UiT The Arctic University of Norway

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Causes and Consequences of Gender Roles

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Abstract

This dissertation addresses the pervasive issue of women's underrepresentation in agentic work and the equally important (but underexamined) issue of men's underrepresentation in communal unpaid work. First, I review research and identify what conditions need to be met in order for counterstereotypical role models to break down some of the barriers to women's entry into agentic work (Chapter 2). One important barrier that is not typically addressed is gender role expectations in the domestic domain. To fill this research gap, I explore how the policy context relates to young, highly educated women's and men's future expectations to take parental leave across 37 countries (Chapter 3). Results showed that women intend to take longer leave than men across all countries. Leave intentions were found to be inversely related to career ambitions, suggesting that gender inequality in agentic work will continue to be an issue for future generations to come. Results further suggests that giving men the opportunity to engage with childcare (through making more leave available to both women and men) is not an effective way to promote communal intentions in young men. With the objective of identifying methods of increasing communal engagement in men, I summarize data on predictors of communal engagement in adulthood across 10 countries (Chapter 4) and in early childhood in Norway (Chapter 5). Results showed that boys' and men's relative lack of communal engagement is evident across the lifespan and across countries that vary in gender equality. Men's communal engagement seems to increase with the awareness that other men can be communal. Boys' communal aspirations, on the other hand, seem to be driven by their communal self-perceptions rather than the perception that other males can be communal. Taken together, these studies have implications for interventions that aim to break down the myriad barriers to gender equality.

Preface

I am the primary author of the work presented in this PhD Dissertation. In collaboration with Professor Sarah E. Martiny, I identified the research question and designed the studies presented in this dissertation. I coordinated the data collection and performed all data analyses. I wrote each chapter and prepared all tables and figures presented in the chapters. Additional contributions for each chapter are described below.

Chapter 1: Introduction

I am the primary author of this chapter, with intellectual contributions from S. E. Martiny.

Chapter 2: Promoting Counterstereotypical Aspirations and Behavior through Exposure to Counterstereotypical Role Models

A version of this chapter has been published. Olsson, M. I. T., & Martiny, S. E. (2018). Does exposure to counterstereotypical role models influence girls' and women's gender stereotypes and career choices? A review of social psychological research. *Frontiers in Psychology*, *9*, 2264. I reviewed the literature and prepared the manuscript, with intellectual contributions and edits from S. E. Martiny.

Chapter 3: How Does the Broader Context Shape Women's and Men's Intentions to Take Leave from Work to Care for their Child?

A version of this chapter has been prepared for publication. Olsson, M. I. T., Van Grootel, S., Block, K., Schuster, C., Van Laar, C., Schmader, T., Meeussen, L., Sun, M., Croft, A., […], Martiny, S. E. Sharing is Caring: A Cross-Cultural Investigation of Gender Differences in the Intended Uptake of Parental Leave. I supervised data* collection in collaboration with S. Van Grootel, K. Block, and M. Sun. I formulated the research questions, conducted the analyses, and prepared the manuscript, with intellectual contributions from S. Van Grootel, K. Block, S. E. Martiny, C. Schuster, C. Van Laar, L. Meeussen, and T. Schmader.

Chapter 4: Contextual Factors to Gender Differences in Communal Helping Behavior

A version of this chapter has been accepted for publication subject to minor revisions. Olsson, M. I. T., Froehlich, L., Dorrough, A. R., & Martiny, S. E. (2020). The Hers and His of Prosociality Across 10 Countries. Data** was collected in collaboration with L. Froehlich, A. Dorrough, S. E. Martiny, & A. Glöckner. I formulated the research questions, conducted the

analyses, and prepared the manuscript. L. Froehlich, A. Dorrough, and S. E. Martiny provided intellectual contributions to the analyses and edited the manuscript.

Chapter 5: Internal and External Factors in Girls' and Boys' Communal Aspirations

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Chapter 6: Conclusions about Causes and Consequences of Gender Roles

I am the primary author of this chapter, with intellectual contributions from S. E. Martiny.

*Ethical approval was sought by each collaborator from their respective university (if required by the ethics standard in their country).

** Ethical approval was provided in 2018 by the internal committee for ethics in research at the Department of Psychology at University of Göttingen, Germany (Reference No. 206).

