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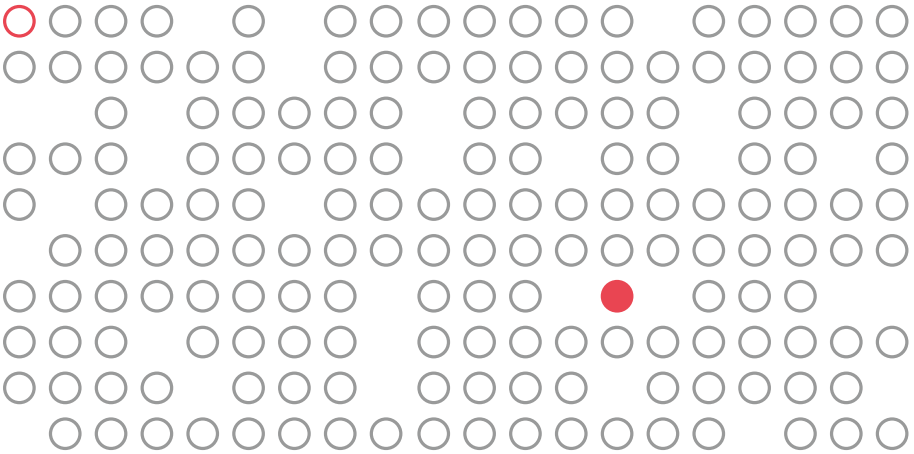
Germany's High Childlessness in an International Context: Studies on Gender Role Attitudes and the Transition to Parenthood

Ansgar Hudde, M.A., M.Res., University of Bamberg



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Germany's High Childlessness in an International Context: Studies on Gender Role Attitudes and the Transition to Parenthood

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Ansgar Hudde, M.A., M.Res.

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Supervisors and Referees:
Prof. Dr. Henriette Engelhardt-Wölfler
Prof. Dr. Michael Gebel
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Introduction

When asking young Europeans whether they would like to have children and how many children they want to have, the majority say that they want two children. A relevant share want three; some want one, but very few—fewer than one in twenty—say that they want no children at all (Kuhnt et al., 2017; Sobotka and Beaujouan, 2014; Testa, 2012). However, many more end up having no children at all. In the Netherlands and in England and Wales, more than one in six women remains childless. In Italy and Germany, more than one in five do so. Among men, childlessness tends to be even higher (Miettinen, Rotkirch, et al., 2015).

If childbearing desires are not fulfilled, it affects not only individuals, but also society as a whole. While low rates of fertility might have limited societal impact in the short run, the impact is major in the long run. In his highly informative and illustrative work, Chesnais (1998) argues that "fertility differentials are—along with technology and ideology—among the major engines of history" (p. 85) and "the well-being of future generations is jeopardized by the collapse of fertility" (p. 96). Therefore, it is no surprise that the European Commission and governments of countries like Italy, Germany, Poland, and Denmark, consider the fertility gap—the difference between desired and actual fertility—to be a societal problem (Davies, 2013; European Commission, 2005).

So why are fertility rates low in some societies? Why are people not reaching their fertility goals? Since World War II, gender relations have changed substan-

tially in Western societies: women have increased their labour force participation, outperformed men in terms of educational achievement, and gained substantially more political representation. Concurrently, men have increased their participation in housework, childcare, and parental leave. In recent decades, scholars have argued that these changing gender relations lead to changes in fertility behaviour, and that differences in gender relations may explain why fertility is currently low—and below desired fertility—in some, but not in other societies (Chesnais, 1996; Esping-Andersen and Billari, 2015; Goldscheider et al., 2015; McDonald, 2000a,b). However, most of these works are rather broad theoretical frameworks. There is a lack of research that formulates and tests concise micro-level mechanisms that link gender relations with fertility.

This dissertation builds upon the work by Esping-Andersen and Billari (2015) to specify and test a mechanism that links gender relations with fertility outcomes. I argue that childlessness is more common in societies where people with very different gender role attitudes live side by side. The more heterogeneous the attitudes in a society, the greater number of couples with partners holding dissimilar views. Couples with dissimilar views are less likely to start families and have children, because they experience or anticipate role conflicts. Gender role attitudes are "beliefs about the appropriate role activities for women and men" (McHugh and Frieze, 1997, p. 4) in various life spheres, such as work and family. The three chapters of this dissertation test three parts of the framework: (1) whether macro-level heterogeneity in gender role attitudes is associated with individual final childlessness, (2) whether macro-level heterogeneity in attitudes translates to the couple level and produces many couples with dissimilar attitudes, and (3) whether partners with dissimilar attitudes are less likely to have a first child together, compared to partners with similar views.

The first paper analyses cross-sectional individual data from 38 countries; the second and third paper analyse dyadic panel-data from German couples. Germany is a very relevant case for the study of fertility and childlessness for several reasons.

First, Europe's most populous country has, for decades, reported low fertility and high childlessness. Second, when it comes to gender relations, Germany takes a middle position on most indicators (see e.g. Mills, 2010). Third and finally, with the German Family Panel (pairfam), Germany offers a unique dataset to study the relationship dynamics of young couples.

This introduction chapter is structured as follows: Section One provides macro-level context on fertility and childlessness. Section Two discusses some major theories that try to explain fertility behaviour; first, two rather general theoretical frameworks, *New Home Economics* and *Second Demographic Transition*, followed by three frameworks that link gender relations to fertility. This leads to the framework of this dissertation, which is presented in Section Three. It is presented along with a discussion of underlying assumptions, and summaries of the three studies that form the cumulative dissertation.

Background: Fertility and Childlessness on the Macro-Level

Beforehand, note that all fertility data shown in this section are on women's, and not men's, fertility. The overall average number of children for women and men should be fairly similar under 'normal' circumstances (e.g. there is no large-scale sex-specific migration or sex-specific early-age mortality; see Schoumaker, 2017). Childlessness, however, can differ substantially between women and men. In many Western societies, men's childlessness is higher (Jalovaara et al., 2018; Miettinen, Rotkirch, et al., 2015). Among men, there is greater inequality in number of children: some men have no children at all, while other men have numerous children with different women (multi-partner fertility; see e.g. Lappegård et al., 2011). The reason that this section reports only women's fertility and childless-

ness is due data restrictions: for most countries, no high-quality data on men's fertility are available.

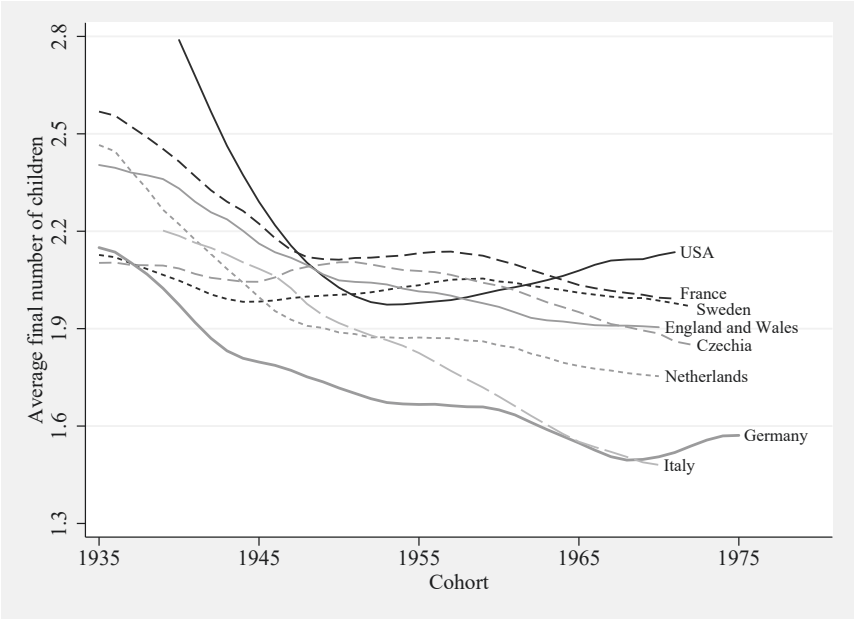

Figure 1: Average final number of children of women in selected countries, by cohort. Source: www.humanfertility.org; Pötzsch (2017, 2018).

Figure 1 plots the development of cohort fertility—the average final number of children of women born in a certain year—for a number of selected countries from 1935 until the last available observation, around the birthyear 1970. The Cohort Fertility Rate (CFR) is a cohort measure and describes the average total number of children that women of a certain birth year have had in total; often measured at age 45. For the purpose of this introduction section—which gives a broad overview of fertility dynamics in Western Societies—cohort fertility seems more helpful than the often-used Total Fertility Rate (TFR). Cohort fertility is unambiguous in its interpretation, it is not affected by changes in timing of fertility (Bongaarts and Sobotka, 2012) and is less driven by short-term fluctuations.

In some of the countries displayed, fertility has been relatively high for all observed cohorts. In the United States, fertility follows a reversed J-shape at a rela-

tively high level: fertility never dropped below 1.9, and is above 2.1 for the most recent cohorts. In Sweden—the country that serves as a main inspiration for the theories on gender relations and fertility—cohort fertility is remarkably stable: between the cohorts 1940 and 1970, fertility is always between 1.95 and 2.05 (*period* fertility in Sweden, however, showed remarkable fluctuations, sometimes referred to as "roller-coaster fertility", Hoem and Hoem, 1996). In France as well, cohort fertility has never dropped below 1.95.

Two of the countries displayed, Italy and Germany, have seen substantial declines and very low fertility in recent cohorts. In Italy, fertility has declined sharply and almost linearly and it is now slightly below 1.5. For many decades, Germany has been the lowest fertility country in Europe—recently replaced by Italy and Spain. German women born in the late 1960s had around 1.5 children on average. Since then, Germany has shown signs of a moderate recovery: women born in the mid-1970s have around 1.6 children on average. Recent data suggest that this recovery will likely not continue, but rather, the average number of children might stabilise at around 1.6 children per woman (Pötzsch, 2017, 2018; Schmertmann et al., 2014). Much of the recent recovery—and, especially, recent rises in period fertility—are driven by women of non-German nationality living in Germany (Pötzsch, 2018).

Between the more "extreme" cases—like the United States and Italy—there are also a number of "less spectacular" countries where fertility has been at a medium level and is currently either stable or slowly declining. Such countries include the Netherlands, England and Wales, and Czechia.

In summary, there are three main messages to be derived from Figure 1. First, fertility among the most recent cohorts is lower than among the oldest observed cohorts in all countries. Second, in most countries, there is no continuous or even linear decline: some societies have experienced or are currently experiencing upward trends. Third, there is substantial variation in fertility among Western Societies; for example, among women born in the late 1960s, those in the United

Sates have, on average, 44% more children than their Italian counterparts.

How relevant are the observed differences in fertility levels between these societies? Here is a simple illustration of the mid- and long-term impact of different fertility levels. Imagine a closed society, that is, one with neither immigration nor emigration. This society has a sex ratio at birth and young-age mortality that are typical to contemporary Western societies (106 boys per 100 girls are born and 98.5% of women survive until the end of their fertile period, see Engelhardt, 2016, p.179 & 305f.). Let us first assume that this society has a constant fertility level equal to that of recent cohorts in the United States (see figure 1). Out of 1,000 children born in 'generation zero', 485 would be girls. Of these 485 girls, 478 would grow old enough to have children. These 478 would give birth to 1,028 children (2.15 per woman), with 499 of them girls. Next, 492 of these girls would grow old enough to have children and would—with the same fertility level—give birth to 505 daughters. These daughters would give birth to 1,086 children ('generation three'). With a United States-birth rate of 2.15 and typical rates of mortality and sex-ratio at birth, the number of children born increase by 8.6% over three generations.

Now, let us imagine that this society has Dutch fertility rates of 1.75 children per woman. By the third generation, the number of births would decrease to 586. With current German fertility levels (1.57), the number of births would decrease to 423; with current Italian levels (1.48), it would drop as low as 354. This example illustrates that even moderate differences in fertility have an immense impact on cohort size in the mid- and long-term.

Trends in Parenthood and Childlessness in Selected Countries

Figure 2 plots the share of women in a birth year who had at least one child in the same countries displayed in Figure 2. It shows both, similarities and relevant differences to the evolution of overall cohort fertility. Perhaps the most striking

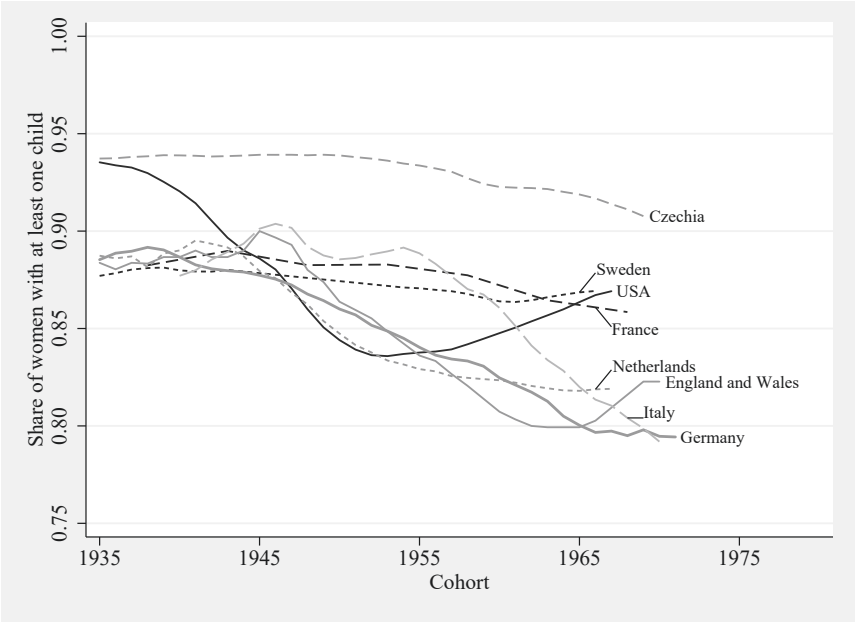

Figure 2: Parity one fertility (share of women of a birth year that have at least one child) in selected countries, by cohort. Source: www.humanfertility.org; Pötzsch (2018).

difference is that for women born in Europe west of the former Iron Curtain in the 1930s, we see virtually no variation between countries. While overall fertility differed substantially, for example between France and Germany, the share of women that remained childless was almost identical. Over time, the differences between countries grew substantially. As for overall fertility, however, in all countries, parity one fertility is lower in the latest observation compared to the earliest observation.

The decline was moderate in Sweden and France, but substantial in Germany and Italy. In Germany and Italy, the share of women that remained childless has almost doubled and is now above 20%. In Czechia, as in many countries in Central and Eastern Europe, parenthood was once almost universal, but this seems to change among recent cohorts. The only countries that have seen any substantial reversals in parenthood are the United States and, most recently, England and

Wales.

In Germany, women's childlessness seems to stabilise at a high level. Looking at the German case in more detail (data not shown here), we find signs for two considerable convergences: by region and by education. First, while childlessness has been considerably lower in Eastern than in Western Germany, Eastern Germany seems to converge towards the Western level in recent cohorts (e.g. 20% vs. 7% for women born in 1960 21%, compared to 15% for women born in 1970). Second, childlessness decreases slightly among the highly educated, while it continues to increase among the lower educated (e.g. 25% vs. 20% for women born in 1960, compared to 27% vs. 16% for women born in 1970).

In summary, even more than for overall fertility, in childlessness there is no common trends for all of the displayed countries and no linear trend in any country. While between-country variation in childlessness was once low among women born between 1935 and 1945, it has grown considerably. Women in Germany and Italy are more than twice as likely to remain childless than those in Czechia, and more than 50% as likely than those in the United States.

The Importance of Parenthood for Overall Fertility

To what degree is low fertility driven by low rates of transition to parenthood? In broad terms, when comparing countries, the rates of parenthood and overall fertility go hand in hand (Tanturri et al., 2015). Figures 1 and 2 show that in both parenthood and overall fertility, Germany and Italy are the lowest, while the United States, France, and Sweden are relatively high. However, the association is not absolute: in Czechia, for example, parenthood is more common than in France or Sweden, but the average number of children per woman is lower.

Another way to look at the parenthood–fertility association is by studying changes within countries over time. Zeman et al. (2018) decompose changes in cohort fertility by country over time into parity-specific transitions. In all of the regions they

studied, lower rates of transition to parenthood contributed to declining fertility in recent decades. In the German-speaking countries and Southern Europe, lower rates of transition to parenthood were the main driver of fertility decline. In Central and Eastern Europe, lower rates of transition to a second child had a greater impact. Bujard and Sulak (2016) studied the German case in more detail and find that the decline between women born in the early 1930s and the late 1940s was mainly driven by falling rates of transition to third, fourth, or subsequent births, while the decline between the late 1940s and the late 1960s was foremost driven by falling first-birth rates.

Here is a simple illustration for the relevance of childlessness for overall fertility. Among the most recent cohorts, Germany has an average number of children of 1.57, and an average childlessness of 22%. The average number of children among all mothers is 2.01. How high would fertility be if childlessness was at 13%, the current value of Sweden and the United States, and the value of Germany for the late 1940s cohorts? If the 9% of 'additional mothers' had one child only, overall fertility would rise to 1.66. If these women had 2.01 children on average, overall fertility would rise to 1.75. As illustrated above, even such moderate differences in fertility have a major impact in the long run.

Theories to Explain Fertility Behaviour

This section first presents two broad theoretical frameworks that explain fertility behaviour: the microeconomic model of Gary Becker, and the value-focused approach by Ron Lesthaeghe and Dirk van de Kaa. Because both theoretical frameworks (alone) do not explain current differences in fertility in Western Societies in a satisfactory manner, I then turn attention to more recent approaches that explain fertility from a gender-relations perspective.

Economic Theories of Fertility

Much of fertility research in recent decades is shaped by a microeconomic perspective, most prominently by Becker's (1993) *New Home Economics*. In a microeconomic perspective, people maximise their utility and all decisions, including fertility decisions, are the results of rational cost-benefit analyses. A fertility decision follows the same decision rules as any other decision, such as whether to buy a new car or whether to commit a crime (compare Becker, 1974). Children are considered a *normal good*, which means that the higher the income, the higher the total child-related expenditure (Becker, 1993, p. 18).

In summary, according to Becker (1993), "each family maximises a utility function of the quantity of children, n; the expenditure on each child, called the quality of children, q; and the quantities of other commodities" (p. 137). Therefore, families face two main trade-offs. First is how much to spend on children versus all other commodities: buy a house that has a nice Jacuzzi for the parents or a house with an additional bedroom for the children? Second is how to distribute the chosen amount of child expenditures: whether to divide it among many children of *lower quality* or spend relatively more on fewer children of *higher quality*: fill the two bedrooms with four children that share rooms, or only have only two children that each get separate bedrooms? (Becker himself uses the example of separate bedrooms—see Becker, 1960, p. 211.)

When weighing costs against benefits, what are the benefits of having children? First are direct, or monetary, benefits. In 'developed' societies, children are usually not productive, that is, they do not generate income or provide substantial workforce, such as by working in a family business or farm. Children might bring along government transfers (most welfare states provide child benefits, tax reductions for parents, or other monetary transfers, Thévenon, 2011). Becker does not discuss the non-monetary benefits from children in detail—he seems to take them as a given: "For most parents, children are a source of psychic income or satisfac-

tion" (Becker, 1960, p. 210). In his later *Treatise on the Family*, Becker (1993) does not explicitly mention any psychological aspect of children. The degree to which children bring non-monetary utility to parents is a matter of "taste" (Becker, 1960, p. 211), and taste might differ between people or groups of people.

What are the costs of children? The main cost factors include direct expenditures on housing, food, and education, as well as the opportunity costs of time spent with children—time that is therefore not spent earning money (Becker, 1993). Becker does not discuss further costs, such as non-monetary opportunity costs like the potential reduction in relationship satisfaction after the transition to parenthood (Twenge et al., 2003).

Two major trends in developed societies substantially change the cost of children: increased earning power of women, and increased returns on investment for human capital.

Potentially, the biggest single cost of children is the opportunity costs of parents who reduce or stop working for pay in order to care for a child and perform the additional housework—which is mainly the mother in most societies. The level of these opportunity costs depends on the earning potential of the parents: the more money one could earn in the labour market, the more money one misses out on when not working. Women's earning potential has strongly increased in recent decades, which has incentivised women to spend less time in the family and more time in the labour market:

> "Indeed, I believe that the growth in the earning power of women during the last hundred years in developed countries is a major cause of both the large increase in labour force participation of married women and the large decline in fertility" (Becker, 1993, p. 140).

According to Becker (1993), a main feature of growing economic development is an increase in the marginal rates of return of education and other human capital investments. The more developed an economy, the more it makes sense to invest

in quality rather than quantity. Therefore, growing rates of return on investment for children "could reduce fertility significantly" (Becker, 1993, p. 154).

On the one hand, Becker's perspective seems very simple and straightforward: Fertility decisions depend on nothing but costs and benefits, and the quantity–quality trade-off. On the other hand, the seemingly simple equation contains a number of unspecified parameters.

First, Becker states that benefits from children depend on tastes—but his framework offers no explanation for whether, how, and why tastes might differ between groups or individuals. Second, the fertility outcome depends on elasticities that are not specified. Let us consider a simplified example. Imagine two families; one is a typical family in a less advanced economy and the other is a typical family in a more advanced economy. Let us assume that the families follow the same behavioural rationales and are identical in cultural or taste-related traits. The family in the less advanced economy has a real income of 1000€ per week, the other family has 2000€. The first family decides to spend 600€ on child-related expenditures and to divide the 600€ among three children. What behaviour would Becker predict for the family with 2000€, under the assumption that it follows the same behavioural rationales?

According to Becker, an increase in income should increase the spendings on children.[1] Let us assume that the second family spends 900€ on children, 50% more than the first family (within Becker's framework, we might as well assume that the family spends 700 or 1100€). The family in the more advanced economy lives in an environment with higher marginal returns on investment. With the quantity–quality interaction, Becker would predict that the family will increase the spending per child—but he does not specify to what degree.[2] Within Becker's

[1] Income would reduce spendings on children only if children were an inferior good, but "children do not appear to be inferior members of any broader class, [therefore] it is likely that a rise in long-run income would increase the amount spent on children" (Becker, 1960, p. 211).

[2] If we look in detail, even the assumption that spendings per child would increase is not necessarily true in the economic framework: "Economic theory does not guarantee that the quantity

framework, all of the following scenarios would be possible; the wealthier parents could: (a) have three children and spend 300€ on each, (b) have two children and spend 450€ on each, or even (c) have only one child and spends 900€ on it. On the macro-level, Becker assumes that economic growth would *probably* lead to small increases in fertility, but he also says that it might as well lead to large increases or even decreases.[3] In summary, very diverse outcomes can be reconciled with Becker's framework—therefore, that framework by itself does not seem very promising in explaining current macro-level fertility levels.

Becker's framework has been widely criticised (e.g. for the general assumption of rationality or of a joint family utility function of households) and modified in numerous ways (e.g. to incorporate social norms). However, Hill and Kopp (2015) argue that many of Becker's core ideas are now mainly taken for granted, and the starting point for most research in (German) family sociology is a modified version of the microeconomic model: "people, given their respective restrictions, try to make the best out of (social) situations—however one may want to label that theoretical core" (Hill and Kopp, 2015, p. 233).

For the purpose of this dissertation—the analysis of childlessness—one shortcoming of Becker's writings is particularly relevant: he writes about both partnership dynamics and fertility, but disregards the interrelation between the two (which Becker 'admits': see Becker, 1993, p. 178). In an overview article on childlessness, Tanturri et al. (2015) conclude that, across societies, not finding a partner for life is the most common reason for childlessness. Not having the right partner is also the most common self-stated reason for unfulfilled childbearing desires (Sütterlin and Hoßmann, 2007). Therefore, if we want to understand fertility and childlessness but ignore partnership dynamics, we miss half of the story.

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of children would increase at all, although a decrease in quantity would be an exception to the usual case" (Becker, 1960, p. 212).

[3] Becker writes that the "quantity elasticity [of income] is probably positive but small", but also that his framework is "permitting small (even negative) quantity income elasticities as well as large ones" (Becker, 1960, p. 212).

Second Demographic Transition

In their Second Demographic Transition theory (SDT), Lesthaeghe and van de Kaa argue that economic models of fertility are "incomplete (not that they are incorrect)" (Lesthaeghe, 1995, p. 8): "Beyond the simple calculation of economic utilities, social and cultural changes play a role in people's move away from marriage and parenthood in postindustrial societies" (Van de Kaa, 1987, p. 6). In fact, both Lesthaeghe and van de Kaa use rational choice language themselves; e.g. as they speak about growing opportunity costs of women or about marriage as a matching of utility functions (Lesthaeghe, 1995; Van de Kaa, 1987). What differentiates the SDT from economic models is the stress on values and changes in values. The SDT is closely related to the idea of post-materialism (Inglehart, 1970, 1990; Lesthaeghe, 2014).

Within this framework, changes in values happen (in Western countries) because societies become more affluent. Following Maslow (1943), once basic needs like survival and safely are satisfied, people move towards higher-order needs, such as individual autonomy and self-actualisation (Lesthaeghe, 1995, 2014; Van de Kaa, 1987).

As the term "transition" indicates, the SDT proposes a sort of end-state toward which societies are moving. In one of the most cited works on SDT, Lesthaeghe (1995) describes this end-state with the following words:

> "[There is] an increased sense of persona1 responsibility. The origin of the social orientation is less a social etiquette, a religious duty or an act of patriotism. It has to come 'straight from the heart' of the individual" (Lesthaeghe, 1995, p. 9).

Lesthaeghe describes a society in which institutional authority, societal and normative pressures decrease while individual responsibility increases. In this framework, there is little normative pressure towards any (family-related) lifestyle—whether or not to form a stable relationship or to have children are now individual

choices that are no longer strongly influenced by church, parents, peers, or the society as a whole.

In this "end-state", the interests of parents—as opposed to the interests of their children—become more important; and the interests of the individual parent—as opposed to the interests of the parents as a union—become more important. Following Ariès (1980), van de Kaa argues: "The days of the 'king-child' are over in Europe" (Van de Kaa, 1987, p. 18).

This has two important demographic consequences. First, women and men have higher minimum standards for relationship quality; and if these standards are not reached, they are more willing to separate—even if this might have adverse consequences for the couples' children. Second, the new, more individual-centred values reduce people's overall willingness to have children; parenthood is now just "one particular lifestyle in competition with several others" (Lesthaeghe, 2014, p. 1).

In 1987, van de Kaa described a decline of fertility "to a level well below replacement" as the "principal demographic feature of this second transition" (Van de Kaa, 1987, p. 5). This is driven by both higher childlessness and lower rates of progression to higher parities ("The emotional satisfactions of parenthood can be achieved most economically by having one or perhaps two children", Van de Kaa, 1987, p. 5).

Even though low fertility is the "principal demographic feature" in early formulations of SDT (van de Kaa, 1987, p. 5), van de Kaa and Lesthaeghe relax or even withdraw this claim in some writings. In one of the initial papers, Lesthaeghe states that "most unions see procreation as important" and "parenthood and commitment are still valued by a significant majority" (1995, p. 12). Already in 1987, van de Kaa notes that "apparently not all 'king-pairs' want to have only one child!" (p20). In a paper from 2001, van de Kaa shows that post-materialists tend to have higher ideal numbers of children. This rejects the—at least implicit idea—that

the SDT is about a reduction in fertility that is driven by changed desires and intentions, and not by increased restrictions.

Van de Kaa (2001) also mentions that fertility is not low in some countries that are leading in SDT and are rather far in the trend towards gender equity, namely Norway, Sweden, and to a lesser degree, the Netherlands: "The trend toward gender equity (McDonald, 2000b) may there have progressed sufficiently to make higher expectations realistic" (p-317). This seems to be self-contradictory: on the one hand, gender equity is a component of SDT—which predicts low fertility—but on the other hand, gender equity in Norway and Sweden is taken as an explanation for the rather high fertility in these countries.

The SDT does not seem very clear on whether and to what degree having children is a part of self-realisation. In 1987, van de Kaa writes that "Low fertility in Western societies could stem from today's quest for greater individual self-fulfillment" (p. 6), while in 2001 he writes that "having children may constitute an important element in their [postmaterialists] perception of well-being and self-realization" (p. 320). In essence, the SDT has a similar challenge as *New Home Economics*: the main parameters in the theoretical model are unspecified (or specified in different ways that seem to contradict each other).

When assessing the empirical fit of SDT, one has to decide whether to interpret the SDT in a narrower or wider sense. The narrow sense would mean taking (early) statements and predicting, for example, low fertility and high voluntary childlessness. The wider sense would mean including the many adaptations and amendments that allow for vast heterogeneity of outcomes. According to a recent review article by Zaidi and Morgan (2017), the narrow SDT has poor fit with empirical micro and macro patterns, the wide SDT "seems to resolve the fit to data, [but] it begs the question, what is left of the original theory?" (Zaidi and Morgan, 2017, p. 487).

Zaidi and Morgan (2017) also criticise SDT in its general approach. According to them, SDT's "search for developmental stages and irreversible transitions is

wrongheaded" (p. 483). SDT predicts similar processes and patterns across different societies, moving towards an end-state, which is represented by the currently "most advanced" country—e.g Sweden. Zaidi and Morgan (2017) state that such predictions generally fail empirically and that they are "historically naïve" (p. 484).

Theories that link Gender Relations with Fertility

In summary, neither Becker's New Home Economics nor the Second Demographic Transition can by itself convincingly explain recent trends and current patterns in fertility in Western societies. It seems especially hard for these frameworks to explain reversals in fertility trends: why fertility stabilises or re-increases in some places. Therefore, a number of theoretical frameworks have emerged that try to explain why and under which conditions fertility will re-increase.

The approaches presented here by McDonald (2000a,b), Goldscheider et al. (2015), and Esping-Andersen and Billari (2015) explain declining and re-increasing fertility with a big societal shift from a gender-asymmetric model towards a gender-symmetric one. All three (groups of) authors share many common arguments, such as the rejection of SDT and value change as the (main) driver for demographic change. Certainly, these approaches are complementary rather than mutually exclusive.[4] These three approaches are among the clearest and most refined frameworks to link gender relations with fertility; however they are not the first. As an example, Chesnais (1996, 1998) argued that high gender equality—in combination with pro-natalist policies—can help sustain moderate to high levels of fertility, as the example of Sweden shows.

McDonald (2000a,b), Goldscheider et al. (2015), and Esping-Andersen and Billari (2015) state that Western post-World War II societies are inevitably moving

[4] Esping-Andersen and Billari (2015) refer to previous work by Peter McDonald several times and also stress the importance of policy. Goldscheider et al. (2015) name an argument that is very similar to Esping-Andersen and Billari (2015), namely that the first half of the gender revolution "created considerable confusion about what men and women expect from each other" (p. 211), yet they only refer to Esping-Andersen and Billari (2015) in a subordinate clause and within a different argument.

from a stable societal arrangement around the gender-asymmetric male breadwinner model towards a gender-symmetric model, often referred to as the gender equity model.[5] Nevertheless, as all three focus on different aspects (while also discussing and including the focus of each other), they bring different implicit or explicit conclusions. In order for fertility to recover, all three emphasise the need for vast societal change. According to McDonald (2000a,b) fertility will recover once all institutions, such as the tax system, childcare facilities, and the family, adapt to women's new roles. Following Goldscheider et al. (2015) fertility will increase once men assume their new roles as equals in the household. According to Esping-Andersen and Billari (2015), fertility will rise once the 'normative confusion' decreases; that is, once there is new societal agreement on what constitutes proper gender and family roles. All three approaches identify the English-speaking, and especially the Nordic countries as forerunners.

Some of the aspects that Zaidi and Morgan (2017) criticised in the Second Demographic Transition might also apply to the gender equity models. According to Zaidi and Morgan (2017), the search for "similar processes and patterns of social change is almost always empirically inaccurate" (p. 484). Zaidi and Morgan (2017) describe that such theories usually approximate the 'end stage' as the current situation in the society that they see as currently most advanced. Zaidi and Morgan (2017) would probably question the prediction of the models presented here that most countries are moving towards the Swedish, Danish, or the US-American model.

There are two main ways to assess the empirical adequacy of the gender equity models. The first is to look at the macro-level association between (average) gender arrangements and fertility; such evidence is mixed (Arpino et al., 2015; Kolk, 2018; Myrskylä et al., 2011). The second way is to test the mechanisms that are

[5] There are different terms to describe the different models: gender-asymmetric, traditional, old or unequal versus gender-symmetric, new, modern or gender-equitable. The term 'gender-equitable' could be especially misleading: the gender roles that are considered 'equitable' can change over time and differ between societies (McDonald, 2013).

supposed to link gender relations with fertility—which must be done for each of the frameworks separately.

Gender Equity in Institutions

McDonald (2000a,b) theorises that low fertility occurs when individual-level institutions, for example, the educational system and the labour market, adapt to the 'new role of women' and provide similar or equal opportunities for women as for men, while other family-related institutions, namely the family itself, are still organised in a 'traditional' way:

> "If women are provided with opportunities nearly equivalent to those of men in education and market employment, but these opportunities are severely curtailed by having children, then, on average, women will restrict the number of children that they have to an extent which leaves fertility at a precariously low, long-term level" (McDonald, 2000b, p. 1).

