revealing historical shifts in societal behaviours and preferences. Goldstein and Stecklov (2023) observed that during the demographic transition, innovative naming correlated with fertility change: in the United States (US) and Norway, traditional names (e.g. John, James, Mary, and Anna in the US) given by white couples to their first child were associated with larger family sizes,

indicating that non-adherence to onomastic (naming) norms could be a signal of broader mindset changes and the adoption of new reproductive behaviours. Connor (2021) discerned a correlation between traditional/Catholic names and higher fertility rates in Ireland during the demographic transition, with the effect pronounced in rural areas, suggesting an alignment with traditional norms rather than religious influences. This complements Hacker's (1999) findings that nineteenth-century American families with Biblical names tended to be more prolific.

While the relationship between naming practices and fertility during the demographic transition is well established, the connection between naming practices and mortality remains largely unexplored. Minello et al. (2021) expanded the scope of naming research by examining its relationship with neonatal mortality in nineteenth-century Veneto (north-east Italy) and France. The study focused on the number of names given to children and its association with neonatal survival: as the number of given names increased, neonatal mortality decreased. This result was consistent across social groups and seasons of birth (two elements that may play a role in child survival patterns), suggesting

a broader cultural shift. The authors proposed that these naming patterns reflected deeper societal changes in the care of children that coincided with improving newborn survival rates. That study highlighted how onomastic practices can serve as indicators of broader cultural transformations that lead to new patterns of mortality.

The relationship between onomastics and mortality, however, warrants further investigation, with the demographic transition offering a particularly informative period for study. This transition, in fact, coincided with another significant transformation in certain areas: the Modern Onomastic Revolution (MOR), specifically the process of name attribution. The MOR corresponds to a profound shift in naming practices that has affected developed countries of Christian tradition over the last two centuries, signalling a change in mindset over time (see Dalla-Zuanna and Minello 2026).

This paper investigates in depth the role of naming practices during the demographic transition and MOR in the Veneto region of Italy. This context has already attracted the attentions of scholars due to its extremely high level of child and neonatal mortality during the eighteenth century and the first decades of the nineteenth century, which was followed by a rapid decline that still awaits full interpretation. Neonatal mortality was particularly severe, especially for winter-born infants (Dalla-Zuanna and Rosina 2011). Infant mortality in Veneto showed a significant decline over several decades. In the period 1831–40, approximately 341 out of every 1,000 infants died before their first birthday. This rate decreased to about 267‰ in 1863–66, and further reduced to 188‰ in 1883–86. This dramatic 45 per cent decline over just 50 years occurred without any significant observable improvements in the diet or living standards of the working classes in that region (Del Panta 1994; Derosas 2002, 2003, 2009; Dalla-Zuanna and Rosina 2011; Minello et al. 2021).

More specifically, we explore the specific name(s) given to children, examining whether diverse naming practices were associated with varying risks of child and neonatal mortality for boys and girls in Veneto during the period 1816–69. Moreover, by delving deeper into the birth and death records of the parish of San Marco, in the heart of Venice—where data are particularly rich and the social environment was more varied and complex than in the rural parishes—we seek to provide more detailed insights, exploring changes in naming practices and their connection with mortality.

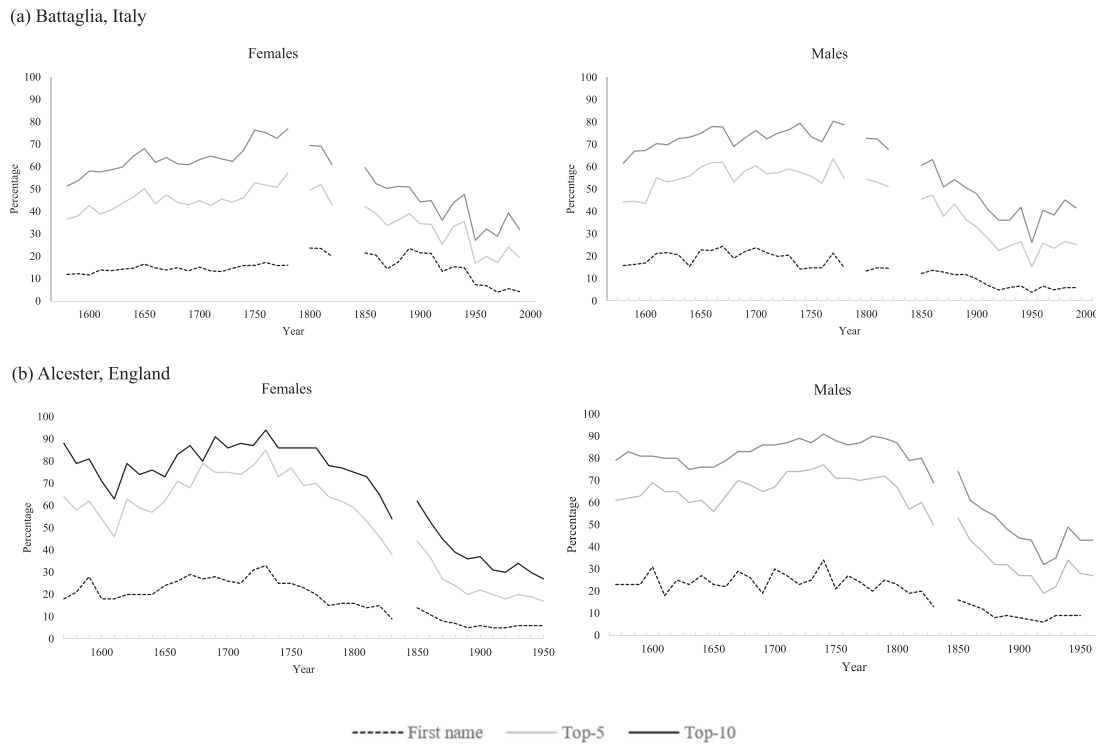
After a brief exposition of the MOR and its possible connection with the demographic transition, we describe the sources and method used. We then present the results and conclude with some interpretative considerations.

Our results clearly demonstrate a link between naming practices and the risk of neonatal mortality. They open avenues for expanding the research to other regions, using given names to understand how shifts in collective mindsets influence demographic transitions. This paper is innovative in being the first to explore the relationship between assigned names and mortality, expanding beyond analysis of the first name to include all names assigned to children. Unlike previous studies, this approach offers a comprehensive view of naming practices and their association with infant mortality. Furthermore, the paper introduces a gendered perspective on the link between mortality and naming practices, setting a new foundation for further research in this area.

### **The Modern Onomastic Revolution as a clue to changing mindsets**

The MOR refers to a significant shift in naming practices in Christian Europe (and Europe's overseas countries and territories) during the last couple of centuries; this was characterized by a departure from criteria for naming individuals that had persisted for at least 500 years. The MOR encompassed the evolution from repetitive and hereditary naming patterns to more diverse and individualized choices (Mitterauer 1993; Rosenthal 2005; Dalla-Zuanna and Minello 2026).

Conventions about given names evolve over time as communities embrace new ideologies that become widely accepted in naming practices (Kotilainen 2022; Sestito 2022). Before the MOR, names were often passed down through generations, reflecting familial, religious, or cultural heritage. From the last centuries of the Middle Ages until the beginning of the nineteenth century, European children were assigned a very limited set of names at the time of baptism: generation after generation, the five most frequent names could easily exceed 50 per cent of all names assigned, for both boys and girls (Figure 1). To underscore the scope of the MOR, we examine long-term historical data, as a secular perspective best highlights recent changes. Data spanning from the sixteenth to the twentieth centuries are rare. We present unpublished data from two rural communities: Battaglia Terme in Italy and Alcester in England, covering 1582 to



**Figure 1** The proportion of given names in the parish of Battaglia Terme (Italy, 1582–1997) and the parish of Alcester (England, 1582–1960), by sex and year of birth

*Source:* Battaglia: parish registers of baptisms (1582–1949) and electoral lists (1950–1997). Alcester: parish registers of baptisms (1582–1839) and civil registers (1850–1960).

recent years. In both areas, up to the mid-eighteenth century, a high concentration of common names is observed, with the top five and top 10 names dominating name choices for both boys and girls. Throughout the nineteenth century, the cumulative frequency of the top names steadily declined, with new names appearing more frequently. By the twentieth century, name variation had increased significantly in both communities, and rapid shifts in name popularity became more pronounced, illustrating a departure from long-standing naming conventions.

Newborns were often named after their godfather or godmother at baptism or after a grandfather or grandmother (Mitterauer 1993). This pattern (a limited number of names, consistently repeated across generations, linked to the names of grand- or godparents) has been observed in all European countries with a Christian tradition, albeit with some local variation. For example, in Early Modern England, a shift occurred from bestowing children with the names of godparents to those of their own parents, with social status also exerting an influence on these naming patterns (Smith-Bannister 1997). Assigning children the names of paternal grandparents, as observed among Dutch settlers in New York by Tebbenhoff (1985), has been seen as

a manifestation of attention to lineage, symbolizing a connection between the family's past and future. Lord (2002) argued that the reuse of family names, especially for the eldest son, typifies societies with wealth inheritance through primogeniture, where it is vital for individuals to ascertain their standing concerning inheritance; in this context, naming serves to designate the heir clearly, with younger sons given the names of other relatives in the hope of receiving potential inheritances from those branches. Breen (1982) identified a parallel rationale for this naming tradition in the west of Ireland in the early twentieth century: for those barred from inheritance, sharing common family names delineated a community of people who could extend mutual support to each other. Additionally, 'necronymic succession', a prevalent practice in early modern Europe and America, involved bestowing on children names previously held by deceased siblings, thereby limiting the pool of chosen names (Tait 2006, p. 325).