***The project was registered with the Norwegian Centre for Research Data. Ethical approval was provided by the internal committee for ethics in research at the Department of Psychology at UiT – the Arctic University of Norway.

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1 Chapter: Introduction

People share a common nature, but are trained in gender roles

- Lillie Devereux Blake, Suffragette

Bakan (1966) introduced the concepts of *communion* and *agency* as two core components of human existence. Agency refers to mastery, assertiveness, competence, achievement, power, and being separate from others. Communion refers to close relations and co-operation with others. Agency and communion have been linked to gender role socialization, in that boys are socialized to be agentic, whereas girls are socialized to be communal (Wood & Eagly, 2012). In many countries, agency and communion continue to define boys and girls into adulthood, such as in the occupations they pursue. Gender research has traditionally focused on women, studying, for example, barriers to women's entry into agentic achievement-orientated roles. Recently, gender researchers have called for more research into country- and individual-level factors affecting men's entry into communal, caring-oriented roles (Croft et al., 2015; Meeussen et al., 2020). It is essential to identify reasons for men's underrepresentation in communal roles because, as I outline below, gender equality for women cannot be achieved without the equal participation of women and men in communal unpaid work. Importantly, the benefits are not only for women; men also benefit from increasing their communal engagement.

The broad goal of this dissertation is to explore the dynamic nature of gender differences in role aspirations and behavior. This dissertation contains four separate papers aimed at investigating factors (e.g., exposure to counterstereotypical role models, policies, gender descriptive norms) that may contribute to narrowing the gender gap in domains traditionally associated with one gender. In introducing this dissertation, I will discuss gender role division in paid and unpaid work across countries and over time, and present key theories underlying gender differences in abilities and behavior and underlying gender role change.

1.1 Slow and Uneven Progress toward Gender Equality

Gender inequality has been defined as a system that privileges men over women in material resources, power, and status (Ridgeway, 2011). It is a widespread issue and one way it persists is through gender segregation in the labor market, as women are vastly underrepresented in high-status paid work at a global level (International Labour

Organisation, 2019). Gender-equal representation in the labor market is an important topic worldwide and the goal of many national and international leaders. For example, Klaus Schwab, founder and executive chairman of the World Economic Forum (WEF, 2020) asserted that "without the equal inclusion of half of the world's talent, we will not be able to deliver on the promise of the Fourth Industrial Revolution" (p. 4). In addition, the European Commission (2020) recently set out guidelines for how to close gender gaps in employment, child care, and decision making, as well as achieving equal participation across different sectors of the economy in all EU member states by 2025. The objective of these guidelines was to achieve "a gender equal Europe where women and men, girls and boys [...] are free to pursue their chosen path in life, where they have equal opportunities to thrive, and where they can equally participate in and lead our European society" (p. 2).

Despite global commitments and efforts, no country has yet achieved gender parity in economic participation and opportunity, educational attainment, health and survival, and political empowerment (according to the Global Gender Gap Index, GGGI; WEF, 2020). Furthermore, based on the (limited) progress made between 2006-2020, the WEF has projected that the global gender gap in economic participation and opportunity (based on women's relative labor force participation, income, and representation in management, legislation, professional and technical work) will not close for another 257 years. Although this is a rather pessimistic prediction, it should not be interpreted to mean that gender equality is unattainable. Progress toward closing the gender gap in economic participation and opportunity has varied between countries and this is partly due to policies that enable mothers to remain in paid work while having young children (Grönlund et al., 2017). For example, Norway, which has one of the most generous family policies in the OECD (Thevenon, 2011), is ranked 2nd on the GGGI and has closed 79% of its gender gap (WEF, 2020). In comparison, Greece, which only provides limited support to parents in connection with the birth of a child (Thevenon, 2011), is ranked 76th on the GGGI and has closed 68% of its gender gap (WEF, 2020).