According to McDonald (2000b), fertility will recover once all institutions adopt the new gender roles and become coherent again. Then, women and men will be able to combine market employment with having children. McDonald (2000b) argues that welfare states should rely less on tax transfers to families, and rather invest in family services. Tax transfers hinder female employment because they do not decrease women's time spent on childcare and housework, and they reduce the need for further market income (under the assumption that women do most of the unpaid work in the home). Family services, to the contrary, enable women to increase their working hours. McDonald stresses the importance of providing childcare or school hours that match regular workday schedules as well as assisting with care for the elderly (2000b). Empirical studies mainly conclude a positive association between policies that support women and men in their new gender roles, such as childcare availability or paid parental leave, and fertility (e.g. Baizán, 2009; Bauernschuster et al., 2016; Bujard and Passet, 2013; Rindfuss et al., 2010).

Evidence for policy effects on the transition to second or third children is stronger than for the transition to parenthood (Bauernschuster et al., 2016; Bujard and Passet, 2013; Laroque and Salanié, 2014; Rindfuss et al., 2010).

Gender Revolution in Two Halves

Goldscheider et al. (2015) interpret changing gender relations as a gender revolution in two halves. The first half consists of a change in women's roles: females gain ground in the public sphere, such as in the educational system and the labour market. As women continue to do most of the unpaid work in the home, it is difficult for them to reconcile work and family. The gender division in which women face the double burden of housework and work for pay is widely considered inequitable. The family, as such, is weakened during the first half of the gender revolution and subsequently, fertility levels decrease.

In the second half of the revolution, men's roles change: they take an active role in the home. Men show growing engagement in childcare, parental leave and housework. These changes or adaptations help both parents reconcile work and family, which strengthens the family as such and translates into higher fertility. In consequence, Goldscheider et al. (2015) argue that fertility will increase when men take a more active role in parenting and housework.

Micro-level evidence concerning the positive effect of the second half of the revolution—increased male involvement in the home—on fertility is mixed. Some studies find that couples in which the male partner performs a higher share of housework or childcare, have higher likelihood of second or third births; some studies find no associations (Cooke, 2004; Craig and Siminski, 2011; Miettinen, Lainiala, et al., 2015; Mills et al., 2008; Neyer et al., 2013). None of the studies finds an effect of men's share of housework on first births (as opposed to higher-order births; see Craig and Siminski, 2011; Miettinen, Lainiala, et al., 2015; Mills et al., 2008). Concerning men's uptake of parental leave, a study on Norway and Sweden

finds that couples in which the man takes some parental leave have higher rates of second and third births (Duvander et al., 2010).

A Multi-Equilibrium Framework of Gender Relations

Esping-Andersen and Billari (2015) develop a multi-equilibrium framework that states that societies can either be in a situation of a stable or unstable equilibrium regarding gender relations. Fertility is moderate or high in stable equilibria and low in unstable equilibria. A stable equilibrium describes a situation with clear societal norms—a situation in which most members of the society share the same values and ideals. These clear norms give people security and provide them with guidelines to acceptable or simply normal behaviour. An unstable equilibrium describes a situation in which these normative guidelines are missing—a situation in which "people are torn between rival normative guidelines" (Esping-Andersen and Billari, 2015, p. 13). In consequence, different members of the society adhere to different norms.

A lack of clear societal norms has important implications for social interactions: people do not know which norms their interaction partners adhere to and they have no "well-defined expectations about others' strategies of action" (Esping-Andersen and Billari, 2015, p. 8). Having no clear norms regarding gender roles likely has important implication for interaction on the partner market and among partners: people do not know about the norms, values, and strategies of actions of the people they interact with.

In this framework, fertility will recover once a society moves towards a new societal equilibrium concerning gender arrangements—once a society has clear societal norms (again). To my knowledge, this framework has not yet been translated into testable hypotheses and tested. There is empirical evidence that is in line with the framework (e.g. Arpino et al., 2015) but, to my knowledge, there is no explicit test of the potential mechanism behind the model by Esping-Andersen and Billari (2015)—and this is what I am doing in this cumulative dissertation.

This Dissertation

The Multi-Equilibrium Framework of Gender Relations as Main Foundation

The framework by Esping-Andersen and Billari (2015) is the main theoretical foundation for this dissertation. However, the multi-equilibrium framework relies on three assumptions that I do not share.

First, Esping-Andersen and Billari (2015) state that "There is likely to be widespread agreement that a viable new family equilibrium must be premised on some kind of gender-symmetric arrangement" (p. 24). While this seems to be in accordance with current changes in most Western societies, I see no reason to predict that a new family equilibrium will be gender-symmetric everywhere. Societies may move in the opposite direction, e.g. from a gender-symmetric to a gender-asymmetric system. It is also possible that societies move towards a stable middle-of-the-road equilibrium, such as a one-and-a-half earner model. In addition—as discussed below—gender relations are multi-dimensional and a new equilibrium might have gender-symmetry on some dimensions and gender-asymmetry on others.

Second, Esping-Andersen and Billari (2015) argue that "change, once triggered, becomes irreversible [...] [and] will continue until a new equilibrium is consolidated" (p. 11). I relax this assumption. It might very well be that societies move from one stable normative model to another, and—midway through—change direction and move back towards the initial, or in another direction towards a third normative model of gender relations. This could, for example, happen because of an external shock, such as major (potentially unforeseen) changes in politics and policies, the economy, or the labour market.

Third, it seems that Esping-Andersen and Billari (2015)—at least implicitly—assume that gender relations are one-dimensional, that is, societies can be classified on a symmetric-asymmetric continuum. Of course, any meaningful theoreti-

cal framework must rely on strong abstraction and simplification of reality. However, for many studies, it might be more useful to conceptualise gender relations as multi-dimensional. Such dimensions include, among others, labour force participation, earnings, educational attainment, political representation, housework and childcare, and decision-making in the household. Various macro-level indicators try to capture gender relations and 'rank' countries according to their degree of gender equality, gender equity, or female empowerment (see e.g. Mills, 2010). The different indicators measure and/or weigh separate aspects and indicators differently. When comparing countries, it shows that these indicators are not very coherent; this suggests that countries might have high gender-symmetry on some dimensions, but low gender-symmetry on others. If gender relations are multi-dimensional, then so are gender role attitudes (Grunow et al., 2018; Knight and Brinton, 2017; Pepin and Cotter, 2018). Therefore, in this dissertation, I operationalise gender role attitudes accordingly.

Theoretical Framework

Figure 3 illustrates the theoretical framework of this dissertation. I argue that macro-level heterogeneity in gender role attitudes leads to higher childlessness, through a mechanism of partnership dynamics. More heterogeneous attitudes at the macro-level translate to the micro-level and increase the share of couples in which both partners have dissimilar gender role attitudes (used synonymously: dissimilar couples). These dissimilar couples should be more likely to experience role conflicts and uncertainties, and therefore be less willing to make the transition to parenthood together. The reduced likelihood of transition to parenthood in given relationships should, in turn, reduce the overall level of fertility.

In this dissertation, I test three parts of this framework. In the first paper, I establish the association between heterogeneity in attitudes and childlessness

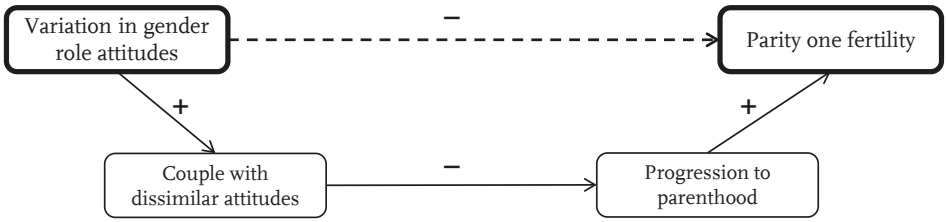

Figure 3: Theoretical framework of this dissertation.

by comparing societies: the more heterogeneous the macro-level gender role attitudes, the more likely individuals are to experience final childlessness. In the second and third paper, I trace two parts of the framework using the example of Germany. The second paper shows that, in the case of Germany, macro-level heterogeneity in attitudes mainly translates to the couple level. The third paper shows that—compared to similar couples—dissimilar couples are less likely to have a first child together, and are more likely to separate. With all three papers taken together, this dissertation substantially strengthens our understanding of the mechanisms that connect gender relations with fertility on the couple level and societal level, and in the interaction between these levels.

Some Underlying (Behavioural) Assumptions

In line with much of the research on family sociology and demography, I assume that "people, given their respective restrictions, try to make the best out of (social) situations" (Hill and Kopp, 2015, p. 233). I assume that people make decisions in order to reach their goals and to maximise their subjective well-being or utility. In this section, I first discuss some assumptions about what goals people might have—and what might potentially inhibit them from pursuing and reaching these goals.

Close to Universal Long-Term Goal: Being in a Stable Relationship

This dissertation builds on the assumption that, in the long run, most people want to find a romantic partner and be in a stable relationship with that person. Evidence from observed behaviour and stated preferences support this assumption: Only around 5% of European are long-term singles, that is, they never enter a co-residential partnership before age 40 (Bellani et al., 2017). Data from wave one of the German Family Panel (pairfam) shows that the share of people that are single and say that they do not want to have a partner is around 5% among those in their mid-to late twenties, and around 3% among those in their mid- to late thirties (own calculations).[6]

Close to Universal Long-Term Goal: Having Children

Further, this dissertation relies on the assumption that, in the long run, most young women and men want to have children. There is vast empirical evidence to support this. The share of young people that want to remain childless, is low; in most surveys and most countries it is clearly below ten per cent—much lower than observed childlessness among recent cohorts in many Western societies (Buhr and Huinink, 2017; Kuhnt et al., 2017; Sobotka and Beaujouan, 2014; Testa, 2012).

Attitudes and Behaviour

Following the theory of cognitive dissonance, I assume that people want to act in accordance with their own values and attitudes (Festinger, 1962). Previous research confirms that gender role attitudes have predictive power for behaviours like the division of childcare, housework, and parental leave/employment (Blair and Lichter, 1991; Davis and Greenstein, 2004, 2009; Fuwa, 2004; Schober and Scott, 2012). However, this does not say that the translation of attitudes into be-

[6] Based on the item "I would like to have a partner'', the answer categories range from "1: not at all'' to "5: completely". Answers 1 and 2 were counted here.

haviour is always direct or linear—there might be biases, for example that men's actual involvement in housework might lag behind their values and attitudes (Bianchi et al., 2000).

Short- and Long-Term Perspective and Behaviour

One reason why people do not always behave in ways designed to reach their long-term goals is that they might pursue short-term goals instead. People make decisions using different criteria depending on the time-horizon they have in mind (Fehr, 2002). This is certainly relevant for decisions in the partner market. Women and men have different preferences and search criteria, depending on whether they have a serious long-term or a casual short-term relationship in mind (Buss and Schmitt, 1993). When people look for a serious relationship—compared to when they look for a casual short-term relationship—they are generally more selective and their preference order shifts: wanting children or being dependable become more important in a partner and being physically attractive or funny become less important (Stewart et al., 2000).

Whether one has a short or long time-horizon in mind is volatile; it can change over the life course and can also change in respect to the same partner (Fulda and Lersch, 2018). According to England et al. (2008), it is a common pattern that people choose a certain partner for the purpose of a non-serious, casual relationship—and later 'end up' in a serious relationship with that person (see also Paik, 2010). It seems reasonable to assume that a partner's gender role attitudes are a considerably less relevant criterion when looking for a casual short-term relationship, rather than a serious long-term commitment. This might be an explanation why a person might "end up" in a relationship with someone with dissimilar and potentially incompatible gender role attitudes. This is discussed in more detail in Paper II.

Information in Mate Choice and Transition to Parenthood

In this dissertation, I assume that people often make choices based on limited, and potentially biased and erroneous information. Information plays a major role in this analysis; specifically information about the gender role attitudes of a (potential) partner. In broad terms, I assume that knowledge of a (potential) partner's attitudes improves during the course of a relationship, but starts at a low level. Improved information over time might therefore lead to disappointments: one learns that the initial hope for or assumption of compatible attitudes is false. The role of information is discussed in all three papers of this dissertation, but in the greatest detail in Paper II.

I am not alone in stressing the role of information for partnership dynamics. As examples, Ermisch (2003) argues that "The process of finding a spouse is one in which information is scarce, and it takes time to gather it" (p. 137), and Becker (1960) states that people "frequently marry with highly erroneous assessments, then revise these assessments as information improves after marriage" (p. 325). Esping-Andersen and Billari (2015) do not explicitly write about information; however, they stress that the lack of clear societal gender norms produces "uncertainty about others' expectations and about the best way of doing things" (p. 15)—and 'uncertainty' is nothing more than lack of information.

Fertility Decisions vs. Fertility Outcomes

The translation of joint fertility decisions into behaviour seems rather straightforward and would mostly show in stopping the use of contraceptives. The translation into outcome, namely pregnancy and the birth of a child, is less straightforward. Many couples try to get pregnant but do not succeed (or only succeed with significant delay, see e.g. Dunson et al., 2004) and a relevant share of childbirths are *not* the results of intentional behaviour (Schneider, 2016). As Becker (1960) puts it:

"Some families are unable to produce children as they desire and some have to produce more than they desire" (p. 321).

Like all of the theoretical approaches discussed above, the framework of this dissertation aims to explain why people make certain fertility *decisions*. However, like in the vast majority of empirical research on fertility, I primarily measure fertility *outcomes*. I discuss this shortcoming in the papers of this dissertation, and in Paper III, I also try to incorporate available information on fertility decisions empirically (which brings along other challenges, as discussed in more detail in that paper).

Paper I: Societal Agreement on Gender Role Attitudes and Childlessness in 38 Countries (single-author)

The first paper tests the theoretical framework of this dissertation from a cross-sectional, country-comparison perspective. Is macro-level heterogeneity in gender role attitudes associated with individuals' likelihood of being parents vs. remaining childless?

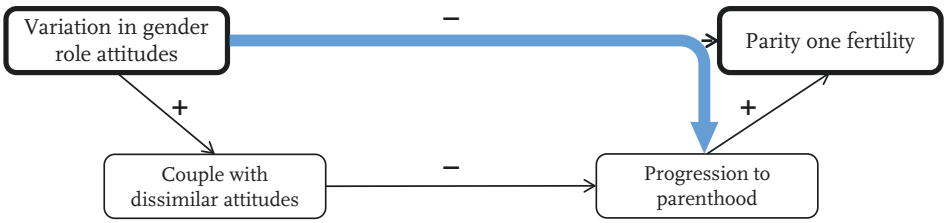

Figure 4: Paper I within the theoretical framework of this dissertation.

The theoretical section of this paper explains the overall framework of this dissertation and discusses two alternative mechanisms that could link heterogeneous attitudes to high childlessness. Heterogeneous attitudes could translate into incoherent family-related policies through the democratic process. Such incoherent policies could have the consequence that no family, whatever family- and gender model they wish to pursue, finds suitable family-supporting policies. Additionally, in a society with diverse gender role attitudes, peers that have different attitudes might sanction each other for their chosen family and gender role model.

For this research, I analyse data from the 2012 International Social Survey Programme. This data set allows a much clearer analysis of gender role attitudes than most other international surveys, because it includes two novel items on how parental leave, childcare and paid work should be shared between a mother and a father. The final dataset includes 6,305 individuals from 38 countries on all continents. To measure gender role attitudes, I run factor analysis on eleven relevant items. The main analyses are multi-level logistic regression models. The main

explanatory variable is the heterogeneity in gender role attitudes—which is measured as the country-specific standard deviation of a factor variable that measures attitudes. In addition to the macro-level heterogeneity in attitudes, the regression models include macro-level average attitudes as well as respondents' individual attitudes.

The results from the factor analysis reveal three distinct dimensions of attitudes. These dimensions reflect views on: (1) whether maternal employment has a negative effects on relationships within the family; (2) whether certain given tasks—mainly housework and childcare, but also working for pay—should be performed by mothers, fathers, or both; and (3) whether mothers should work and contribute to the family income. The further analyses rely on the second dimension, as it most clearly captures the *gendered* component on views towards family life. This allows us to go beyond the simplistic egalitarian–inegalitarian linearity in most previous studies on gender relations and fertility.

Regression analyses support the main hypothesis: the greater the variation in gender role attitudes, the higher the likelihood for individuals to remain childless. The association is significant and holds against various robustness checks. Further analysis tests against the mediation-through-policy mechanism: is variation in attitudes still associated with parenthood once we control for public policies? To test this, I run three-level models (individual level, sub-national regional level, and national/county level) with fixed-effects on the country level. The results show that, also within countries, more heterogeneous attitudes on the sub-national, regional level are associated with higher childlessness on the individual level. The paper includes several robustness checks and sensitivity analyses.

This study is innovative as it gives insight into the mechanisms that link gender relations and fertility. Within the dissertation, Paper I shows that macro-level variation in attitudes is associated with individual childlessness. This offers first cross-sectional and cross-country support for the theoretical model of the dissertation—and sets the foundation for more in-depth and micro-level investigation.

Paper II: Homogamy in Gender Role Attitudes among Young Couples: Evidence from Germany (single-author)

The theoretical model of this dissertation—and therefore, also of Paper I and Paper III—rely on the assumption that macro-level heterogeneity in attitudes translates to the micro-level. That is, in a society with heterogeneous attitudes, we should see many couples in which both partners have dissimilar attitudes. Paper II tests, for the example of the high-heterogeneity-case Germany, whether macro-level heterogeneity in attitudes is actually translating to the micro-level.

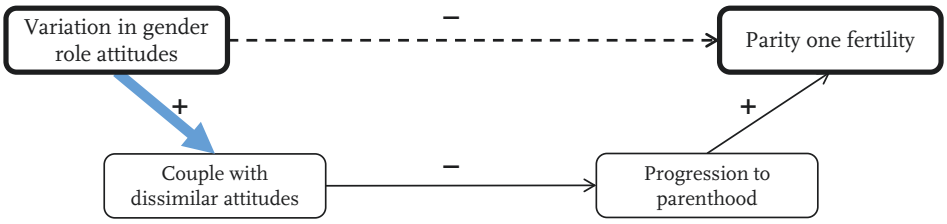

Figure 5: Paper II within the theoretical framework of this dissertation.

I put the degree of homogamy in gender role attitudes among young couples into perspective by comparing real couples to two types of counterfactuals. To create these counterfactuals, I separate the observed couples in the dataset into two datasets—one with females and one with males—and then re-mate couples using different algorithms. One algorithm mates couples randomly; the other mates couples in a way that it maximises similarity in attitudes between partners. The random matching would represent a situation in which macro-level variation perfectly translates to the couple level. The matching-for-similarity represents the opposite situation in which macro-level variation does *not* translate to the couple level.

In addition to illustrating the degree of homogamy in attitudes, the paper discusses and tests which mechanisms lead to that observed degree. There are four

potential mechanisms: direct assortative mating, homogamy as a by-product of assortative mating on other traits, alignment over time, and lower rates of separation among homogamous couples.

The data for this section comes from the German family panel (pairfam), a unique data source to analyse partnership dynamics among young couples. Measures for similarity in attitudes are based on the absolute difference scores and computed over four attitudinal items.

The result shows that real couples resemble randomly matched couples much more than couples matched for maximum similarity. This suggests that—in the case of Germany—macro-level variation mainly translates to the couple level. Concerning the mechanisms behind observed homogamy, I find clear evidence for alignment over time. Using fixed-effects panel regression models, duration of relationship is significantly and substantially associated with higher similarity in attitudes. Therefore, those partners that remain in a relationship become more and more similar over time. I find no clear evidence that similarity in attitudes is a by-product of homogamy on other variables: couples mated to maximise similarity in education and religiosity are only slightly more similar in their attitudes than couples that are mated randomly. Further, the paper finds no evidence that dissimilar couples are more likely to separate.

Important to the framework of this dissertation, Paper II shows that—in the case of Germany—macro-level variation in attitudes generally translates to the couple-level. This supports a crucial element of this dissertation's theoretical framework. Further, the paper contributes to the general literature on partnership dynamics by showing that homogamy is rather low on a variable that has important consequences for the functioning of a relationship (as also shown in Paper III). The paper also offers a methodical contribution because it presents an intuitive method to illustrate the degree of homogamy on multiple variables simultaneously.

Paper III: Intra-Couple (Dis)Similarity in Gender Role Attitudes and the Transition to Parenthood (co-author: Henriette Engelhardt)

Paper III tests the theoretical framework of this dissertation on the micro-level: are couples in which the woman and the man hold dissimilar gender role attitudes less likely to have a first child together compared to couples in which both partners share similar attitudes? Numerous previous studies analysed the association between women's or men's individual attitudes and their fertility outcomes, producing mixed results. This paper argues that by ignoring the attitudes of these women's or men's partners, and the fit or similarity between their attitudes in particular, previous research missed out on (at least) half of the story. We contribute to this literature by analysing attitudes and fertility from a couple-level (dyadic) perspective.

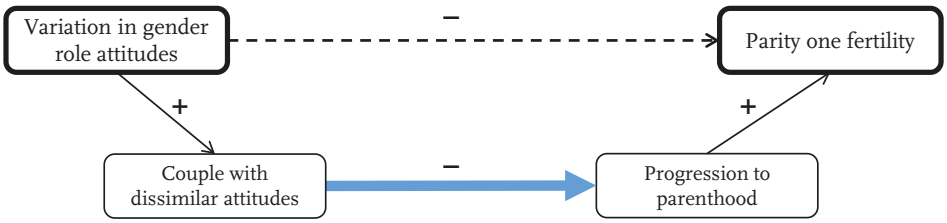

Figure 6: Paper III within the theoretical framework of this dissertation.

We argue that when two partners have dissimilar gender role attitudes, they are less willing to start a family together. Partners that share the same gender role attitudes should agree on how to organise their family life; partners that hold opposite attitudes will likely want to organise family life in different ways—which could bring along role conflicts. The transition to parenthood brings new and important questions concerning gender roles, like: How should parents share parental leave? How should they share childcare and decision-making in child-raising? How should they share the increasing housework demands? We argue

that the more dissimilar partners' gender role attitudes are, the more likely people feel uncertainty about or anticipate future role conflicts. Uncertainty about or the anticipation of role conflicts should, in turn, increase the perceived costs of parenthood and thus reduce the willingness to have children together.

We analyse dyadic data from 705 young couples from the first eight waves of the German Family Panel (pairfam). We measure their degree of similarity in attitudes at wave 1, and regress this on three different outcome variables, which are measured at the last point of observation (5.3 years after the first observation, on average): The first variable is a binary variable that measures whether or not the two partners have had a child together. Second is a variable with three categories that further distinguishes the no-childbirth group into those that neither had a child nor separated, and those that did separate. Third is a variable that includes available information on childbirth intentions. In all of the main models, we control for both partners individual attitudes.

The descriptive results show that in a substantial share of couples, the partners have dissimilar views. The main result from the regression analyses is that couples with dissimilar answers to items concerning female roles are less likely to have a child together. The association is statistically significant and substantial: couples with similar attitudes are around 50% more likely to make the transition to parenthood than couples with very dissimilar attitudes towards female roles. Dissimilarity in attitudes is positively associated with both continuation of a relationship without childbirth and relationship separation. Further, the results are stable when introducing available information on fertility intentions. The results hold against a number of robustness checks. We find no evidence that the direction of dissimilarity in attitudes matters (whether it is the female or male partner that agrees more with a statement).

Within my dissertation, this paper offers micro-level evidence in support of the theoretical model. It shows that the fit of both partners' gender role attitudes has important implications for their relationship dynamics.

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Paper I

A slightly different version of this chapter is published as:

Hudde, A. (2018). Societal Agreement on Gender Role Attitudes and Childlessness in 38 Countries. In: *European Journal of Population* 34.5, pp. 745–767. DOI: 10.1007/s10680-017-9459-8.

Abstract:
Many authors argue that levels of childlessness and fertility are a function of changing gender relations, but the mechanisms behind this association remain unclear and mainly untested. This study argues that the societal variation in gender role attitudes explains the link: a great variation in attitudes among potential partners leads to uncertainty and conflicts, which depresses people's propensity for parenthood. This idea is tested with multilevel logistic regression models for 6305 individuals in 38 countries on all continents, using ISSP 2012 data. Measures for the average gender role attitude in the society as well as the dispersion in attitudes are regressed on whether individuals have at least one child or are childless. Attitudes are captured using factor analysis and represent opinions towards the gendered division of given tasks and privileges, such as child-rearing or the uptake of parental leave. The dispersion in attitudes is the standard deviation of the factor variable in the given country. The analysis gives support to the hypothesis: the greater the variation in gender role attitudes, the higher the chance for individuals to remain childless. The association is significant and holds against various robustness checks.

Introduction

The idea that patterns of fertility and parenthood over time are a U-shaped function of societal gender relations has gained growing interest in recent years: the argument is that once gender relations moved away from the male breadwinner model, childlessness increased and overall fertility decreased. That is to say, more gender equality meant less fertility. After a certain threshold is surpassed, the gender equity–fertility nexus changes its direction: more gender equality or gender equity means less childlessness and more fertility (e.g. Esping-Andersen, 2009; Esping-Andersen & Billari, 2015; McDonald, 2000a,b). For a recent discussion of these arguments from an American perspective, see Cherlin (2016).

While these authors provide important contributions to the formulation of broad theoretical frameworks that link changing gender roles to changes in demographic behaviour, there is a lack of knowledge about the underlying mechanisms and little empirical evidence. The existing studies, e.g. Arpino et al. (2015) or Myrskylä et al. (2011) show that higher gender equality or more gender-equitable attitudes are associated with higher fertility on the macro-level, but these analyses do not trace the underlying mechanisms.

Taking the framework by Esping-Andersen and Billari (2015) as point of departure, this study develops and tests such a mechanism: the lack of macro-level, societal agreement on a specific gender role model decreases people's chance to become parents. Empirically, the degree of societal agreement on gender role attitudes is measured as the variation in gender role attitudes in a given society. Low variation, meaning that most members of society share similar attitudes, represents great societal agreement, high variation the opposite.

Multilevel models are run using the Family and Changing Gender Roles IV-module from the International Social Survey Programme 2012 (ISSP) for 38 countries. The independent variable of interest is variation in gender role attitudes. This is measured as the standard deviation of a factor variable that measures gen-

der role attitudes in a given country. The measure for gender role attitudes describes the opinion how given tasks or privileges, such as childcare or uptake of parental leave, should be distributed between males and females. Results show that large variation in gender role attitudes on the macro-level is significantly associated with higher final childlessness on the individual level. This holds against a number of robustness checks. Three-level models—which measure gender role attitudes and their variation at the sub-national, regional level, and apply country-level fixed effects—show that the observed association goes beyond unobserved country-level characteristics such as general culture, family friendliness or social policy.

This article offers four main contributions to the literature on gender relations and childlessness. First, it specifies and tests a mechanism that links societal gender roles to fertility. Second, the multilevel analysis combines societal gender roles with individual fertility, ruling out that any macro-level association is driven by the composition of the populations regarding factors that influence the transition to parenthood. Third, by measuring final childlessness, the measure does not suffer from tempo distortions caused by cross-country differences in the timing of fertility. Fourth, using ISSP data from 2012 I am able to apply a measure for gender role attitudes that is more integral and unambiguous than in previous cross-country analyses.

Theoretical Background

Esping-Andersen and Billari (2015) present a theory which interprets a U-shaped evolution of fertility levels depending on the spreading of gender-symmetric norms and attitudes.[7] They argue that societies move from a situation with a societal

[7] To describe different forms of gender relations, mainly the contrast between the male breadwinner and the dual earner gender roles, various terms are used: gender-asymmetric, traditional, old or unequal versus gender-symmetric, new, modern, gender-equal or gender-equitable. Particularly, the term 'gender-equitable' could be misleading though as different societies and societies at different times might regard different gender roles as equitable (cf. McDonald 2013).

agreement on gender relations, a situation with strong gender role norms (male breadwinner and female homemaker), "through a prolonged period of uncertainty and normative confusion" towards a situation with new strong gender role norms centred around more gender-symmetric norms and the dual-career family model (Esping-Andersen & Billari, 2015, p. 6). When there are strong gender-related norms, most members of the society share the same ideals about gender roles. The here-established mechanism that links the societal variation in gender role attitudes to the transition to parenthood builds upon this theoretical work.

Normative change concerning gender roles can take two ideal-typical paths: either the society as a whole shifts slowly, uniformly and step-by-step in a certain direction or the transition from one model to another causes ruptures as some members of the society adopt a new model, while others continue sticking to the old one.

To give an example, the uniform scenario might look like this: in the, say, 1960s, most members of the society believed that the male breadwinner and female homemaker model is the right way to go. Gradual change begins, and people tend to favour more and more female employment and male involvement in the home. Twenty years later, the clear societal norm is that mothers work part-time while still doing most of the work in the home. Another 20 years later, all members of the society favour a model in which both partners share work for pay and unpaid work in the home equally. All these changes could potentially happen in a uniform way. The implication would be that the *variation* in realized gender roles and gender role attitudes is low and constant over time.

While this scenario is possible, the version in which the transition causes ruptures might seem more likely and is the one that Esping-Andersen and Billari (2015) describe in their framework. Some members of the society adhere to new gender roles while others adhere to traditional ones. Esping-Andersen and Billari (2015) state that it is an implication of this scenario that there is more *variation* in gender roles halfway, when there is no model of gender relations that is the clear

societal norm. This plurality of gender roles is said to produce normative confusion: there are no clear gender roles which have a strong normative pull and give members of the society (or a societal group) a guideline on what constitutes 'good', socially desired and simply *normal* gender roles.

Esping-Andersen and Billari (2015) do, however, not give further attention to the idea of variation in attitudes.[8]

The aim of this article is to do exactly that: give further attention to the idea of normative confusion and the lack of clear societal ideas in gender relations, describe a theoretical approach in which the variation is the causal driver behind demographic behaviour, provide an operationalisation of variation in attitudes and test how it is associated with people's propensity to remain childless.

Empirical Evidence on Gender Relations and Fertility

A number of empirical studies deal with different aspects of the interplay between gender relations and fertility in advanced societies (Balbo et al., 2013; Kreyenfeld

[8] In an endnote next to a graph on the "Relationship between gender egalitarianism and partnership stability, late 1980s" Esping-Andersen and Billari (2015, p. 22) discuss the comparison of two measures for "the hegemony of gender norms: either a simple headcount (share of egalitarians in the population) or the coefficient of variation (to capture the degree of value uniformity in the population). Our estimations produce essentially the same result" (Esping-Andersen and Billari 2015, p. 26). However, for binary variables, coefficient of variation is not a suitable indicator for the degree of uniformity or variation (Vogt and Johnson 2011, p. 59). Standard deviation and variance are measures for the degree of variation in a dummy variable, but a distinct interpretation of variation and mean value provides little insight: variation and mean value determine each other mathematically. For each value of standard deviation, there are two possible corresponding mean values, one being $.5+x$, the other $.5-x$. An example: if the mean value of a binary variable is .75, the standard deviation is forced to be .44. A population with a standard deviation of .44 could have one of the two mean values $.5 + .25 = .75$ or $.5 - .25 = .25$. Here is an example for why the coefficient of variation is not helpful to describe heterogeneity in a binary variable: let us compare two populations of each 100 individuals, that can be either egalitarian or non-egalitarian. Population A is mainly egalitarian: 90 individuals hold egalitarian views, 10 non-egalitarian ones. Population B is the opposite case: 10 individuals hold egalitarian views, 90 non-egalitarian ones. Intuition and standard deviation (or variance) would suggest that both populations have the same degree of homogeneity in attitudes (standard deviation = .30, variance = .09). The coefficient of variation would show a very different picture: it is 3.02 for population A and .36 for population B. In the data of Esping-Andersen and Billari (2015), all mean values are greater than .5. Thus, within their range of data, mean values perfectly predict levels of variation and vice versa. In practise, by using the coefficient of variation for such values, one measures practically nothing else than the mean value: in the range of mean values going from around .5 to close to 1, the correlation between mean value and coefficient of variation is -.99 (tested on a dummy dataset).

& Konietzka, 2017; Tanturri et al., 2015). Myrskyla et al. (2011) argue that gender equity is a necessary condition for rising fertility in highly developed societies. Evidence concerning the effect of male involvement in childcare and housework on fertility is mixed (see for example Cooke, 2004; Kan & Hertog, 2017; Mills et al., 2008; Tanturri et al., 2015).

Studies on the effect of social policies that promote gender equality, such as the provision of childcare, are often interpreted to have a positive effect even though many of these studies face difficulties, for example concerning endogeneity, reversed causality, the isolation of different policy measures or the distinction between timing and quantum changes in fertility (see for example Bauernschuster et al., 2016; Gauthier, 2007; Hudde & Engelhardt, 2017; Luci-Greulich & Thévenon, 2013; McDonald, 2006; Neyer, 2003; Rindfuss et al., 2010). Even though there is a lack of studies on the effect of family-friendly policies on childlessness, as opposed to overall fertility, some studies suggest that social policy might be more important for the transition to having a second or third birth than for the transition to parenthood (Bauernschuster et al., 2016; Hank & Kreyenfeld, 2003; Laroque & Salanié, 2014; Rindfuss et al., 2010).

Arpino et al. (2015) analyse changes in fertility as societies move from traditional towards new gender roles. They show that at first total fertility rate (TFR) decreases as societies become more gender equitable, but once a certain threshold is reached, the relationship turns positive. This relationship seems to be moderated by the differences in attitudes between men and women: the change happens faster and more pronounced when the agreement between men and women is greater.

I argue, it is not (only) the gap between men and women that matters, but the level of agreement within the group of peers and especially within the group of *potential partners*. My analysis further adds to this as it studies final childlessness, a measure that does not suffer from tempo distortions, unlike total fertility rate (Bongaarts & Sobotka, 2012). Arpino et al. (2015) measure gender role attitudes

as "views regarding the proper role of women in the labour market" (p.373) alone. My analysis uses a measure that is more integral and captures attitudes towards the gendered division of different tasks and privileges, such as childcare, uptake of parental leave and working for pay.