Furthermore, naming practices are not gender-neutral: generally speaking, traditional names are preferred for boys more than for girls. In the past, while both boys and girls were named after relatives and godparents, there were differences in the frequency and patterns. Boys' names often carried

more weight in terms of lineage and inheritance, whereas girls' names were less likely to follow strict patterns of inheritance (Smith-Bannister 1997). This sex difference in naming practices has deep historical roots. Main (1996) observed that in early New England, while boys' names were increasingly drawn from classical sources, girls' names shifted towards literary characters and euphonious creations, suggesting a trend towards the infantilization of naming practices for females. This connection persists even in more recent times: Rossi (1965) discovered that American middle-class parents tended to select family and traditional names more frequently for boys than for girls during the first half of the nineteenth century. Stahl (1992) illustrated a similar trend, showing that women in newly established Israel more frequently replaced their foreign names with Hebrew names compared with men. Lieberman and Bell (1992), in their examination of 1973 and 1985 New York birth records for both White and Black newborns, also concluded that boys' names were more associated with tradition.

The MOR, hence, occurred at a diverse pace by sex and also by country but usually started during the nineteenth century. A trend emerged towards a plurality of names that changed rapidly over time. Such choices emphasize personal identity and uniqueness, often influenced by factors such as popular culture, global trends, and the desire for distinctiveness within society (Lieberman 2000). Table 1 provides examples from the Veneto region, where the top five names for boys and for girls comprised 41 and 39 per cent, respectively, of all first given names during the nineteenth century but only 15

and 11 per cent of all names in 2021. The five most popular names for both boys and girls nearly all changed from 2001 to 2021.

The trend towards non-traditional names in modern settings has been interpreted as a reflection of the modern family's acknowledgment of the unique value of each child (Logue 1987; Mitterauer 1993). The timing of the MOR in Veneto (1800–1950), as in other Western Christian countries and regions, was in parallel with the change in the emotional value assigned to newborns, as shown by a robust body of research (see e.g. Ariès 1960; Pancino 1984; Morel 1991; Reher et al. 1997; Rollet 2001). Several studies and analyses have extended the pioneering insights of Philippe Ariès into the increasing societal attention to childhood. This concept has been well documented through various scholarly works, such as those by Morel (1991), Reher et al. (1997), and Rollet (2001). More generally, a major shift in the attention given to children across pedagogy, literature, and family dynamics took place between the eighteenth and nineteenth centuries (Serra et al. 2021).

The nineteenth century also marked a turning point in childcare practices in Veneto. Industrialization increased the likelihood of children growing up in parental households (Kertzer 1987). Significant reforms relating to the care of foundlings (infants brought to institutions immediately after birth) were introduced, such as the 1888 initiative in Rovigo that offered mothers subsidies to nurse their children, reducing the chances of infants entering the foundling system and thereby leading to reduced early mortality (Minelli 1898; Ipsen 2000).

**Table 1** Frequency of the top five first given names: Boys and girls born in Veneto region, Italy, in 1816–69, 2001, and 2021

|                                           | Period                                                           |                                                                  |                                                                    |
|-------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------|
|                                           | 1816–69                                                          | 2001                                                             | 2021                                                               |
| <i>Males</i>                              |                                                                  |                                                                  |                                                                    |
| Top five names as percentage of all names | 41                                                               | 19                                                               | 15                                                                 |
| List of top five names                    | Giovanni (11 per cent)<br>Luigi<br>Giuseppe<br>Antonio<br>Angelo | Matteo (5 per cent)<br>Andrea<br>Riccardo<br>Marco<br>Alessandro | Leonardo (4 per cent)<br>Tommaso<br>Edoardo<br>Riccardo<br>Lorenzo |
| <i>Females</i>                            |                                                                  |                                                                  |                                                                    |
| Top five names as percentage of all names | 39                                                               | 16                                                               | 11                                                                 |
| List of top five names                    | Maria (20 per cent)<br>Anna<br>Angela<br>Teresa<br>Giovanna      | Anna (4 per cent)<br>Giulia<br>Chiara<br>Sara<br>Alessia         | Sofia (3 per cent)<br>Aurora<br>Emma<br>Alice<br>Vittoria          |

Source: CHILD data set (for 1816–69) and ISTAT—The Italian National Institute of Statistics (for 2001 and 2021).

Medical advancements played a crucial role. The first paediatrician in Venice, Cesare Musatti, published guidelines for mothers, emphasizing practices such as frequent bathing, room warming, and extended breastfeeding (Musatti 1876). The nineteenth century also saw the spread of kindergartens and improvements in infant nutrition, including the development of formula milk (Catarsi and Genovesi 1985; Stevens et al. 2009). These changes were accompanied by broader improvements in sanitation and personal hygiene, which contributed to a decline in infectious diseases and mortality (Hogan and Kertzer 1987). Additionally, the consolidation of obstetric knowledge, building on the midwifery courses established in Veneto in the previous century, further enhanced childcare practices (Pancino 1984). These cultural and medical advancements likely influenced parental attitudes and behaviours, potentially being reflected in naming practices and contributing to improved child survival rates even before the major public health reforms of the late nineteenth century. This period also marked the beginning of an awareness of the link between caregiving and survival: ‘Our children die because we do not know how to raise or protect them; our children die because poverty and ignorance are, unfortunately, too often the only guardian angels seated beside their cradles’ (written by the physician Giuseppe Sormani in 1881; quoted by Pozzi [2003, p. 64]). Medical opinion at the time emphasized the importance of the environment in which a child was born and raised, the quality of obstetric care, and pregnancy conditions. Key factors included neonatal care practices, breastfeeding and weaning methods, and the issues of abandonment and wet-nursing. Additionally, specific local concerns included lack of training among midwives, the heavy workloads and poor nutrition of pregnant mothers, and harmful maternal practices and beliefs that impacted infant health (Pasi 1997).

In this historical context, studying the connection between naming practices as a proxy for care and early mortality is challenging. The research question we aim to answer is whether there is a correlation between the name assigned to a child and their risk of dying in early life. The role of the *number* of given names as an indicator of long-term parental investment in terms of care and its protective effect on early-life mortality has already been documented: the number of names was used as an indicator reflecting ‘the psychological investment of the parents in the child, as well as the level of care she or he would receive in early life. Parents who make a higher long-term investment in their children will

give them more names than parents who give less importance to childcare’ (Minello et al. 2021, pp. 212). Here, more specifically, we aim to investigate whether the *type* of name chosen—whether following a traditional or modern pattern—also plays a role in this dynamic. This hypothesis is grounded in the idea that when other family characteristics are controlled for, parents who chose innovative names for their children during the MOR were also those most attuned to the emerging views on childhood, adopting behaviours that more effectively safeguarded their children’s health. If this hypothesis is confirmed, choice of name can be used as a proxy for the level of care and attention children receive, which may subsequently influence their survival prospects.

## Data and methods

### *The CHILD data set*

The CHILD (Collecting Habsburg Information about Life and Death) data set used in this study involves 34 parishes which captured data on births and on deaths of children up to age five years in the five central provinces of the Veneto region (Venice, Treviso, Padua, Vicenza, and Verona) during the nineteenth century. This data set includes the names of 155,215 babies born. The data are derived from civil birth registers (1816–65) and civil death registers (1816–69) maintained in parish and/or diocesan archives under the Austrian Empire (1816–66) and the first five years of the Italian Kingdom in Veneto (1866–70). During both periods, ministers of religion also served as civil registrars, reflecting the dual role of religious institutions in maintaining official demographic records. Using precise nominative linkage (by name, surname, age at death, and names of father and mother), we accurately calculate the survival time (in days) for each newborn. To eliminate cases of endogenous neonatal mortality from our analysis—those unlikely to be mitigated by childcare interventions—we exclude the following: (a) unnamed infants; (b) those who were not baptized; (c) those recorded by the clergy as stillborn; and (d) infants who died on the day of their birth. Our final sample consists of 118,083 births (for a more extensive description of the sources and the data set, see Dalla-Zuanna et al. [2017] and Minello et al. [2017, 2021]).

Linkage is restricted to individuals who died in the same parish within five years of birth. This method accurately estimates early mortality (occurring in the neonatal period and the first few months of

life) but may underestimate mortality increasingly with age, particularly in areas of higher mobility. Additionally, foundlings are excluded from birth and death counts. Historical evidence from Berengo (1963) indicates that during the first half of the eighteenth century, population movements were limited, with one-third of migrations confined to the same province and international migration being practically negligible. For families with very young children, emigrations and immigrations were similar in number. To mitigate potential underestimation of child mortality, we use a method similar to the ‘dummy births’ approach used by Schofield and Wrigley (1979). We create ‘generated records’ for those children who were found in death registers but not in birth registers, who died in the first few years of life, and whose places of birth and death were in the same parish. While we cannot entirely rule out the possibility that parents who chose non-traditional names exhibited different migration patterns, the historical context, our methodological approach, and these additional data should minimize this concern. The limitation of our study to a five-year period further reduces the potential for significant bias due to outmigration. In the overall CHILD sample, only 7.23 per cent of all death records are not linked to any birth record, a percentage that rises to 12.97 per cent in the urban sample.

The name(s) and surname of the child are recorded in both the birth and death registers. The birth registers serve as our primary source for the child’s name(s), as they generally offer the more accurate name record.

A more in-depth analysis is possible for the parish of San Marco, in the city of Venice. During the observation period (1816–69), among all parishes in the CHILD database, uniquely the parish of San Marco recorded not only the names of godfathers and godmothers at baptism but also the names of paternal and maternal grandfathers. Consequently, our analysis of given names for this parish focuses exclusively on male newborns with a male godfather (90 per cent of the total) and with both grandfathers named on the birth certificate ( $n = 1,554$ ).

### *The analytic strategy*

This study investigates the role of name choice practices on mortality outcomes across four age groups: overall child mortality (0–4 years); neonatal mortality (1–28 days); early child mortality (1–11 months); and late child mortality (1–4 years). The analysis relies on logistic regression models, where

the outcome variable indicates whether the child is alive or dead at the end of each respective period. The structure of the study is shown in Table 2; all analyses are conducted separately for males and females.