Progress toward gender equality has not only varied between countries but also over time. In the 1960s and 1970s, following the "second wave" feminist movement, women started to enter paid work in Australia, New Zealand, Scandinavia, and the US at an unprecedented rate (OECD, 1999; Pew, 2015). In many Western European countries, a comparable increase in women's labor force participation began in the 80s (OECD, 2011). This progress toward gender equality in paid work, however, slowed down at the turn of the 20st century (Ortiz-Ospina & Tzvetkova, 2018). The curve has similarly flattened with respect

to women's entry into agentic, high-status work. For example, despite many efforts to increase women's representation in management and leadership positions (through setting targets and introducing women's quotas), there has only been a modest increase in women's representation in management positions over the last decades (International Labour Organisation, 2018; OECD, 2020).

Researchers have argued that one reason for this so-called stalled revolution is that women's progression into paid work is not mirrored in men's progression into unpaid work (England, 2010). This asymmetric change in women's and men's roles over time is currently reflected in the relative size of the gender gap in unpaid work vs. paid work. For example, in the EU, women spend an average of 31 hours a week on paid work, whereas men spend an average of 41 hours a week on paid work (EIGE, 2019). In contrast, women with young children spend on average twice as much time on domestic work as men (Eurofound, 2017). Women's larger share of unpaid work means that many working women with children are faced with the choice between doing a so-called "second shift" (one at work and another at home; Hochschild & Machung, 2012) or abandoning or scaling back their high-status, time-intensive career ambitions (Stone, 2007).

The unequal distribution of domestic work can thus have negative consequences for women. More specifically, if women stay in full-time work, the additional burden of a second shift may negatively influence their emotional and physical well-being (Dugan & Barnes-Farrell, 2020). If, on the other hand, women reduce their working hours or exit the labor market entirely, they will have less access to economic resources, putting them at greater risk of poverty in old age (see Jefferson, 2009). The traditional gender division of unpaid work is thus also a gender inequality issue, and (as I will illustrate later in this introduction) a pervasive one. The slow and uneven change in women's and men's roles across time demonstrates the need to further our understanding of how to promote the greater representation of women and men in agentic and communal roles, respectively. Next, I will review research on women's underrepresentation in agentic roles. Subsequently, I will review research on men's underrepresentation in communal roles.

1.2 A Persistent Gender Inequality: Women's Underrepresentation in Agentic Roles

As I outlined in the previous section, the gender gap in labor market participation is "closing" in some countries. It is important to note, however, that this has not necessarily afforded women substantially more resources, power, or higher status. In many countries –

even those that rank high on gender equality indices – the labor market remains segregated by gender, with women overrepresented in low-status, low-pay positions (Charles, 1992, 2003; Charles & Bradley, 2009). For example, in Norway, where women are equally represented in the labor force and in mid-level management positions, they are vastly underrepresented in agentic high-status sectors that are not required to abide by gender quotas. For instance, only 12-18% of board representatives in limited companies are women (CORE, 2020; Statistics Norway, 2017). Some researchers have linked Scandinavian women's underrepresentation in high-status positions to their countries' generous parental leave policies (Evertson & Duvander, 2011). This is because although long and highly compensated leave from work is available to both parents in Scandinavian countries, most of the leave is taken by mothers (Duvander et al., 2019). Long and repeated absence from work is, in turn, associated with less opportunities to progress up the career ladder. As people generally report gender-egalitarian attitudes in Scandinavian countries (Dotti Sani & Quaranta, 2017), this demonstrates the need for research to not only focus on the individual - as someone who carves out their own path in life based on their attitudes - but to also look at how the broader social, policy, and cultural contexts shape gender division in paid and unpaid work (a point I return to in Chapter 3).

In addition to this, it is noteworthy that although Scandinavian countries have closed their gender gap with respect to educational attainment and health and survival (WEF, 2020), Scandinavian countries lag behind other countries with regard to their gender gap in certain sectors of the labor market. For example, women in Scandinavia are highly underrepresented in Science, Technology, Engineering, and Mathematics relative to women in countries that score lower on gender equality indices (STEM; Charles, 2011). This illustrates that higher rankings on gender equality indices do not necessarily correspond to more gender parity (i.e., equal representation of women and men) in high-status and high-achieving work sectors.