Linking Variation in Gender Role Attitudes to Fertility

Esping-Andersen and Billari (2015) take a longitudinal perspective and describe the transition from traditional to egalitarian gender arrangements. The mechanism that I specify becomes independent of the notion of this transition. If the degree of variation in attitudes within a society is a driver for cross-country differences in childlessness, countries with higher variation should have systematically higher levels of childlessness.

High variation in a society might be a consequence of the transition from male breadwinner to dual earner model (as Esping-Andersen & Billari, 2015, describe it), any other transition (see below), or any other reason, such as incoherent social policy that hinders the societal gathering behind a specific role model. The question, where the variation 'comes from', is of secondary interest for this study (but might be of interest for future research).

Beforehand, it should be stressed that there is no need or reason to think of gender relations in a binary way in which people either support the male breadwinner, 'traditional' model or the 'egalitarian', 'modern' model. While there is evidence suggesting that many societies are moving towards a more gender-symmetric society, it might as well happen that some societies find stable arrangements at alternative shapings of gender relations, e.g. centred around the one-and-a-half earner model or a model with gender-symmetric roles in the labour market but gender-asymmetric roles in the home, also societies might move 'backwards', towards more traditional gender regimes.

Variation in Gender Role Attitudes and Partnership Dynamics

Most women and men are assumed to have a preference for living in a harmonious, relatively conflict-free, stable relationship and for having children (Testa, 2012). Conflicts might emerge if both partners have different views on gender roles, opposing opinions on the proper behaviour of a male and a female partner, of a mother and a father. Consider two hypothetical cases of couples with different gender ideologies: (1) the woman has a more symmetric gender ideology than the male partner. The man expects her to do most of the housework and childcare while the woman wants her partner to contribute (close to) equally. (2) The man has a more symmetric gender ideology than the woman and expects her to contribute much to the family income, while the woman expects him to earn the lion's share of the money. The man wants to involve equally in parenting while the woman wants to be the main decision-maker in child-rearing.

In both cases, the attitudinal differences are a burden to the couple. The gap between different gender role models is expected to be especially salient when a couple has young children or is planning life with children and discussing how to organise it: Who will—if at all—stop working for pay and for how long? How should the housework be divided? Who will be the main decision-maker in parenting?

It could be assumed that someone's gender ideology is—just like any other character trait—something that is partly known a priori, will partly be known once certain situations are addressed explicitly (e.g. a couple discusses who would take how much parental leave if they were to have a child), and will partly only show once a certain situation arises (e.g. a woman does not have certainty on whether her partner will regularly engage in household maintenance or childcare until the couple cohabits and has a child).

This implies that any planned and discussed or actual succession to a new stage of the partnership (partnership formation as such, cohabitation, marriage,

transition to parenthood, having additional children) brings along the risk of a 'bad surprise': one learns more about the partner's gender ideology and it shows that the partner has ideas on gender roles that are different and potentially conflicting and incompatible to one's own ideas. Whenever such a 'bad surprise' is experienced, be it in the stage of dating, cohabiting or after a first child, the chance of taking the next step is diminished. The risk of such a disappointment is argued to be higher, the greater the variation of gender role attitudes is within the group of *potential partners*.

In a scenario in which all potential partners have the same gender ideology, the risk of a bad surprise is zero. In a scenario with a plethora of different and conflicting views, the risk becomes great. As people may have experienced role conflicts in earlier steps of the relationships, in previous relationships, or seen them among peer couples, they will anticipate that conflicts might emerge after cohabitation and especially after the birth of a child. The greater the fear of important conflicts, the lower the propensity to take the risk.

This argument builds on the stated assumption that people have, at least in the early stage of partnership formation, imperfect knowledge about the gender ideology of their potential and actual partners. Let us for a moment assume the opposite: individuals on the dating market have perfect information on the gender ideology of themselves and of all potential partners. In this case, couple formation could happen based on attitudinal similarity. No matter how big the variation in attitudes, most people could find a partner with compatible attitudes (assuming low or moderate differences in the attitudinal distribution between females and males) and there would be no 'bad surprises'. Empirical results seem to reject this idea. Hohmann-Marriott (2006) shows that in the late 1980s a considerable share of American couples have divergent views towards the gendered division of paid and unpaid work and couples with great dissimilarity are more likely to split up. Paper II of this dissertation compares attitudinal similarity in 'actual' German couples to two types of 'synthetic' couples: (1) randomly matched and

(2) matched based on maximum similarity in attitudes. The actual matching of partners is much closer to being random than to being maximum in similarity. Paper II concludes that either couples are, due to a lack of information, unable to find partners with suiting attitudes or do not consider gender ideology as a central dimension in choosing a partner. Either of these interpretations could be read as support for the idea that high attitudinal variation on the macro-level translates into higher dissimilarity on the couple-level.

If the elaborated mechanism is in fact at work, individuals living in societies, in which people have a high agreement on gender roles, should be systematically more likely to progress to a first or additional child than individuals living in societies where people show very different attitudes towards gender roles. This should persist independently of the average attitude. This leads to the hypothesis: *The greater the societal variation in gender role attitudes, the higher the chance that individuals remain childless.*

As argued, this association should show in a longitudinal as well as in a cross-sectional perspective. If a high variation in attitudes *causes* high childlessness through the elaborated mechanism, then, at one point in time, individuals in a high-variance society should be less likely to achieve parenthood than those in a low-variance society, independently of how gender relations were in these societies 20 years ago or how they will be 20 years in the future.

Variation in Gender Ideology, Peer-Group Effects and Coherence of Public Policy

At least two additional mechanisms might link variation in gender role attitudes to fertility:

(1) A peer-group mechanism: If a peer group of friends, colleagues or family members consists of people preferring different gender role arrangements, they might meet each other with criticism and reproaches. A person that sees mothers mainly as homemakers and fathers as providers might brand a working mom as a bad mother and an active father as unmanly; someone who considers a work-

ing mom and an active father desirable might brand the female homemaker as unambitious and lazy, the father that focuses on his role as provider as old fashioned. Schneider and Bujard (2013) argue that this is happening in the German case. Given the general lack of survey data that covers attitudinal information of more or less entire social networks of family, friends and colleagues, testing this mechanism empirically seems difficult.

(2) A mediation through public policy: through the democratic process societal disagreement on gender roles translates into incoherent public policies. In a country in which everyone has more or less the same attitudes on gender roles, governments have an incentive to tailor their family policies, such as tax system or the organisation of caring for children and elderly, to this specific role model.[9]

A country with great differences in attitudes between or within different parties, coalitions and governments, might produce a policy mix with measures that promote and incentivise different gender role models. In consequence neither the male breadwinner nor the double-career family nor a family organised in any other way finds policies that match their needs.

Note that this notion of incoherence in family policies differs from the argument of McDonald (2000a,b), Esping-Andersen (2009) and others: while McDonald (2000a,b), Esping-Andersen (2009) and others focus on discrepancies between societal gender norms and the entity of policies, this argument is on coherence *within* public policy, the question to which degree different measures in the policy mix "counteract each other by having different aims or requirements, or [...] reinforce each other by being on the same underlying logic" (Neyer & Andersson, 2008, p. 702).

As examples, France (Hantrais, 1994; Thévenon, 2009) or Sweden (Hoem et

[9] Research shows that societal attitudes/public opinion (among numerous other factors) influence policy in democratic systems; how big this influence is, and how much it relies on salience of a specific policy/a policy field, is largely contested though (Burstein 2003). Most, but not all, countries in the sample are democratic. Research on public opinion and policy in non-democratic settings is very limited, but also suggests potential influences (Horne 2010).

al., 2001) have been described as more, Germany (Fleckenstein, 2011; Hantrais, 1994), Austria (Hoem et al., 2001) or Great Britain (Hantrais, 1994) as less coherent in their policies. Societal attitudes can be source and consequence of public policy (Svallfors, 2010). Gangl and Ziefle (2015) provide an example of such policy feedback as they identify a causal effect of a change in parental leave reform on subjective work commitment of women.

Based on these ideas, policies could also influence the degree of variation in societal attitudes: coherent policies that are tailored around one specific model of gender relations might encourage one specific gender ideology and align societal attitudes around it, while an incoherent set of policies in which different measures support different gender ideologies might cement or even foster societal disagreement. The following sections feature a test on whether the variation in attitudes—parenthood hypothesis, holds net of effects of public policy.

Data and Methods

To identify and measure gender role attitudes, factor analysis is run on a battery of items from the Family and Changing Gender Roles IV-module from the International Social Survey Programme (ISSP) 2012. All countries that participate in the survey are studied, except for Spain and Turkey, as key variables are not available for these two countries. This leaves 38 countries on all continents. For a list of all sample countries, see the appendix. Average response rate for the sample countries is 51%. However, in a number of countries, response rates were low. In Belgium, India, Ireland, Latvia and The Netherlands, response rates were between 25 and 30%, in Canada as low as 18%. As further robustness checks, I ran models excluding these countries; results were robust.

Even though the ISSP is on Family and Changing Gender Roles, it does not feature a question on how many children a respondent has ever had. Parents and childless women and men are identified indirectly. The questionnaire asked

respondents to only answer four questions if they 'have ever had any children'. Respondents who answered any of the four questions are coded as parents. Less than 2% of female and male respondents did not answer these questions but indicated to live in a household with children. They are coded as missing as it is unclear whether they live in a household with children of whom they are not the parent or whether they did not answer the questions for any other reason. For a limited number of countries, questions on number of children are available.[10] Contrasting the indirect measure against the direct measure suggests a high degree of consistency.

To detect final or very-close-to-final childlessness while keeping the sample reasonably large, main regression models are run for females aged 45+ and males 50+. Upper age limits are 55 for females and 60 for males. This leaves 6305 individuals for regression analyses, observations per country range from 56 (India) to 720 (China). 89.9% of males are fathers, and 92.3% of females are mothers.[11]

To produce reliable estimates, a broader age range, 20–55 for females and 25–60 for males, is chosen to compute the country- and region-level variables: average and variation in attitudes. This leaves 23,017 observations in total, ranging from 227 (Canada) to 2638 (China) per country.

The choice of sample creates two challenges: (1) The younger people in the age range are not the same individuals and do not belong to the same cohort as those, for who I measure childlessness. (2) The older people in the sample, those for who I capture childlessness, might have changed their attitudes and views since their period of family formation. Previous research suggests that gender role attitudes do change over the life course. For example, Perales et al. (2017) show how attitudes towards gender divisions of labour change over time and how they respond

[10] For some countries, ISSP 2012 was part of a larger national survey, e.g. in the USA, ISSP 2012 was part of the General Social Survey 2012, and in Germany, it was part of the German General Social Survey (ALLBUS) 2012.

[11] Country-level shares of parenthood in the ISSP sample are largely consistent with other sources (see appendix for details).

to the transition to parenthood. Baxter et al. (2015) find opposing effects of ageing and the transition to parenthood: people become less 'gender-traditional' as they grow older, but more traditional after they become parents. The magnitude of these changes within an individual seem rather small in comparison with the between-individuals variation in attitudes (Baxter et al., 2015). Baxter et al. (2015) also suggest that younger cohorts are less traditional than older ones.

There seems to be no single ideal way to account for the above described challenges, but two robustness checks are proposed:

(1) Using attitudinal info of young people only, females aged 20–30 and males 25–35. The advantage of this selection is that these are the people that are currently in their main phase of partnership formation and transition to parenthood. On the downside, attitudes and fertility outcomes are not measured for the same cohort. Using this sample rules out potential ageing effects but ignores potential cohort effects.

(2) Using attitudinal info from the same people that are included in the multilevel regressions. These are females aged 45–55 and males 50–60. Complementary to (1), this selection rules out potential changes over cohorts but ignores potential ageing effects.

Both age restrictions bring along a decrease in number of observations to compute the macro-level variables (6345 observations for the young sample and 7271 for elder sample) which might make the estimates to be less robust. If all three measures, variation in the whole population, among young people and among those with finished birth careers, yield similar results, it could be read as strong support for the argument, that results are robust to potential distortions by cohort or ageing effects of gender role attitudes.

Finding a measure for gender role attitudes that allows cross-country comparison is difficult (Braun, 2008; Constantin & Voicu, 2015; Scott & Braun, 2009). A challenge is for example that a certain behaviour (or attitude towards such behaviour) might have different meanings in different cultural settings. For exam-

ple Walby (1994) argues that the emancipatory power of female employment differs depending on the societal context. In some societies, working might enable women to achieve a similar status as men, in others it might not be enough, and again in others women might have an equal status even if they do not work. Constantin and Voicu (2015) argue that an older wave of ISSP from 2002 is generally suitable for comparative analyses of gender role attitudes but criticise the lack of questions on the believe how men and women should share tasks like childcare, elderly care or family care. The ISSP 2012 contains two new questions which might fill this gap—see below.

To identify latent factors that capture distinguishable aspects of gender role attitudes, iterated principal factor analyses are run. The factors are rotated using promax rotation.[12] Table 1 lists all items that are used for factor analysis.

The variation in gender role attitudes in a country or region is defined as the standard deviation of the factor variable in the given country or region.

Multilevel logistic regression models are run to test the hypothesis that a higher variation in gender role attitudes on the macro-level is associated with lower parenthood on the micro-level. In all models, the dependent variable is coded zero if the respondent is childless and one if the respondent is a parent.

All models control for micro-level variables sex, age, age-squared and years of education and its square. On the macro-level, all models control for the GDP of country (Becker, 1993; Furuoka, 2009; Luci-Greulich & Thévenon, 2014; Myrskylä et al., 2009, 2011). This variable is introduced as a control because it is correlated with gender role attitudes $r = .78; p < .001$) and with parenthood ($r = .36; p < .001$). All control variables are interacted with sex of the respondent.

If the association between variation in gender role attitudes and fertility is explained by differences in public policy (or any other country-level characteristic),

[12] The goal is to find a convincing variable that captures gender role attitudes—and it is no problem if that variable is correlated with other measures and attitudes—so promax, which does not force the different factors to be uncorrelated, is chosen here.

Table 1.1: List of items for factor analysis.

Item	*Label of item*
Warm relation	A working mother can establish just as warm and secure a relationship with her children as a mother who does not work.
Child suffers	A pre-school child is likely to suffer if his or her mother works.
Family suffers	All in all, family life suffers when the woman has a full-time job.
Want home	A job is all right, but what most women really want is a home and children.
Housewife	Being a housewife is just as fulfilling as working for pay.
Both contribute	Both the man and woman should contribute to the household income.
Men money	A man's job is to earn money; a woman's job is to look after the home and family.
Work school	Do you think that women should work outside the home full-time, part-time or not at all under the following circumstances? After the youngest child starts school.
Work U6	Do you think that women should work outside the home full-time, part-time or not at all under the following circumstances? When there is a child under school age.
Leave divide[1]	Consider a couple who both work full-time and now have a new born child. [...] if both are in a similar work situation and are eligible for paid leave, how should this paid leave period be divided between the mother and the father?
Care best	Consider a family with a child under school age. What, in your opinion, is the best way for them to organise their family and work life?

Note: The first seven questions allow the following answers: strongly agree / agree / neither agree nor disagree / disagree / strongly disagree.
Answer categories for "leave divide" are: mother: entire leave / mother: most of the leave; father: some / both half / father: most of the leave; mother: some / father: entire leave.
Answer categories for "care best" are: Mother home; father works full-time / Mother works part-time; father works full-time / Both work full-time *or* Both work part-time / Father works part-time; mother works full-time / Father home; mother works full-time.
[1] This item was only presented to respondents who previously stated that there should be paid parental leave, which around 90% of all respondents did (many, but not all countries in the sample have paid parental leave; for an overview see www.leavenetwork.org.). In some countries, respondents who said that there should be paid leave differed significantly in their answers to the other gender role items. I performed multiple imputation for missings on this items. There were some changes in average attitudes in some countries that were minor in size (e.g. United States, Australia and China now had slightly more symmetric average attitudes; Belgium and Slovenia slightly more asymmetric attitudes). Regression analyses including imputed data were consistent.

the association should disappear once country-level fixed effects (dummy variables for all countries) are introduced. Three-level models with individuals nested in regions which are nested in countries test this. Region-level variables, average and variation in attitudes are computed for all regions with at least 100 attitudinal observations. Countries for which only one region fulfils this requirement are dropped from this analysis.[13] 73 regions in 22 countries remain.

If the (dis)agreement between two partners and their chance of conflicts is the key, then what should matter is not the variation in the society as a whole, but in attitudes among potential partners. In an example: for a female college graduate aged 35, gender role attitudes of male graduates aged 30–45 might be more relevant that those of males aged 25 and without formal education.

I try to isolate the attitudinal variation among *potential partners* from the variation in the whole society following the rationale: variation among potential partners is variation that can *not* be explained by character traits that typically shape dating behaviour. Among these variables are sex, age, education, religiosity, ethnicity or place of residence (Blossfeld, 2009; Schwartz, 2013).

One could think of variation among likely potential partners as the variation in attitudes *within* groups of people that share the same sex, age, education, etc. In the above example of the 35 years of college graduate, her individual group of likely potential partners might be men aged 35–45 who have a college degree. In that case, for her, variation in attitudes among her potential partners would be variation in attitudes in the group of men that are aged 35–45 and hold a college degree.

In other, more technical, words: the variation among potential partners is the variation that cannot be explained by micro-level regressions that regress sex, age, etc., on gender role attitudes (run separately for each country).

For more information on the calculation of this measure, see the appendix.

[13] These countries are: Argentina, Canada, Finland, Germany, Great Britain, Hungary, Ireland, India, Japan, Lithuania, Mexico, Poland, Sweden, Slovenia and USA.

Two different measures are proposed here: *unexplained variation I*, which applies micro-level regressions, run separately for each country, with the variables sex, age, education (with interactions for age and education with sex), region of residence and urban versus rural location. *Unexplained variation II* adds a measure for religiosity. Other relevant variables, such as the ethnicity of the respondent, are not available in a manner that is comparable between countries.

Results

Table 2 shows the results from factor analysis. Generating three factors offers a result that allows a clear interpretation. In each case, a higher value on the factor represents a more 'modern' or 'gender-symmetric' attitude (women are *not* mainly regarded as homemakers, an equal gendered division of tasks and privileges is desired and mothers labour force participation is approved). All bivariate correlations between the three generated factors are positive and range between .60 and .71 on the micro-level and .74 and .88 on the macro-level.

Table 1.2: Result from factor analysis.

	Female homemaker	*Gender division*	*Mother as earner*
Warm relation	.36		
Child suffers	.68		
Family suffers	.77		
Want home		.58	
Housewife		.38	
Both contribute			.32
Men money		.61	
Work school			.58
Work U6			.71
Leave divide		.46	
Care best		.50	

Note: Displayed numbers are factor loadings. Blanks represent loadings $< .3$ in absolute values.

Three Different Aspects of Gender Role Attitudes

The first factor, *female homemaker*, loads strongest on the three items on negative consequences that maternal employment might have on relationships within the family. This factor is almost unrelated to items regarding the question whether mothers should work or which parent should involve more in childcare (*work U6*, *work school* and *leave divide, care best*). People with a low value on this factor tend to believe that a mother who stays at home is better for the family and the kids.

The third factor, called *mother as earner*, measures whether people think that women and mothers of young children in particular should work for pay. People with a high value in this factor believe that women in general and mothers of small children specifically should work and earn money.

The first and third factor, *female homemaker* and *mother as earner*, mainly load on questions that deal with the role of women alone—and not in contrast to the role of men. Both factors might mix up gender role attitudes with general, 'ungendered' opinions on the interplay and potential conflicts between family and labour market. Probably some of those who believe that young children suffer if the mother works full-time also believe that young children suffer if the father works long hours. What might hint towards that idea that *female homemaker* captures family rather than gender ideology or at least mix the two is that many of those who think a woman's employment is bad for the family actually disagree with gender-separate spheres. Some of those who think that mothers of young children should work, as measured by *mother as earner* might be more concerned about securing household income rather than ideals family and gender ideology.[14]

[14] This seems to be especially valid for some countries in Eastern Europe and outside of Europe. In Russia, China or Mexico, the majority believes that mothers of young children should work at least part-time. ("Do you think that women should work outside the home full-time, part-time or not at all under the following circumstances? When there is a child under school age".) Nevertheless, the majority of this group believe that this will actually have negative consequences for the child (agreement to: "A pre-school child is likely to suffer if his or her mother works".) Also, more than a third of those who favour maternal employment actually support gender-separate spheres (agreement to: "A man's job is to earn money; a woman's job is to look after the home and family").

The second factor, labelled *gender division*, loads strongly on items that specifically ask whether a given task or privilege should be allocated to the male partner, the female partner or to both equally. These tasks and privileges include earning money, taking parental leave and caring for young children (*men-money*, *leave divide* and *care best*). This factor also loads on the questions whether women prefer homemaking and whether being a housewife is as fulfilling as working for pay (*want home* and *housewife*). This factor is unrelated to all questions regarding maternal employment and its consequences (*warm relation, child suffers, family suffers, work U6, work school*) and thus clearly distinguishes attitudes towards the *gendered* division of tasks from questions concerning the conflict between family and labour market. As the second factor, *gender division*, captures gendered views and gender ideology most unambiguously, it is most promising to measure gender role attitudes for the here-presented work. All further analyses apply this factor.

People in the Nordic countries and in the Netherlands show highest mean scores on the factor *gender division* and more right-leaning distributions in Figure 1.1 (Finland being somewhat of an outlier among the Nordic countries with a mean value most similar to Germany). Most gender-asymmetric views are found in countries in Central and Eastern Europe and outside of Europe, such as Philippines, Russia and Latvia. The 'cluster' of countries in Central and Eastern Europe is extremely heterogeneous though.

The country with the flattest curve and consequently the highest variation in attitudes is Austria, followed by Germany. The country with the lowest variation is China, followed by Chile. Interestingly, two of the extreme cases of low and high variation, Chile and Austria, are almost identical in their mean and median value for gender role attitudes. Over the whole sample, females have slightly more gender-symmetric views and variation is slightly bigger among females than among males. In general, between-country differences (over male and female respondents) seem to be much more salient than within-country differences between female and male respondents.

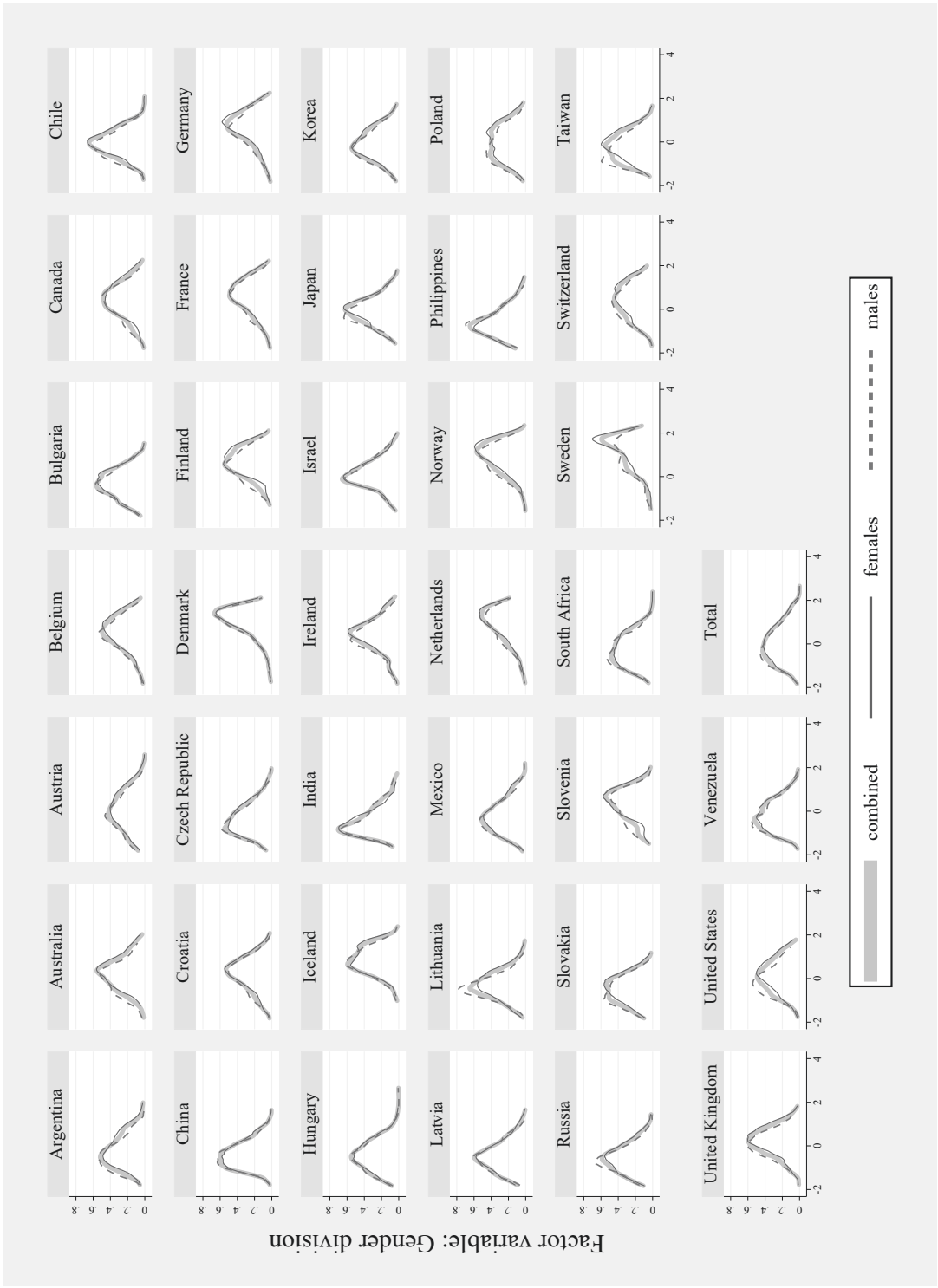

Figure 1.1: Distribution of gender role attitudes in all sample countries for males and females separately. Kernel density plots.

Variation in Gender Role Attitudes and Individual Parenthood

Tables 1.3 and 1.4 show the regression models to test the hypothesis that parenthood is less common, the higher the variation in gender role attitudes is in a society. This association should persist independently of the content or mean value of gender role attitudes in the society. In all models, the odds ratio for variation in gender role attitudes is significant and smaller than one, which represents a negative association, as predicted. The higher the variation in attitudes, the lower the chance that respondents have at least one child. The magnitude of association is almost constant in all presented models.

Model 1 is the base model that includes relative individual gender role attitudes, measured as the deviation from the country-level mean value, the variation in gender role attitudes, measured as the standard deviation of attitudes on the macro-level, and the macro-level mean value of attitudes. For males and females combined, more gender-symmetric attitudes on the macro-level are associated with higher chance of parenthood on the micro-level. Individual-level attitudes that are more gender-asymmetric than the country-average are associated with higher transitions to parenthood.

Model 2 tests whether the associations between parenthood and the gender-attitudes-related variables differs between male and female respondents. It shows that none of the interaction effects is significant. Model 3 adds the square term for the average attitudes in a country to the base model. As discussed in Section 1, the literature suggests an U-shape association between individual parenthood and gender relations. This pattern cannot be found in the set of these countries with mainly medium or high values of gender-symmetric attitudes. Model 4 adds the gap in attitudes between men and women in the respective country (country-mean value of female respondents minus country-mean value of male respondents). The odds ratio is insignificant: the association between variation in gender role attitudes and individual fertility is not a function of differences in average attitudes

between females and males.

Models 10 and 11 in the appendix measure macro-level variables, average gender role attitudes and variation in gender role attitudes, for two age-restricted subsamples. In order to rule out potential ageing-effects of change in attitudes, model 10 measures macro-level variables based on younger respondents who are currently in their main phase of partnership formation and transition to parenthood. In order to rule out potential cohort effects of change in attitudes, model 11 measures macro-level variables based on the restricted subsample of those, that are aged 45? (females) and 50? (males). In models 10 and 11, compared to model 1, all associations are consistent in size while standard errors for all variables are greater. Given that mean attitudes and variation in attitudes are calculated based on a much lower number of observations, increased standard errors should not be a surprise. Nevertheless, the negative association between variation in attitudes and individual parenthood remains statistically significant in all models.

Figure 2 shows the predicted probabilities of individuals to have at least one child at different levels of macro-level variation in gender role attitudes and at global mean values on all other variables. Predicted probabilities for parenthood versus childlessness range from 85% for the highest value of variation in attitudes in the dataset, as observed in Austria, to 94% for the opposite value, as observed in China. The following examples should give an—admittedly rough—intuition for the size of association, based on predicted margins of model 1: if the variation in gender role attitudes was as low in Germany as it is in the United Kingdom (the country with the second highest variation versus the country with the eighth lowest variation), progression to parity one would be predicted to be 5% higher. Complementary, childlessness would be predicted to be 38% lower.[15]

[15] Predicted value for parenthood and childlessness Germany: 87.9 and 12.1%, for United Kingdom: 92.5 and 7.5%. This equals a difference of 4.6% points and a difference of 5.2% in parenthood or 38.0% in childlessness.

Table 1.3: Logistic multilevel regressions predicting parenthood (=1) versus childlessness (=0).

	(1) base model	(2) +interactions	(3) +square-term	(4) +sex-gap
Individual attitudes (measured as difference from macro-level mean)				
Country-level	0.91* (0.042)	0.89 (0.058)	0.91* (0.042)	0.91* (0.042)
Macro-level mean-value of attitudes				
Country-level	1.31**(0.129)	1.20 (0.144)	1.17 (0.150)	1.33**(0.130)
Macro-level variation in attitudes				
Country-level: standard deviation	0.79***(0.055)	0.83* (0.070)	0.81** (0.057)	0.80** (0.058)
Interaction with sex of respondent (reference: female)				
Individual attitudes		1.04 (0.097)		
Country-level mean attitudes		1.20 (0.175)		
Country-level standard deviation		0.91 (0.091)		
Country-level mean-value: Square-term			1.11 (0.090)	
Diff. in attitudes betw. females and males				0.94 (0.065)
Controls individual level	yes	yes	yes	yes
Controls country level	yes	yes	yes	yes
Country-level RE	yes	yes	yes	yes
Observations: micro-level	6305	6305	6305	6305
Observations: countries	38	38	38	38

Odds ratios displayed. Standard errors are displayed in parentheses.
All independent variables are standardised.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 1.4: Logistic multilevel regressions predicting parenthood (=1) versus childlessness (=0).

	region-level	variation among potential partners	
	(5)	(6)	(7)
Individual attitudes (measured as difference from macro-level mean)			
Country-level		0.91* (0.042)	0.91* (0.045)
Region-Level	0.96 (0.065)		
Macro-level mean-value of attitudes			
Country-level		1.27* (0.129)	1.26* (0.127)
Region-level	0.91 (0.275)		
Macro-level variation in attitudes			
Region-level: standard deviation	0.73* (0.096)		
Country-level: unexplained variation I		0.82**(0.059)	
Country-level: unexplained variation II			0.81**(0.057)
Controls individual level	yes	yes	yes
Controls country level	yes	yes	yes
Country-level RE		yes	yes
Region-level RE	yes		
Country-level FE	yes		
Observations: micro-level	2986	6305	6305
Observations: countries	22	38	38
Observations: regions	73		

Odds ratios displayed. Standard errors are displayed in parentheses.
All independent variables are standardised.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

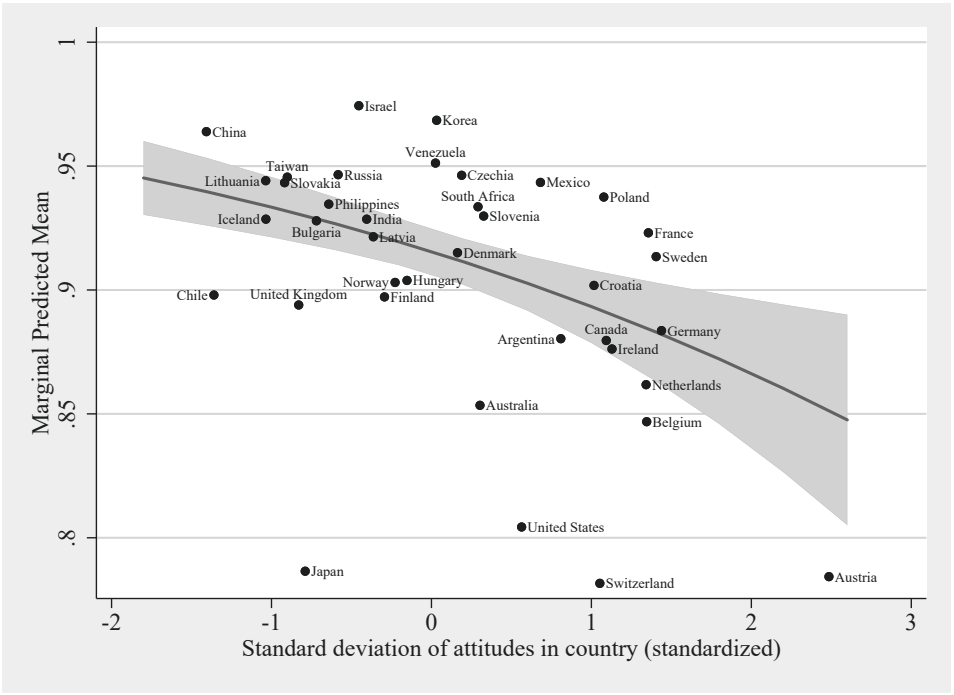

Figure 1.2: Predicted probability of having at least one child in dependence of variation in gender role attitudes at mean values of all other covariates (calculation based on model 1); combined with a bivariate country-level scatterplot of share of parents versus variation in gender role attitudes.