*CHILD data set.* The first phase of the analysis involves a comprehensive examination of overall child, neonatal, early child, and late child mortality using all the parishes included in the CHILD data set. Within the 34 parishes included in our data set, we identify the most prevalent first names, focusing on the top five during 1816–69, to detect the main independent variable, type of name, which is binary: traditional vs modern names. We divide the observation period into three: 1816–34, 1835–52; and 1853–69. The most commonly encountered names for boys are Giovanni, Antonio, Giuseppe, Luigi, and Angelo (in the period 1816–34) and Pietro (in the periods 1835–52 and 1853–69) and for girls Maria, Anna, Angela, Teresa, and Giovanna (in 1816–34) and Luigia (in the periods 1835–52 and 1853–69). These names are categorized as ‘traditional’ and contrasted with other names, referred to as ‘modern’.

The daily probabilities of dying in the Veneto region are not homogeneous throughout the different periods of infant life, reflecting substantial variation in the causes of death across these age intervals. Mortality is estimated as 28.4‰ at age 1–28 days, 0.5‰ at 1–11 months, and 0.2‰ at 1–4 years. This heterogeneity at different stages of early life justifies our focus on multiple types of child mortality, which we analyse separately.

We use the 118,083 children born in the 34 parishes of the CHILD data set to model the risk of child mortality for boys and girls with the five most common (traditional) given names relative to the risk of dying for children with modern names. Owing to the extremely high levels of neonatal mortality—and given that the most significant reductions in mortality between 1840 and 1870 occurred during the first month of life—we choose to investigate more thoroughly the connection between given names and mortality at age 1–28 days. The underlying idea is that in a context of high neonatal mortality, the attention given to children may have a particularly strong effect on their survival chances during the first weeks of life. Given the seasonal neonatal mortality differences observed in Veneto, we incorporate additional models that include a composite variable for birth season and traditional vs modern name type. During the eighteenth and

**Table 2** Data set, dependent and main independent variables, and sample by model

| Data set                | Dependent variable    | Main independent variable                                           | Sex                |
|-------------------------|-----------------------|---------------------------------------------------------------------|--------------------|
| <i>CHILD Veneto</i>     | 0–4 years             | Traditional vs modern first name <sup>1</sup>                       | Males (Model 1)    |
|                         | Child mortality       |                                                                     | Females (Model 2)  |
|                         | 1–28 days             |                                                                     | Males (Model 1a)   |
|                         | Neonatal mortality    |                                                                     | Females (Model 2a) |
|                         | 1–11 months           | Traditional vs modern first name <sup>1</sup>                       | Males (Model 1b)   |
|                         | Early child mortality |                                                                     | Females (Model 2b) |
|                         | 1–4 years             |                                                                     | Males (Model 1c)   |
|                         | Late child mortality  |                                                                     | Females (Model 2c) |
|                         | 1–28 days             | Traditional vs modern first name <sup>1</sup><br>by season of birth | Males (Model 3)    |
|                         | Neonatal mortality    |                                                                     | Females (Model 4)  |
|                         | 0–4 years             |                                                                     | Males (Model 5)    |
|                         | Child mortality       |                                                                     | Females (Model 6)  |
|                         | 1–28 days             | Giovanni vs other first names Maria vs<br>other first names         | Males (Model 5a)   |
|                         | Neonatal mortality    |                                                                     | Females (Model 6a) |
|                         | 1–11 months           |                                                                     | Males (Model 5b)   |
|                         | Early child mortality |                                                                     | Females (Model 6b) |
| <i>San Marco parish</i> | 1–4 years             | Traditional vs modern first name <sup>1</sup>                       | Males (Model 5c)   |
|                         | Late child mortality  |                                                                     | Females (Model 6c) |
|                         | 0–4 years             | Traditional vs modern first name <sup>1</sup>                       | Males (Model 7)    |
|                         | Child mortality       |                                                                     | Females (Model 8)  |
|                         | 1–28 days             |                                                                     | Males (Model 7a)   |
|                         | Neonatal mortality    |                                                                     | Females (Model 8a) |
|                         | 1–11 months           | Traditional vs modern first name <sup>1</sup>                       | Males (Model 7b)   |
|                         | Early child mortality |                                                                     | Females (Model 8b) |
|                         | 1–4 years             |                                                                     | Males (Model 7c)   |
|                         | Late child mortality  |                                                                     | Females (Model 8c) |
|                         | 0–4 years             | First name: grandfather vs<br>godfather vs unconventional           | Males (Model 9)    |
|                         | Child mortality       |                                                                     | Males (Model 9a)   |
|                         | 1–28 days             |                                                                     | Males (Model 9b)   |
|                         | Neonatal mortality    |                                                                     | Males (Model 9c)   |
|                         | 1–11 months           | All names: grandfather vs<br>godfather vs unconventional            | Males (Model 10)   |
|                         | Early child mortality |                                                                     | Males (Model 10a)  |
|                         | 1–4 years             |                                                                     | Males (Model 10b)  |
|                         | Late child mortality  |                                                                     | Males (Model 10c)  |

<sup>1</sup>Traditional names are the five most frequent in the period 1816–69.

*Note:* All models control for: father's occupation, urban vs rural parish (for the CHILD data set only), season of birth, time between the birth of the child and the marriage of the parents, period of birth, and number of given names.

*Source:* Authors' own.

nineteenth centuries, winter neonatal mortality was three to four times higher in Veneto than in other areas with similar winter temperatures, such as England and Tuscany (Dalla-Zuanna and Rosina 2011). Notably, the overall decline in mortality began precisely when winter neonatal mortality started to decrease. By analysing this composite variable, we aim to discern whether the shift towards modern names and the associated changes in child-

rearing practices had differential impacts on survival rates depending on the season of birth. To provide a concrete (and extreme) example of this mechanism, we also analyse the probability of neonatal mortality for boys and girls with the most common name (Giovanni [John] and Maria [Mary]), by applying the same method.

The structure of the analysis is as follows (see Table 2):

- Models 1 and 2 examine child mortality (0–4 years) for males and females, comparing traditional vs modern first names;
- Models 1a–2c further stratify the analysis into specific age ranges (1–28 days, 1–11 months, 1–4 years) for both sexes;
- Models 3 and 4 focus on neonatal mortality (1–28 days), considering the impact of birth season on traditional vs modern names for both sexes
- Models 5 and 6 investigate neonatal mortality specifically for the names Giovanni (males) and Maria (females) compared with other first names

The predicted probabilities come from a logistic model specification and can be represented as follows:.

$$P(Y=1) = \frac{e^{\hat{\alpha} + \beta_1 \times \text{TraditionalName} + \beta_2 \times X_1 + \dots + \beta_k \times X_k}}{1 + e^{\hat{\alpha} + \beta_1 \times \text{TraditionalName} + \beta_2 \times X_1 + \dots + \beta_k \times X_k}} \quad (1)$$

where  $Y$  indicates whether the child survived (1) or not (0); *TraditionalName* is a binary indicator for whether the child received a traditional name;  $X_1 \dots X_k$  represent the additional covariates in the model; and  $\alpha, \beta_1 \dots \beta_k$  are the estimated parameters. The models control for several covariates: father's occupation; being born in an urban or rural parish; season of birth; time interval between birth of the child and marriage of the parents (as a proxy of birth order along with its squared term to capture potential non-linearities); and period of birth. Finally, the models control for another variable that can be considered to be a proxy of parental mindset and has already been confirmed to be related to the risk of early death (Minello et al. 2021): the number of given names, distinguishing between those with only one name (traditional) and those with two or more names (modern) (see Table 3 for descriptive univariate statistics). For the analysis of neonatal mortality probabilities from logistic models are shown graphically, for clarity of interpretation. The core idea is to calculate the risk of neonatal mortality for children with traditional (the most frequent five names) vs modern names.

We make some additional robustness checks. First, to identify firstborn children we create three separate groups, identifying children born within the periods 12, 18, and 24 months after their parents' wedding and estimated distinct models for each specification. We then model neonatal mortality risks by naming practices for firstborn children only. If the firstborn child of each sex were more likely to

receive a traditional name, we would expect to observe a stronger effect for children born closer to the time of marriage. Second, we stratify the sample by father's occupation to explore the neonatal mortality risks linked to diverse naming practices across family backgrounds.

*San Marco parish.* We calculate the risk of dying for each newborn and apply the same strategies as before to eliminate cases of endogenous neonatal mortality from the analysis. Here, names are categorized at three levels, generating three different models.

At the first level, we identify traditional (43.2 per cent) vs modern (56.8 per cent) first names, focusing on the top five names during 1816–69 and following the same binary categories as for the complete CHILD data set.

Second, for boys only we quantify how many had: the same first name as one of their grandfathers (24.3 per cent); the same first name as one of their godfathers (24.9 per cent); or an 'unconventional' first name (50.8 per cent). If the names of the godfathers and grandfathers correspond, the child is assigned to the godfather category. We also include in this category those with the same name as their father (71 cases). In 21 cases, that name corresponds to the name of the grandfather. Including/excluding the name of the father as a robustness check does not change the results of the models. Moreover, in this parish, children were equally likely to be named after their paternal or maternal grandfather. The data show no significant preference for using the name of one grandfather over the other when naming newborns. To exclude other religious or traditional patterns, we check for children named after the saint's day that they were born on (main saints only): this represents only 2 per cent of the total number of newborns. Including/excluding children named after saints' days does not change the results of the models.