At a global level, women currently account for 30% of all scientists (UNESCO, 2019). However, women represent almost half of scientists in South East Europe (49%), and in the Caribbean, Central Asia, and Latin America (44%). In comparison, women represent approximately a third of scientists in the European Union (33%) and in sub-Saharan Africa (30%), and less than a fifth in South East Asia (16.9%; UNESCO, 2015). Women's global representation in science also varies by level, as women are less represented at the faculty level than at the bachelor level (UNESCO, 2015). In relation to this, researchers have noted that, despite an increase in the number of women in STEM over recent decades in the US

(e.g., Ceci et al., 2014), the gender gap in productivity (in regard to the number of publications) and impact (in regard to the number of citations) has also increased (Huang et al. 2020). As noted by Huang and colleagues, this widening gender gap is not because men publish more than women per year. Instead, it is largely driven by shorter career lengths and higher dropout rates among women, who seem to leave tenure track jobs for teaching positions or parenting responsibilities more often than men (Eagly, 2020). This suggests that women's underrepresentation in STEM (as in other agentic high-status positions) is – at least partially – accounted for by an unequal gender division in the domestic domain.

Some researchers, however, have put forward the argument that women's underrepresentation in high-status and time-intensive careers is, by and large, rooted in inherent gender differences in ability rather than in gender roles and patriarchical structures (Lawrence, 2006; Schmitt, 2015). For example, Lawrence proposed that the underrepresentation of women in science and in top leadership positions is because male attributes are deemed more important for these positions than female attributes, and not because women are discriminated against in the hiring process (Lawrence, 2006). Lawrence argues that biological factors such as higher testosterone levels in men result in men, on average, being more likely to have the spatial skills that are required in STEM (Janowsky et al., 1994). He also links the comparatively low proportion of women at the professor level in some STEM fields to inherent differences between women and men, as he argues that in order to get to the top it is important to be competitive and ruthless, which are qualities inherent to men.

In the next section, I will review evidence relating to gender differences in abilities that may be relevant to women's underrepresentation in high-status and time-intensive careers. If gender differences in abilities are malleable (as opposed to static), then it may be the case that one barrier to women's interest in STEM and top leadership positions is the *perception* that such gender differences exist (Ellemers, 2018). In the following, I mainly draw upon social psychological theorizing and empirical research in examining the malleability of gender differences in abilities. The degree to which gender differences are malleable or not is relevant to the potential of interventions that aim to promote women into fields where they are underrepresented (a point I examine in more detail in Chapter 2). I do not evaluate the potential of such interventions based on evidence for or against inherent differences between women and men because, as Bem (1993) argues, a biological basis for gender differences does not render obsolete the social and environmental influences that may moderate any differences expressed at birth on adult women and men.

1.2.1 Do Gender Differences in Abilities Account for Women's Underrepresentation in Agentic Roles?

If we look more closely at gender differences in abilities in STEM fields and in leadership positions where women are underrepresented, evidence reviewed by Hyde (2014) shows that gender differences in psychological variables are not only (in most cases) small, but also dynamic, which is more in line with a social rather than a biological perspective on gender differences. In a comparison of meta-analyses on gender differences in complex problem solving, Hyde noted that gender differences have decreased from being in the small to moderate range (d = 0.29; Hyde et al., 1990) to being in the negligible (d = 0.07; Hyde et al., 2008) to small range (d = 0.16; Lindberg et al., 2010). This, along with research showing that gender differences in mathematical abilities only appear when gender stereotypes have been made salient (Spencer et al., 1999; Quinn and Spencer, 2001), suggests that women's underrepresentation in STEM fields where complex problem-solving skills are required is not due to a lack of ability.

However, with respect to gender differences in spatial ability, which is a skill often associated with those who enter STEM education and occupations (Wai et al., 2009), research has recorded substantially larger effect sizes (especially in mental rotation; Zell et al., 2015). On average, men tend to outperform women on mental rotation tasks (d ranging from .52 to 1.49; Geiser et al., 2008). It seems plausible, therefore, that gender differences in spatial abilities account (at least partly) for women's underrepresentation in STEM. It is important to note, however, that spatial skills are malleable (Uttal et al., 2013). For example, women's disadvantage in mental rotation is alleviated with training (Moè, 2016), which raises the possibility that men's advantage is due to greater experience with toys and activities (e.g., video games; Cherney & London, 2006) that enhance their spatial skills rather than being indicative of inherent abilities. Furthermore, the notion that male advantage in spatial abilities is rooted in gender differences in brain organization (Levy, 1972, 1978) is not well supported by research. Although research has shown small but consistent gender differences in hemispheric asymmetry, gender differences in spatial abilities also emerge in the absence of such asymmetry (see systematic review by Hirnstein et al., 2019).