Variation in Gender Role Attitudes and Individual Parenthood: Variation on the Country Level, Regional Level and Among Potential Partners

As discussed in theoretical framework section, there are at least two alternative mechanisms that might link societal disagreement on gender roles to fertility: first, a translation of unclear gender norms into incoherent family policy with the consequence that no family, whatever gender role model it follows, finds policies tailored to their needs, and second negative sanctioning among peers who pursue different gender role models. This section is an attempt to disentangle these mechanisms.

In most countries, the majority of public policies that might influence fertility behaviour are country-level policies. All individuals in a given country are affected

by it, independently of their region of residence within the country.

While it is hard to empirically capture all aspects of public policy, one can apply country-level fixed effects which capture all unobserved country characteristics, including—among many others—historical experience, culture, economic development, and public policy. If the association between variation in gender role attitudes and fertility is explained by differences in public policy (or any other country-level characteristic), the association should disappear once country-level fixed effects (dummy variables for all countries) are introduced. Model 5 is a three-level model with individuals nested in regions which are nested in countries. Average gender role attitudes and variation in attitudes are measured on the level of these regions (and not on the level of countries, as in models 1–4).[16] In the model with country fixed effects (5) the odds ratio for variation in gender role attitudes on the regional level is similar to the odds ratio for variation on the country-level in all other models. The hypothesis—more variation means higher chance of parenthood—holds even against controlling for public policy and other country-specific factors. The association between more gender-symmetric average attitudes on the macro-level and individual parenthood disappears.

Models 6 and 7 include two measures for variation among potential partners, as opposed to variation in the whole society in the base model. As *standard deviation of attitudes in country*, *unexplained variation I* and *unexplained variation II* are standardised, their odds ratios are comparable. If the variation in attitudes among potential partners—as opposed to variation in the whole society—matters, the odds ratio for *unexplained variation II* should be smallest and the odds ratio for *standard deviation of attitudes in country* closest to zero. This pattern does not show that all odds ratios are similar in size and significance. This result does not allow any clear conclusion on whether or not it is the variation among potential partners that matters, rather than variation in the whole society.

[16] Running the base model with the restricted sample of model 5 brings coherent results which suggests that the sample-restriction does not confound the picture.

Further robustness checks are shown in the online supplementary material. I run models excluding potentially influential cases on the macro-level and control for two macro-level indices that should capture aspects of gender equity/gender equality/female empowerment. The proposed pattern that individual fertility is a function of the variation in gender role attitudes holds in all models.

Discussion

While there are several studies that deal with the interplay between gender relations and fertility in some way, there is still insufficient knowledge of and empirical evidence about the mechanisms behind the observed patterns. This study contributes to filling this gap by specifying and testing a model that explains how the variation in gender role attitudes links gender roles to fertility.

Esping-Andersen and Billari (2015) stand in line with a number of other prominent theoretical works that link gender relations to fertility and family formation, such as McDonald (2000a,b) and Goldscheider et al. (2015). All claim that (Western) post World War II societies are inevitably moving from a stable societal arrangement around the male breadwinner model towards the gender equity model. This will eventually bring a re-increase in fertility levels. According to Esping-Andersen and Billari (2015), fertility will recover once, and because, new norms on gender and family roles will become the societal consensus.

My analysis shows that parenthood rates are systematically higher, the greater the degree of societal agreement on gender roles is, a prediction that is derived from Esping-Andersen and Billari (2015). Results hold against a number of robustness checks. The analysis also supports the previous finding that more macro-level gender equality is associated with higher fertility (Arpino et al., 2015; Myrskylä et al., 2011).

This study is innovative as it gives further insight into the mechanisms that link gender relations and fertility, as it applies a much clearer and more unambiguous

measure for gender role attitudes, and as it shows how—in general—the variation in variable matters for a social outcome, independently of its content or mean value. Will this cross-sectional finding hold in the longitudinal perspective? Will the move towards new gender and family roles bring along a decrease in societal variation in attitudes, and will this translate into higher parenthood and lower childlessness?

The analysis suffers from a number of shortcomings. The first, and main issue is, as discussed in Section 1, the data structure. Gender role attitudes are measured in the same year as fertility outcomes. If ideal data were available, I would measure attitudes when people are in their typical years of partnership and family formation (probably somewhere between age 20 and age 30), and measure fertility outcomes around 20 years later, once we know whether or not people remain permanently childless (e.g. age 45 for females and age 50 for males). In an ideal setting, I would predict parenthood versus childlessness of those that are in late forties or fifties today with attitudinal data from the same cohorts, measured some 20 years earlier. Given that my data are cross-sectional, I predict childlessness of those in their late forties or fifties with attitudes of people that mainly are (1) from later cohorts and (2) younger. Two alternative approaches are presented as robustness checks: one rules out potential ageing but not cohort effects, the other rules out potential cohort but not ageing effects. These approaches yield almost identical results which suggests a robust association.

ISSP 2012 data also has a number of other challenges. Response rates and numbers of observations were low in a number of countries, and the identification of parents and the childless was indirect. In general terms, cross-country comparison of gender role attitudes remains a challenge, for example because such attitudes relate to institutional settings like the labour market, formal childcare or parental leave, and these institutional settings differ widely between countries (Braun, 2008; Constantin & Voicu, 2015; Scott & Braun, 2009).

Like most research on fertility, our theoretical reasoning is about fertility decisions, while I actually measure fertility outcome (Schneider, 2016). Some of the childlessness might be involuntary (e.g. due to infertility), also some of the childbirths might be unplanned or unintended. Shares of these two groups are likely to differ between the countries under investigation.

Future analyses should try to disentangle different mechanisms that link the association between the variation in gender role attitudes and individual parenthood more precisely. What share of the association can be attributed to processes of partnership formation or to peer-group mechanisms?

While the aim of this article was to develop the theoretical framework and show that macro-level associations are robustly in line with theoretical predictions, future research could go into the 'second stage' and test the partnership-hypothesis using micro-level panel data (Billari, 2015). When two partners in a couple have very different and possibly incompatible (parental) gender role attitudes at one point in time, they should be less likely to become parents later on. Such micro-level analysis might also be able to consider not only the transition to parenthood but further parity progressions. Future research could also gain greater insight into the question why societal agreement in gender role attitudes is high in some, and low in other countries.

All in all, this study provides a substantial contribution to understanding by which mechanisms gender relations and fertility are related. While in general a pluralistic society—with a variety of different gender role models and no strong normative pressure to follow a certain 'lead model'—would be desirable, this could come at the cost of high childlessness and lower fertility. If higher levels of fertility are desired, it is upon the society and policy makers to agree on a specific gender role model and tailor institutions around it—or to find a creative way of escaping this trade-off and reconciling a variety in gender role models with moderate or even high fertility.

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Appendix

Scatterplots: Gender Role Attitudes, Variation in Gender Role Attitudes and Childlessness

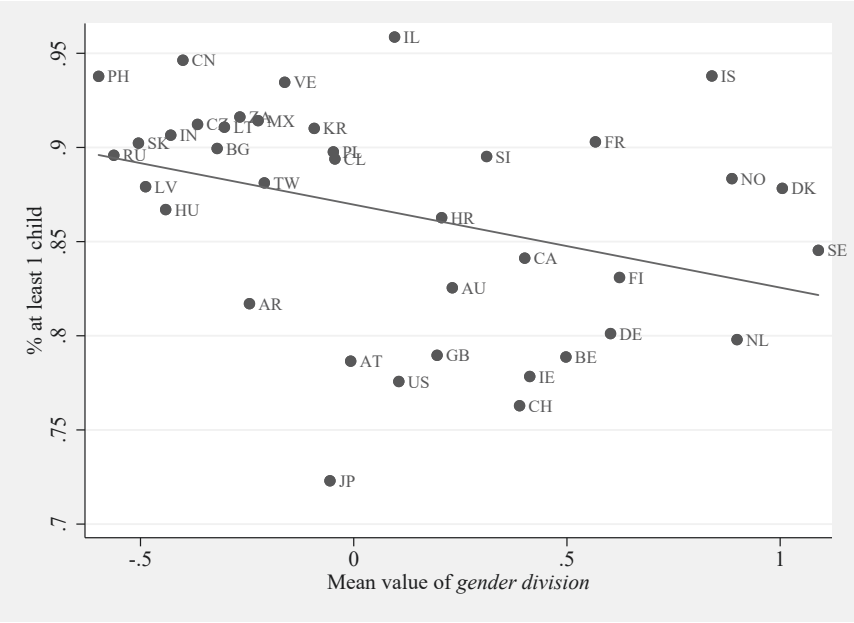

Figure A1.1: Share of population with at least one child and mean value of the factor gender division. $r = -.36; p < .05$.

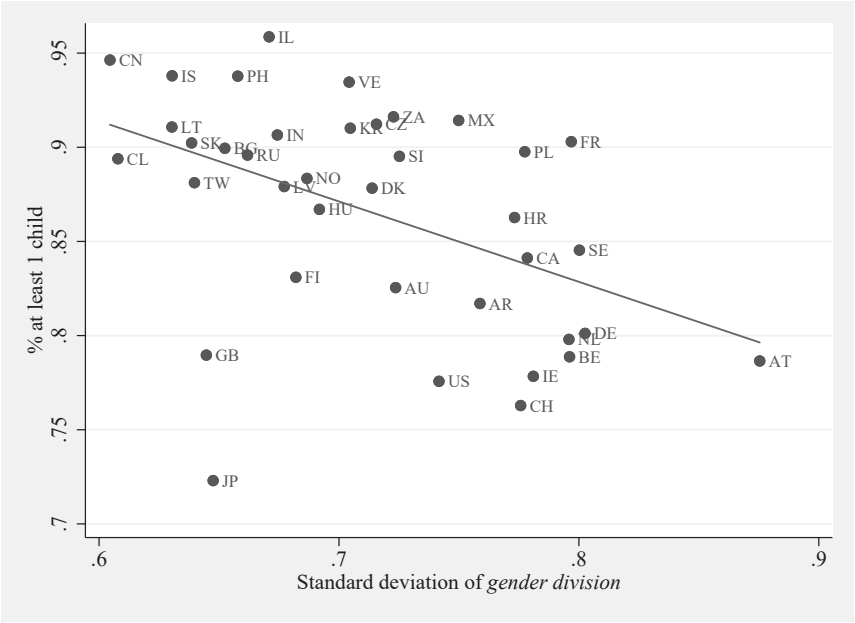

Figure A1.2: Share of population with at least one child and standard deviation of the factor gender division. $r = -.47; p < .01$.

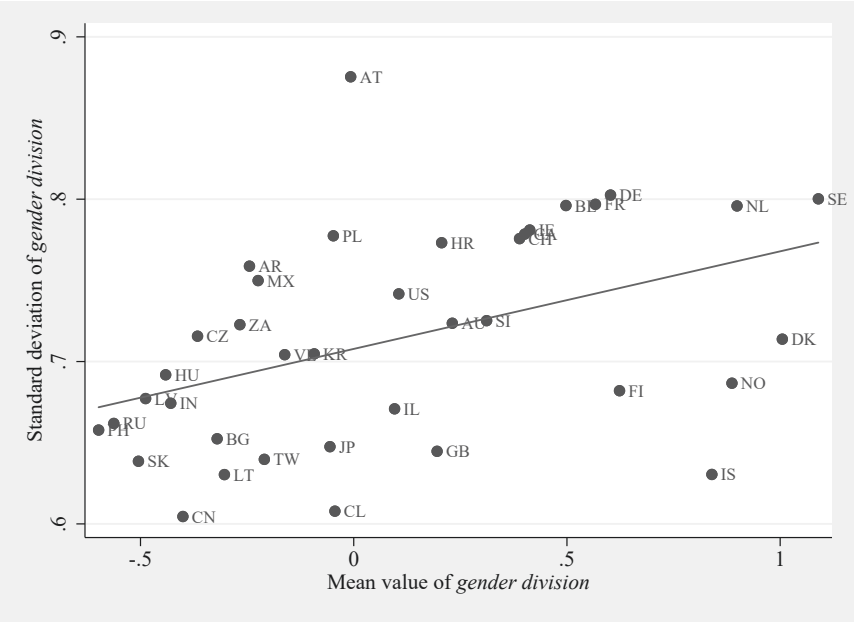

Figure A1.3: Standard deviation and mean value of the factor gender division. $r = .44; p < .01$.

Benchmarking Shares of Parenthood in ISSP Against Other Data

To assess the reliability of data identification of parents/childless, I compare country-level average shares of parents in the ISSP-sample to previously published estimates of parenthood in the sample countries (drawn from Sobotka, 2017; Tanturri et al., 2015; www.humanfertility.org; these sources mainly rely on censuses or similar large-sample data). Women in the ISSP-sample are on average born in 1962, so I compared the ISSP value with Sobotka's (2017) values for the 1960 cohort (or the closest one to that). Such reference data is available for 24 countries (data unavailable for countries in Latin America, South Africa and most of Asia). Note that the reference data is only available for females (Tanturri et al., 2015 report levels of male childlessness for six countries; in all countries male childlessness is higher than female childlessness). Figures A1.1 and A1.2 plot ISSP-values for share of parents (including 95-confidence interval) against the reference values. Correlation between ISSP-values for females and males with reference values is .73 ($p<.0001$). Correlation between ISSP-values for females only with reference values are .63 ($p<.001$). Generally, ISSP-data overestimates the share of parents over the whole sample, which is in line with previous research Kreyenfeld et al., 2012. Over the whole ISSP-sample (combining males and females), there are two countries, in which the prevalence of parenthood in the ISSP-sample differs significantly from the reference data, Austria and France. In Austria, this discrepancy is mainly driven by low parenthood among men in the Austrian sample (share parents, among males: .73, among females: .82). For the French sample, it is less clear what drives the discrepancy. Looking at the female ISSP-subsample, only one country deviates significantly – and substantially – from the linear fit: Sweden. I ran models excluding these three countries, Austria, France, and Sweden, and results were robust.

Control Variables and Their Sources

Two macro-level indices for gender equity are introduced, including their square

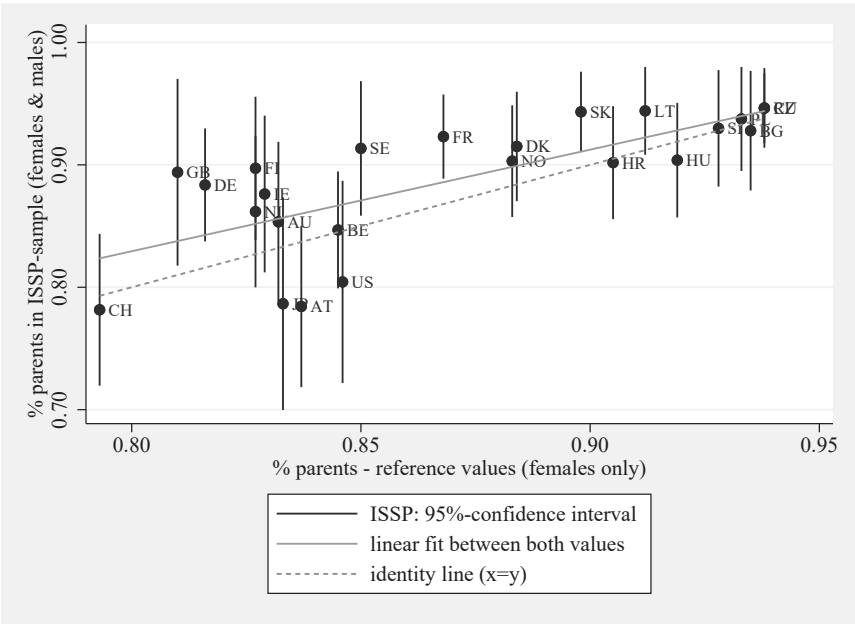

Figure A1.4: Benchmarking share of parents: comparing ISSP-sample (females and males combined) to reference data. $r = .73; p < .0001$.

values. For a discussion of these measures in relation to fertility, see Mills (2010). Mills (2010) also discusses two additional indices which could not be introduced in this analysis as they are not available for a large number of sample countries. The Global Gender Gap Index (GGG) is drawn from Hausmann et al. (2006) and refers to the year 2004, the first year that is available. The Gender Equity Index (GEI) is drawn from Social Watch (2007) and refers to the year 2007, the earliest year for which comprehensive data are available. Data for the Gross Domestic Product (GDP) are drawn from The World Bank (2015) and refer to the year 2000, as data is not available for all countries for earlier years.

Models for Further Robustness Checks

Table 1 shows the models for further robustness checks. Models 8 and 9 are the base model, run for only female and only male individuals respectively. Direction and magnitude of association of all gender-related variables with childlessness are

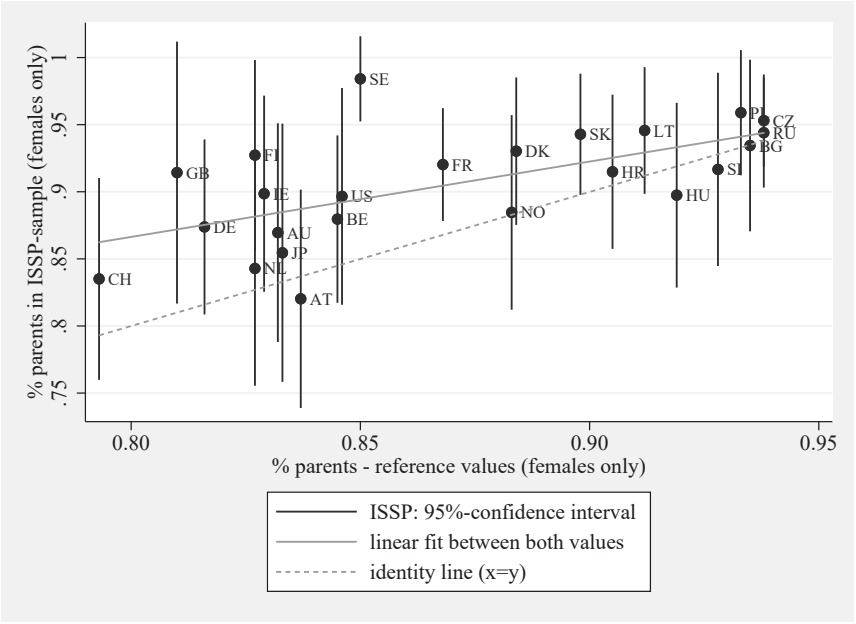

Figure A1.5: Benchmarking share of parents: comparing ISSP-sample (females only) to reference data. $r = .63; p < .001$.

the same for female and male respondents. The association between variation in attitudes and childlessness is significant for male and female respondents. Individual attitudes are insignificant in both modes. Macro-level attitudes are only significant for males. These declines in significance might be driven by decreased number of observations. In a joint model with interactions between sex of respondent and gender-related variables, none of the interactions is significant (not shown here).

Models 10 and 11 measure macro-level variables, average gender role attitudes and variation in gender role attitudes, for two age-restricted sub-sample, as discussed in the main document. The negative association between variation in attitudes and individual parenthood remains statistically significant in these models.

Models 12 and 13 introduce gender-related macro-level indices. Model 12 controls for the Global Gender Gap Index (GGG), which "assesses the level of equality between women and men [...] within the four critical categories – economic-,

educational-, political- and health- based criteria" Hausmann et al., 2006, p. 3 (this index is not available for Taiwan and Venezuela). Model 13 controls for the Gender Equity Index (GEI) which should measure gender equality and/or gender equity (Social Watch (2007) uses both terms to describe the index) in three dimensions: "economic activity, empowerment and education" (Social Watch, 2007; this index is not available for Taiwan, India, Korea, South Africa and Venezuela). With the given control variables, there is no significant association between Global Gender Gap or Gender Equity Index with individual childlessness.

Models 14 to 16 are run without influential cases on the macro-level, as suggested by Van der Meer et al. (2010). Model 14 excludes Chile, the country with a Cook's D above the cut off value. Model 15 excludes all countries with DFBETA above the cut off value for the variable variation in gender role attitudes (Chile and Austria). Model 16 excludes all countries with DFBETA above the cut off value for any (control) variable (Chile, China, Norway, United States, Austria, Germany, Croatia, Japan, and Ireland). The main association between variation in gender role attitudes and individual fertility is significant at the 5%-level in all models and significant at the 1%-level in all joint models for males and females.

Table A1.1: Logistic multilevel regressions predicting parenthood (=1) versus childlessness (=0). Robustness Checks and Sensitivity Analysis. Odds ratios are displayed.

	Sex-separate analyses		Alternative macro-vars		Add macro-controls		Drop influential macro-level cases		
	females (8)	males (9)	younger subs. (10)	older subs. (11)	GGG (12)	GEI (13)	Cook's D (14)	DFBETA I (15)	DFBETA II (16)
Individual attitudes (measured as difference from country-level mean)									
Individual attitudes	0.89 (0.058)	0.93 (0.062)	0.91* (0.043)	0.91* (0.043)	0.91* (0.043)	0.91 (0.045)	0.91* (0.043)	0.93 (0.046)	0.92 (0.0523)
Country-level mean-value of attitudes									
Full age-range	1.21 (0.136)	1.45** (0.179)			1.34** (0.153)	1.32* (0.143)	1.41*** (0.114)	1.42*** (0.131)	1.38* (0.180)
Younger sub-sample			1.23* (0.120)						
Older sub-sample				1.25* (0.132)					
Country-level variation in attitudes									
Full age-range	0.84* (0.065)	0.74*** (0.064)			0.79** (0.057)	0.79*** (0.054)	0.72*** (0.042)	0.72***(0.053)	0.75** (0.075)
Younger sub-sample			0.83** (0.056)						
Older sub-sample				0.85* (0.062)					
Additional controls on the macro-level									
Global Gender Gap Index					0.98 (0.080)				
Gender Equity Index						1.03 (0.084)			
Controls individual level	yes	yes	yes	yes	yes	yes	yes	yes	yes
Controls country level	yes	yes	yes	yes	yes	yes	yes	yes	yes
Country-level RE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations: micro-level	3593	2712	6305	6305	5980	5431	6060	5907	4384
Observations: countries	38	38	38	38	36	33	37	36	29

Standard errors are displayed in parentheses. All independent variables are standardised.
Model 8: Model run for female respondents only.
Model 9: Model run for male respondents only.
Model 10: Macro-level variables computed based on younger sub-sample (cf. section Data & Methods, p. 17 in current version).
Model 11: Macro-level variables computed based on older sub-sample (cf. section Data & Methods, p. 17 in current version).
Model 12: Controlling for Global Gender Gap Index (GGG) 2006.
Model 13: Controlling for The Gender Equity Index (GEI) 2007.
Model 14: Deletion of influential cases: dropped if Cook's D above the cut off value (Chile).
Model 15: Deletion of influential cases: dropped if DFBETA for variation in gender role attituds is above cut off value (Chile and Austria).
Model 16: Deletion of influential cases: dropped if DFBETA for in any (control) variable is above cut off value (Chile, China, Norway, United States, Austria, Germany, Croatia, Japan, and Ireland).
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Calculation of *unexplained variation I & II*

Unexplained variation I & II are attempts to capture the variation in gender role attitudes that is *not* explained by individual characteristics which typically shape partner markets. The goal is to have a measure for the variation in attitudes among potential partners.

As mating behaviour is clearly structured by factors like age, education, religion, ethnicity or place of residence, the goal is to measure the variation in attitudes that persists net of these factors. Take for example a society that consists of strongly segregated sub-groups, segregation by education, religion, ethnicity, space/region or something else, and mating happens generally within these groups. If within these groups members have a strong agreement on gender roles but the content of these roles differs strongly between these two groups, potential and actual partners (within the same group) should all share similar opinions. In this case the first measure, the standard variation in the whole society, would be large, while the second measure, the variation controlling for factors that might segregate, would be small. Due to this it would be expected that the second measure is the better predictor of fertility. The measure is computed as follows: micro-level OLS-regressions are run for each country separately. The dependent variable is the factor that measures gender role attitudes, the independent variables are characteristics that should influence mating behaviour. The within-variation, the variation among potential partners, is the variation that is not explained by the country-level regressions: the mean squares (MS; calculated as the sum of squares (SS) divided by the respective degrees of freedom). Two sub-models were presented in section 6. The first, *unexplained variation I* includes the variables sex, age, years of education (with interaction for age and education with sex), region of residence and type of place of residence (urban vs. rural). The second measure, *unexplained variation II*, adds a measure for religiosity as a dummy variable which is one if the respondent visits religious services at least once a month and zero otherwise. From a theoretical perspective it would be desirable to include a number of other

measures as well. Such an example is race or ethnicity but information on this question differs so strongly from one country to another, so the inclusion of such a variable does not seem promising (some countries provide information on the ethnic group of the respondent (e.g. Great Britain, Ireland, Russia), on whether the respondent or respondents' parents were born in the country (e.g. France, Australia, Denmark), of which cultural group or country of origin the ancestors are (Canada, USA), which caste they belong to (India) whether or not the respondent belongs to a minority group (Iceland) or provide no information at all (Austria).
Figure A1.7 shows two examples of such micro-level regressions. Figure A1.6 compares how the countries 'rank' on the three different measures: *standard deviation* and *unexplained variation I & II*. It shows that for example in Poland *standard deviation* and *unexplained variation I* differ a lot. This means that in Poland a large share of the variation in gender role attitudes is explained by sex, age and education (adjusted r^2 in the micro-level regression model for *unexplained variation I*: .23). The opposite is the case for Czech Republic (adjusted r^2 in the micro-level regression model for *unexplained variation I*: .02).

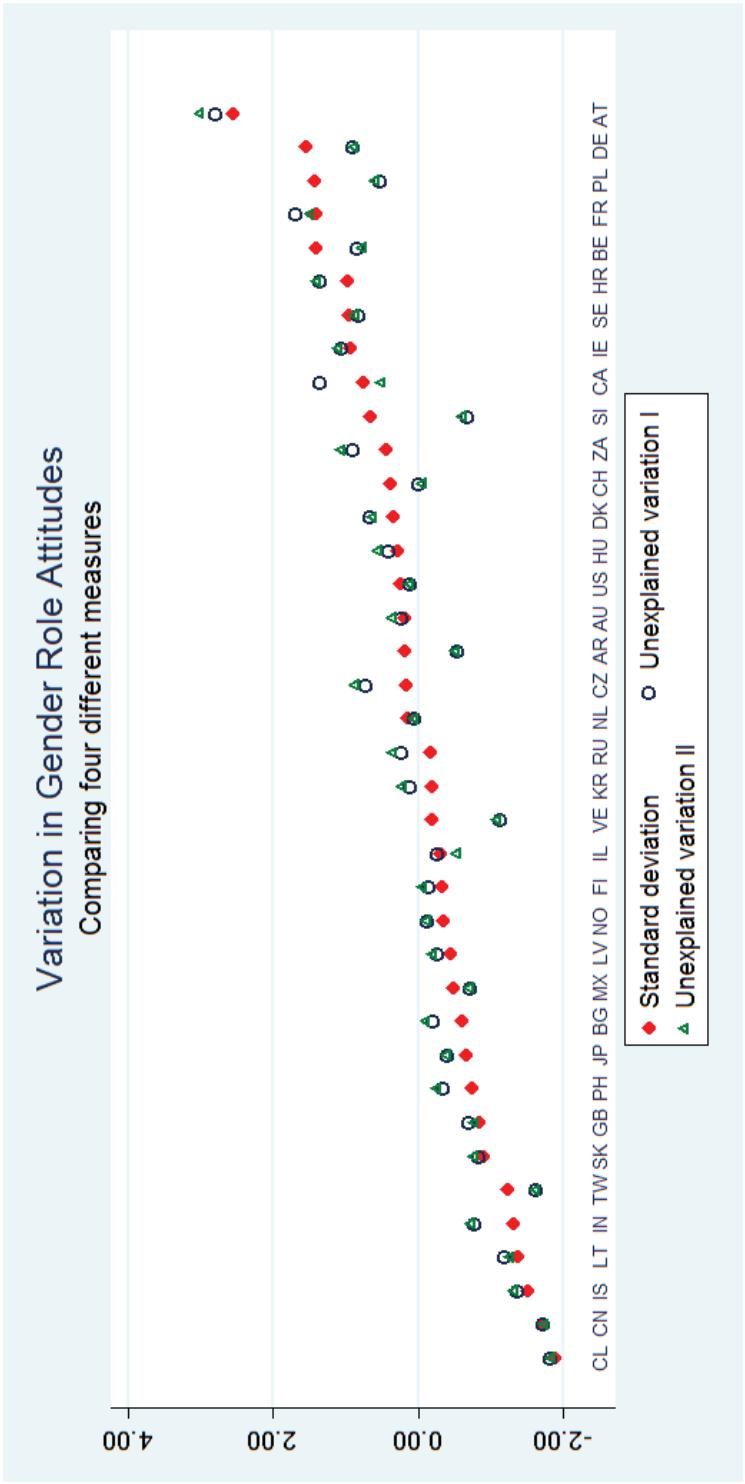

Figure A1.6: Comparing the measures *standard deviation* with *unexplained variation I & II*. All variables are standardised.

Figure A1.7: Micro-level regression: calculating *unexplained variation I* for Poland and *unexplained variation II* for the United States.; Dependent variable: factor *gender division*.

```
. * unexplained variation I for POLAND:
.
. reg gender      male     age     educyrs          male_age        male_educyrs            ///
> i.region_numeric        urban                              if cntry2 == "PL"
```

Source	SS	df	MS	Number of obs	=	418
				F(12, 405)	=	11.64
Model	73.1045117	12	6.09204264	Prob > F	=	0.0000
Residual	211.874655	405	.523147296	R-squared	=	0.2565
				Adj R-squared	=	0.2345
Total	284.979167	417	.683403277	Root MSE	=	.72329

unexplained variation I

gender	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
male	-.0338542	.5682518	-0.06	0.953	-1.150946	1.083237
age	.0015015	.0052838	0.28	0.776	-.0088856	.0118885
educyrs	.0911851	.0151795	6.01	0.000	.0613446	.1210256
male_age	-.0140162	.0086314	-1.62	0.105	-.0309843	.0029518
male_educyrs	.0327446	.0247556	1.32	0.187	-.015921	.0814101
region_numeric						
Malopolska (South-East)	-.0359325	.1272008	-0.28	0.778	-.2859887	.2141237
North-East & East	-.061949	.1285646	-0.48	0.630	-.3146863	.1907883
Pomorze (North)	-.1228683	.1478046	-0.83	0.406	-.4134284	.1676918
Silesia (South-West)	.0110261	.1302632	0.08	0.933	-.2450504	.2671027
West	-.2535522	.1409842	-1.80	0.073	-.5307045	.0236001
Wielkopolska (Central-West)	.039985	.1307385	0.31	0.760	-.2170259	.2969959
urban	.1226924	.0790151	1.55	0.121	-.0326385	.2780233
_cons	-1.227254	.3178896	-3.86	0.000	-1.852173	-.6023339

```
.
.
. * unexplained variation II for UNITED STATES:
.
. reg gender      male     age     educyrs          male_age        male_educyrs            ///
> i.region_numeric        urban          i.rel2           if cntry2 == "US"
```

Source	SS	df	MS	Number of obs	=	365
				F(15, 349)	=	5.13
Model	36.4829846	15	2.43219897	Prob > F	=	0.0000
Residual	165.348619	349	.473778278	R-squared	=	0.1808
				Adj R-squared	=	0.1455
Total	201.831604	364	.554482428	Root MSE	=	.68832

unexplained variation II

gender	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
male	.7289687	.4993068	1.46	0.145	-.2530602	1.710998
age	.002004	.0052619	0.38	0.704	-.008345	.0123531
educyrs	.0872249	.0164894	5.29	0.000	.0547938	.1196559
male_age	-.0118805	.0084076	-1.41	0.159	-.0284165	.0046556
male_educyrs	-.0329513	.0250035	-1.32	0.188	-.0821277	.0162252
region_numeric						
US2	-.0062808	.2170029	-0.03	0.977	-.4330788	.4205172
US3	-.1479815	.2054491	-0.72	0.472	-.5520556	.2560925
US4	.1199272	.238201	0.50	0.615	-.3485628	.5884172
US5	-.1862732	.2049764	-0.91	0.364	-.5894175	.2168712
US6	-.2444578	.239475	-1.02	0.308	-.7154536	.226538
US7	-.2175729	.2168079	-1.00	0.316	-.6439874	.2088415
US8	-.0363265	.2251677	-0.16	0.872	-.4791828	.4065298
US9	-.2086897	.2166256	-0.96	0.336	-.6347456	.2173663
urban	.0112935	.120104	0.09	0.925	-.2249252	.2475122
1.rel2	-.2126828	.0746598	-2.85	0.005	-.3595224	-.0658432
_cons	-.8063798	.4016129	-2.01	0.045	-1.596266	-.0164936

Table A1.2: Country-Level Summary Table of Used Variables.