Finally, we consider all the names given to male newborns and quantify what proportion of the children had at least one name referring to a grandfather or godfather (75.9 per cent) and how many had only names not linked to either (i.e. all unconventional: 24.1 per cent). Parents, grandparents, and godparents—as a rule—were indicated with only one given name in children's birth certificates. In the rare cases where they were referred to by multiple names, we consider only the first. Since we consider all the names of each child in the analyses, we identify only those with *any* traditional names, without

**Table 3** Frequency distribution of independent variables (column percentages)

| Variable                                   | Category                                       | CHILD <sup>1</sup> | San Marco |
|--------------------------------------------|------------------------------------------------|--------------------|-----------|
| <i>Father's occupation</i>                 | Farmer                                         | 46.3               | 0.0       |
|                                            | Craftsman/labourer (including fisher)          | 25.1               | 26.0      |
|                                            | Merchant                                       | 7.7                | 41.6      |
|                                            | Employee / civil servant                       | 2.5                | 10.9      |
|                                            | Servant                                        | 1.7                | 9.9       |
|                                            | Skilled worker/well-to-do individual/landowner | 10.0               | 11.2      |
|                                            | Other/missing                                  | 6.7                | 0.4       |
| <i>Parish type</i>                         | Urban                                          | 24.9               | –         |
|                                            | Rural                                          | 75.1               | –         |
| <i>Season of birth</i>                     | Winter (Dec, Jan, Feb)                         | 28.7               | 26.2      |
|                                            | Spring (Mar, Apr, May)                         | 23.8               | 24.3      |
|                                            | Summer (Jun, Jul, Aug)                         | 24.3               | 25.1      |
|                                            | Autumn (Sept, Oct, Nov)                        | 23.2               | 24.4      |
| <i>Interval between marriage and birth</i> | Mean, in years                                 | 7.6                | 6.2       |
| <i>Period of birth</i>                     | 1816–34                                        | 32.7               | 31.3      |
|                                            | 1835–52                                        | 34.6               | 37.1      |
|                                            | 1853–69                                        | 32.7               | 31.6      |
| <i>Number of given names</i>               | One                                            | 51.1               | 5.2       |
|                                            | Two (or more)                                  | 48.9               | 26.2      |
|                                            | Three or more names                            | –                  | 68.6      |

<sup>1</sup>CHILD is the data set covering 34 parishes in five provinces in Veneto (Padova, Treviso, Vicenza, Venice, and two rural parishes of Verona).

Source: Authors' analysis of CHILD data set.

separating those with a godparent's or grandparent's name, since many children may have had both grandparents' and godparents' names.

The structure of the analysis for San Marco is as follows (see Table 2):

- Models 7 and 8 examine child mortality (0–4 years) for each sex, comparing traditional vs modern first names;
- Models 7a–8c stratify the analysis into specific age ranges (0–28 days, 1–11 months, 1–4 years) for each sex;
- Model 9 investigates child mortality (0–4 years) for males, comparing first names categorized as grandfathers vs godfathers vs unconventional;
- Models 9a–9c apply the approach of Model 9 to specific age ranges (0–28 days, 1–11 months, 1–4 years) in males;
- Model 10 expands on Model 9, considering all names, for child mortality (0–4 years) in males;
- Models 10a–10c apply the approach of Model 10 to specific age ranges (0–28 days, 1–11 months, 1–4 years) in males.

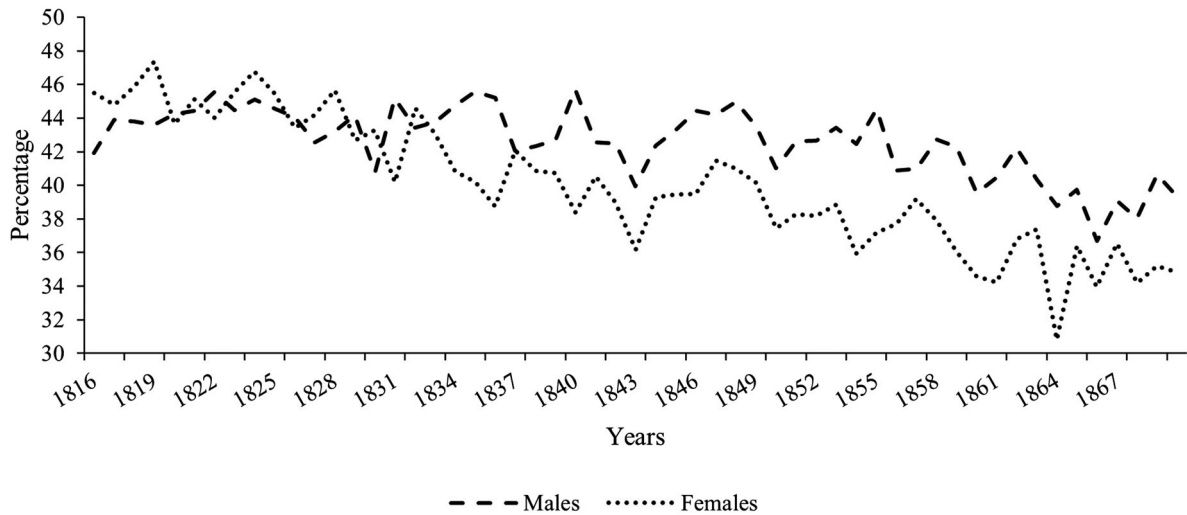
The models control for the same variables used in the analysis of the pooled sample of 34 parishes (Table 3), excluding the urban/rural classification and, for parsimony, the quadratic term of the interval between marriage and birth.

## Results

Figure 2 presents the proportional distribution of the five most prevalent given names combined for male and female children born from 1816 to 1869 across the 34 parishes in Veneto. For girls, the percentage peaks at 47.4 per cent in 1819 and then shows a marked decline, reaching 30.8 per cent in 1869. Conversely, boys' names exhibit a high of 45.7 per cent in 1840 and a similar downward trend, falling to 36.7 per cent by 1869. The data show noticeable variations over time, with the highest percentages observed in the earlier years and a general declining trend towards the end of the period. These trends may suggest a shift in naming practices over time, which started earlier for girls.

### *Given names and child mortality in the Veneto region (Models 1–6)*

Table 4 indicates no consistent effect across age groups of having a modern (vs traditional) name on child mortality. For both boys and girls, modern names are associated with significantly lower odds of death only during the neonatal period (1–28 days): odds ratio (OR) = 0.93 for males and OR = 0.87 for females, both statistically significant at the 1 per cent level. This protective effect does not persist beyond the neonatal phase, as the ORs for



**Figure 2** The proportional distribution of traditional given names (the five most common names combined) by sex: Veneto region, 1816–69

Source: Authors' analysis of data from CHILD data set.

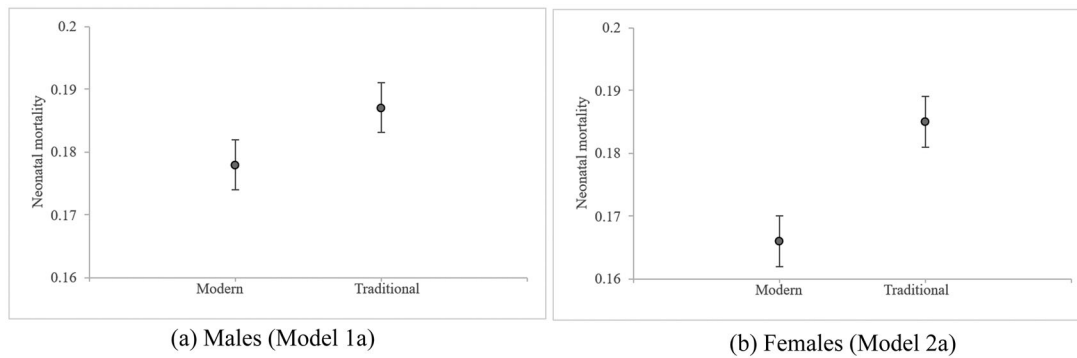
**Table 4** Hazard ratios of child mortality, stratified by age range and by sex, by type of name (traditional vs modern): Veneto region, 1816–69