With regard to women's underrepresentation in top leadership positions, a meta-analysis by Eagly et al. (1995) showed only negligible gender differences (d = -.02) in leadership effectiveness. Although gender differences seem to be more or less pronounced across different kinds of leadership styles (Eagly et al., 2003; but see Oshagbemi & Gill, 2003), such gender differences seem to be in line with broad gender role expectations and

may be reduced in societies or contexts where gender role expectations are less pronounced (Croft et al., 2020; a point I will get back to in Chapter 4). Furthermore, research suggests that gender differences in performance in competitive environments (with women performing less well than men) are also more pronounced when women compete against a man rather than against another woman, which suggests that the activation of gender stereotypes, rather than lack of abilities, contributes to women's underrepresentation in competitive high-ranking positions (Gneezy et al., 2003).

Considering evidence for the dynamic nature of gender differences in complex problem solving, spatial skills, and leadership, it becomes difficult to relate the gender gap found in STEM and leadership positions to women and men being inherently different from one another. Instead, it seems more plausible that gender segregation in these domains is influenced by other factors, such as low self-efficacy, lack of experience, lack of value fit or sense of belonging, negative stereotypes, and evaluation bias in hiring (Broadbridge & Weyer, 2007; Cheryan et al., 2017; Davies et al., 2005; Diekman & Steinberg, 2012; Ellemers, 2014; Phelan et al., 2008). In Chapter 2, I explore the potential of interventions to break down some of these psychological barriers and promote girls' and women's interest in high-status and time-intensive positions (in STEM and leadership) through exposure to counterstereotypical role models (e.g., female scientists or female leaders).

Notwithstanding these barriers, women's equal representation in high-status, time-consuming work sectors may also be thwarted by men's underrepresentation in domestic work (Croft et al., 2019). Research suggests that when women take greater responsibility for domestic work (i.e., household tasks and childcare), they may not have the time or motivation to pursue high-status careers (Fritz & Knippenberg, 2018; Williams & Chen, 2014). Women's progression into high-status, time-consuming positions may also be hampered by the mere expectation that women take more responsibility for domestic work, leading employers to favor men over women when hiring and promoting (Becker et al., 2019; Nordberg, 2019). Thus, in order to achieve gender equality for women in economic participation and opportunity, it is essential to not only focus attention on gender-unequal representation in the work domain, but also in the domestic domain.

1.3 An Underexamined Gender Inequality: Men's Underrepresentation in Communal Roles

Men's underrepresentation in in Health, Elementary Education, and Domestic roles (sometimes summarized under the umbrella term HEED; Croft et al., 2015) is indicative of

men's relatively lower engagement in communal behavior and lower endorsement of communal goals (Diekman et al., 2010). Men's underrepresentation in communally-oriented work is evident in labor markets across the world. Even in gender-egalitarian Norway, only 11% of nurses and midwives and 17% of childcare workers are male (Statistics Norway, 2018). In the US, men's underrepresentation in communal work is even more stark, as only 7.8% of nursing staff in residential care facilities are male (Cartwright et al., 2011). In addition, across the world, women spend 2 to 10 times more time on unpaid care work than men (OECD, 2014).

Over recent decades, the gender gap in domestic work has narrowed, but this is mainly driven by a reduction in the time women spend on domestic work, as the average time men spend on domestic work has increased only slightly (Altintas & Sullivan, 2016; Hook, 2010). This small change in men's domestic behavior is mirrored in the workplace. While women's entry into male-dominated work (e.g., engineering, law) has increased in recent decades –in the US, from 24% to 33% – men's representation in female-dominated work (e.g., nursing, kindergarten teaching) has not. If anything, it has decreased slightly from 19% to 18% (Croft et al., 2015).