Country	*share of parents*	*Att. factor I gender division*	*Att. factor II female homemaker*	*Att. factor III mother as earner*	*standard deviation (factor I)*	*sex gap (factor I)*	*unexpl. variation I (factor I)*	*unexpl. variation II (factor I)*	*GGG 2004*	*GEI 2007*	*N computation macro att.*	*N regression models*
Argentina	0.88	-0.57	-1.28	-1.14	0.81	0.28	-0.02	0.01	0.68	0.70	484	117
Austria	0.78	-0.06	-0.50	-1.19	2.49	0.25	2.85	3.03	0.70	0.72	532	153
Australia	0.85	0.45	0.31	-0.66	0.30	0.33	0.06	0.15	0.72	0.76	391	116
Belgium	0.85	1.02	0.48	0.51	1.35	0.20	0.67	0.57	0.71	0.74	720	222
Bulgaria	0.93	-0.73	-0.76	-0.19	-0.72	0.04	-0.53	-0.48	0.69	0.74	369	111
Canada	0.88	0.81	0.85	0.26	1.09	0.25	1.23	0.78	0.72	0.75	227	108
Switzerland	0.78	0.79	-0.03	-0.35	1.05	0.19	0.66	0.64	0.70	0.67	615	174
Chile	0.90	-0.14	-1.25	-1.00	-1.36	0.16	-1.63	-1.62	0.65	0.62	835	245
China	0.96	-0.90	-0.69	-0.11	-1.41	0.05	-1.70	-1.70	0.66	0.61	2638	720
Czech Republic	0.95	-0.83	-0.02	-0.29	0.19	0.10	0.59	0.72	0.67	0.69	857	242
Germany	0.88	1.24	0.99	0.43	1.44	0.21	0.91	0.95	0.75	0.80	606	189
Denmark	0.92	2.11	2.16	2.23	0.16	0.04	0.37	0.29	0.75	0.79	492	153
Finland	0.90	1.29	1.62	1.59	-0.29	0.30	-0.42	-0.37	0.80	0.84	345	107
France	0.92	1.17	0.67	0.56	1.36	0.17	1.64	1.40	0.65	0.64	781	234
United Kingdom	0.89	0.37	0.48	-0.23	-0.83	0.17	-0.97	-1.06	0.74	0.74	267	66
Croatia	0.90	0.40	0.33	0.83	1.02	0.14	1.30	1.36	0.71	0.73	574	163
Hungary	0.90	-0.99	-0.80	-0.32	-0.15	0.04	-0.13	-0.05	0.67	0.70	548	156
Ireland	0.88	0.84	0.61	-0.06	1.13	0.17	1.13	1.11	0.73	0.69	353	105
Israel	0.97	0.16	-0.36	0.52	-0.45	0.03	-0.61	-0.85	0.69	0.73	507	117
India	0.93	-0.96	-1.16	-0.97	-0.40	-0.16	-0.05	0.01	0.60		445	56
Iceland	0.93	1.75	1.58	1.87	-1.03	0.14	-1.14	-1.12	0.78	0.79	530	126
Japan	0.79	-0.17	0.49	-1.55	-0.79	0.02	-0.74	-0.78	0.64	0.60	356	89
Korea	0.97	-0.24	-1.24	-1.08	0.03	0.14	-0.05	0.03	0.62		705	222
Lithuania	0.94	-0.70	-0.62	-0.50	-1.04	0.14	-1.07	-1.18	0.71	0.77	453	161
Latvia	0.92	-1.09	-1.06	-0.82	-0.36	0.01	-0.29	-0.22	0.71	0.76	540	191
Mexico	0.94	-0.53	-1.67	-1.43	0.68	0.05	0.31	0.36	0.65	0.61	638	106
Netherlands	0.86	1.88	0.93	0.02	1.34	0.13	1.00	0.96	0.72	0.77	350	123
Norway	0.90	1.85	1.46	1.67	-0.23	0.25	-0.21	-0.18	0.80	0.83	548	165
Philippines	0.93	-1.33	-1.52	-1.15	-0.64	0.01	-0.42	-0.34	0.75	0.76	697	153
Poland	0.94	-0.15	-0.00	-0.39	1.08	0.28	0.18	0.20	0.68	0.72	490	128
Russia	0.95	-1.25	-1.14	-0.68	-0.58	0.14	-0.30	-0.22	0.68	0.71	661	187
Sweden	0.91	2.29	1.80	1.88	1.40	0.28	1.14	1.13	0.81	0.89	321	104
Slovenia	0.93	0.62	0.57	1.53	0.33	0.28	-1.07	-1.04	0.67	0.72	393	114
Slovakia	0.94	-1.13	-0.24	0.29	-0.92	0.20	-1.14	-1.11	0.68	0.70	497	194
Taiwan	0.95	-0.49	0.05	0.19	-0.90	0.26	-1.65	-1.65			789	202
United States	0.80	0.18	0.09	0.27	0.56	0.26	0.28	0.23	0.70	0.74	397	92
Venezuela	0.95	-0.39	-1.04	-1.06	0.03	0.06	-0.82	-0.77			657	123
South Africa	0.93	-0.62	-0.12	0.53	0.29	0.10	0.66	0.79	0.71		1409	271

N computation macro att. refer to number of observations on basis of which country-level aggregates (average attitudes and variation in attitudes) were calculated (age 20-55 & 25-60).
N regression models refer to number of observations that entered into main regression models (age 45-55 & 50-60).

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Paper II

Hudde, A. (2018). Homogamy in Gender Role Attitudes Among Young Couples: Evidence from Germany. *Manuscript under Review.*

Abstract:
Romantic partners' similarity in gender role attitudes affects important outcomes such as relationship stability and separation, or fertility. However, there is little knowledge about how similar romantic partners are in these attitudes. Using dyadic panel data from German couples (sourced from pairfam), this study puts the degree of homogamy in gender role attitudes among young couples into perspective by comparing real couples to two types of counterfactuals. To create these counterfactuals, I re-mate couples in two ways: (a) randomly and (b) in such a way that similarity in attitudes between partners is maximized. Real couples differ only slightly from randomly mated couples, which suggests rather weak attitudinal similarity. I further test the mechanisms that determine the degree of homogamy: there is strong evidence for alignment over time, but no clear evidence for lower rates of separation among homogamous couples, or for homogamy as a by-product of assortative mating on other variables. This paper offers methodological and substantial contributions to the literature: it presents a method for intuitive assessment of the degree of homogamy on multiple variables simultaneously. It also shows that, in Germany, macro-level diversity in attitudes largely translates into dissimilar attitudes between partners—with important implication for relationship dynamics.

Introduction

There are good reasons why people might want to choose a partner who has similar gender role attitudes. Such attitudes have a direct impact on the everyday life of couples and families: if partners have different views on whether housework, paid work, or childcare should be done by women, men, or both equally, it will likely incite conflict (Kalmijn, 2005). However, there are also good reasons why people might *not* choose a partner with similar. When dating, people might have other priorities, such as appearance, similar interests and hobbies, or high status and success (e.g. Buss, Shackelford, et al., 2001; Skopek et al., 2011; Stewart et al., 2000). In addition, individuals might not have enough information about the attitudes of their potential partners: views towards the gendered sharing of housework, childcare and paid work are usually not popular topics for a first date.

Previous research on couple-dissimilarity on diverse traits, such as race/ethnicity, education, personality, and religion, shows that higher dissimilarity is associated with lower relationship satisfaction and stability (Bratter and King, 2008; Charles et al., 2013; Clarkwest, 2007; Kalmijn et al., 2005; Lehrer and Chiswick, 1993; Luo and Klohnen, 2005; Myers, 2006; Schwartz, 2013; Wang et al., 2006). More specifically, similarity in gender role attitudes between romantic partners matters in relationship dynamics. Three longitudinal studies of young couples in the United States and Germany find that couples with dissimilar attitudes have lower relationship satisfaction, higher risk of separation, and lower chance of transition to parenthood (Hohmann-Marriott, 2006; Arránz Becker, 2013; Paper III of this dissertation). Similarity in gender role attitudes also has an effect on the sharing of paid work and childcare (Nitsche and Grunow, 2018).

These results suggest that studying partner similarity in gender role attitudes is central to understanding variation in key demographic outcomes, such as fertility or relationship separation—however, to my knowledge, there is no study that provides an understanding of the degree of partner similarity in gender attitudes.

This paper puts the degree of homogamy in gender role attitudes into perspective by contrasting observed couples with two types of counterfactual couples that represent the two extreme points between the observed couples. Further, this study sheds light on the mechanisms that lead to the observed degree of similarity. Thereby, this paper makes an important substantial contribution to the literature on homogamy and assortative mating.

In addition to the substantial contribution, this paper makes a valuable methodological contribution to the literature on assortative mating. A main conclusion from a review paper on homogamy is that "matching partners are far from random" (Schwartz, 2013, p. 452). However, most of studies that this conclusion relies on show only that partners are "from random"—but do not show *how far* from random. In other words, most studies show that there is *statistically significant* homogamy, but do not give a comprehensible or clear interpretation of the *degree* of homogamy. Traits, for which romantic partners tend to be more similar than randomness would predict, are diverse and include education, social background, race/ethnicity, lifestyle, and others (Blossfeld, 2009; Charles et al., 2013; Feng and Baker, 1994; L. K. Jepsen and C. A. Jepsen, 2002; Kalmijn, 1998; Lampard, 1997; Luo and Klohnen, 2005; Schwartz, 2013; Schwartz and Mare, 2005; Speakman et al., 2007; Watson et al., 2004). The focus on statistical significance and negligence of substantial meaning in homogamy research has been criticized in quantitative social research more broadly (see e.g. Bernardi et al., 2017). The few existing studies that do provide an understanding of the degree of couples' similarity examine single variables—mainly categorical traits with low numbers of categories, such as religiosity or party affiliation—but never multiple variables at the same time (e.g. Kalmijn, 1998; Lampard, 1997). This study provides a methodological approach that allows a comprehensible understanding of the degree of homogamy in a multi-dimensional framework.

I use unique data from the German family panel (pairfam). Pairfam is ideal for studying couples in the early stage of a relationship: first, it surveys both partners

in a couple, even if they do not (yet) live in the same household; second, it samples many people in their mid- to late-twenties—the period when many people enter serious unions (Billari and Liefbroer, 2010), and third, pairfam is a panel data set that follows both partners in a relationship for up to nine years. Germany is an interesting setting to study homogamy in gender role, because such attitudes are very heterogeneous in Germany and previous research suggests that this heterogeneity in attitudes is a main driver behind Germany's high rates of separation and low fertility (Papers I and III).

Theoretical Framework: Why One Might, or Might Not, Expect Similarity in Gender Role Attitudes

I understand gender role attitudes as "beliefs about the appropriate role activities for women and men" in various life spheres, such as work, family, or politics (McHugh and Frieze, 1997, p. 4). The focus is on attitudes about the gendered organisation of family life because these views are directly related to the internal functioning of a relationship (Kalmijn, 2005; Paper III). Previous research showed that gender role attitudes predict behaviours, such as the division of housework, childcare, and employment (see e.g. Blair and Lichter, 1991; Davis and Greenstein, 2004, 2009; Fuwa, 2004; Schober and Scott, 2012). This paper studies views on how men and women and mothers and fathers should balance their engagement in paid work and in the home. In line with recent research, I treat gender role attitudes not as uni-dimensional, e.g. a linear egalitarian-inegalitarian scale, but as multi-dimensional (Grunow et al., 2018; Knight and Brinton, 2017; Pepin and Cotter, 2018). Such views are hereafter called *gender role attitudes* or, used synonymously, *gender ideology*.

The literature on mating preferences identifies opposing hypotheses or frameworks of: "birds of a feather flock together," the idea that people search for a part-

ner who is similar to them, versus "opposites attract," the idea that people look for a partner who is dissimilar, because dissimilarity could mean complementary (e.g. Dijkstra and Barelds, 2008). When asked whether they prefer complementarity or similarity in a partner, the vast majority of people choose complementarity (Dijkstra and Barelds, 2008). Theoretically, dissimilarity on some traits could bring complementarity. For example, a rather silent person could be a good fit with a more talkative partner (extraversion/introversion is one of the view traits for which research finds negative assortative mating, see Luo and Klohnen, 2005; Watson et al., 2004). However, things are different when it comes to gender roles: similar attitudes can be complementary, while dissimilar ones cannot. Consider two couples. In the first, the female and the male partner equally believe that women should focus on home and children, while men should focus on paid work. These partners have similar attitudes, but they prefer complementary gender roles. In the second couple, the female partner believes that women should focus on home and children while men should focus on paid work; the man believes that tasks in home, child rearing and paid work, should be shared equally. Their attitudes are dissimilar, and the preferred gender roles are incompatible. Consequently, I do not believe that people have a preference for a partner who holds dissimilar, and therefore likely incompatible, gender role attitudes.

There are four potential reasons for homogamy in gender attitudes. The first is direct assortative mating, which happens if similarity in gender role attitudes has a direct influence on initial mating. The second is indirect assortative mating, which happens if (a) people choose partners who are similar to them in other characteristics, such as education or religiosity, and (b) these characteristics predict gender role attitudes of women and men. The third possibility is alignment, meaning that partners become more similar over time. The fourth is differential separation, meaning that partners who were dissimilar at the beginning of the relationship are more likely to have separated, and are therefore less likely to be in the sample.

The first two reasons apply to initial mating at the beginning of a relationship at time t_0; the last two apply to changes between the moment of initial mating and the moment of observation, at time t_1.

Direct Assortative Mating

Partners could have similar gender role attitudes because people intentionally search for a partner who holds similar views. Because such attitudes have a direct impact on the internal functioning of a relationship, it makes sense to look for a partner with similar views (Kalmijn, 2005). The assumption that people intentionally look for a partner with certain gender ideology is also present in the literature. Esping-Andersen and Billari (2015) explicitly assume that highly educated women search for men with egalitarian views. However, to my knowledge, none of the empirical tests of mate preferences mentions gender role attitudes (e.g. Bleske-Rechek and Ryan, 2015; Buss, Shackelford, et al., 2001; Lewis, 2016; Potârcă and Mills, 2015; Shackelford et al., 2005; Skopek et al., 2011; South, 1991).

As I argue, there are at least three reasons why direct assortative mating might happen to a low degree or not at all. First, knowledge about a partner's gender role attitudes improves over time, but starts at a rather low level (Fallesen and Breen, 2016). This paper interprets someone's gender ideology as an "experience trait" (Brüderl and Kalter, 2001). Contrary to characteristics such as appearance, education or income ("search traits"), it takes time, experience of behaviour, and discussion to learn about a partner's gender ideology: "The process of finding a spouse is one in which information is scarce, and it takes time to gather it".(Ermisch, 2003, p. 137)

Second, there might be a false consensus effect/bias. People are likely to assume that their own views are in agreement with the attitudes of the ones close to them, at least in the absence of specific information to the contrary (the false consensus effect is widely established in psychology, see e.g. Byrne et al., 1986;

Goel et al., 2010; Kenny and Acitelli, 2001). The false consensus effect could make people believe that their (potential) partner is more similar than is actually true. Also, Becker (1993) acknowledged this idea and argued that people "frequently marry with highly erroneous assessments" (p. 325).

Third, the perceived importance of gender role attitudes might be low in the phase of dating and partnership formation. People make decisions using different criteria, depending on what time-horizon they have in mind (Fehr, 2002). This is certainly relevant for decisions in the partner market. Research shows that women and men have different preferences and search criteria, depending on whether they have a serious long-term, or a casual short-term relationship in mind (Buss and Schmitt, 1993). Likely, gender ideology is not the most important search criterion among people who have a short or medium time horizon in mind. Whether people have a short or long time-horizon in mind is volatile, it can change over the life course and can also change in respect to the same partner (Fulda and Lersch, 2018): a relevant share of serious relationships was not 'planned' initially, but rather developed out of a not serious, casual relationship (e.g. "hookups" or "one night stands", see England et al., 2008; Paik, 2010).

Indirect Assortative Mating or the By-Product Hypothesis

Extensive research shows that there is assortative mating on a broad range of characteristics (e.g. Blossfeld, 2009; Luo and Klohnen, 2005; Schwartz, 2013; Skopek, 2011; Speakman et al., 2007). Some of these characteristics, like education, religiosity, and others, are predictors of gender role attitudes (Davis and Greenstein, 2009).

Assortative mating on variables such as education or religiosity can lead to similarity in gender role attitudes if three conditions are met: if there is substantial homogamy on variables like education or religiosity; if these variables are substantial predictors of gender role attitudes; and if these variables predict gender role

attitudes more or less equally for women and men. This idea of indirect assortative mating is also called the "by-product hypothesis" (Kalmijn, 1998), meaning that similarity in gender role attitudes might be a by-product of social homogamy, of assortative mating on other characteristics.

Alignment Over Time

Observed similarity in attitudes at t_1 might be greater than at t_0, the beginning of a relationship, because partners become more similar over time (see, e.g., Oppenheimer's discussion of *postmarital socialisation*, 1988). Such alignment might happen either because partners influence each other, or because both partners have common experiences, like common peers, which influence both partners in a similar way (Kalmijn, 2005; Kenny, 1996). However, previous research reports only limited convergence in attitudes (Feng and Baker, 1994; Kalmijn, 2005; Luo and Klohnen, 2005; Schober and Scott, 2012; Watson et al., 2004).

Differential Separation

Observed similarity in gender role attitudes at t_1 might be greater than at t_0, the beginning of the relationship, because couples with similar attitudes are more likely to stay in the relationship until t_1, while couples with dissimilar attitudes are more likely to separate. Partners' gender role attitudes have a direct impact on the functioning of a relationship (Kalmijn, 2005). Partners with similar attitudes likely agree on how to divide housework and other tasks; partners with dissimilar attitudes likely do not. The couples that disagree might be more likely to experience conflicts, which reduces relationship satisfaction and increases the risk of separation (Paper III). Previous research shows that partners with very dissimilar gender role attitudes are more likely to separate than partners with similar attitudes (Arránz Becker, 2013; Hohmann-Marriott, 2006; Paper III). Therefore, observed similarity in attitudes might be greater than similarity in the beginning of

a relationship, because the dissimilar partners have a lesser chance of remaining in a relationship until the moment of observation.

Data and Method

Data and Sample

Data. I analyse data from the first nine waves (2008–2009 to 2016–2017) of the German Family Panel (pairfam), release 9.0 (Brüderl, Hank, et al., 2018; Huinink, Brüderl, et al., 2011). The design and sampling of pairfam differs from household surveys. Pairfam is a multi-actor survey: first it samples an individual (called the *anchor*) and second, it samples that individual's partner, no matter whether the partner is a cohabiter or not.

Case Selection. I selected opposite-sex couples in Western and Eastern Germany in which the anchor is in the cohorts 1981-83 (and therefore in their mid-to late twenties) in wave one (1,716 cases with available data from both parents at wave 1). The level of analysis is the couple. To get as close as possible to the couples' initial mating, I study young couples with a relationship duration of a maximum of seven years (n=1,134).[17] The sample is restricted to childless partners, because the transition to parenthood influences the gender role attitudes of women and men (Baxter et al., 2015; Buchler et al., 2017; Schober and Scott, 2012) (n=734). In all, 598 couples (81%) have available data on all relevant variables and are included in the analysis; of these, 418 couples are from Western Germany and 180 couples are from Eastern Germany.[18]

[17] See the section on robustness checks and sensitivity analyses for the different cut-off values. The duration of relationship is defined as the time since the partners first entered their relationship (that is, if a couple experienced numerous relationship episodes with breaks in between, the beginning of the first relationship episode is counted as starting date).

[18] A couple is defined as being from Western or Eastern Germany if the anchor resides in that region at wave 1.

I study couples in Eastern and Western Germany separately because dating markets are mainly local, and gender role attitudes continue to differ substantially between Eastern and Western Germany (Bauernschuster and Rainer, 2011; Eckhard et al., 2015; Huinink, Kreyenfeld, et al., 2012; Lichter et al., 1995). The main text reports the results for Western Germany and mentions if results for Eastern Germany differ substantially. The result tables and figures for Eastern Germany are in the Appendix.

Analytical Strategy and Measures

Gender Role Attitudes. The following Likert scale items measure female and male gender and family role. The answer categories range from 1 (*agree completely*) to 5 (*disagree completely*).

- *Women: family > career*: Women should be more concerned about their family than about their career.
- *Child < 6 suffers if mother works*: A child under age six will suffer from having a working mother.
- *Housework: female involvement = male involvement*: Men should participate in housework to the same extent as women.
- *Child suffers if father focuses on work*: Children often suffer because their fathers spend too much time at work.

All items capture views towards the gendered organisation of couple and family life. These are not different measures for the same underlying dimension, e.g. a 'simple' traditional-egalitarian-scale, but instead, capture various attitudinal dimensions and aspects. This is in line with other recent research that argues that gender relations and gender role attitudes are multi-dimensional (Grunow et al., 2018; Knight and Brinton, 2017; Paper I). Cronbach's alpha for the four items is

rather low: .56 in Western Germany, and .49 in Eastern Germany. This supports my decision *not* to create a composite index and reduce complexity through factor analysis or a similar method, but rather work with the full complexity in attitudes and study all items separately (compare Nitsche and Grunow, 2018, who use the same data set).

Measurement of Dissimilarity in Attitudes: Number of Items with Dissimilar Answers. I measure dissimilarity using absolute difference score (ADS). Answers are defined as dissimilar if the absolute difference score is two or greater; that is, the partners' answers are at least two points on the Likert scale apart. Absolute difference scores are widely used to measure similarity between partners (e.g. Hohmann-Marriott, 2006; Keizer and Komter, 2015). I measure dissimilarity with the following method: (1) item-by-item, (2) counting items with dissimilar answers within the sub-groups of items that deal with women's or men's roles, and (3) counting all items with dissimilar answers. An alternative measure for similarity is profile correlation; however this measure requires a larger set of items than is available in this dataset (e.g. Arránz Becker, 2013). As shown in the section on robustness checks and sensitivity analyses, the results also hold when using linear or square absolute difference scores.

Mating: Real and Counterfactual Couples

This study compares couples as they are mated in real life to three types of synthetic couples as counterfactuals. The counterfactuals are created by two different principals: (1) they are mated randomly and (2) they are mated so as to achieve maximum similarity in gender role. To create the synthetic couples, I divide the real couples into two data sets, one that consists of men, the other of women. I then re-mate couples based on different algorithms as explained below.

(1) Randomly mated couples. This algorithm re-mates couples randomly. To do so, it assigns every observation in the female data set a consecutive number

between 1 and 418. It then creates a random variable in the male data set, and assigns every observation a number between 1 and 418. The algorithm then mates women and men who were given the same number. To achieve reliable estimates of similarity of randomly mated couples, I perform this step 10,000 times and compute the average value.

(2) Couples mated to achieve maximum similarity in gender role attitudes. The intuitive description of this procedure is like a modified speed-dating scenario. The main differences to 'regular' speed dating are as follows: (a) whenever a couple is a match, that newly formed couple leaves the speed dating process and (b) people continue speed dating until they have found a mate, while their expectations for a mate lower over time.

Round number one. Think of a circle of tables, each seats one women, sitting on the inside of the circle, and one man, sitting on the outside. In the beginning, women and men are randomly assorted to tables. If a man and a woman gave similar answers to all items, they are a match and leave the speed dating arena. Among those who remain, men rotate and take a seat on the next table where a woman sits. Again, matches leave the speed dating arena; the others rotate, until they have met all potential partners. Even after meeting all potential partners, some will not have found a partner who fulfills the requirement of similar responses to all items. These women and men enter round number two.

Round number two. Men now rotate again, which means that they talk to the same women, they have already met in round number one, for a second time. The difference to round one: women and men now accept a partner who gave a dissimilar answer on one of the four items. The rest follows according to round one.

Additional rounds. In each additional round, women and men lower their expectations: in the third round people accept a partner who gives dissimilar answers to two items, in the fourth round they accept dissimilarity on three items, and in the fifth and final round, any partner is accepted.

I then calculate the average similarity in attitudes among the mated couples. Note that this mating procedure is not necessarily the 'best' possible one; it is an approximation. To find the best possible sorting, one would need to compare $418!$ (the factorial of $418 = 418 \times 417 \times 416 \times ... \times 1 = 6.7 \times 10^{916}$) couples, which is difficult to handle with regular computing technology. The mating procedure in this study is likely to be a sufficiently good approximation. In addition, it is a Pareto-efficient mating: one could not give one person a more suitable partner without giving another person a less suitable one.[19]

Results

Family and gender role attitudes among Male and Female Respondents

Figure 2.1 shows how women and men in Western Germany responded to the four items on gender role attitudes. On three out of the four items, the answers of women and men follow similar patterns, and the dispersion in answers among women and men is high. The exception is the statement that men should participate equally in housework – hardly anyone disagrees with that statement.

Women and men have similar levels of agreement with the statement that women should focus on career rather than family (in fact, women agree slightly more often; the difference is not statistically significant, however). Men are more worried that children suffer if mothers work, and slightly more worried that children suffer if fathers are too work-focused. This suggests that men give more importance to fathers in child rearing than women do—an attitude that one might label as more egalitarian. (For a similar finding using British data, see Buchler

[19] The initial "seating" in the first round is random. The average similarity varies slightly, depending on the initial 'seating'. Therefore, the whole procedure is repeated 100 times to identify the best mating.

Table 2.1: Descriptive summary table. Western Germany (n=418).

	Female partner		Male partner	
	Mean	SD	Mean	SD
Gender Role Attitudes				
1. Women: family > career	2.62	1.16	2.54	1.12
2. Child < 6 suffers if mother works	2.63	1.25	3.01	1.23
3. Housework: female involvement = male involvement	4.52	0.83	4.27	0.9
4. Child suffers if father focuses on work	3.42	0.98	3.5	0.96
Age	24.79	2.38	27.11	3.2
Education. Share in group				
Lower secondary education (Volks- und Hauptschule)	0.03		0.02	
Lower secondary education (Realschule, Mittlere Reife)	0.05		0.02	
Upper secondary education vocational	0.18		0.32	
Upper secondary education general	0.15		0.05	
Post-secondary non tertiary education general	0.17		0.14	
First stage of tertiary education	0.32		0.43	
Second stage of tertiary education	0.01		0.01	
Religiosity: Frequency of attendance to church, mosque, synagogue religious service. Share in group				
Never	0.35		0.45	
Less often	0.38		0.32	
Several times per year	0.17		0.14	
One to three times per month	0.05		0.05	
Once a week	0.02		0.02	
More than once a week	0.02		0.02	
Duration of relationship in years	3.29	1.97	3.29	1.97

et al. (2017). Unsurprisingly, women are more likely to agree completely that men should participate equally in housework.

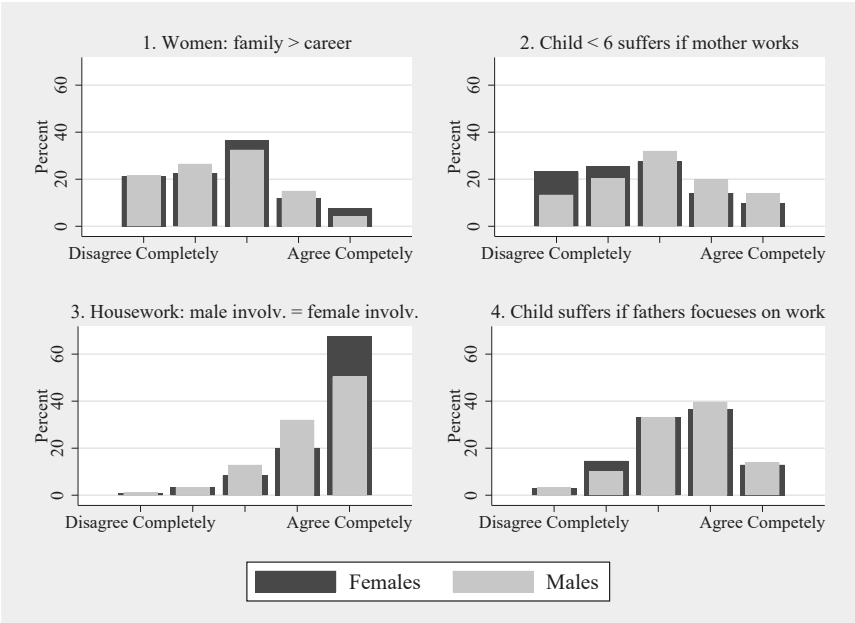

Figure 2.1: Responses to gender role items of female (n=418) and male (n=418) respondents. Western Germany.

How do answers in Eastern Germany differ? People in Eastern Germany agree less often that women should focus on family, and are less worried about maternal employment or work-focused fathers. The differences between men and women are mainly similar in the East and the West.

Partners' (Dis)Similarity in Gender Role

Figure 2.2 shows the differences in attitudes between both partners in a relationship. It plots the difference score for each response, which is the Likert scale value of the female partner's response minus the value of the male partner's response. The light grey bars indicate couples in which both partners give similar answers (the difference score is between -1 and +1). The dark grey bars indicate couples

in which both partners give dissimilar answers (the difference score is below -2 or above +2). A symmetrical distribution would mean that there are as many couples in which the female partner agrees more with the statement as there are couples in which the male partner agrees more with the statement. In broad terms, none of the distributions are very far from being symmetrical. On all items, between 64% and 83% of couples have similar views; a substantial fraction, 17% to 36%, have dissimilar views.

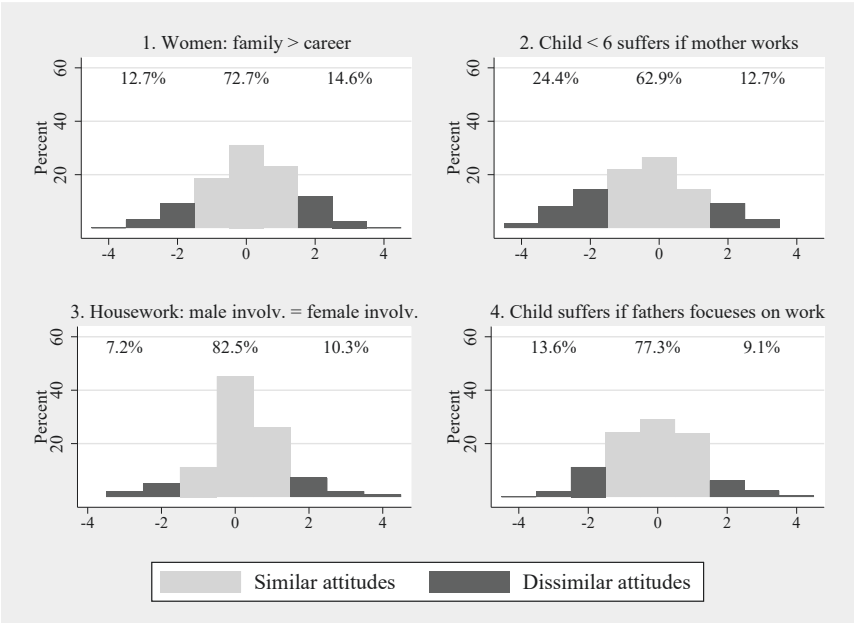

Figure 2.2: Difference scores (value of female partner minus value of male partner) for responses to gender role items. Positive values: female partner agrees more with statement than male partner does. Western Germany ($n_{couples}$=418).

There is a clear association between Figures 2.1 and 2.2: the higher the dispersion in, as shown in Figure 2.1, the higher the share of couples with dissimilar answers, as shown in Figure 2.2. This is a first hint that macro-level dispersion in attitudes translates into dissimilarity between romantic partners.

Concerning the first item, whether women should focus on family rather than on career, there is almost a balance between couples in which the female partner agrees more and couples in which the male partner agrees more (13% vs. 15%). For the second item, whether a young child suffers if the mother works, there are more couples in which the male partner agrees more with the statement (24% vs. 13%). In 10% of couples, the woman shows higher agreement that men should participate equally in the housework; in 7% of couples, the man shows higher agreement. In 10% of couples, the woman is more concerned about work-focused fathers; whereas, in 14% of couples, the man is more concerned about this item.

The main difference in Eastern Germany appears in the item whether children suffer from mothers' employment. In Eastern Germany, there are substantially fewer couples with dissimilar attitudes than in Western Germany (24% vs. 36%).

How (Dis)Similar are Partners in their Gender Role Attitudes? – Comparing Similarity in Attitudes among Real and Synthetic Couples

In how many items did the partners in the different types of mating give dissimilar answers? Figure 2.3 compares the average number of items with dissimilar answers. In the real couples, the partners, on average, gave dissimilar answers to 1.05 items. In the random mating, partners gave dissimilar answers to an average of 1.27 items; in the couples matched for maximum similarity, dissimilar answers were found in only 0.14 items. The first graph clearly shows two main results. First, the real mating is much closer to the random mating than to the mating for maximum similarity scenario. Second, even though the difference between random mating and real mating seems rather small in substantial terms, it is statistically significant: the similarity is lower in all of the 10,000 random mating iterations than among the real couples.

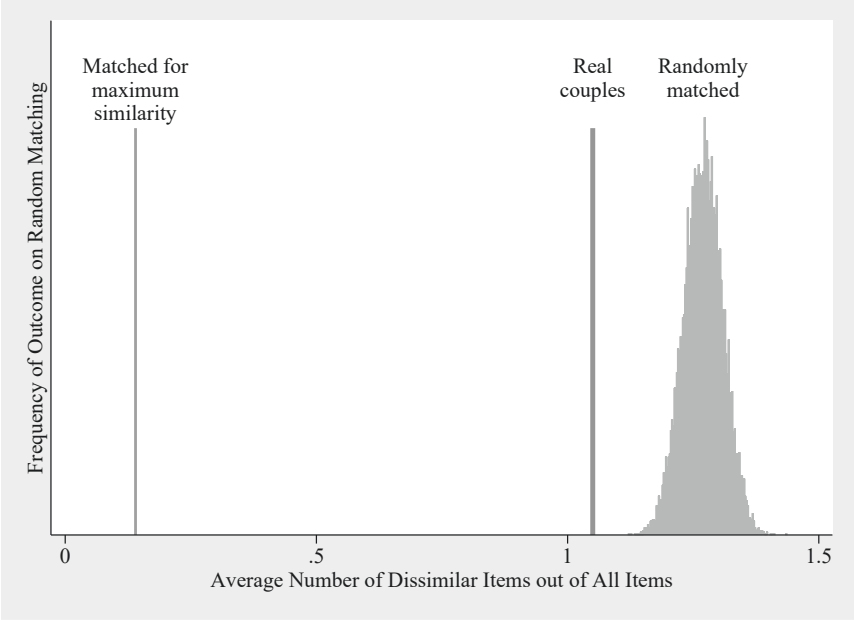

Figure 2.3: Average number of items with dissimilar answers, by type of matching. Random matching is performed 10,000 times. Western Germany ($n_{couples}$=418).