| Variable                                                      | Category                                       | Males                 |                       |                         |                       | Females               |                       |                         |                       |
|---------------------------------------------------------------|------------------------------------------------|-----------------------|-----------------------|-------------------------|-----------------------|-----------------------|-----------------------|-------------------------|-----------------------|
|                                                               |                                                | 0–4<br>years<br>Model | 1–28<br>days<br>Model | 1–11<br>months<br>Model | 1–4<br>years<br>Model | 0–4<br>years<br>Model | 1–28<br>days<br>Model | 1–11<br>months<br>Model | 1–4<br>years<br>Model |
|                                                               |                                                | 1                     | 1a                    | 1b                      | 1c                    | 2                     | 2a                    | 2b                      | 2c                    |
| <i>Type of name</i>                                           | Traditional                                    | Ref.                  | Ref.                  | Ref.                    | Ref.                  | Ref.                  | Ref.                  | Ref.                    | Ref.                  |
|                                                               | Modern                                         | 0.99                  | 0.93***               | 1.02                    | 1.03                  | 0.93***               | 0.87***               | 0.99                    | 1.00                  |
| <i>Father's occupation</i>                                    | Farmer                                         | Ref.                  | Ref.                  | Ref.                    | Ref.                  | Ref.                  | Ref.                  | Ref.                    | Ref.                  |
|                                                               | Craftsman/labourer                             | 1.26***               | 1.21***               | 1.10**                  | 1.33***               | 1.25***               | 1.15***               | 1.00                    | 1.45***               |
|                                                               | Merchant                                       | 1.20***               | 1.10**                | 1.13**                  | 1.26***               | 1.18***               | 1.15**                | 0.93                    | 1.33***               |
|                                                               | Employee / civil servant                       | 0.89**                | 0.92                  | 0.98                    | 0.82**                | 0.87**                | 0.97                  | 0.84                    | 0.87                  |
|                                                               | Servant                                        | 1.12**                | 1.27***               | 0.74                    | 1.18*                 | 1.06                  | 1.35***               | 0.73**                  | 1.10                  |
|                                                               | Skilled worker/well-to-do individual/landowner | 0.88***               | 1.07*                 | 0.77***                 | 0.75***               | 0.87***               | 1.02                  | 0.75***                 | 0.82***               |
| <i>Parish type</i>                                            | Other/missing                                  | 2.22***               | 2.19***               | 1.72***                 | 1.80***               | 2.23***               | 2.19***               | 1.66***                 | 1.93***               |
|                                                               | Rural                                          | Ref.                  | Ref.                  | Ref.                    | Ref.                  | Ref.                  | Ref.                  | Ref.                    | Ref.                  |
|                                                               | Urban                                          | 1.03                  | 0.58***               | 1.18***                 | 1.53***               | 1.01                  | 0.58***               | 1.25***                 | 1.37***               |
| <i>Season of birth</i>                                        | Winter                                         | Ref.                  | Ref.                  | Ref.                    | Ref.                  | Ref.                  | Ref.                  | Ref.                    | Ref.                  |
|                                                               | Spring                                         | 0.60***               | 0.42***               | 0.80***                 | 1.14***               | 0.59***               | 0.37***               | 0.85***                 | 1.21***               |
|                                                               | Summer                                         | 0.44***               | 0.14***               | 0.96                    | 1.21***               | 0.42***               | 0.11***               | 0.93                    | 1.23***               |
|                                                               | Autumn                                         | 0.61***               | 0.36***               | 1.29***                 | 0.96                  | 0.61***               | 0.35***               | 1.35***                 | 1.00                  |
| <i>Interval between marriage and birth (in years)</i>         |                                                | 0.99                  | 0.94***               | 0.99                    | 1.03                  | 1.00                  | 0.97***               | 1.00                    | 1.05***               |
| <i>Interval between marriage and birth (in years) squared</i> |                                                | 1.00                  | 1.00***               | 1.00*                   | 0.99                  | 0.99                  | 1.00***               | 1.00                    | 0.99***               |
| <i>Period of birth</i>                                        | 1816–34                                        | Ref.                  | Ref.                  | Ref.                    | Ref.                  | Ref.                  | Ref.                  | Ref.                    | Ref.                  |
|                                                               | 1835–52                                        | 0.89***               | 0.84***               | 0.87***                 | 1.03                  | 0.91***               | 0.85***               | 0.84***                 | 1.07**                |
|                                                               | 1853–69                                        | 0.73***               | 0.60***               | 0.76***                 | 0.98                  | 0.73***               | 0.59***               | 0.71***                 | 1.03                  |
| <i>Number of given names</i>                                  | One                                            | Ref.                  | Ref.                  | Ref.                    | Ref.                  | Ref.                  | Ref.                  | Ref.                    | Ref.                  |
|                                                               | Two (or more)                                  | 0.80***               | 0.66***               | 1.00                    | 0.90***               | 0.78***               | 0.66***               | 0.96                    | 0.95                  |

\* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

Note: Ref. denotes the reference category.

Source: As for Table 3.



**Figure 3** Predicted probability of neonatal mortality by sex and type of name (traditional vs modern): Veneto region, 1816–69

*Note:* Bars show predictive margins with 95 per cent confidence intervals.

*Source:* As for Figure 2.

older age groups (1–11 months, 1–4 years) are not statistically significant and hover around unity. We also estimated a comprehensive model including an interaction term for sex and applying a Wald test, and the results confirmed a statistically significant difference in the effect of name type on neonatal mortality risk between boys and girls: 69.6 (0.000).

Figure 3 (from Models 1a and 2a in Table 4) illustrates the predicted probabilities of neonatal mortality by sex, distinguishing between those with traditional and modern names. The predicted probability of dying within the first month of life is 17.7 per cent for boys with modern names compared with 18.5 per cent for boys with traditional names; for girls the equivalent figures are 16.4 and 18.3 per cent, respectively. Although these differences may appear small, they are statistically significant and exceed, for instance, the gap in neonatal mortality observed between children of farmers and those with fathers from the highest social group (skilled workers, well-to-do individuals, and landowners) (Table 4).

Focusing on neonatal mortality, hence, serves to validate the relevance of the naming mechanism, even when examining the high mortality rates during the earliest period of life. The interaction between birth season and first given name (Models 3 and 4 in Table 5) is particularly revealing: the difference in neonatal mortality between children with modern vs traditional names is most pronounced in winter: the season when neonatal mortality in Veneto was especially high during 1750–1850 and also the season in which the long-term decline in neonatal mortality (starting in the 1830s) began. In the other seasons, the relative odds of neonatal death are already substantially lower across all naming categories, and the

additional protective effect of modern names appears more limited.

As a concrete (and extreme) illustration of the naming mechanism, we examine the likelihood of neonatal mortality among boys and girls with the most common names (Giovanni and Maria). In the Veneto region in 1816–69, with all other conditions remaining constant, the risk of neonatal death was significantly greater for children given Giovanni or Maria as their first name (models in Table 6 and Figure 4). The elevated mortality risk associated with the names Giovanni and Maria is concentrated in the neonatal period: we observe no significant effects in older age ranges, although the 0–4 years model shows a small but significant excess risk.

Finally, we conduct some robustness checks to assess the reliability of our findings and ensure that the observed associations remain consistent across different specifications. First, we verify the results using only girls and boys born in the initial period after their parents' marriage, as a proxy for identifying firstborn children. The aim is to disentangle the possible mechanism of repeated names: the choice of names is finite, and name(s) given to subsequent newborns were obviously influenced by the names given to previously born children. Moreover, children could be given the names of deceased siblings. Focusing on firstborns overcomes both of these issues. We explore different specifications for identifying firstborn children (born during the 12, 18, or 24 months after the parental marriage) and obtain consistent results. Once again, we find that the choice of names is statistically significant for both males and females: having a modern name decreases the risk of death during the first month for both girls and boys (Appendix Table A1). We find some suggestive

**Table 5** Odds ratios of neonatal mortality (1–28 days), stratified by sex, interacting type of name (traditional vs modern) with season: Veneto region, 1816–69

| Variable                                                      | Category                                       | Males<br>Model 3 | Females<br>Model 4 |
|---------------------------------------------------------------|------------------------------------------------|------------------|--------------------|
| <i>Type of name by season</i>                                 | Traditional/Winter                             | Ref.             | Ref.               |
|                                                               | Modern/Winter                                  | 0.94**           | 0.90***            |
|                                                               | Traditional/Spring                             | 0.44***          | 0.41***            |
|                                                               | Modern/Spring                                  | 0.42***          | 0.37***            |
|                                                               | Traditional/Summer                             | 0.14***          | 0.13***            |
|                                                               | Modern/Summer                                  | 0.15***          | 0.10***            |
|                                                               | Traditional/Autumn                             | 0.36***          | 0.37***            |
|                                                               | Modern/Autumn                                  | 0.38***          | 0.30***            |
| <i>Father's occupation</i>                                    | Farmer                                         | Ref.             | Ref.               |
|                                                               | Craftsman/labourer                             | 1.21***          | 1.15***            |
|                                                               | Merchant                                       | 1.10**           | 1.15**             |
|                                                               | Employee / civil servant                       | 0.97             | 0.97               |
|                                                               | Servant                                        | 1.27***          | 1.35***            |
|                                                               | Skilled worker/well-to-do individual/landowner | 1.07*            | 1.02               |
|                                                               | Other/missing                                  | 2.20***          | 2.19***            |
| <i>Parish type</i>                                            | Rural                                          | Ref.             | Ref.               |
|                                                               | Urban                                          | 0.60***          | 0.58***            |
| <i>Interval between marriage and birth (in years)</i>         |                                                | 0.94***          | 0.97***            |
| <i>Interval between marriage and birth (in years) squared</i> |                                                | 1.00***          | 1.00***            |
| <i>Period of birth</i>                                        | 1816–34                                        | Ref.             | Ref.               |
|                                                               | 1835–52                                        | 0.84***          | 0.85***            |
|                                                               | 1853–69                                        | 0.60***          | 0.59***            |
|                                                               |                                                |                  |                    |
| <i>Number of given names</i>                                  | One                                            | Ref.             | Ref.               |
|                                                               | Two (or more)                                  | 0.66***          | 0.64***            |

\* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

Note: Ref. denotes the reference category.

Source: As for Table 3.

evidence that among children born shortly after their parents' marriage, those with modern names experience lower neonatal mortality than those with traditional names. This finding is consistent with the notion that firstborns are more likely to receive traditional names, and therefore, the naming effect may be more pronounced at low birth orders. However, the differences across the time intervals (12, 18, and 24 months) are not statistically significant, so this pattern should be interpreted with caution.

Second, to assess the robustness of the effect of naming practices on neonatal mortality, we conduct a bootstrap analysis with 1,000 resamples. The results confirm the statistical significance of the coefficient measuring traditional vs modern names (0.613), with a 95 per cent confidence interval ranging from 0.032 to 0.895, indicating a consistent positive association between traditional names and neonatal mortality risk.

Third, despite the robustness of our results—from models which all control for father's occupation as a proxy for socio-economic status, ensuring that our variable of interest is not conflated with a status measure—we estimate separately additional models based on father's occupation (using the

CHILD data set). These models (Appendix Table A2) show that the variable indicating traditional vs modern naming is statistically significant in the expected direction for all groups except servants and the skilled workers and well-to-do group. It is not uncommon to observe similar demographic behaviours in these two categories, which share, by proximity, access to certain material and cultural resources unavailable to other less advantaged occupations. For these groups, the effect is not statistically significant, possibly due to the limited variation in caregiving effects among groups that were already comparatively well protected relative to others.