Croft et al. (2015) refer to men's underrepresentation in communal roles as an "underexamined inequality" (p. 343). They note that women's underrepresentation in agentic roles has been given much more attention by academic scholars and policy makers than men's underrepresentation in communal roles. A basic search on the database PsychInfo (run on 19.01.2021) illustrates this. The search terms "men" and "communal" produced 538 hits, whereas the search terms "women" and "leadership" produced 40,954 hits. This lopsided focus is not surprising, given that women's underrepresentation in agentic roles has prevented them from attaining high social and economic status. However, as other researchers have argued before me (e.g., Croft et al., 2015; Meeussen et al., 2020), and as I demonstrate below, promoting communal engagement in men is important, not only to ensure equality for women, but also for men. This is because men, just like women, are restrained by gender role expectations.

Men, for example, are expected to behave in a manner that affirms their high social status. Research has shown that men (but not women) who behave modestly are subject to backlash (Moss-Racusin et al., 2010). In addition, research suggests that people are more likely to perceive girls' passage into "womanhood" to be rooted in physical factors more than social factors, but boys' passage into "manhood" to be rooted more in social factors rather

than physical factors, indicating that manhood is something that has to be "earned" (Vandello et al., 2008, p. 1336). In line with this, research has shown that men in tribal societies engage in public displays of toughness and physical endurance in risky and challenging situations in formalized "rites of passage" from boyhood to manhood (Vandello et al., 2008, p. 1325,). Whereas such formal rituals do not exist in industrialized/large-scale societies, recent research from the US suggests that boys reaching adolescence experience increasing pressure not to express fear or insecurity; they expect backlash from their peers and feel uncomfortable sharing or expressing feelings of insecurity or sadness (Barker et al., 2020). Such gender role expectations can have negative consequences for boys' and men's psychological and physical health. Meeussen et al. (2020) point to a number of studies that show that men are more at risk for excessive drug and alcohol use, suicide, and other risky behaviors. Meeussen et al. argue that this relates to – and is perhaps caused by – proscriptive norms that prevent men from seeking professional help or confiding in others when they experience psychological problems, and prescriptive norms that encourage engaging in risky behavior to prove one's manhood. In order to alleviate such negative health consequences, it may thus be important to make it more acceptable for men to be low in agency (i.e., allow them to express weakness and uncertainty) and to increase men's communal engagement, which may improve their physical as well as psychological health.

Indeed, a number of studies have shown that greater communal engagement corresponds with higher physical and psychological well-being in both women and men (Bauer & McAdams, 2010; Fleeson et al., 2002; Holt-Lunstad et al., 2010; Le et al., 2012; Sheldon & Cooper, 2008). For example, as part of a 4-week diary study, Le et al. (2012) found that people high in communal orientation reported more positive emotions, which in turn was related to a greater sense of self-worth and greater daily satisfaction with close relationships. In addition, Bauer and McAdams (2010) found that young adults' communal goals were associated with higher subjective well-being at a 3-year follow up. Furthermore, research suggests that when men engage in caring for their young children, their own well-being improves, as well as their relationships with their children and female partners (Feldman, 2000; Knoester et al., 2007; O'Brien & Twamley, 2017; Petts & Knoester, 2020). Together, these studies indicate that men would benefit from engaging communally. Alas, men remain underrepresented in communal roles.

As my search on PsychInfo indicated, in comparison to the huge literature on reasons for women's underrepresentation in agentic roles, relatively little research has been conducted to date on reasons for men's underrepresentation in communal roles or their

relative lack of engagement with communal behavior. Croft et al. (2015) proposed that men's entry into communal roles is restricted by internal as well as external factors. Internal factors concern values, traits, and goals that are seemingly at odds with engagement in communal roles and originate in vicarious and direct learning of gender role expectations. External factors concern the financial and social backlash men expect if they were to take up communal roles. Meeussen et al. (2020) propose a range of factors that may make it more normative for men to engage communally (from providing sufficient income compensation as part of parental leave to making male communal role models more visible). Interventions at an institutional level may very well be effective. Even though the increase in men's engagement in domestic work has been relatively modest overall, the trajectory has varied considerably between countries, possibly as a function of different welfare policies (Altintas & Sullivan, 2017). But given that research on men's underrepresentation in communal roles is sparse and limited to a small number of countries, it remains unclear exactly what it is that contributes to promoting communal engagement in men. With the aim of contributing to the emerging literature on men's underrepresentation in communal roles, I will return to the question of how different policies shape and contribute to men's communal engagement in Chapter 3, where I explore country-level correlates of women's and men's intentions to take parental leave.