Figure 2.4 illustrates the differences between types of mating in more detail. In the counterfactual mating for maximum similarity, 92% of people find a partner who has similar views on all items. In real mating, it is 35% and in random mating, it is 25%. The curves for real mating are similar to those for random mating, and very different to those for mating for maximum similarity.

For the same figures for Eastern Germany, see the Appendix. The results for Eastern Germany are similar in broad terms. Both randomly matched and real couples have slightly more similar attitudes in the East than in the West and the difference between random and real mating is slightly larger in the East than in the West.

Table 2.2 subdivides dissimilarity by type of mating into subgroups of items concerning women's and men's roles, and into single items. Here, I also compute the reduction in dissimilarity from random to real mating. Intuitively, the question is: how much of the similarity potential do real mates exploit? In all of the items,

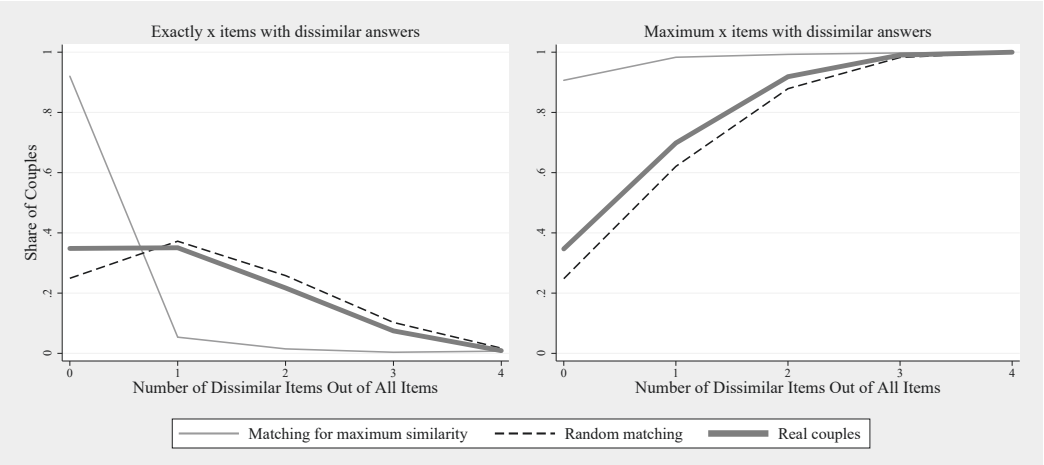

Figure 2.4: Share of couples by number of dissimilar items, by type of matching. Western Germany ($n_{couples}$=418).

the reduction is 19%; in female-related items, the reduction is 23%; and in male items, the reduction is 17%. Item by item, the reduction is greatest on the first item, whether women should focus on family rather than on career (29%), and is smallest for the last item, whether children suffer if their fathers focus too much on work (15%).[20]

What Mechanisms Explain the Observed (Low Degree of) Similarity between Partners?

As shown above, real couples are similar, but not identical to randomly mated couples. This raises the question of how the observed difference between real and randomly mated couples happen.

As argued in the theoretical section, there are four mechanisms that could lead to homogamy in gender role attitudes: (1) direct assortative mating on gender role, (2) indirect assortative mating, (3) alignment over time, and (4) differential rates

[20] The exemplary calculation for all items combined is the realized absolute reduction divided by the highest possible reduction. The realized absolute reduction is 0.22 (1.27-1.05) and the highest possible reduction is 1.13 (1.27-.14).

Table 2.2: Average dissimilarity in gender role attitudes between both partners in real and counterfactual matchings. Western Germany ($n_{couples}$=418).

	Matched for maximum similarity	Real couples	Randomly matched couples	Matched by education and religiosity
Number of dissimilar items out of all items	0.14	1.05	1.27	1.22
Number of dissimilar items on female roles (items 1&2)	0.09	0.64	0.80	0.75
Number of dissimilar items on male roles (items 3&4)	0.05	0.40	0.47	0.46
Dissimilarity on items:				
1. Women: family > career	.02	.27	.37	.33
2. Child < 6 suffers if mother works	.07	.37	.43	.41
3. Housework: female involvement = male involvement	.04	.17	.20	.19
4. Child suffers if father focuses on work	.01	.23	.27	.28

of separation. The following sections test whether indirect assortative mating, alignment and differential separation are occurring in the sample. Since there is no way to test direct assortative mating (the data do not indicate whether people deliberately chose partners by gender role), only the three other mechanisms are tested.

Indirect Assortative Mating

Indirect assortative mating on gender role attitudes happens if three conditions hold: (1) there is homogamy on other variables, (2) these variables are sufficiently strong predictors of gender role attitudes, and (3) these variables predict gender role attitudes roughly equally for women and men.

Education and religiosity were selected for substantial reasons, and for reasons of data availability. Previous research showed that people tend to mate with partners that are similar to them in level of education and religiosity and that both variables predict gender role attitudes (Blossfeld, 2009; Davis and Greenstein, 2009;

Schwartz, 2013; Watson et al., 2004). Unfortunately, a number of other and potentially relevant variables are not available for both partners. As examples, the family background (parental education, number of siblings, growing up in an urban or rural area) are available only for the anchor person, but not the partner.

Education is measured as ISCED-97, and religiosity as frequency of attendance at religious ceremonies (see Table 2.1 for distributions of these variables). In the sample, the Spearman rank correlation for both partners' religiosity is .48 ($p<.001$) and that of education is .39 ($p<.001$). Therefore, condition one—couples are homogamous on the variables—is met to a reasonable degree. However, homogamy might still be lower than expected. For example, among men with tertiary education, half have a partner who also has tertiary education and half have a partner without tertiary education.

Table 2.3: Associations between gender role attitudes, education, and religiosity for female and male partners. Spearman rank correlation coefficients. Western Germany ($n_{females=418}$, $n_{males}=418$).

	Education		Religiosity	
	Females	Males	Females	Males
1. Women: family > career	$-.29^{***}$	$-.12^{*}$	.05	$.23^{***}$
2. Child < 6 suffers if mother works	$-.21^{***}$	$-.05$	$.20^{***}$	$.21^{***}$
3. Housework: female involvement = male involvement	.04	$-.02$	$-.10^{*}$	$-.22^{***}$
4. Child suffers if father focuses on work	$-.04$	$-.05$	.07	.04

p-values in parentheses.
$^{+}p < 0.10,^{*}\ p < 0.05,^{**}\ p < 0.01,^{***}\ p < 0.001$

Table 2.3 shows whether education and religiosity are associated with the gender role attitudes of women and men. Of the 16 displayed correlations, eight are statistically significant, and none is very strong in substantial terms. The second condition for indirect assortative mating, that religiosity and education are sufficiently good indicators of, holds only moderately.

Do education and religiosity predict attitudes in a similar manner for women and men? For men, religiosity is more strongly associated with attitudes than education is; for women it is the other way around. The view that women should focus on family rather than on career is associated with lower education in both women and men, and with higher religiosity in men. It is, however, not related to the religiosity of women. The view that young children suffer from maternal employment is associated with lower education in women and with lower religiosity of both women and men. It is, however, not related to the education level of men. The view that men should participate equally in housework is associated with lower religiosity in women and men, but is unrelated to the level of education in women and men. The view that children suffer if their fathers focus too much on work is unrelated to the education level or religiosity of women and men. In sum, there is only one association, religiosity and views on maternal employment, where the association is significant and similar in size for both women and men. The third condition, that the religiosity and education predict attitudes in women and men equally, does not hold.

If a person searches for and finds a mate who is similar in level of education and religiosity, would that person also be similar in gender role attitudes? To test this, I rematch couples to maximise similarity in education and religiosity. The mating process is analogous to the 'speed dating scenario' described above used to maximise similarity of gender role.

Couples with maximum similarity in education and religiosity are somewhat more similar in attitudes towards women's roles than randomly matched couples. The difference is small and appears only in items regarding women's roles. For all items combined, real couples give dissimilar answers to 1.05 items; randomly matched couples are dissimilar on 1.27 items; and couples matched in education and religiosity are dissimilar on 1.22 items.

The results for Eastern Germany are qualitatively similar; however, the evidence for indirect assortative mating is even weaker.

In consequence, even the maximum amount of assortative mating on education and religiosity could only explain a minor share of the observed difference between real couples and randomly matched couples. To understand the observed difference between real and randomly matched couples, other explanations must be pursued.

Alignment over Time

A researcher may observe similarity in attitude at t_1, not because of similarities at the initial mating (t_0), but because couples became more similar between t_0 and t_1. The next test determines whether partners become more similar over time. Of course, there is no estimate of alignment before the first observation; however, I can estimate the alignment between the first and last observation and therefore, can test whether alignment occurs at all and to what magnitude.

To do so, I run fixed-effects regression models for all of the couples for which data is available for more than one wave. This is the case for 250 out of 418 couples. Dropouts mainly happen because the anchor or the partner stops participating in the survey. However, a small number of couples (59) drop out because the partners separate. At wave one, couples that are in the sample for fixed-effects models are no different in similarity on attitudes compared to couples that are not in that sample (dissimilar answers are 1.05 vs. 1.04 items, $p>0.1$).

Table 2.4 shows clear alignment over time. The longer the relationship, the more similar partners become in their gender role. After one year of a relationship, couples have dissimilar views on a predicted 1.12 items; after two years, on 1.00 items; after five years, on 0.83 items; and after ten years, on 0.71 items. Alignment seems more pronounced on views towards female roles and especially on the question of whether young children suffer when their mothers work.

Table 2.4: Alignment over time: Effect of duration of relationship on similarity in gender role attitudes. Linear fixed-effects regression models. Western Germany ($n_{couples}$=250, $n_{couples \times waves}$=746).

	Nr. of dissimilar items out of all items	Nr. of dissimilar items on female roles (items 1&2)	Nr. of dissimilar items on male roles (items 3&4)
Duration of relationship, logged	-0.18^{***}	-0.13^{***}	-0.05^{+}
	(0.00)	(0.00)	(0.10)
Constant	1.12^{***}	0.71^{***}	0.41^{***}
	(0.00)	(0.00)	(0.00)

(Continuation of Table 2.4)

	1. Women: family > career	2. Child < 6 suffers if mother works	3. Housework: female involv. = male involv.	4. Child suffers if father focuses on work
Duration of relationship, logged	-0.04^{+}	-0.09^{***}	-0.03	-0.02
	(0.06)	(0.00)	(0.16)	(0.28)
Constant	0.28^{***}	0.42^{***}	0.24^{***}	0.18^{***}
	(0.00)	(0.00)	(0.00)	(0.00)

p-values in parentheses.
$^{+}p < 0.10,^{*}\ p < 0.05,^{**}\ p < 0.01,^{***}\ p < 0.001$

Note that for the purpose of this study, it is interesting to know *whether* partners become more similar over time; the exact process that lies behind it is of lesser interest.

Results shows that partners become significantly and substantially more similar in their attitudes over time. This suggests that a good share of the observed differences between real and randomly matched couples at t_1 is driven by alignment between t_0 and t_1.

Results for Eastern Germany are similar in numeric terms. However, the coefficients are not statistically significant, potentially because of the lower number of observations.

Differential Separation

A researcher may observe similarity in attitudes at t_1 not because of initial mating, but because one cannot observe the dissimilar couples anymore, because they have separated. Again, it is impossible to test whether differential separation happened before the first observation, but it is possible to test differential separation between the first and last observation.

To see whether differential separation is occurring, this section analyses Kaplan-Meier survival estimates. Do similar couples experience higher 'survival'? In other words, are similar couples' relationships more stable? The sample contains all couples for which an anchor appears for more than one wave. The sample is 317 couples, 99 of which experience separation during the period of observation. The interest starts at the beginning of the relationship and ends either when the couple separates, or when the couple is no longer observed in pairfam. Couples enter the survival analysis at the moment of the first interview (and not at the beginning of the relationship; as, prior to the first interview, the attitudes cannot be observed; therefore, most observations are left-truncated).

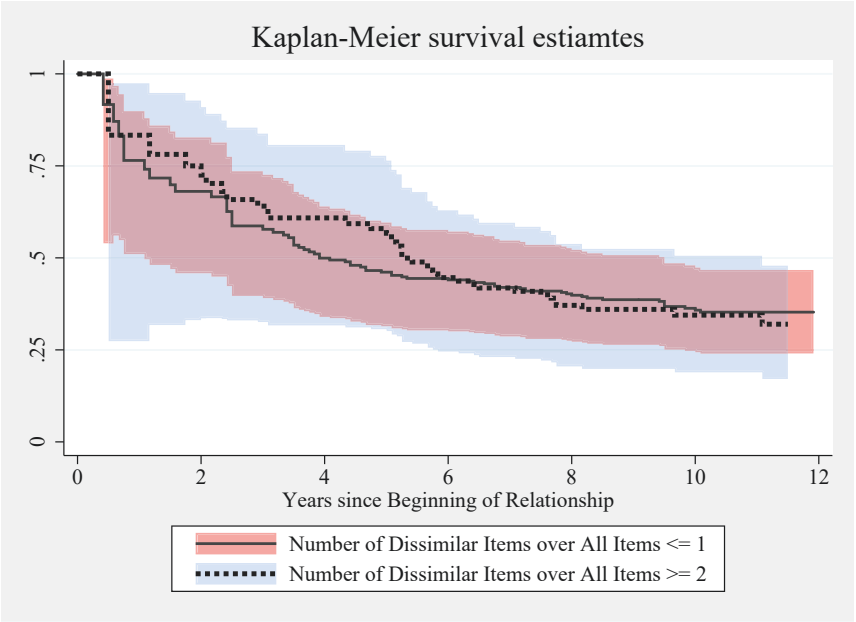

Figure 2.5: Association between similarity in attitudes and separation. Kaplan-Meier survival curves for couples with dissimilar views on maximum two items, vs. couples with dissimilar views on more than two items ($n_{couples}$=308).

Figure 2.5 plots Kaplan-Meier survival estimates to see whether dissimilar attitudes are associated with higher risks of separation. For the sake of simplicity, the figures compare two groups: couples that gave dissimilar answers to a maximum of one out of four items (70% of couples), and couples that gave dissimilar answers to two or more items (30% of couples). Results show no differences in the survival curves of the two groups: dissimilar couples are, in this analysis, not more likely to separate than similar couples. However, one should be cautious in interpreting these results. As Figure 2.5 shows, confidence intervals are large. I further compared survival curves for similar and dissimilar couples for each item separately and found no significant or substantial differences.

Note that, for this paper, the research interest is whether similarity among observed couples might be caused by higher rates of survival—and therefore higher chance of observation—among similar couples. Therefore, I want to know whether

dissimilar couples are more likely to separate—but I am not interested in whether a potential association between similarity and separation is 'causal' (which one might, for example, test by including other relevant covariates). This might, together with the low number of observations, be a reason why this study does not replicate previous finding that dissimilar attitudes are associated with higher risk of separation (Arránz Becker, 2013; Hohmann-Marriott, 2006; Paper III).

All in all, these results provide no evidence for the idea that dissimilar couples are more likely to separate. (Eastern Germany, additionally, shows no evidence for differential separation). Therefore, the observed homogamy in this sample—measured, on average, 3.5 years after the beginning of the relationship—is likely *not* due to higher rates of separation among dissimilar couples.

Robustness Checks and Sensitivity Analyses

Enough Fish in the Sea? Sensitivity of the Results to the Number of Potential Partners

Using the speed-dating scenario, the chance of finding a partner with maximum similarity in attitudes might be better, the more people who participate in the speed dating, the more potential partners one has available. In the main analysis, the sample size—the participants in the speed dating—is 418 for Western Germany and 180 for Eastern Germany. The next test examines how sensitive the results of mating for maximum similarity are to sample size. Does the theoretical possibility to find a similar partner depend on the number of potential partners? Figure 2.6 plots the average number of items of dissimilar views in mating for maximum similarity for different sample sizes.

I repeatedly draw random sub-samples of the 418 couples, and run the mating for maximum similarity algorithm. For each sub-sample size, the process is repeated 50 times. The result in Figure 2.6 shows that—as expected—a more similar

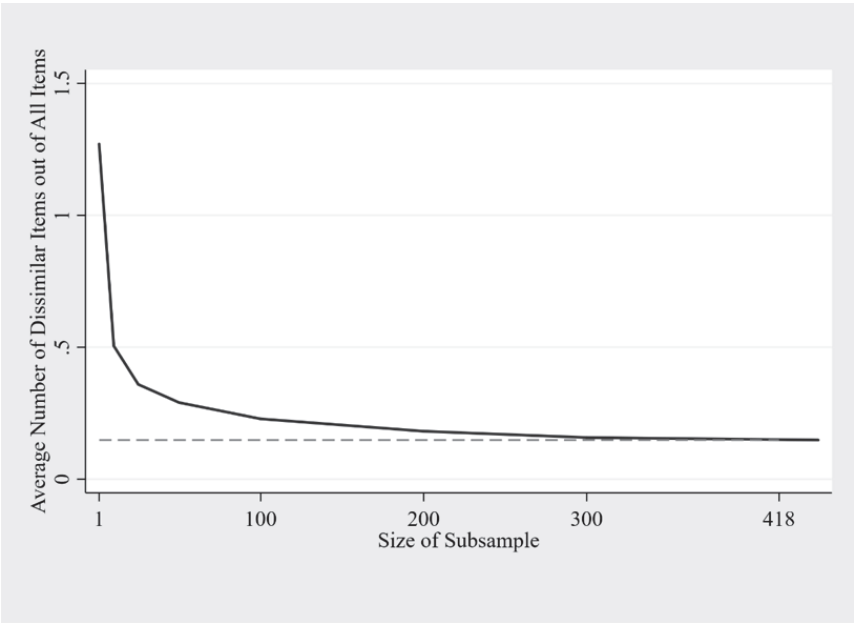

Figure 2.6: Average number of dissimilar items in matching for maximum similarity for different sizes of subsample.

mating is possible, the greater the sample is. The dashed line shows the results for the full sample of 418 couples. Starting at a lower number, an increase in the number of potential partners strongly improves chances to find a similar partner. At higher sample sizes, e.g. at 50 or higher, a greater sample only improves the average fit marginally.

The results suggest that whether one has 50 or many more potential partners does not strongly impact chances to find a partner with similar gender attitudes. The main result—real couples are much closer to random than to maximum similarity—would still hold if it were assumed that people had only 50, or even only 25 potential partners. This suggests that the results would be similar if the sample was as low as 50 or if the sample would be much larger. It also suggests that it does make sense to compare mating in Eastern Germany—where the sample size is 180—with Western Germany, where the sample size is 418.

Different Measures for Dissimilarity in Attitudes

All analyses are run using two alternative measures for dissimilarity, absolute difference scores and square difference scores.[21] The results are robust: real couples are substantially closer to randomly matched couples than to couples matched for maximum similarity; there is little evidence for indirect assortative mating or substantial and significant alignment over time and no evidence for differential separation.

Different Cut-Off Values for Duration of Relationship

The aim of this study was to get as close to the initial mating of partners as possible and then study the dynamics of these couples longitudinally (observing alignment and differential separation). I therefore restricted the sample to couples with a relationship duration of a maximum of seven years at wave 1. This section tests whether the results are stable if this value is increased or decreased. All analyses are run for couples with a maximum relationship duration of 4 and 10 years (7 ± 3 years). The results are robust. Naturally, standard errors are generally largest in in the 4-year-sample and smallest in the 10-year-sample.

For alignment and differential separation, the results are stable for 10 years; for 4 years, the number of observations in the regression models is low; therefore not all coefficients are statistically significant. For 10-year periods, all regression coefficients are similar in size and standard errors are generally smaller.

Conclusion

A main conclusion of previous research on homogamy among romantic couples is that "matching partners are far from random" (Schwartz, 2013, p. 452). This

[21] The square difference score over all items is the sum of the item-specific square difference scores (and not the square of the sum of item-specific difference scores).

study puts the degree of homogamy in gender role attitudes among young couples into perspective and shows that, in fact, mating is not so far from random. The degree of homogamy is low to moderate. I test whether similarity in gender role attitudes is a by-product of assortative mating on education or religiosity and find very little evidence for such indirect assortative mating. This study finds clear and substantial evidence for alignment over time: fixed-effects panel models show that partners' attitudes become substantially more similar over time. There is no evidence for higher rates of separation among dissimilar couples.

What does this tell us about the relevance of gender role attitudes in partner selection? Among couples with an average relationship duration of three years, similarity in attitudes is low. Clear evidence for alignment suggests that similarity in attitudes was even lower in the beginning of the relationship. Apparently, young people in Germany do not choose partners with very similar gender attitudes. Do people have insufficient information about the attitudes of their potential partners? Do they not consider gender role attitudes very important compared to traits like similar lifestyles or education, or compared to physical attractiveness? Future research could study these questions.

Many studies on homogamy test whether homogamy is statistically significant, but do not provide an understanding of the *degree* of homogamy. Such studies show that real similarity is significantly higher than randomness would predict. However, they do not discuss *how much* more similar they are. This paper presents a novel methodological approach to do exactly this: give an understanding of the degree of homogamy. A main advantage of this method is that it allows an assessment of homogamy on multiple dimensions simultaneously. This method can help scholars in future studies on homogamy with diverse traits.

This study has limitations. The sample might be selective in two ways that are associated with similarity in gender role attitudes: First, the sample excludes those couples that have already separated before the first wave. Based on previous findings, dissimilar couples are more likely to separate (Arránz Becker, 2013;

Hohmann-Marriott, 2006; Paper III). Even though the analysis presented here suggests that dissimilar couples are not more likely to separate early in the relationship, this study might still overestimate similarity, because couples that are dissimilar (ex-couples) are no longer observed.

Second, the participation of the anchor's partner might be selective. Schröder et al. (2013) test whether relationship quality and institutionalisation are associated with the chance that the anchor's partner participates in pairfam. They find no clear associations with relationship quality, but do find clear associations with institutionalisation: partners in co-residence are much more likely to participate than those living apart. If institutionalisation is associated with similarity in attitudes, there should be higher similarity in more institutionalised unions: co-residing partners have more chances to influence each other, and have more common experiences (compare Kalmijn, 2005); Equally, more similar couples may be more likely to move in together (compare Paper III). Consequently, I assume that the couples I observed might be biased towards higher similarity.

In sum, this paper shows that even though there are good reasons why people might want to choose a romantic partner who has similar gender role, many people do not. These results have important implications for relationship dynamics and macro-level patterns of fertility and union status. Previous research showed that this dissimilarity on the couple level affects the sharing of childcare and the partners' approach to paid work and has negative effects on relationship satisfaction, relationship stability and fertility (Arránz Becker, 2013; Hohmann-Marriott, 2006; Nitsche and Grunow, 2018; Paper III). The greater the number of couples with dissimilar views, the more couples are under stress, which leads to lower macro-level fertility rates and higher rates of separation and divorce. Future research could assess the degree of homogamy of attitudes in other societies and test what other consequences that dissimilarity in gender role attitudes has on, for example the intergenerational transmission of attitudes, that is, the gender role attitudes of future generations.

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Appendix

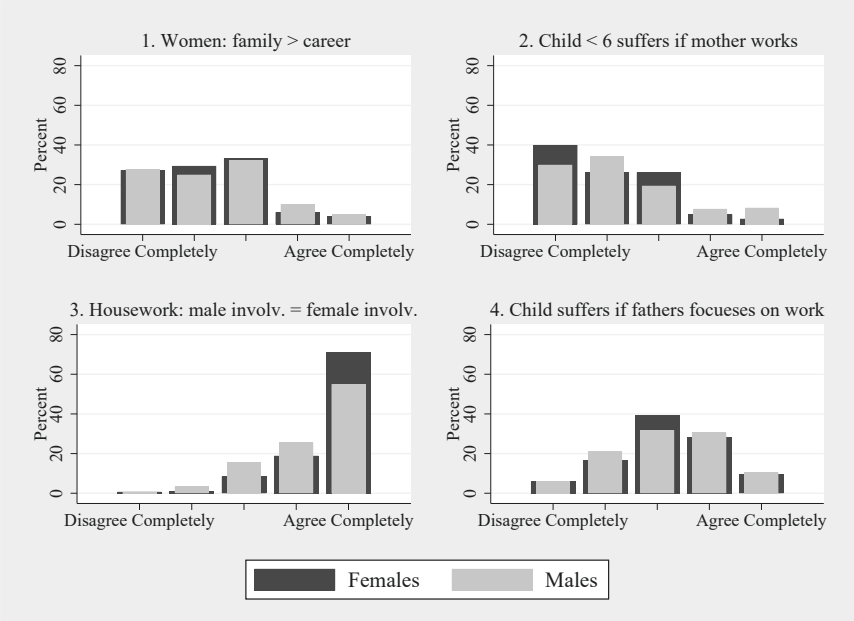

Figure A2.1: Responses to gender role items of female (n=180) and male (n=180) respondents. Eastern Germany.

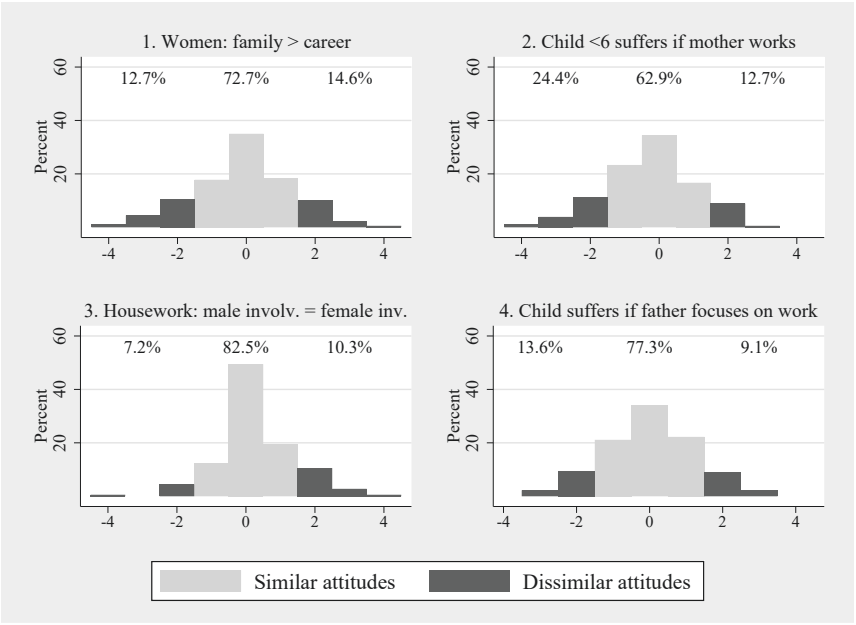

Figure A2.2: Difference scores (value of female partner minus value of male partner) for responses to gender role items. Positive values: female partner agrees more with statement than male partner does. Eastern Germany ($n_{couples}$=180).

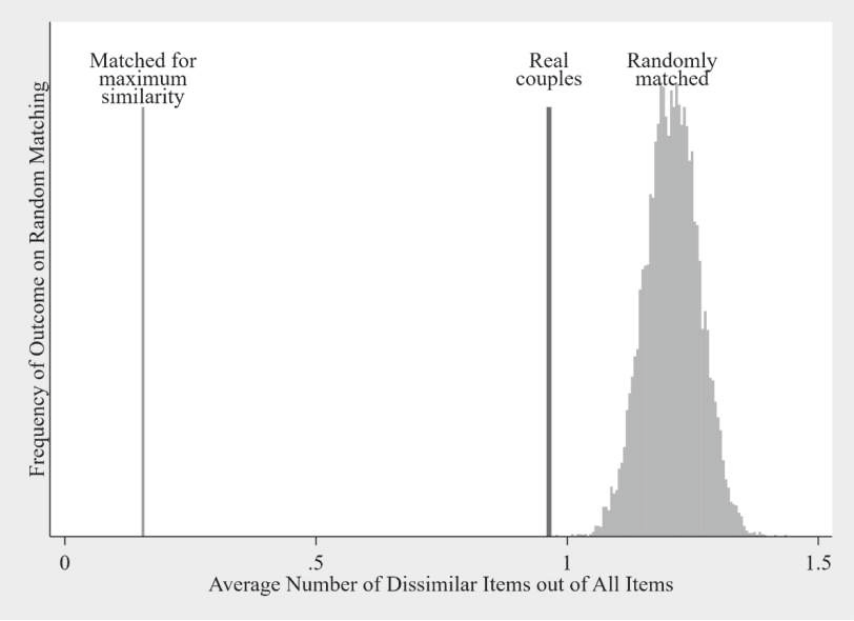

Figure A2.3: Average number of items with dissimilar answers, by type of matching. Random matching is performed 10,000 times. Eastern Germany ($n_{couples}$=180).

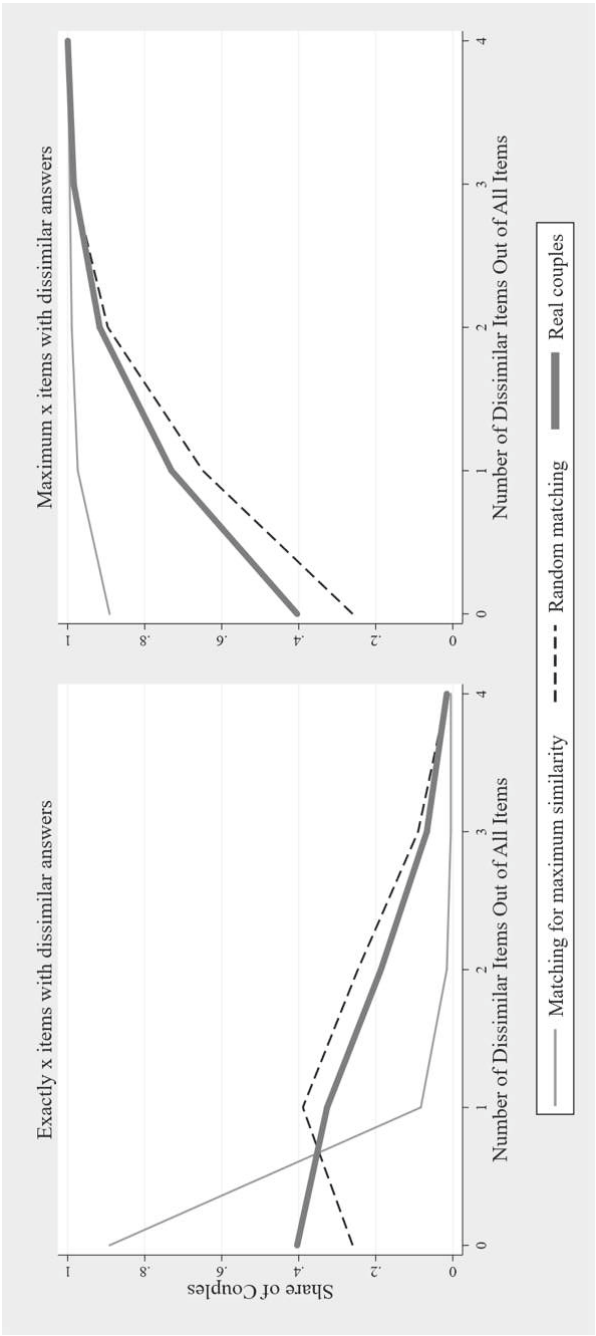

Figure A2.4: Share of couples by number of dissimilar items, by type of matching. Eastern Germany ($n_{couples}$=180).

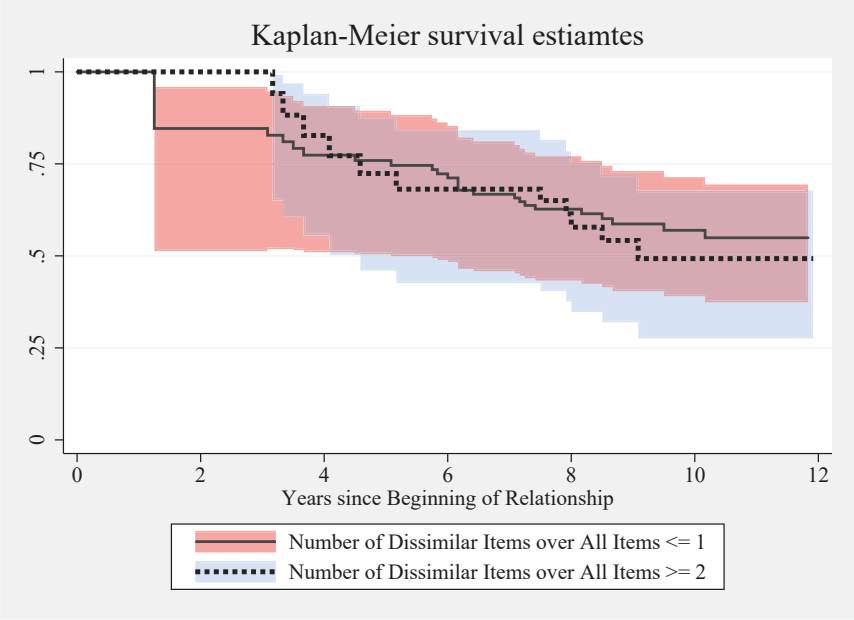

Figure A2.5: Association between similarity in attitudes and separation. Kaplan-Meier survival curves for couples with dissimilar views on maximum two items, vs. couples with dissimilar views on more than two items ($n_{couples}$=143).