#### *Beyond names: Covariates of child mortality in historical Veneto (Models 1 and 2)*

Since this paper addresses a relatively unexplored topic, we briefly discuss the control variables, focusing on the 34 parishes of Veneto (Table 4). Differences in the risk of death by father's occupation are particularly relevant to the focus of this paper. Mortality at 1–11 months and 1–4 years is lower among the children of the elite—namely, the employee and

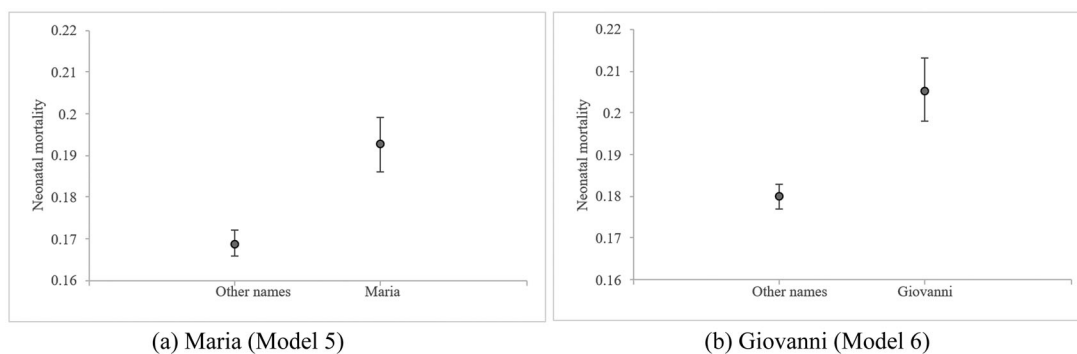
**Table 6** Odds ratios of child mortality, stratified by age range and by sex, by type of name (Giovanni vs other names for boys; Maria vs other names for girls): Veneto region, 1816–69

| Variable                                               | Category                                       | Males               |                     |                       |                      | Females             |                     |                       |                      |
|--------------------------------------------------------|------------------------------------------------|---------------------|---------------------|-----------------------|----------------------|---------------------|---------------------|-----------------------|----------------------|
|                                                        |                                                | 0–4                 | 1–28                | 1–11                  | 1–4                  | 0–4                 | 1–28                | 1–11                  | 1–4                  |
|                                                        |                                                | years<br>Model<br>5 | days<br>Model<br>5a | months<br>Model<br>5b | years<br>Model<br>5b | years<br>Model<br>6 | days<br>Model<br>6a | months<br>Model<br>6b | years<br>Model<br>6c |
| Type of name                                           | Giovanni/Maria                                 | Ref.                | Ref.                | Ref.                  | Ref.                 | Ref.                | Ref.                | Ref.                  | Ref.                 |
|                                                        | Other names                                    | 0.91***             | 0.83***             | 1.00                  | 0.98                 | 0.93***             | 0.83***             | 0.99                  | 1.03                 |
| Father's occupation                                    | Farmer                                         | Ref.                | Ref.                | Ref.                  | Ref.                 | Ref.                | Ref.                | Ref.                  | Ref.                 |
|                                                        | Craftsman/labourer                             | 1.26***             | 1.21***             | 1.10**                | 1.33***              | 1.25***             | 1.15***             | 1.00                  | 1.45***              |
|                                                        | Merchant                                       | 1.19***             | 1.10*               | 1.12*                 | 1.26***              | 1.17**              | 1.14**              | 0.94                  | 1.32**               |
|                                                        | Employee / civil servant                       | 0.90*               | 0.98                | 0.99                  | 0.83**               | 0.86**              | 0.97                | 0.84*                 | 0.86                 |
|                                                        | Servant                                        | 1.11*               | 1.27**              | 0.84                  | 1.18**               | 1.07                | 1.35**              | 0.73**                | 1.10                 |
|                                                        | Skilled worker/well-to-do individual/landowner | 0.87***             | 1.07                | 0.77***               | 0.75***              | 0.87***             | 1.03                | 0.75***               | 0.82***              |
|                                                        | Other/missing                                  | 2.23***             | 2.22***             | 1.74***               | 1.80***              | 2.21***             | 2.16***             | 1.66***               | 1.92***              |
| Parish type                                            | Rural                                          | Ref.                | Ref.                | Ref.                  | Ref.                 | Ref.                | Ref.                | Ref.                  | Ref.                 |
|                                                        | Urban                                          | 1.03                | 0.61***             | 1.17***               | 1.53***              | 1.01                | 0.59***             | 1.24***               | 1.36***              |
| Season of birth                                        | Winter                                         | Ref.                | Ref.                | Ref.                  | Ref.                 | Ref.                | Ref.                | Ref.                  | Ref.                 |
|                                                        | Spring                                         | 0.60***             | 0.42***             | 0.80***               | 1.15***              | 0.59***             | 0.37***             | 0.85***               | 1.20***              |
|                                                        | Summer                                         | 0.144***            | 0.14***             | 0.96                  | 1.21***              | 0.41***             | 0.11***             | 0.94                  | 1.23***              |
|                                                        | Autumn                                         | 0.61***             | 0.36***             | 1.29***               | 0.96                 | 0.61***             | 0.36***             | 1.34***               | 0.99                 |
| Interval between marriage and birth (in years)         |                                                | 0.99                | 0.94***             | 0.99                  | 1.06***              | 1.00                | 0.97***             | 1.00                  | 1.05***              |
| Interval between marriage and birth (in years) squared |                                                | 1.00                | 1.00***             | 1.00*                 | 0.99***              | 0.99                | 1.00***             | 1.00                  | 0.99***              |
| Period of birth                                        | 1816–34                                        | Ref.                | Ref.                | Ref.                  | Ref.                 | Ref.                | Ref.                | Ref.                  | Ref.                 |
|                                                        | 1835–52                                        | 0.89***             | 0.84***             | 0.87***               | 1.02                 | 0.91***             | 0.85***             | 0.84***               | 1.07*                |
|                                                        | 1853–69                                        | 0.73***             | 0.60***             | 0.76***               | 0.98                 | 0.73***             | 0.57***             | 0.75***               | 1.03                 |
| Number of given names                                  | One                                            | Ref.                | Ref.                | Ref.                  | Ref.                 | Ref.                | Ref.                | Ref.                  | Ref.                 |
|                                                        | Two (or more)                                  | 0.79***             | 0.66***             | 1.00                  | 0.90***              | 0.78***             | 0.63***             | 0.97                  | 0.93                 |

\* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

Note: Ref. denotes the reference category.

Source: As for Table 3.

**Figure 4** Estimated probabilities of neonatal deaths for children named Maria or Giovanni: Veneto region, 1816–69

Note: Bars show predictive margins with 95 per cent confidence intervals.

Source: As for Figure 2.

civil servant group and the skilled workers, well-to-do individuals, and landowners group—which may reflect better material living conditions. By contrast, few differences in neonatal mortality (and only for males) are observed between the children of the elite and those of farmers. Given that within both occupational groups, neonatal mortality varies significantly by the name assigned (Appendix Table A2), this finding provides further evidence that changes in cultural attitudes—rather than material conditions—played a key role in the decline of neonatal mortality in nineteenth-century Veneto.

The risk of dying was higher in rural areas during the first month of life, whereas mortality was higher in urban areas in the subsequent age groups. Neonatal mortality was significantly elevated for children born in winter, while mortality at ages 1–4 was higher among those born in summer. As extensively discussed in Dalla-Zuanna et al. (2014), this latter pattern reflects a selection effect: only the most robust infants survived the extremely high neonatal mortality associated with winter births, making them better equipped to withstand mortality risks later in life.

The effect of the interval between the parents' marriage and the child's birth—used as a proxy for birth order—shows a non-linear pattern for some age ranges. For both males and females aged 1–28 days, the linear term is significantly negative (OR = 0.94 and 0.97, respectively), while the squared term is significantly positive (OR = 1.00,  $p < 0.01$ ), suggesting a U-shaped relationship: neonatal mortality tends to decrease with longer intervals, likely reflecting lower mortality among later-born children, but rises again for births occurring several years after marriage, possibly due to selective fertility or deteriorating maternal health. The effect remains modest and is not consistent across all age groups. Among females aged 1–4 years (Model 2c), both the linear and the quadratic terms are significant but with a different curvature: mortality risk increases with the interval, yet the positive effect weakens as the interval grows. These curvilinear associations may reflect complex interactions between birth order, parental investment, and family dynamics that deserve further exploration. Moreover, while neonatal mortality (1–28 days) and infant mortality (1–11 months) declined sharply between 1816–34 and 1853–69, this trend is not observed in mortality at ages 1–4. The substantial reduction in early-life mortality meant that even less robust children survived the neonatal and infant periods, thereby contributing to relatively higher mortality rates in later childhood.

The decline in mortality during the periods 1835–52 and, more markedly, 1853–69—relative to 1816–34—remains statistically significant at ages 1–28 days and 1–11 months. This pattern suggests that additional factors, not captured by our models, contributed to the reduction in mortality during the neonatal period and throughout the first year of life.

Finally, a greater number of names assigned to a child appears to have been protective for both females and males. Taken together, the two onomastic indicators—receiving multiple names and receiving non-traditional names—suggest that less conventional naming practices were positively associated with higher survival rates, particularly during the neonatal period.

#### *Given names and child mortality in the parish of San Marco (Models 7–10)*

We now examine data from the Venetian parish of San Marco. Due to the smaller sample size, detecting statistically significant differences requires larger effect sizes than in the pooled analysis of the 34 parishes of Veneto. As in Veneto, neonatal mortality in San Marco is higher among children given traditional names (Models 7 and 8, Table 7). The association is particularly pronounced among boys, who also exhibit higher mortality at ages 1–4 when not assigned one of the five most common first names.

Next we consider only males, for whom additional information is available. The analysis of first given names shows that mortality is consistently lower across all three age groups (1–28 days, 1–11 months, and 1–4 years) among those not named after their godfather or a paternal/maternal grandfather (i.e. those given unconventional names; Model 9, Table 8). However, the difference reaches statistical significance only in the 1–4-year age group. When considering all given names (not only the first), children with unconventional names show a consistent survival advantage over those named according to traditional patterns. This advantage is visible across all age groups but is statistically significant only in the neonatal period (Model 10, Table 8).