Up to this point, I have outlined how gender roles can have negative consequences for both women and men and thereby the need for interventions/policies to address gender segregation across paid and unpaid work. I have briefly described some of the causes of gender segregation across roles by pointing out some of the barriers to women's entry into agentic, high-status work and to men's communal engagement. In the next section, I will discuss in more detail the theoretical perspectives and empirical research examining how and why men and women end up in different roles.

1.4 Causes of Gender Stereotypes

As I have illustrated in the previous sections, despite changes to women's roles over the 20th century, a gendered division in paid and unpaid work is still present in many countries.

Evolutionary psychologists theorize that gender differences in the traits and abilities that contribute to this gendered division of labor emerge because women and men have faced different challenges to reproduce (Buss, 1995). Specifically, this approach argues that distinct characteristics or abilities that enhanced reproductive success in women and men,

respectively, evolved over time. Whereas men can produce millions of sperm every day, women normally produce one egg per 28 days and spend 9 months in gestation. Women's reproductive success would thus have been determined by high parental investment and by their ability to select mating partners who were willing and able to provide for them and their child. Men's reproductive success, on the other hand, would have been determined by their ability to compete with other males for female mates (Buss & Schmitt, 1993). According to evolutionary psychologists, since gender differences originate in mate selection and intrasexual competition, male advantage is expected in leadership and spatial rotation because these skills are essential in hunting (Buss, 1995; Buss et al., 2020). Men who were skilled in hunting would have been perceived by females as better equipped to provide for their offspring and would thus have been their preferred choice of mating partner. In modern societies, hunting skills are no longer necessary to find a partner. Nevertheless, in line with an evolutionary account, a male advantage in leadership and spatial rotation skills remain as a product of our evolutionary past (Buss, 1995).

Importantly, however, the changes we have observed in women's entry into agentic paid work over the last century have occurred too quickly to reflect an evolutionary process. Moreover, these changes speak against the notion that women and men are inherently different from one another. At the same time, evidence of similarity across countries suggests that there are certain shared processes at play. Social role theory posits that gender roles originate in both biological and sociocultural processes (Eagly et al., 2000). Biological differences between women and men, such women giving birth and breastfeeding, mean that a traditional division of roles (with women as caregivers and men as breadwinners) is often the most effective; hence we see similarities in women's and men's role division across cultures and over time. However, women's and men's division of labor is also influenced by local ecological and socioeconomic demands (e.g., access to contraception); hence we see differences in women's and men's role division across cultures and over time (see review by Wood & Eagly, 2012).

A key tenet of social role theory is that this gender-based division of roles activates gender role beliefs: that is, societally shared beliefs about women's and men's inherent abilities (Eagly et al., 2000). For example, gender segregation in communal and agentic roles is assumed to underlie the gender stereotype that women are high in communal traits (e.g., they are warm, sensitive, cooperative, and emotionally expressive) but low in agentic traits (e.g., they are not assertive, competitive, ambitious, or self-reliant), whereas men are high in agentic traits but low in communal traits (Prentice & Carranza, 2002). Social role theory

postulates that this is driven by correspondent inference, which is the presumption that people's external behavior corresponds to their internal characteristics (Gawronski, 2004). This was verified in early experimental research by Eagly and Steffen (1984), which showed that women and men who were depicted as homemakers were both perceived to be low in agency but high in communion (Study 3), indicating that gender stereotypes are tied more closely to the roles themselves than to the gender of the person in the role.

Social role theory asserts that gender role beliefs are typically shared within a society (Eagly & Wood, 2012). Specifically, to the extent that women are overrepresented in domestic and communal work in a society, people in that society will perceive women as more communal. Likewise, to the extent that men are overrepresented in high-status work in a society, people in that society will perceive men as more agentic. In line with this, research has shown that gender role beliefs correspond to actual (or expected) changes to the gendered division of roles across time and across countries (Diekman & Eagly, 2000; Diekman et al., 2005; Koenig & Eagly, 2014; Miller et al., 2015; Wilde & Diekman, 2005). For example, Diekman and Eagly (2000) asked participants to estimate role division and rate an average woman or man on a range of characteristics in the past, the present, and the future. The results indicated that perceived changes to gender roles over time (toward non-traditionalism) corresponded with a convergence in the perceived personality characteristics of women and men. Specifically, expectations of a more equal division of labor corresponded with rating women higher on masculine personality traits and men higher on feminine personality traits.