Table A2.1: Descriptive summary table. Eastern Germany (n=180).

	Female partner		Male partner	
	Mean	SD	Mean	SD
Gender Role Attitudes				
1. Women: family > career	2.30	1.04	2.4	1.13
2. Child < 6 suffers if mother works	2.03	1.04	2.28	1.21
3. Housework: female involvement = male involvement	4.59	0.73	4.29	0.93
4. Child suffers if father focuses on work	3.15	1.05	3.21	1.07
Age	24.96	2.38	27.47	2.57
Education. Share in group				
Lower secondary education (Volks- und Hauptschule)	0.01		0.01	
Lower secondary education (Realschule, Mittlere Reife)	0.03		0.02	
Upper secondary education vocational	0.37		0.46	
Upper secondary education general	0.12		0.04	
Post-secondary non tertiary education general	0.17		0.12	
First stage of tertiary education	0.30		0.36	
Second stage of tertiary education	0.01		0.01	
Religiosity: Frequency of attendance to church, mosque, synagogue religious service. Share in group				
Never	0.79		0.81	
Less often	0.13		0.1	
Several times per year	0.04		0.06	
One to three times per month	0.02		0.01	
Once a week	0.02		0.02	
More than once a week	0.01		0.01	
Duration of relationship in years	3.37	2.02	3.37	2.02

Table A2.2: Average dissimilarity in gender role attitudes between both partners in real and counterfactual matchings. Eastern Germany ($n_{couples}$=180).

	Matched for maximum similarity	Real couples	Randomly matched couples	Matched by education and religiosity
Number of dissimilar items out of all items	0.16	0.96	1.21	1.18
Number of dissimilar items on female roles (items 1&2)	0.07	0.52	0.68	0.66
Number of dissimilar items on male roles (items 3&4)	0.08	0.44	0.53	0.52
Dissimilarity on items:				
1. Women: family > career	.03	.28	.34	.33
2. Child < 6 suffers if mother works	.04	.24	.34	.33
3. Housework: female involvement = male involvement	.06	.20	.21	.21
4. Child suffers if father focuses on work	.02	.24	.32	.31

Table A2.3: Associations between gender role attitudes, education, and religiosity for female and male partners. Spearman rank correlation coefficients. Western Germany ($n_{females=180}$, n_{males}=180).

	Education		Religiosity	
	Females	Males	Females	Males
1. Women: family > career	−0.11	−0.00	0.16*	0.19**
2. Child < 6 suffers if mother works	−0.15*	−0.07	0.03	0.17*
3. Housework: female involvement = male involvement	−0.00	0.10	−0.17*	0.08
4. Child suffers if father focuses on work	0.02	0.04	0.06	0.08

p-values in parentheses.
$^{+}p < 0.10,^{*}\, p < 0.05,^{**}\, p < 0.01,^{***}\, p < 0.001$

Table A2.4: Alignment over time: Effect of duration of relationship on similarity in gender role attitudes. Linear fixed-effects regression models. Eastern Germany ($n_{couples}$=131, $n_{couples \times waves}$=423).

	Nr. of dissimilar items out of all items	Nr. of dissimilar items on female roles (items 1&2)	Nr. of dissimilar items on male roles (items 3&4)
Duration of relationship, logged	−0.09	−0.11*	0.02
	(0.24)	(0.03)	(0.66)
Constant	0.97***	0.61***	0.36***
	(0.00)	(0.00)	(0.00)

(Continuation of Table A2.4)

	1. Women: family > career	2. Child < 6 suffers if mother works	3. Housework: female involv. = male involv.	4. Child suffers if father focuses on work
Duration of relationship, logged	−0.03	−0.08*	0.01	0.01
	(0.44	(0.02)	(0.70)	(0.79)
Constant	0.25***	0.36***	0.22***	0.14**
	(0.00)	(0.00)	(0.00)	(0.01)

p-values in parentheses.
$^{+}p < 0.10,^{*} p < 0.05,^{**} p < 0.01,^{***} p < 0.001$

3

Paper III

Hudde, A. & Engelhardt, H. (2018). Intra-Couple (Dis)Similarity in Gender Role Attitudes and the Transition to Parenthood. *Manuscript under Review*.

Abstract:
This paper tests whether couples in which the woman and the man hold dissimilar gender role attitudes are less likely to have a first child together, compared to couples in which both partners share similar attitudes. The argument derives from, and contributes to, the ongoing macro-level discussion on gender equity and fertility, which lacks translation of the broad macro-level frameworks into micro-level hypotheses and their empirical testing. The study further contributes to micro-level research on gender role attitudes and fertility, which has examined the content of one partner's attitudes but has ignored the fit of both partners' views. We analyse unique longitudinal data from the German Family Panel (pairfam), which includes information on attitudes of both partners in a couple. Results show that couples, in which both partners have dissimilar gender role attitudes at an early stage in their relationship, are substantially and significantly less likely to have a child together later on. We further show that results are stable when including information on fertility intentions, and that couples with dissimilar attitudes are more likely to separate. Observation hold independently of both partners' individual attitudes, and hold against a number of robustness checks.

Introduction

When asking young Americans or Europeans whether and how many children they would like to have, the majority answer that they want two or three children. Some want one, but only very few—around one in twenty in most surveys—say that they want to have no children at all (Kuhnt et al., 2017; Morgan and Taylor, 2006; Sobotka and Beaujouan, 2014; Testa, 2012). However, more than one in twenty end up having no children; in some countries many more. Among recent cohorts, in the United States around one in seven women remains childless; in Italy, Spain, or Germany more than one in five (Sobotka, Zeman, et al., 2015). Among men, childlessness tends to be even higher (Miettinen, Rotkirch, et al., 2015). On the macro-level, high childlessness is a main driver behind the low overall fertility that we observe in some societies (Bujard and Sulak, 2016; Tanturri et al., 2015; Zeman et al., 2018).

Several authors explain periodic or long-lasting low levels of fertility in various countries with different aspects of societal gender relations (Cherlin, 2016; Chesnais, 1996; Esping-Andersen, 2009; Esping-Andersen and Billari, 2015; Goldscheider, Bernhardt, and Lappegård, 2015; McDonald, 2000a,b). Most of these works deal with fertility in total, rather than distinguishing between childlessness and higher-order fertility (Tanturri et al., 2015). We build upon these works on fertility and gender relations to derive and test a mechanism to explain one part of the variation in fertility behaviour: differences in transition to parenthood.

Esping-Andersen and Billari (2015) argue that fertility is high in societies in which either the male breadwinner or the dual career model is the clear societal norm; in contrast, fertility is low in societies that lack agreement on "what constitutes proper gender roles and identities in family life" (p. 6). In societies with clear societal gender norms—whether they are centred on the male breadwinner, the dual earner model, or any other model—most people within the same country share similar gender ideology. In other words, diversity or variation in gender role

attitudes among different people within the same country is low. The opposite is the case in societies without clear gender norms: there are large differences between people's gender role attitudes in one country at one point in time. In the model of Esping-Andersen and Billari (2015) a large variation in attitudes is a side effect of a transition process from one set of societal gender relations to another one.

Paper I of this dissertation provides empirical evidence for this idea. Building upon Esping-Andersen and Billari (2015), Paper I argues that variation in attitudes within a society tends to translate into variation in attitudes among potential partners. This in turn complicates mating and increases the number of couples in which the woman and the man hold very different gender ideologies. This hinders the transition to parenthood. Childlessness is systematically higher in societies where gender role attitudes are more heterogeneous (Paper I).

While there is evidence for this association on the cross-country level (Paper I), our aim is to trace and test this idea on the micro level. Is the degree of similarity in gender ideology between two partners in a relationship associated with the likelihood of transition to parenthood? Are couples in which the woman and the man hold very dissimilar gender role attitudes less likely to have a first child together, compared to couples in which the woman and the man hold similar views?

Previous micro-level research studied the association between gender role attitudes and fertility on the individual level, but not on the dyadic (couple) level (Bernhardt and Goldscheider, 2006; Bernhardt, Goldscheider, and Turunen, 2016; Kaufman, 2000; Miettinen, Basten, et al., 2011; Puur et al., 2008; Westoff and Higgins, 2009). These studies produced mixed results, potentially because they left out an important part of the story: (1) the attitudes of the second partner and (2) the fit or similarity between the partners' attitudes. We develop theoretical arguments and hypotheses on the association between the degree of similarity between both partners' attitudes and the transition to parenthood. To our knowledge, there is no study that does this; we aim to fill this gap.

Although we know of no study that deals with partners' similarity in attitudes and fertility outcomes, there are studies on two different, but related outcomes (Parr, 2010): relationship satisfaction and relationship separation. Two panel studies from the United States and Germany find that greater dissimilarity is associated with lower relationship satisfaction and higher relationship separation (Arránz Becker, 2013; Hohmann-Marriott, 2006). A cross-sectional study of Dutch couples finds no associations between similarity in attitudes and relationship satisfaction (Keizer and Komter, 2015). Those results show that, at least in some contexts, similarity in gender role attitudes matters for relationship dynamics.

We study the association between similarity in attitudes between two partners and their probability of having a first child together using dyadic (couple) level data from the *German Family Panel* (pairfam). These data allow for an analysis of the attitudes of both partners in a relationship and for tracing a couple's fertility over time.

Germany offers an ideal setting for this analysis for several reasons: (1) it is a country that takes a medium position in the 'gender revolution' (Esping-Andersen, 2009; Goldscheider, Bernhardt, and Lappegård, 2015) with a large variation in gender role attitudes (Paper I); (2) its large macro-level variation in attitudes translates into dissimilar views between men and women among a relevant share of couples (Paper II); and (3) it is a country with long-lasting low fertility and high childlessness despite an almost universal desire among young people to have children (Bujard and Sulak, 2016; Kuhnt et al., 2017; Pötzsch, 2016).

Our paper offers three main contributions to the literature. First, we develop a mechanism that links gender relations to partnership dynamics and the transition to parenthood, and we test that mechanism on the micro-level. Second, rather than examining the individual level, we take a couple-perspective and use dyadic data with attitudinal information from both partners. Third, whereas previous research studied the egalitarian/inegalitarian contrast, we add the similar/dissimilar contrast to the literature on gender relations and fertility.

Theoretical Framework

Gender role attitudes are "beliefs about the appropriate role activities for women and men" in various life spheres, such as work, family, or politics (McHugh and Frieze, 1997, p. 4). We focus on attitudes towards the gendered organisation of family life in practice, because these attitudes are directly related to the internal functioning of the relationship (Kalmijn, 2005). We study views on how men and women, mothers and fathers, should divide housework, childcare, and bread earning. Such attitudes are hereafter called *gender role attitudes* or, used synonymously, *gender ideology*.

We assume that people want to organize their family life in accordance with their own (gender role) attitudes (Festinger, 1962). Previous research confirms that gender role attitudes are a predictor of behaviours like the division of childcare, housework, and employment (see e.g. Blair and Lichter, 1991; Davis and Greenstein, 2004, 2009; Fuwa, 2004; Schober and Scott, 2012). Consequently, two partners that share the same gender role attitudes should agree on how to organize their family life. If, on the other hand, two partners hold opposite gender role attitudes, they will likely want to organize their family life in different ways.

If partners want to organize family life in different ways, one or both partners will likely be unhappy with the actual sharing of employment, childcare, and housework. Previous research showed that individuals, whose actual sharing of housework is in dissonance with their gender role attitudes, perceive division of housework as less fair, are more likely to separate, and less likely to have a second child (Goldscheider, Bernhardt, and Brandén, 2013; Greenstein, 1996; Oláh and Gahler, 2014).

Why Gender Role Attitudes Matter for the Transition to Parenthood

If two partners have different gender ideologies, it should be more salient if they have children or are thinking of having children—than if having children is not a topical issue (yet). If childless partners (who cohabit) hold different gender ideologies, they may want to divide or share housework in different ways, which can create conflicts (Kalmijn, 2005). They can, however, not experience any role conflicts concerning the division of childcare, and are unlikely to disagree concerning their employment patterns: in Germany, full-time employment is the most common activity status for childless women and has been almost universally accepted for some decades now (Alwin et al., 1992; Gustafsson et al., 1996; Treas and Widmer, 2000).

The picture is very different for a couple with children. With the greater amount of housework and childcare to be shared, a couple must agree on which partner, if at all, stops or reduces working, temporarily or permanently (Bianchi et al., 2000). The transition to parenthood increases the relevance of gender role attitudes (Baxter et al., 2015; Johnson and Huston, 1998; Kalmijn, 2005).

In consequence, the transition to parenthood holds a greater risk of immediate or future role conflicts among partners who hold opposite gender role attitudes compared to partners who share the same attitudes. Given the higher risk of conflicts, the transition to parenthood has greater costs for couples with dissimilar gender role attitudes. These anticipated costs reduce couples' propensity to have a first child together (Becker, 1993).

Dissimilarity in Gender Role Attitudes in the Beginning of a Relationship and in the Stage of Potential Progression to Parenthood

If having a partner holding dissimilar gender role attitudes potentially brings costs and conflicts—as argued above—do people even enter a (serious) relationship with someone that holds dissimilar gender role attitudes? Evidence from Germany suggests so. Paper II compares the degree of similarity in attitudes among real couples and synthetic, randomly matched couples. The share of couples with dissimilar views only differs moderately between real and randomly matched couples. Accordingly, a relevant number of people enter a relationship with a partner who holds dissimilar views.

There are at least three reasons why people start a relationship with someone who has dissimilar gender role attitudes (for a more detailed discussion, see Paper II). First, in the period of meeting and dating, people might have little information on the gender role attitudes of their partner: it takes time, experience of behaviour, and discussion to learn about another person's gender role attitudes (Paper II). Second, according to the false consensus effect/bias people think that their potential partner is more similar to them than is actually true (Byrne et al., 1986; Goel et al., 2010; Kenny and Acitelli, 2001; Ross et al., 1977). Third, compared to traits like appearance, hobbies, or level of education, the perceived importance of gender role attitudes might be low in the phase of dating and partnership formation (Paper II).

All three potential explanations predict that—compared to the phase of partnership formation—the degree of similarity in attitudes will be much more salient and more likely to be considered a potential source of trouble, once the topic of whether or not to have a child becomes central.

First, by the time the decision for or against having a child becomes topical,

partners typically have gotten to know each other better, and may have even discussed how they would prefer to organize their family life. Also, they might already have experienced role conflicts, even in the absence of a child. The partners have more and better specific information about each other's gender role attitudes, and therefore feel more confident in judging how similar they are. Second, having better and more specific information reduces the chance that people are under the false consensus effect: some people will reject the previous and false assumption that they and their partner share the same attitudes. Third, when family formation becomes a topical issue, people are more likely to give attention to ideas on the gendered organisation of family life.

Following this, at the time of making a decision for or against having a child together, people can be categorised into three groups: (a) they feel confident in the judgement that their own attitudes and their partner's attitudes are a good match, and that having a child will not bring major role conflicts; (b) they feel uncertain about how good the fit is and are therefore unsure whether or not having a child will bring role conflicts; and (c) they feel confident in their judgement that their own and their partner's attitudes are *not* a good match and therefore, clearly anticipate role conflicts after the birth of a child.

People should be more likely to feel uncertainty about or have anticipation of future role conflicts the greater the gap between both partners' attitudes. Uncertainty about or the anticipation of role conflicts should, in turn, increase the perceived cost of parenthood and thus reduce a couple's willingness and likelihood to have a first child together.

This leads us to our first hypothesis: *The greater the dissimilarity in gender role attitudes between two partners, the less likely they are to have a first child together.*

Dissimilarity in attitudes increases the perceived cost of transition to parenthood and, to a lower degree, the perceived cost of continuing childless in the relationship. The higher costs of transition to parenthood and of a childless continua-

tion of the relationship for couples with dissimilar attitudes should increase their risk of relationship dissolution (Arránz Becker, 2013; Hohmann-Marriott, 2006).

Thus, our second hypothesis is: *The greater the dissimilarity in gender role attitudes is between two partners, the more likely they are to separate than to have a first child together.*

For some couples, their dissimilarity in attitudes might be too high to make the transition to parenthood, but not too high to continue the relationship without children. Therefore, couples with dissimilar attitudes may be more likely to choose childless continuation over the transition to parenthood; but they may also be more likely to choose separation over childless continuation. Based on these countering expectations, we have no hypothesis on the net effect of dissimilarity in attitudes on likelihood of childless continuation.

Like most research on fertility, the first hypothesis follows the assumption that intentions translate more or less directly into outcomes, that couple's willingness and decision to have a first child translates into the birth of a child (Ajzen, 1991). However, not every intention or attempt to become pregnant results in pregnancy and not every pregnancy is the result of intentional behaviour (Schneider, 2016). In our data there is some, however imperfect, information on fertility intentions. As a robustness check, we test whether the results hold for an alternative outcome variable that includes available information on fertility intentions.

Data and Methods

Data and Sample

Data. We analyse data from the first eight waves (collected annually in the years 2008/09 to 2015/16) of the *German Family Panel* (pairfam), Release 8.0 (Brüderl et al., 2017; Huinink et al., 2011). The design and sampling of pairfam differs substantially from household surveys. Pairfam has a multi-actor design—it surveys

individuals plus those people that are related to the individual. In a first step, it draws a random sample of more than 12,000 persons, so-called *anchors*, who are males and females from three birth cohorts in Germany, 1971-73, 1981-83 and 1991-93. Pairfam asks the anchors: "Are you currently in a serious relationship?" and "When did your relationship with [name of partner] start?" If anchors are in a serious relationship, pairfam asks for permission to interview the anchor's partner as well. If the anchor has separated from a previous partner, the ex-partner is not interviewed anymore, if the anchor has re-partnered, pairfam tries to interview the new partner.

Case Selection. We study couples in which the anchor is in two cohorts: 1981-83 and 1971-73, therefore, the anchors are in their mid-to late twenties and thirties at Wave 1 (n=8,064). The level of analysis is the couple. Couples enter the sample if (a) the anchor is in an opposite-sex relationship in Wave 1 (n=6,048), (b) that partner also participated in the first wave of the survey (n= 3,375), (c) none of the partners has any children at Wave 1 (n=1,066) and (d) the *anchor* participated in at least two waves of the survey (n= 831). One couple was dropped in which the female partner is aged 45+ (n=830). 85% of the remaining couples (n=705) were not missing any variables of interest and entered the final analysis. 60% of these couples (n=421) were observed for all eight waves and 74% were observed for at least five waves (n=521); the mean number of waves is 5.3 waves.

Our sample consists of couples that are in a relationship, and that are childless, at wave 1. Therefore, our sample does not include two groups: couples that have separated before wave 1, and couples that have already had a child before wave 1. Previous research suggests that these two omitted groups might differ in (dis)similarity on gender role attitudes. The couples that have separated before were likely couples with higher dissimilarity (Arránz Becker, 2013; Hohmann-Marriott, 2006, ; see also the results section of this paper). The couples that have already made the transition to parenthood were likely couples with lower dissimilarity (see the results section of this paper).

Analytical Strategy and Measures

Data Structure and Method. If perfect data were available, we would measure gender role attitudes of both partners at the moment when they enter the relationship and observe whether they ended up having a child together once the female partner is aged 45. We try to approximate this design and measure attitudinal variables for both partners at the first available observation, which is Wave 1. (Note that the duration of the relationship at that time has a median of 4.8 years and a mean of 5.5 years). Information on the couple's fertility events comes from the last wave that the *anchor* participated in. For an alternative outcome variable, in which we try to approximate fertility *decisions*, we make use of all available waves of the anchor person and his/her partner. We use logistic and multinomial logistic regression models.

If the sample were restricted to couples and waves for which continuous information of both partners is available, we would only have 177 couples to observe until the eighth wave, or 254 couples until wave five, at least. The amount of information gained from continuous observation would not outweigh the loss of observations: (a) to answer our research question, we would ideally measure attitudes of both partners when they enter the relationship. Continuous information on changes in people's gender role attitudes is not needed (whether the degree of convergence in both partners' attitudes is a predictor of transition to parenthood is an interesting, but distinct research question, which could be analysed in the future, using a different dataset with more observations) and (b) most of the control variables are rather constant over time.

Outcome Variable 1: Progression to a First Common Child. This outcome variable is binary. It is coded one (n=284) if (a) the anchor has had at least one child between the first and last observation and (b) the anchor's initial (Wave 1) partner is the other biological parent of that child; otherwise the variable is coded zero (n=421). The zero category comprises several different outcomes: couples that

still are together but did not have a child in the meantime and couples that separated, some of which might have re-partnered and might have children with their new partners.

Outcome Variable 2: Distinguishing Between Childless Continuation and Separation. We distinguish between two groups of couples that did not have a child (n=421): those that are still in a relationship with the initial partner (n=298) and those that separated (n=123). For this dependent variable, we run multinomial logistic regression.

Outcome Variable 3: Pregnancy Intention. Like most research on fertility, the theoretical reasoning is about fertility decisions, but the main measure is fertility outcome (Schneider, 2016). As a robustness check, we try to get closer to fertility decisions by adjusting the initial variable, actual birth events, in case we have information that either (a) a pregnancy was intended but no childbirth happened, or (b) an actual childbirth was not planned. To compute this variable, we make use of all available waves of an anchor and his/her partner. Anchors (in all waves) and partners (starting in Wave 2) were asked whether they had tried to conceive/get pregnant during the past 12 months. If in at least one wave the anchor or partner answered the question with "yes", we code the variable as one, *pregnancy intention* (if the second partner disagreed, and said that he/she did not want to conceive/get pregnant, we did not code the variable to pregnancy intention). Items on unplanned pregnancies were only included in the anchors', not the partners' questionnaires. If anchors that experienced a childbirth stated that "actually, I didn't want a child" (item included in Waves 2 and 3) or that a pregnancy was "unexpected" (included in Waves 4 to 8), we coded the couple as zero, *no pregnancy intention*. Notably, there are two drawbacks to this variable: (1) there is reason to assume that unintended and/or unexpected pregnancies are under-reported (e.g. due to ex-post rationalisation, Schneider, 2016) and (2) not all items are available for both partners in all waves. All in all, we assume that the variable *pregnancy intention* offers some, but not perfect adjustment to capture a fertility decision.

Gender Role Attitudes. The following Likert-scaled items measure female and male gender and family role attitudes. The answer categories range from 1 (*agree completely*) to 5 (*disagree completely*).

- *Women: family > career*: Women should be more concerned about their family than about their career.
- *Child < 6 suffers if mother works*: A child under age six will suffer from having a working mother.
- *Housework: female involvement = male involvement*: Men should participate in housework to the same extent as women.
- *Child suffers if father focuses on work*: Children often suffer because their fathers spend too much time at work.

All of these four items capture views towards the gendered organisation of couple life and family life. They are not different measures for the same underlying dimension, e.g. a 'simple' traditional-egalitarian-scale, but rather, capture various attitudinal dimensions and aspects. This is in line with other current research that argues that gender relations and gender role attitudes are multi-dimensional (Grunow et al., 2018; Knight and Brinton, 2017; Pepin and Cotter, 2018; Yu and Kuo, 2018; Paper I). A Cronbach's alpha of .56 for females and .52 for males supports the decision to *not* reduce complexity through factor analysis or a similar method, but rather, to work with the full complexity in attitudes and study all single items (compare Nitsche and Grunow 2018, who use the same data).

Measurement of Dissimilarity in Attitudes. To test whether dissimilarity in views on all measured dimensions of attitudes matter equally, we compare three different measures of dissimilarity in views on: (1) *female and male gender roles*, which counts in how many of the four items the two partners have dissimilar views (this can range from 0 to 4); (2) *female gender roles* and *male gender roles* which counts

within the two groups (ranging from 0 to 2 each); and (3) *single items* (binary variables). A binary variable measures whether two partners have similar (=0) or dissimilar (=1) attitudes on an item. They are defined as having dissimilar attitudes if their absolute difference score (ADS) is two or greater, which means that they are two or more categories apart on the Likert-scale. Using a dichotomous variable for similarity allows for simple interpretation. Robustness checks show that linear absolute difference scores or square difference scores yield coherent results, but models with binary measures fit the data best. Absolute difference scores are widely used to measure similarity between partners (e.g. Hohmann-Marriott, 2006; Keizer and Komter, 2015). An alternative measure for couple similarity is profile correlation (for a recent application, see Arránz Becker, 2013). Given that we only have four attitudinal items, this measure is not suitable for our analysis.

Distinguishing Between Dissimilarity and Content. To distinguish between similarity in attitudes and the content of both partner's attitudes, all models control for both partners' individual attitudes (cf. Keizer and Komter, 2015; Kenny, 1988). We tested introducing individual attitudes as linear variables and as factor variables. The results for dissimilarity in attitudes are consistent. To facilitate interpretation and save space, models with linear variables are shown in the main article, models with factor variables appear in the appendix.

Control Variables. We control for a number of variables that have been found to be related to the transition to parenthood or fertility in general (Balbo et al., 2013; Tanturri et al., 2015), to gender role attitudes (Davis and Greenstein, 2009), or to both. All models control for the *age of the female partner* using dummies for three-years age intervals (e.g. one dummy for women aged 18-20, one dummy for women aged 21-23, etc.), *age of male partner*, and *duration of relationship*, whether the residence of the anchor is in *Eastern or Western Germany*, and the *level of education* of both partners. The measure for education is based on ISCED-97 classi-

fication, including currently enrolled students.[22] We also control for dissimilarity between partners concerning the two individual-level variables: age and education. If individual gender role attitudes are associated with age and education, similarity in gender role attitudes might also be associated with similarity in age and education. Therefore, we introduce the variables *dissimilar age*, a dummy that is 1 if the man and woman are more than five years apart and *dissimilar education*, a dummy that is 1 if partners are more than one category apart in the education scale. All of the control variables are measured at Wave 1. Subsequently, we do not control for any variables that indicate the degree of institutionalisation of the relationship or represent an investment in the relationship, such as status of cohabitation or marriage. These variables might be endogenous, part of the "family building strategy": e.g. a couple might move in together and then marry because they plan to have children together (Baizán et al., 2004, p. 533). In the analysis, we compare couples that differ in the time for which we can observe them. To account for this, all of the models control for the time of observation: yearly dummies (date of last interview of the anchor minus date of first interview of the anchor) are part of the model, as well as interactions between the yearly dummies with the age of the female partner and the age of female partner squared (due to the lower number of observations per group; these interactions are not included the multinomial logistic models for Outcome Variable 2). Table 1 shows the summary statistics for the main variables.

Table 3.1: Descriptive summary table of variables at the individual and couple level.

	Couple-level		Individual-level				
			Female		Male		
	Mean	SD	Mean	SD	Mean	SD	Range
DISSIMILARITY IN GENDER ROLE ATTITUDES							
Nr. of dissimilar items out of all items	0.99	0.94					0-4
Nr. of dissimilar items on female roles (Items 1&2)	0.60	0.68					0-2
Nr. of dissimilar items on male roles (Items 3&4)	0.40	0.57					0-2
Dissimilarity on item...[1]							
1. Women: family > career	0.28						0-1
2. Child < 6 suffers if mother works	0.32						0-1
3. Housework: female involv. = male involv.	0.16						0-1
4. Child suffers if father focuses on work	0.24						0-1
INDIVIDUAL GENDER ROLE ATTITUDES							
1. Women: family > career			2.52	1.15	2.52	1.15	1-5
2. Child < 6 suffers if mother works			2.52	1.25	2.78	1.30	1-5
3. Housework: female involv. = male involv.			4.50	0.83	4.28	0.92	1-5
4. Child suffers if father focuses on work			3.32	1.02	3.48	1.00	1-5
CONTROL VARIABLES							
Duration of relationship at Wave 1, in years	5.49	4.13					0-27
Time of observation, in years	5.34	2.25					0.75-7.42
Age			27.29	4.75	30.05	5.58	18-62
Dissimilarity in age[2]	0.19						0-1
Eastern Germany	0.17						0-1
Education (share in group)							
No degree or lower secondary education			0.05		0.03		
Upper secondary			0.41		0.39		
Post-secondary non tertiary education general			0.18		0.13		
Tertiary education			0.36		0.45		
Dissimilarity in education[c]	0.25						0-1
n	705		705		705		

[1] At least two groups on the Likert-scale apart.

[2] At least six years apart.

[3] At least two educational groups apart.

Results

Descriptive Results

At Wave 1, the sample couples had, on average, been in a relationship for 5.5 years. 23% of the couples are neither cohabiting nor are married, 49% are cohabiting, and 28% are married. During the period of observation, 284 couples (40%) have a child together. Among the 421 couples that do not have a child, 123 (29%) separate.

Family and Gender Roles Among Male and Female Respondents

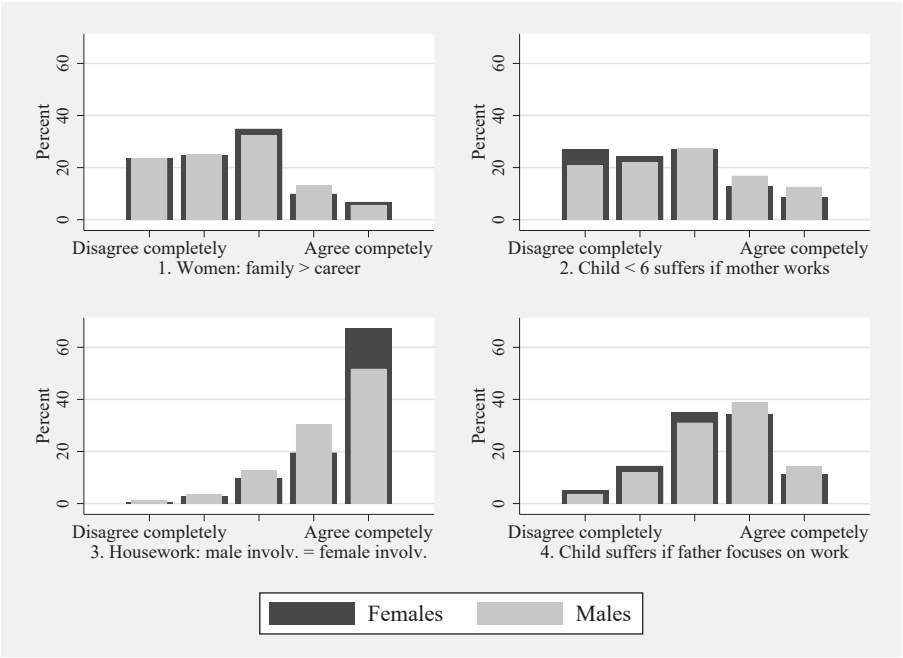

Figure 3.1: Responses to gender role items of females (n=705) and males (n=705).

[22] With four categories, as follows: [a] no more than lower secondary, ISCED 2a or lower; [b] upper secondary education, ISCED 3b and 3a; [c] post-secondary non-tertiary education general education, ISCED 4a; and [d] tertiary education, ISCED 5 and 6.

Figure 1 plots the answers of the female and male respondents to all four items. In broad terms, the answers of the males and females follow similar patterns on all four items. Most men and women tend to disagree with or feel indifferent about the idea that women should be more concerned about their family than about their career. Between-individuals variation in answers is great on this item but differences between female and male respondents are minor. Views about the negative effects of working mothers on young children are also diverse, with females seeing mothers' employment as less negative than males. Among males, and even more so among females, there is broad consensus that men should participate in housework as much as women do. Most respondents, especially males, tend to believe that children often suffer because their fathers spend too much time at work. It seems that men consider the role of fathers in child-rearing important more often than their female partners do. This result might be surprising for some, but it is in line with a similar finding from the United Kingdom (Buchler et al., 2017).

Partners' (Dis)Similarity in Gender Role Attitudes

Figure 2 plots the difference scores (the value of the female partner minus the value of the male partner) on all four attitudinal items. In broad terms, none of the distributions deviates strongly from being symmetric. The light grey bars indicate couples with a difference score that ranges between -1 and +1; these are couples that we define as having similar views on this item. The darker grey indicates couples with a difference score that is below -1 or above +1, couples that we define as having dissimilar views. On all items, between 68 and 84% of couples have similar views, whereas 16 to 32% have dissimilar views.

The distribution of difference scores for the first item are almost perfectly symmetrical: there are as many couples in which the male partner agrees more as there are couples in which the female partner agrees more (in which the average difference scores are not significantly different from zero). On the three other items,

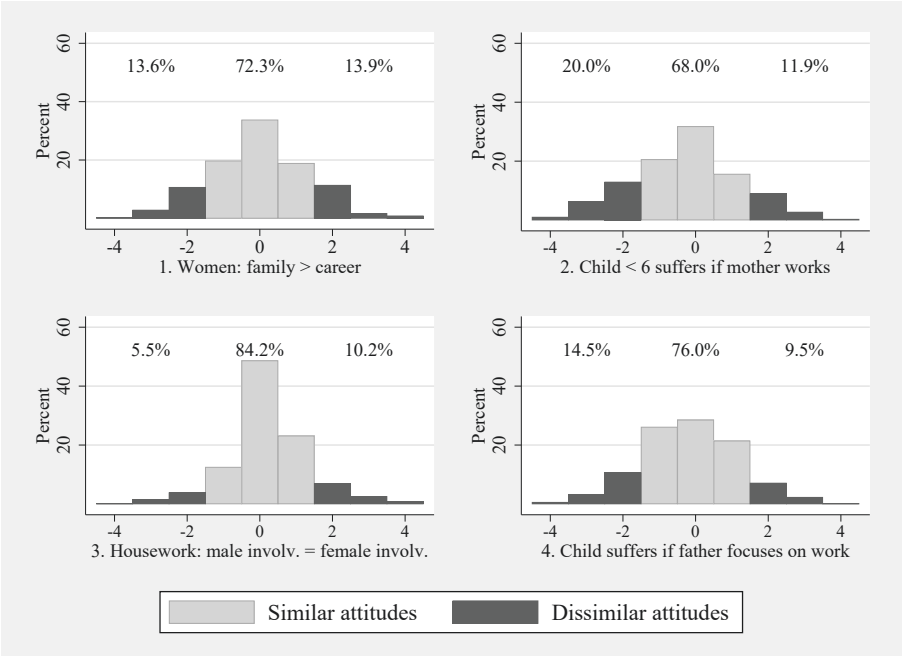

Figure 3.2: Difference scores (value of female partner minus value of male partner) for responses to gender role items (n=705).

distributions are (mildly) skewed. The mean difference scores are statistically significantly different from zero for these three items ($p<.001$), but the magnitude of difference might be smaller than expected. Not surprisingly, there are more couples in which the female partner is more favourable towards working mothers than the male partner. There are also more couples in which the female partner agrees more that men should engage as much in housework as women than the other way around. When it comes to the role of fathers in child rearing, in many couples, the man agrees more that a child suffers if a father is too career-focused.