## **Discussion**

From a temporal point of view, the MOR and the demographic transition overlapped in the Veneto region, and this paper confirms that name choice was correlated with early mortality, especially during the neonatal period. Children given non-

**Table 7** Odds ratios of child mortality, stratified by age range and sex, by type of name (traditional vs modern): San Marco parish, 1816–69

| Variable                                              | Category                                       | Males                 |                       |                         |                       | Females               |                       |                         |                       |
|-------------------------------------------------------|------------------------------------------------|-----------------------|-----------------------|-------------------------|-----------------------|-----------------------|-----------------------|-------------------------|-----------------------|
|                                                       |                                                | 0–4<br>years<br>Model | 1–28<br>days<br>Model | 1–11<br>months<br>Model | 1–4<br>years<br>Model | 0–4<br>years<br>Model | 1–28<br>days<br>Model | 1–11<br>months<br>Model | 1–4<br>years<br>Model |
|                                                       |                                                | 7                     | 7a                    | 7b                      | 7c                    | 8                     | 8a                    | 8b                      | 8c                    |
| <i>Type of name</i>                                   | Traditional                                    | Ref.                  | Ref.                  | Ref.                    | Ref.                  | Ref.                  | Ref.                  | Ref.                    | Ref.                  |
|                                                       | Modern                                         | 0.83***               | 0.76**                | 0.96                    | 0.80*                 | 0.99                  | 0.91                  | 0.87                    | 1.05                  |
| <i>Father's occupation</i>                            | Craftsman/labourer                             | Ref.                  | Ref.                  | Ref.                    | Ref.                  | Ref.                  | Ref.                  | Ref.                    | Ref.                  |
|                                                       | Merchant                                       | 1.01                  | 0.92                  | 0.97                    | 1.09                  | 0.85                  | 0.98                  | 0.79                    | 0.83                  |
|                                                       | Employee / civil servant                       | 1.07                  | 1.44                  | 1.05                    | 0.87                  | 0.91                  | 1.09                  | 1.10                    | 0.68                  |
|                                                       | Servant                                        | 1.11                  | 1.14                  | 1.28                    | 0.97                  | 0.83                  | 1.08                  | 0.86                    | 0.71                  |
|                                                       | Skilled worker/well-to-do individual/landowner | 0.69**                | 1.10                  | 0.54**                  | 0.66**                | 0.65***               | 1.20                  | 0.69**                  | 0.45***               |
|                                                       | Other/missing                                  | 0.60                  | 1.42                  | 0.30                    | 0.22                  | 0.42*                 | 0.97                  | 0.97                    | 0.19                  |
| <i>Season of birth</i>                                | Winter                                         | Ref.                  | Ref.                  | Ref.                    | Ref.                  | Ref.                  | Ref.                  | Ref.                    | Ref.                  |
|                                                       | Spring                                         | 0.71***               | 0.48***               | 0.91                    | 0.95                  | 0.86                  | 0.70**                | 0.74                    | 1.19                  |
|                                                       | Summer                                         | 0.74***               | 0.21***               | 1.08                    | 1.26                  | 0.70***               | 0.25***               | 0.83                    | 1.25                  |
|                                                       | Autumn                                         | 0.77***               | 0.29***               | 1.31                    | 1.11                  | 0.92                  | 0.49***               | 1.51**                  | 1.06                  |
| <i>Interval between marriage and birth (in years)</i> |                                                | 1.00                  | 0.99                  | 0.99                    | 1.01                  | 1.01**                | 1.00                  | 0.99                    | 1.03***               |
| <i>Period of birth</i>                                | 1816–34                                        | Ref.                  | Ref.                  | Ref.                    | Ref.                  | Ref.                  | Ref.                  | Ref.                    | Ref.                  |
|                                                       | 1835–52                                        | 0.97                  | 0.63***               | 0.81                    | 1.47*                 | 0.93                  | 0.69**                | 0.72**                  | 1.43**                |
|                                                       | 1853–69                                        | 0.74***               | 0.46***               | 0.65**                  | 1.15                  | 0.71***               | 0.58***               | 0.73**                  | 0.93                  |
| <i>Number of given names</i>                          | One                                            | Ref.                  | Ref.                  | Ref.                    | Ref.                  | Ref.                  | Ref.                  | Ref.                    | Ref.                  |
|                                                       | Two (or more)                                  | 0.44***               | 0.68**                | 0.73                    | 0.33***               | 0.30***               | 0.70                  | 0.51***                 | 0.21***               |

\* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

Note: Ref. denotes the reference category.

Source: Authors' analysis of data for San Marco parish in the CHILD data set.

traditional names displayed a higher probability of surviving the first month of life, and this association emerged in most social groups, being particularly evident among those born in winter (a season associated with very high neonatal mortality in pre-transitional Veneto).

The underlying concept aligns with recent studies suggesting that naming practices can serve as proxies for parental mindset—traditional or modern—thus potentially reflecting caregiving behaviours. Our findings extended this line of reasoning by showing that changes in naming practices may also signal changes in attitudes towards childcare. In particular, couples who abandoned traditional onomastic practices sooner were likely to overlap with those who adopted new behaviours to protect their children better, for example from environmental risks such as winter cold.

Our main empirical results highlighted patterns in neonatal mortality. For both sexes, but particularly among girls, the probability of survival during the first month of life was higher for those who received non-traditional names. The results remained

consistent when the analysis was restricted to first-borns and run separately by parental occupation. Neonatal mortality was especially elevated for children named Giovanni and Maria, the most popular names in Veneto (and beyond) at the time. Moreover, having multiple names—another signal of deviation from rigid naming norms—was also associated with greater survival chances.

The overall decline in mortality was concentrated among children with modern names during the first month of life and in winter: the period that contributed most to the sharp rise in mortality in Veneto during the eighteenth and nineteenth centuries, as well as to its subsequent decline. By contrast, we found no significant association between naming practices and mortality at older ages, with the exception of males in San Marco. Mortality at older ages (1–4 years), moreover, did not decline over the considered period. Broader socio-economic dynamics—such as family-level conditions—might have played a more important role. We plan to explore developments in later periods in future research, including the potential protective effect of multiple names.

**Table 8** Odds ratios of child mortality for boys, stratified by age range and naming practice (grandparent vs godparent vs unconventional); San Marco parish, 1816–69

| Variable                                              | Category                                           | First given name      |                       |                         |                       | All given names       |                       |                         |                       |
|-------------------------------------------------------|----------------------------------------------------|-----------------------|-----------------------|-------------------------|-----------------------|-----------------------|-----------------------|-------------------------|-----------------------|
|                                                       |                                                    | 0–4<br>years<br>Model | 1–28<br>days<br>Model | 1–11<br>months<br>Model | 1–4<br>years<br>Model | 0–4<br>years<br>Model | 1–28<br>days<br>Model | 1–11<br>months<br>Model | 1–4<br>years<br>Model |
|                                                       |                                                    | 9                     | 9a                    | 9b                      | 9c                    | 10                    | 10a                   | 10b                     | 10c                   |
| <i>Type of name</i>                                   | Godfather                                          | Ref.                  | Ref.                  | Ref.                    | Ref.                  | Ref.                  | Ref.                  | Ref.                    | Ref.                  |
|                                                       | Grandfather                                        | 0.88                  | 0.99                  | 0.84                    | 0.92                  |                       |                       |                         |                       |
| <i>Father's occupation</i>                            | Unconventional                                     | 0.75**                | 0.77                  | 0.88                    | 0.70**                | 0.73***               | 0.62**                | 0.85                    | 0.78                  |
|                                                       | Craftsman/labourer                                 | Ref.                  | Ref.                  | Ref.                    | Ref.                  | Ref.                  | Ref.                  | Ref.                    | Ref.                  |
|                                                       | Merchant                                           | 1.06                  | 0.94                  | 1.25                    | 1.02                  | 1.05                  | 0.84                  | 1.24                    | 1.00                  |
|                                                       | Employee / civil servant                           | 1.05                  | 1.52                  | 1.23                    | 0.70                  | 1.03                  | 1.27                  | 1.21                    | 0.68                  |
|                                                       | Servant                                            | 1.05                  | 1.37                  | 1.18                    | 0.84                  | 1.05                  | 1.11                  | 1.18                    | 0.82                  |
|                                                       | Skilled worker/well-to-do individual/<br>landowner | 0.80                  | 1.12                  | 0.62                    | 0.77                  | 0.77                  | 0.87                  | 0.61                    | 0.74                  |
|                                                       | Other/missing                                      | –                     | –                     | –                       | –                     | –                     | –                     | –                       | –                     |
| <i>Season of birth</i>                                | Winter                                             | Ref.                  | Ref.                  | Ref.                    | Ref.                  | Ref.                  | Ref.                  | Ref.                    | Ref.                  |
|                                                       | Spring                                             | 0.61***               | 0.47***               | 0.65                    | 0.83                  | 0.61***               | 0.47***               | 0.65                    | 0.84                  |
|                                                       | Summer                                             | 0.57***               | 0.19***               | 0.95                    | 0.87                  | 0.57***               | 0.17***               | 0.95                    | 0.87                  |
|                                                       | Autumn                                             | 0.64***               | 0.31***               | 0.91                    | 0.91                  | 0.64***               | 0.36***               | 0.90                    | 0.73                  |
| <i>Interval between marriage and birth (in years)</i> |                                                    | 1.01**                | 1.02                  | 0.98                    | 1.03**                | 1.02**                | 1.02                  | 0.98                    | 1.03**                |
| <i>Period of birth</i>                                | 1816–34                                            | Ref.                  | Ref.                  | Ref.                    | Ref.                  | Ref.                  | Ref.                  | Ref.                    | Ref.                  |
|                                                       | 1835–52                                            | 0.94                  | 0.64**                | 0.85                    | 1.37                  | 0.95                  | 0.63***               | 0.85                    | 1.38                  |
|                                                       | 1853–69                                            | 0.60***               | 0.33***               | 0.61**                  | 1.03                  | 0.59***               | 0.32***               | 0.61                    | 0.95                  |
| <i>Number of given names</i>                          | One                                                | Ref.                  | Ref.                  | Ref.                    | Ref.                  | Ref.                  | Ref.                  | Ref.                    | Ref.                  |
|                                                       | Two (or more)                                      | 0.71                  | 0.34**                | 1.46                    | 1.01                  | 0.63**                | 0.30***               | 1.52                    | 0.91                  |

\* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

Note: Ref. denotes the reference category.