Disagreement on Gender Role Attitudes and Fertility Transitions: Regression Models

Outcome Variable 1: Progression to a First Common Child. Table 2 shows the results of tests of the first hypothesis using different measures for gender role similarity. Models 1, 2 and 3 include alternative measures for similarity on gender role attitudes between partners. Model 1 includes a variable that counts on how many of the four items the two partners gave dissimilar answers. The results show that couples that gave dissimilar answers to a greater number of items are less likely to have a first child together by the last wave of observation. This association is in line with our hypothesis, but is only significant at the 10% level (in a model that introduces both partners' individual attitudes as factor variables, rather than as linear variables, it is significant at the 5% level; see the appendix).

Model 2 tests whether dissimilarity in attitudes concerning male or female gender roles matters. If couples give dissimilar answers to items concerning female gender roles, they are significantly less likely to have a child together ($p<.01$). We found no such association for dissimilar answers to items concerning male gender roles.

In Model 3, dissimilarity in answers is tested separately for the four items. It appears that dissimilarity on both items concerning female roles matter (nearly) equally. It also seems that both items concerning male gender roles do not matter (equally) for the transition to parenthood.

Overall, the results support the first hypothesis. Couples that have dissimilar gender role attitudes are less likely to have a child together. However, the results do not support the association for all attitudinal items—only for those that deal with female roles. As similarity on both single items on female roles seem to matter to roughly the same extent for transition to parenthood, and Akaike information criterion (AIC) suggests that the model that distinguishes between the similarity concerning female and male gender roles fits the data best, all further analyses

build upon Model 2.

In substantial terms, the association between similarity in attitudes towards female gender roles and the likelihood of transition to parenthood is reasonably strong: couples that disagree on both items (11% of couples) have a predicted probability of having a child of 30%, those that disagree on one item (37% of couples) have a probability of 37%, and those that agree on both items (52% of couples) have a probability of 45%. In sum, if partners have different attitudes towards female gender roles, they are significantly and substantially less likely to have a child together.

Concerning the control variables, women with tertiary education are less likely to have a first child; for men there is no significant association. Couples with dissimilar levels of education seem to be less likely to have a child. Within the individual attitudinal variables, only one is significant: couples in which the male partner believes that women should focus more on family than on career are more likely to have a child.

Outcome Variable 2: Distinguishing Between Childbirth, Childless Continuation, and Separation. If couples with dissimilar attitudes are less likely to have a child together, this could mean: (1) they are more likely to stay together without having children (*childless continuation*), and/or (2) they are more likely to separate.

Table 3 shows the multinomial logistic regression results for the three competing outcomes. As predicted in the second hypothesis, against the reference category *childbirth*, *separation* is significantly more likely the greater the dissimilarity in attitudes. The outcome of *childless continuation* is also significantly more likely the greater the dissimilarity in attitudes. Figure 3 plots the results: dissimilar gender role attitudes are associated with a substantially lower probability of transition to parenthood, a substantially higher probability of separation and a moderately higher probability of childless continuation of the relationship.

Table 3.2: Dissimilarity in gender role attitudes and the progression to parenthood. Logistic regressions.

	(1) Dissimilarity on all items		(2) Dissimilarity on male and female items		(3) Dissimilarity on single items	
	OR	p	OR	p	OR	p
DISSIMILARITY IN GENDER ROLE ATTITUDES						
Nr. of dissimilar items out of all items	0.83	(0.07)				
Nr. of dissimilar items on female roles (Items 1&2)			0.65**	(0.00)		
Nr. of dissimilar items on male roles (Items 3&4)			1.19	(0.33)		
Dissimilarity on item...						
1. Women: family > career					0.61*	(0.02)
2. Child < 6 suffers if mother works					0.69	(0.07)
3. Housework: female involv. = male involv.					1.20	(0.55)
4. Child suffers if father focuses on work					1.18	(0.48)
INDIVIDUAL GENDER ROLE ATTITUDES						
Female partner						
1. Women: family > career	1.02	(0.83)	1.05	(0.64)	1.05	(0.62)
2. Child < 6 suffers if mother works	0.91	(0.29)	0.91	(0.32)	0.91	(0.33)
3. Housework: female involv. = male involv.	0.83	(0.12)	0.86	(0.23)	0.86	(0.24)
4. Child suffers if father focus work	0.95	(0.64)	0.96	(0.71)	0.96	(0.70)
Male partner						
1. Women: family > career	1.22*	(0.03)	1.23*	(0.03)	1.23*	(0.03)
2. Child < 6 suffers if mother works	0.96	(0.60)	0.98	(0.80)	0.98	(0.79)
3. Housework: female involv. = male involv.	1.05	(0.62)	1.12	(0.29)	1.13	(0.33)
4. Child suffers if father focuses on work	1.11	(0.28)	1.11	(0.28)	1.11	(0.29)
CONTROL VARIABLES						
Duration of relationship at Wave 1, in years	1.00	(0.14)	1.00	(0.21)	1.00	(0.22)
Eastern Germany (ref.: Western Germany)	1.09	(0.73)	1.06	(0.82)	1.06	(0.83)
Education female partner (ref.: post-secondary non tertiary general)						
No degree or lower secondary education	1.74	(0.31)	1.69	(0.35)	1.69	(0.35)
Upper secondary	0.83	(0.49)	0.83	(0.50)	0.83	(0.50)
Tertiary education	0.57*	(0.04)	0.58*	(0.04)	0.58*	(0.04)
Education male partner (ref.: post-secondary non tertiary general)						
No degree or lower secondary education	0.83	(0.77)	0.80	(0.72)	0.79	(0.72)
Upper secondary education	0.99	(0.97)	0.99	(0.96)	0.98	(0.95)
Tertiary education	1.37	(0.30)	1.31	(0.36)	1.30	(0.38)
Dissimilarity in education (ref.: similar)	0.67	(0.08)	0.68	(0.09)	0.68	(0.09)
AIC	852.6		848.4		852.2	
Share of couples with childbirth by last observation	40.28%		40.28%		40.28%	
n	705		705		705	

Odds ratios are displayed, p-values in parentheses.
All models additional control for age of both partners and time of observation.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table 3.3: Dissimilarity in gender role attitudes and three competing outcomes: Childless continuation (continuation of relationship without childbirth) and separation, compared to childbirth. Multinomial logistic regression.

	(4) Outcome: Childless continuation vs. childbirth		Outcome: Separation vs. childbirth	
	OR	p	OR	p
Dissimilarity in gender role attitudes				
Nr. of dissimilar items on female roles (Items 1&2)	1.76**	(0.00)	1.44*	(0.02)
Nr. of dissimilar items on male roles (Items 3&4)	0.96	(0.84)	0.77	(0.18)
Individual gender role attitudes				
Female partner				
1. Women: family > career	0.99	(0.95)	0.93	(0.50)
2. Child < 6 suffers if mother works	1.04	(0.71)	1.13	(0.21)
3. Housework: female involv. = male involv.	1.09	(0.60)	1.18	(0.22)
4. Child suffers if father focus work	1.06	(0.65)	1.03	(0.78)
Male partner				
1. Women: family > career	0.82	(0.10)	0.79*	(0.02)
2. Child < 6 suffers if mother works	0.97	(0.76)	1.02	(0.82)
3. Housework: female involv. = male involv.	0.80	(0.13)	0.93	(0.55)
4. Child suffers if father focuses on work	0.90	(0.41)	0.87	(0.20)
Control variables				
Duration of relationship at Wave 1, in years	0.99**	(0.01)	1.00	(0.88)
Eastern Germany (ref.: Western Germany)	0.99	(0.99)	0.89	(0.69)
Education female partner (ref.: post-secondary non tertiary general)				
No degree or lower secondary education	0.85	(0.80)	0.53	(0.29)
Upper secondary	1.31	(0.46)	1.16	(0.61)
Tertiary education	1.70	(0.15)	1.66+	(0.09)
Education male partner (ref.: post-secondary non tertiary general)				
No degree or lower secondary education	1.29	(0.73)	1.60	(0.48)
Upper secondary education	0.80	(0.55)	1.26	(0.49)
Tertiary education	0.61	(0.19)	0.94	(0.86)
Dissimilarity in education (ref.: similar)	1.54	(0.14)	1.38	(0.19)
chi2	292.1			
Share of couples with childbirth by last observation	40.28%			
Share of couples with childless continuation by last observation	42.27%			
Share of couples with separation by last observation	17.45%			
n	670			

Odds ratios are displayed, p-values in parentheses.
All models additional control for age of both partners and time of observation.
+ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

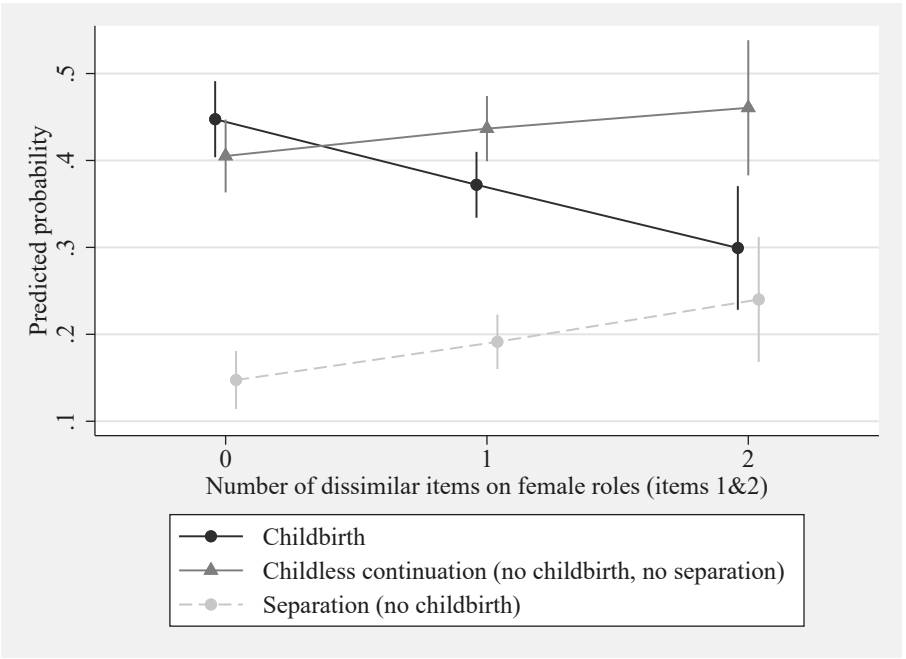

Figure 3.3: Predicted probabilities of childbirth, childless continuation, and separation; by number of dissimilar items on female roles (n=670).

Outcome Variable 3: Pregnancy Intention. As a robustness check, we test whether dissimilarity in attitudes is not only associated to fertility outcomes, but also to fertility intentions. For 125 couples in the sample we have information that they unsuccessfully tried to have a child. For 19 couples we have information that had a child but the childbirth was not intended. Combining these two groups' information, for the pregnancy intention variable, 387 couples intended to become pregnant (284 actual childbirths, plus 125 unfulfilled intentions, minus 22 unintended pregnancies), versus 318 that did not intend to become pregnant (421 couples without childbirth minus 125 unfulfilled intentions, plus 22 unintended pregnancies). Table 4 shows that greater dissimilarity in gender role attitudes is associated with lower probability of pregnancy intention. In sum, the results are robust for the variable that aims to approximate pregnancy intentions. This supports the findings for the first hypothesis.

Table 3.4: Dissimilarity in gender role attitudes and pregnancy intention. Logistic regression.

	(5)	
	OR	p
Dissimilarity in gender role attitudes		
Nr. of dissimilar items on female roles (Items 1&2)	0.75*	(0.03)
Nr. of dissimilar items on male roles (Items 3&4)	0.95	(0.77)
Individual gender role attitudes		
Female partner		
1. Women: family > career	1.25*	(0.02)
2. Child < 6 suffers if mother works	0.96	(0.63)
3. Housework: female involv. = male involv.	0.93	(0.55)
4. Child suffers if father focus work	0.86	(0.12)
Male partner		
1. Women: family > career	1.29**	(0.00)
2. Child < 6 suffers if mother works	0.91	(0.27)
3. Housework: female involv. = male involv.	1.12	(0.30)
4. Child suffers if father focuses on work	1.07	(0.48)
Control variables		
Duration of relationship at Wave 1, in years	1.00	(0.31)
Eastern Germany (ref.: Western Germany)	1.31	(0.28)
Education female partner		
(ref.: post-secondary non tertiary general)		
No degree or lower secondary education	0.72	(0.54)
Upper secondary	1.46	(0.15)
Tertiary education	1.19	(0.52)
Education male partner		
(ref.: post-secondary non tertiary general)		
No degree or lower secondary education	1.55	(0.46)
Upper secondary education	0.88	(0.66)
Tertiary education	1.16	(0.61)
Dissimilarity in education (ref.: similar)	0.77	(0.24)
AIC	901.0	
Share of couples with pregnancy intention by last observation	54.89%	
n	705	

Odds ratios are displayed, p-values in parentheses.
All models additional control for age of both partners and time of observation.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Further Robustness Checks

To test whether the reported results are robust, the following checks are performed: (1) testing alternative measures for dissimilarity, (2) running models for the subsample of couples observed until the last wave, (3) testing for potentially heterogeneous associations between Western and Eastern Germany, (4) controlling for both partners' individual attitudes in greater detail, (5) running a model that does not control for individual attitudes, (6) testing whether the direction of dissimilarity, rather than dissimilarity itself is relevant, and (7) testing for potential endogeneity, because similarity in attitudes might be driven by relationship satisfaction.

(1) Models A1 and A2 in the appendix show two alternative measures of dissimilarity: absolute differences scores and squared difference scores. The results are robust, but the AIC suggests that the measures for dissimilarity used in the main models fit the data best.

(2) In the main analysis, the couples are observed for different numbers of waves. In the above models, we extensively controlled for the duration of observation; however, one might still suspect that this does not account for all potential distortions. This check determines whether results hold when the sample is restricted to couples observed through Wave 8 (Model A3 in the Appendix). The results are robust in both significance and magnitude of association.

(3) Eastern and Western Germany differ in gender role attitudes (both average attitudes and variation in attitudes) as well as in levels of childlessness. We now challenge our implicit assumption that the association between similarity in gender role attitudes and the transition to parenthood holds in the Eastern as well as Western regions of Germany. We find no significant heterogeneity between East and West (Model A4 in the appendix). The association between similarity in attitudes and transition to parenthood is significant for the Western regions (reference category) and is somewhat, yet insignificantly, stronger in the Eastern regions.

(4) In the previous models, both partners' individual attitudes are included as

linear variables, to facilitate (easier) interpretation and limit the size of tables. To control for the complexity in both partners' individual attitudes, we now introduce individual attitudes as factor variables (a dummy variable for each value of the Likert-scaled items). The results are stable (as shown in Model A5 in the appendix).

(5) Because there might be some degree of collinearity between partners' individual attitudes and the measures for dissimilarity in attitudes, we also run models that do not include any measure for individual gender role attitudes. Model A6 in the appendix shows that these results are robust.

(6) To see if the direction of dissimilarity might matter, that is, it could make a difference whether the male or the female partner agrees more with a certain statement, the next check looks at the two items on female roles, as dissimilarity in attitudes on these items is associated with transition to parenthood. Figure A1 in the appendix shows that there is no substantial or significant difference between the directions of dissimilarity in attitudes.

(7) Relationship satisfaction could both be cause and consequence of similarity in attitudes. On the one hand, dissimilarity could lead to conflicts that could reduce relationship satisfaction. On the other hand, people that are very happy with their partner and their relationship might be more likely to adapt to their partner's attitudes. For example, adapting to a partner's attitudes could be interpreted as investing in the relationship and people with higher relationship satisfaction might be more willing to make that investment (Arránz Becker and Lois, 2010). Therefore, similarity in attitudes at t_0 might be a consequence of relationship satisfaction at t_{0-1} and a predictor of relationship satisfaction at t_{0+1}. Conversely, satisfaction at t_0 might be a consequence of similarity at t_{0-1} and a predictor of similarity at t_{0+1}. When both partners' reported relationship satisfaction are introduced into the model (measured at the same time as similarity in attitudes), it accomplishes two things at the same time, one that is intended, one that is not intended as follows: first, it rules out a potential source of endogeneity; second, it partly controls for the potential causal chain (dissimilarity at t_{0-1} leads to dissatisfaction at t_0

which leads to a lower chance of progression to parenthood at t_1). Model A7 in the appendix shows that the association between dissimilarity and transition to parenthood decreases slightly but remains significant when introducing relationship satisfaction.

In summary, all analyses consistently show that couples in which both partners hold dissimilar attitudes towards *female* gender roles are less likely to have a first child together. Whether partners also have dissimilar attitudes towards male gender roles attitudes seems irrelevant throughout all of the model specifications.

Discussion

This paper provides micro-level evidence to the argument that childlessness is high when (1) societal variation in gender role attitudes is large (Paper I) and (2) this variation translates into dissimilarity between a man's and a woman's attitudes at the couple level (Paper II). The results support the multi-equilibrium framework presented by Esping-Andersen and Billari (2015): childlessness is low when there are clear societal gender norms and a general agreement of "what constitutes proper gender roles and identities in family life" (p. 6). Childlessness is high when such societal agreement is lacking and there is great variation in views. Contrary to previous studies, we take a couple-level perspective on gender role attitudes and the transition to parenthood and hypothesise that the match (or lack of) between both partners' attitudes matters. Very dissimilar attitudes increase the anticipated and actual risk of conflicts about how to organize family life. This, in turn, decreases a couple's willingness to make the transition to parenthood together.

We find robust support for this hypothesis: couples with similar gender role attitudes are about 50% more likely to have a first child together than couples with very dissimilar attitudes. As the likelihood of transition to parenthood decreases, the likelihood of separation increases substantially and the likelihood of childless continuation of the relationship increases moderately. A potentially surprising

result is that only similarity in attitudes towards female roles matters—the effect of similarity in attitudes towards male roles does not significantly explain fertility or separation.

There are, however, at least three factors that represent limitations. First, if ideal data were available, we would be able to measure attitudes shortly after the beginning of the relationship and observe fertility outcomes when the female partner is age 45. Our data structure falls short of this ideal on both 'sides'. Compared to this ideal, we measure gender role attitudes five years too late (when the partners have been in a relationship for five years on average), and observe fertility outcomes about twelve years too early (when the female partner is 33 years old on average). Also, to answer our specific research question and due to the low case numbers, we only look at gender role attitudes at one point in time. Future research could—if suitable data become available—examine the relationship between the changes in attitudes and fertility outcomes.

Second, the items to study gender role attitudes from pairfam might not be ideal for these purposes. Because the items seem to capture quite distinct aspects of gender role attitudes, we are not able to condense all of the items into one single meaningful indicator. Because the pairfam data has only four items on gender roles, we are not able to make a clear and unambiguous distinction between different aspects of gender role attitudes.

Third, we found that the transition to parenthood is significantly predicted by dissimilarity in attitudes towards women's roles, but not by dissimilarity in attitudes towards men's roles; however, it is not clear whether this reflects substantial differences or is a data issue. The two items on men's roles may not capture respondents' views as precisely as the two items on women's roles. In particular, the question whether men should participate in household tasks as much as women do, receives almost universal approval among all respondents, regardless of sex of respondent. Subsequently, this item may be formulated in such a manner that it does not manage to distinguish sufficiently between people with different views.

The other item on male roles, whether a child suffers if the father focuses too much on his career, is similar to, but not symmetrical to the items on female roles. If there were symmetrical items, we could easily compare whether similarity in attitudes on women's roles is really more important than similarity in attitudes on men's roles (Examples for symmetric items would be "Women should be more concerned about their family than about their career" and "Men should be more concerned about their family than about their career"). Also, symmetric items would allow for full identification of the gendered perspective in attitudes, as opposed to, for example, more general and un-gendered views on the balance between work and family.

We study the case of Germany, a country that has high childlessness, a medium position on the gender revolution and shows high heterogeneity in gender role attitudes. Based on our analyses, what associations would we expect for other countries? We would assume that the share of couples with dissimilar attitudes could vary substantially between countries. If attitudes in a society are more homogeneous, or there is stronger assortative mating on attitudes, the share of couples with dissimilar attitudes could be much lower. Regardless, we would hypothesise that the association between similarity in attitudes and transition to parenthood should remain: even if the share of couples with dissimilar attitudes is lower, these 'remaining' couples with dissimilar attitudes should be less likely to make the transition to parenthood.

While it is upon future research to test our framework in other countries, contrasting Eastern and Western Germany supports this idea (see section on robustness checks). In Eastern Germany, on average, attitudes are considerably more supportive of working mothers, and attitudes are more homogeneous. In consequence, the share of couples with dissimilar attitudes is lower in Eastern Germany (Paper II). However, the association between dissimilarity in attitudes and transition to parenthood does not differ substantially between Eastern and Western Germany. The macro-level impact should, however, be bigger in Western Germany:

the higher the share of couples with dissimilar attitudes, the higher the number of couples with lower chances of transition to parenthood—which should translate into a higher macro-level impact on childlessness and fertility.

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Appendix

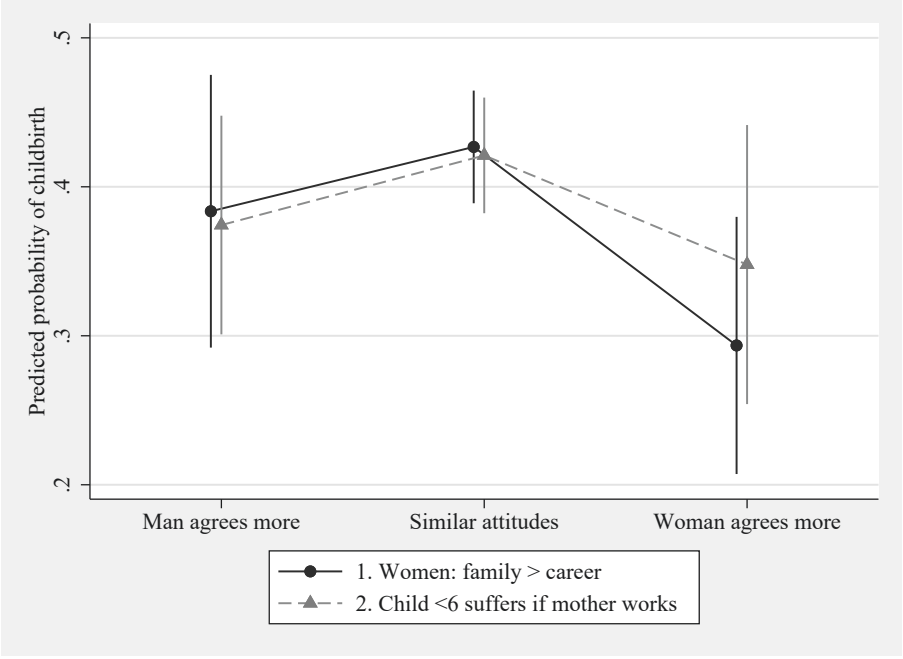

Figure A3.1: The effect of direction of dissimilarity in items on female roles on transition to parenthood. Marginsplot based on logistic regression (model not shown here; n=705).

Table A3.1: Dissimilarity in gender role attitudes and progression to parenthood. Robustness checks I. Logistic regressions.

	(A1) Outcome: Childless continuation vs. childbirth		(A2) Outcome: Separation vs. childbirth	
	OR	p	OR	p
DISSIMILARITY IN GENDER ROLE ATTITUDES				
Sum of absolute difference scores: items on female roles (Items 1&2)	0.87*	(0.04)		
Sum of absolute difference scores: items on male roles (Items 3&4)	1.06	(0.50)		
Sum of square difference scores: items on female roles (Items 1&2)			0.97*	(0.03)
Sum of square difference scores: items on male roles (Items 3&4)			1.02	(0.20)
INDIVIDUAL GENDER ROLE ATTITUDES				
Female partner				
1. Women: family > career	1.04	(0.68)	1.04	(0.65)
2. Child < 6 suffers if mother works	0.91	(0.30)	0.91	(0.30)
3. Housework: female involv. = male involv.	0.86	(0.21)	0.87	(0.28)
4. Child suffers if father focus work	0.96	(0.71)	0.96	(0.68)
Male partner				
1. Women: family > career	1.24*	(0.02)	1.25*	(0.02)
2. Child < 6 suffers if mother works	0.97	(0.74)	0.97	(0.76)
3. Housework: female involv. = male involv.	1.12	(0.34)	1.15	(0.23)
4. Child suffers if father focuses on work	1.11	(0.31)	1.11	(0.31)
CONTROL VARIABLES				
Duration of relationship at Wave 1, in years	1.00	(0.17)	1.00	(0.15)
Eastern Germany (ref.: Western Germany)	1.07	(0.79)	1.06	(0.81)
Education female partner (ref.: post-secondary non tertiary general)				
No degree or lower secondary education	1.64	(0.37)	1.68	(0.35)
Upper secondary	0.84	(0.52)	0.83	(0.50)
Tertiary education	0.58*	(0.04)	0.58*	(0.05)
Education male partner (ref.: post-secondary non tertiary general)				
No degree or lower secondary education	0.80	(0.73)	0.78	(0.70)
Upper secondary education	0.96	(0.89)	0.97	(0.92)
Tertiary education	1.33	(0.34)	1.35	(0.31)
Dissimilarity in education (ref.: similar)	0.68	(0.09)	0.68	(0.10)
AIC	853.4		851.9	
Share of couples with childbirth by last observation	40.28%		40.28%	
n	705		705	

Odds ratios are displayed, p-values in parentheses.
All models additional control for age of both partners and time of observation.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table A3.2: Dissimilarity in gender role attitudes and progression to parenthood. Robustness checks II. Logistic regressions.

	(A3) Outcome: Childless continuation vs. childbirth		(A4) Outcome: Separation vs. childbirth	
	OR	p	OR	p
Dissimilarity in gender role attitudes				
Nr. of dissimilar items on female roles (Items 1&2)	0.63**	(0.01)	0.68*	(0.01)
Nr. of dissimilar items on male roles (Items 3&4)	0.96	(0.84)	1.29	(0.20)
Interaction: Eastern Germany X number of dissimilar items on female roles (items 1&2)			0.64	(0.29)
Interaction: Eastern Germany X number of dissimilar items on male roles (items 3&4)			0.61	(0.27)
Individual gender role attitudes				
Female partner				
1. Women: family > career	1.12	(0.32)	1.04	(0.66)
2. Child < 6 suffers if mother works	0.85	(0.14)	0.91	(0.31)
3. Housework: female involv. = male involv.	0.77	(0.08)	0.86	(0.22)
4. Child suffers if father focus work	0.90	(0.38)	0.96	(0.69)
Male partner				
1. Women: family > career	1.12	(0.34)	1.22*	(0.03)
2. Child < 6 suffers if mother works	0.98	(0.82)	0.99	(0.86)
3. Housework: female involv. = male involv.	1.10	(0.46)	1.11	(0.33)
4. Child suffers if father focuses on work	1.19	(0.13)	1.12	(0.25)
Control variables				
Duration of relationship at Wave 1, in years	1.00	(0.31)	1.00	(0.20)
Eastern Germany (ref.: Western Germany)	0.85	(0.60)	1.59	(0.21)
Education female partner (ref.: post-secondary non tertiary general)				
No degree or lower secondary education	2.59	(0.14)	1.69	(0.35)
Upper secondary	0.88	(0.70)	0.84	(0.52)
Tertiary education	0.64	(0.16)	0.57*	(0.04)
Education male partner (ref.: post-secondary non tertiary general)				
No degree or lower secondary education	0.89	(0.88)	0.74	(0.63)
Upper secondary education	1.01	(0.97)	0.97	(0.93)
Tertiary education	1.39	(0.35)	1.28	(0.41)
Dissimilarity in education (ref.: similar)	0.89	(0.64)	0.67	(0.09)
AIC	578.6		850.0	
Share of couples with childbirth by last observation	53.68%		40.28%	
n	421		705	

Odds ratios are displayed, p-values in parentheses.
All models additional control for age of both partners and time of observation.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Table A3.3: Dissimilarity in gender role attitudes and progression to parenthood. Robustness checks III. Logistic regressions.

	(A5) Dissimilarity on all items		(A6) Dissimilarity on male and		(A7) Dissimilarity on single items	
	OR	p	OR	p	OR	p
DISSIMILARITY IN GENDER ROLE ATTITUDES						
Nr. of dissimilar items on female roles (Items 1&2)	0.64**	(0.00)	0.67**	(0.00)	0.67**	(0.01)
Nr. of dissimilar items on male roles (Items 3&4)	1.08	(0.72)	1.19	(0.30)	1.17	(0.38)
INDIVIDUAL GENDER ROLE ATTITUDES						
Female partner						
1. Women: family > career					1.06	(0.56)
2. Child < 6 suffers if mother works					0.88	(0.17)
3. Housework: female involv. = male involv.					0.88	(0.29)
4. Child suffers if father focus work					0.97	(0.79)
Male partner						
1. Women: family > career					1.19	(0.07)
2. Child < 6 suffers if mother works					1.01	(0.92)
3. Housework: female involv. = male involv.					1.09	(0.44)
4. Child suffers if father focuses on work					1.10	(0.33)
CONTROL VARIABLES						
Duration of relationship at Wave 1, in years	1.00	(0.18)	1.00	(0.23)	1.00	(0.21)
Eastern Germany (ref.: Western Germany)	1.13	(0.65)	1.12	(0.65)	0.97	(0.90)
Education female partner (ref.: post-secondary non tertiary general)						
No degree or lower secondary education	1.68	(0.40)	1.67	(0.35)	1.89	(0.25)
Upper secondary	0.86	(0.59)	0.83	(0.49)	0.83	(0.49)
Tertiary education	0.61	(0.08)	0.54*	(0.02)	0.58	(0.05)
Education male partner (ref.: post-secondary non tertiary general)						
No degree or lower secondary education	0.64	(0.51)	0.97	(0.96)	0.72	(0.62)
Upper secondary education	1.01	(0.97)	1.03	(0.91)	1.01	(0.98)
Tertiary education	1.32	(0.37)	1.42	(0.24)	1.30	(0.39)
Dissimilarity in education (ref.: similar)	0.62*	(0.05)	0.67	(0.08)	0.72	(0.17)
INDIVIDUAL GENDER ROLE ATTITUDES AS FACTOR VARIABLES						
[Reference group: 3]						
Female partner						
1. Women: family > career						
1 Disagree completely	0.06	(0.07)				
2	1.10	(0.89)				
4	0.56	(0.16)				
5 Agree completely	0.50	(0.08)				
2. Child <6 suffers if mother works						
1 Disagree completely	1.07	(0.89)				
2	1.18	(0.61)				
4	0.92	(0.73)				
5 Agree completely	1.13	(0.73)				

(Table continued on next page)

(Continuation of Table A3.3.)

	(A5) Dissimilarity on all items		(A6) Dissimilarity on male and		(A7) Dissimilarity on single items	
	OR	p	OR	p	OR	p
3. Housework: male involv. = female inv.						
1 Disagree completely	0.90	(0.71)				
2	0.57*	(0.03)				
4	0.68	(0.30)				
5 Agree completely	0.91	(0.83)				
4. Child suffers if father focuses on work						
1 Disagree completely	1.20	(0.54)				
2	0.97	(0.92)				
4	0.81	(0.52)				
5 Agree completely	0.74	(0.47)				
Male partner						
1. Women: family > career						
1 Disagree completely	4.65	(0.09)				
2	0.46	(0.18)				
4	0.77	(0.45)				
5 Agree completely	1.14	(0.69)				
2. Child <6 suffers if mother works						
1 Disagree completely	0.98	(0.97)				
2	0.65	(0.20)				
4	1.13	(0.62)				
5 Agree completely	0.96	(0.91)				
3. Housework: male involv. = female inv.						
1 Disagree completely	0.58	(0.05)				
2	1.24	(0.43)				
4	1.23	(0.51)				
5 Agree completely	1.81	(0.28)				
4. Child suffers if father focuses on work						
1 Disagree completely	0.99	(0.97)				
2	0.96	(0.88)				
4	0.64	(0.15)				
5 Agree completely	1.19	(0.63)				
Relationship satisfaction						
Female partner					1.02	(0.71)
Male partner					1.15*	(0.01)
AIC	867.0		842.8		834.0	
Share of couples with childbirth by last observation	40.28%		40.28%		40.28%	
n	705		705		688	

Odds ratios are displayed, p-values in parentheses.
All models additional control for age of both partners and time of observation.
$^{+}$ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$