Source: As for Table 7.

Our findings are noteworthy in at least two key areas: first, in relation to the sex differences in the link between mortality and naming practices; and second, more broadly, in confirming the importance of using naming practices to capture social changes in attitudes towards care of children.

How can we interpret a statistical link between onomastic innovation and survival that was more intense and pervasive among girls than among boys? First, it is unlikely that increased care for children—of which onomastic changes would be a proxy—would have affected females to a greater extent than males. Rather, it is better to start from the fact that in Veneto, infant mortality was slightly more unfavourable to girls than would have been expected if only natural sexual dimorphism had been at work (see Appendix). Existing literature supports the idea that in some European countries during the nineteenth century, societal expectations and gender roles led to significant disparities in the care and treatment of girls compared with boys. Boys were often seen as future providers and heirs,

necessitating greater investment in their health and education. Conversely, girls were viewed primarily as future wives and mothers, roles that were considered less valuable in a patriarchal society. This resulted in girls receiving less medical attention, poorer nutrition, and fewer educational opportunities (Beltrán Tapia and Szołtysek 2022). It is therefore possible that better care for children of both sexes had a greater impact on females, who started from a more precarious and potentially more improvable situation. In other words, it is possible that a change of pace in the care of children of both sexes revealed the greater resistance of girls to the risk of early death and that this manifested itself in more evident improvements for girls with innovative names: (i.e. those whom we expected to receive more care).

Second, in the Habsburg Veneto, the MOR was more intense and occurred earlier for females than for males (Figure 2), indicating a greater resistance to changing traditional onomastics for boys. For the time and place examined in this paper, Dalla-

Zuanna and Minello (2026) demonstrated that naming practices evolved differently for girls and boys. The choice of boys' names likely remained more closely tied to traditional mechanisms, given the greater societal importance attributed to sons compared with daughters. The parents most averse to change, even in the way they cared for their offspring, may have been concentrated in the group of parents that continued to assign traditional names to their daughters (a group proportionally smaller than the group still assigning traditional names to sons). It is also possible that the social pressure to maintain traditional names was greater for the parents of male newborns, even among those who adopted new ways of caring for their children, and that for the latter, consequently, the link between innovative onomastics and survival emerged less clearly. However, even among boys the connection between onomastic changes and survival is very evident: in the Venetian parish of San Marco, where the onomastic revolution occurred earlier than in rural communities (see Dalla-Zuanna and Minello 2026), the survival of boys with names other than those of their godparents and grandparents was significantly higher (although the data did not allow for a comparison with girls).

Overall, it is highly relevant that the role of naming practices varied during the demographic transition, as this indicates that the diffusion of general awareness and care for children introduced additional factors into play. This variability may capture the essence of the evolving norms and practices around caregiving. Childcare changed over time and the increasing role of family was demonstrated, even if by research looking mainly at the elite (Lewis 1986). This temporal variation suggests that as societal norms and public health initiatives evolve, the influence of traditional practices, such as naming, may wane or shift, revealing a complex interplay between cultural traditions and emerging health paradigms. In an urban area, such as Venice, Padua or Treviso, the anticipation of the change is consistent with other demographic changes (Friedlander 1969; Van Poppel 1989). However, the emphasis on the conjugal family unit and the new perspective of children as autonomous beings did not significantly alter the tradition of naming after kin in all rural areas (as for the Netherlands during the nineteenth and early twentieth centuries), which casts doubts on the demographic implications of this practice (Van Poppel et al. 1999). Therefore, the relationship between the MOR and the infant mortality transition—as demonstrated in the Veneto Region—warrants careful examination in each specific context.

These findings for Veneto are significant both theoretically, helping to disentangle the role of cultural changes in the past, and methodologically, as information on names is present in nearly all historical sources used in the study of past population dynamics. These findings could suggest that naming practices reflect broader societal attitudes and behaviours towards child-rearing during historical periods of demographic transition. Traditional names may be associated with conservative or less progressive approaches to childcare, while modern names may indicate access to better healthcare and a more forward-thinking mindset regarding child well-being. Further research would be needed to fully understand the underlying mechanisms driving these associations and to explore potential confounding factors.

However, our analysis did not aim to provide an exhaustive account but rather an exploratory contribution to understanding the cultural dynamics surrounding naming and early-life mortality. For instance, we plan to investigate the role of religion more systematically in future work. This was not feasible with the current data set, which lacks detailed information on religious affiliation. Yet, religion may influence both naming practices and early-life mortality. Prior studies (Derosas 2003; Connor 2017) have shown that infant mortality varied markedly across religious groups in historical contexts, for example lower rates among Jewish and other non-Catholic households. While our data pertained almost exclusively to Catholic individuals in Veneto, future research could explore these intersections more deeply, especially in urban contexts where greater religious diversity may have existed. Moreover, a pioneering study has shown that the MOR also emerged in a Tuscan Jewish community with comparable intensity and characteristics to those observed in Catholic parishes in the Veneto region (Livi Bacci 1978).

In summary, although not a direct measure of childcare, the given name has the advantage of being a readily available and usable proxy for cultural change that should be carefully considered in every specific context of study in countries of Christian tradition. It can be a useful piece of the puzzle that brings together the diverse cultural changes that underlie the demographic transition.

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- 1 The authors are both based at the University of Padova: Alessandra Minello is based in the Department of Statistical Sciences and in the Department of Political Science, Law and International Studies, and Gianpiero Dalla-Zuanna is based in the Department of Statistical Sciences.

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No potential conflict of interest was reported by the authors.

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## Appendix

### Note on sexual dimorphism

According to the standard tables of Hill and Upchurch (1995), if the probability of dying before the fifth birthday ( ${}_5q_0$ ) is 400‰ (that observed in the Veneto region in 1815–69), in the absence of gender-based discriminatory behaviors and due to sexual dimorphism alone, the ratio between the probability of death for females and males should be 0.874 in the first year of life and 1.004 between ages one and four. These standard life tables were constructed with regressive methods, using data from countries known for the absence of particular gender discrimination in the care of boys and girls. Since the life tables cover levels of  ${}_5q_0$  between 50 and 300‰, we extrapolated the data for  ${}_5q_0 = 400$ ‰ (i.e. the average level for the Veneto region in 1816–70). In Veneto, this ratio between the death probabilities of females and males was higher (0.933 in the first year of life and 1.027 in the 1–4 age group), indicating discriminatory behaviors against girls. However, the sex differences in infant mortality in Veneto are not too large: for example, they are lower than those observed in some Muslim countries around 1990 by Hill and Upchurch (1995), comparing the standard life tables with the mortality data obtainable from the Demographic and Health Survey. (The countries were: Egypt 1988, 1992; Jordan 1990; Morocco 1987, 1992; Pakistan 1990; and Tunisia 1988.)

### Appendix tables

**Table A1** Predicted probabilities from logistic regression models for neonatal mortality (0–28 days) among firstborn children, by time since parents' marriage and sex: Veneto region, 1816–69

| Model | Time since marriage | Sex   | Modern name | Traditional name | Controls included | N     | Pseudo $R^2$ |
|-------|---------------------|-------|-------------|------------------|-------------------|-------|--------------|
| 1     | ≤12 months          | Boys  | 0.19***     | 0.21***          | Yes               | 2,250 | 0.097        |
| 2     | ≤12 months          | Girls | 0.20***     | 0.23***          | Yes               | 2,497 | 0.087        |
| 3     | ≤18 months          | Boys  | 0.19***     | 0.20***          | Yes               | 4,155 | 0.097        |
| 4     | ≤18 months          | Girls | 0.20***     | 0.23***          | Yes               | 4,536 | 0.082        |
| 5     | ≤24 months          | Boys  | 0.19***     | 0.21***          | Yes               | 6,651 | 0.098        |
| 6     | ≤24 months          | Girls | 0.20***     | 0.23***          | Yes               | 7,272 | 0.082        |

\* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

Source: Authors' analysis of CHILD data set.

**Table A2** Logistic regression models for neonatal mortality (0–28 days) by paternal occupational group: Veneto region, 1816–69

| Model | Father's occupation                    | Traditional name<br>(odds ratio) | Controls included | N      | Pseudo $R^2$ |
|-------|----------------------------------------|----------------------------------|-------------------|--------|--------------|
| 1     | Farmer                                 | 1.07 (0.021)***                  | Yes               | 51,484 | 0.072        |
| 2     | Craftsman/labourer (including fishers) | 1.19 (0.031)***                  | Yes               | 29,639 | 0.114        |
| 3     | Merchant                               | 1.16 (0.170)**                   | Yes               | 9,092  | 0.097        |
| 4     | Employee / civil servant               | 1.36 (0.117)**                   | Yes               | 2,952  | 0.094        |
| 5     | Servant                                | 0.94 (0.124)                     | Yes               | 2,007  | 0.078        |
| 6     | Landowners                             | 1.16 (0.053)***                  | Yes               | 7,557  | 0.110        |
| 7     | Skilled worker/well-to-do individual   | 0.94 (0.137)                     | Yes               | 4,251  | 0.070        |
| 8     | Other/missing                          | 0.91 (0.060)                     | Yes               | 7,912  | 0.115        |

\* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

Note: For each model the reference category is modern names.

Source: As for Table A1.