Further evidence for the hypothesis that gender role beliefs are dynamic and closely tied to a gender-based division of roles comes from Eagly et al. (2020), who examined changes to gender stereotypes (measured as part of public opinion polls) from 1946 to 2018. Eagly and colleagues found that gender stereotypes had shifted for competence: in 1946 more people associated competence with men, whereas in the present more people associated competence with women. Moreover, they found that gender stereotypes for communion had become more widespread, as over time more people perceived women as more communal than men. In contrast, gender stereotypes for agency had not changed: people perceived men as more agentic than women in 1946 as well as in the present (if anything, more people perceived men as more agentic than women in the present). That more people view women as more communal now may seem to be in stark contrast to changes to women's gender roles since the middle of the 20th century. However, Eagly and colleagues argue that their findings correspond with changes in women's roles as women have (by and large) entered work

sectors that are communally demanding (e.g., health and education) rather than work sectors that are agentically demanding. Specifically, the perception that women today "freely choose" to enter communal domains (a freedom they may not have had in 1946) further reinforces the perception that women are inherently communal. Taken together, in line with social role theory, numerous studies show that stereotypes of women and men are broadly reflective of the gendered division of roles in a given time and place.

1.5 Causes of Gender-Stereotypical Behavior

A second key tenet of social role theory is that gender roles contribute to gender differences in behavior. One way in which gender role beliefs give rise to gender-congruent behavior is that women and men experience external pressure to conform (Eagly et al., 2000). Such pressure is related to expectations of reward and punishment associated with conforming or not conforming to gender role expectations, respectively. Research suggests that women risk being penalized for expressing dominant behavior (Ferguson, 2018; Williams & Tiedens, 2016), whereas men risk being penalized for not being agentic enough (Moss-Racusin et al., 2010). Importantly, it is expectations of backlash rather than actual backlash that contribute to gender-congruent behavior. Research suggests that even when the perceived pressure to conform is unfounded, individuals engage in gender-congruent behavior nonetheless (Miyajima & Yamaguchi, 2017). Another way in which gender role beliefs give rise to gender-congruent behavior is that women and men internalize gender roles and form an internal set of standards against which they regulate their behavior or aspirations (Eagly et al., 2000; Witt & Wood, 2010; Wood & Eagly, 2009).

If we accept that a gendered division of roles gives rise to gender role beliefs, which in turn give rise to gender-congruent self-perceptions and behavior, it follows that changes to the gendered division in paid or unpaid work across time or across countries should produce corresponding changes in gender differences in self-perception and behavior. There is some support for this. For example, research suggests that women's and men's self-perceptions over time mirror the asymmetric changes to women's and men's representation in paid and unpaid work. Specifically, over the last few decades, women have seen themselves as increasingly agentic, whereas the degree to which men perceive themselves to be communal has not changed (Twenge, 1997; Twenge, 2001; Twenge et al., 2012). Cross-cultural research has also shown that both benevolent sexism (i.e., chivalrous attitudes toward women who conform to gender norms) and hostile sexism (i.e., antagonistic attitudes toward women who threaten the status quo; Glick & Fiske, 2001) are less common in more egalitarian countries

(Glick et al., 2000). What this suggests is that gender role expectations (i.e., the degree to which women are rewarded and punished for engaging in gender-congruent and gender-incongruent behaviors, respectively) are less prevalent in countries where women are afforded more economic and political power. In addition to this, cross-cultural research shows that gender differences in mate preferences (i.e., what traits are desirable in a partner) are less pronounced in countries that rank higher (rather than lower) on a gender equality index (Eagly & Wood, 1999). Thus, in support of social role theory, evidence suggests that a gendered division of roles and related gender role beliefs correspond to gender differences in self-perceptions and behavior.

However, seemingly in contrast to the evidence just given, a number of studies have shown that gender differences are more pronounced in egalitarian countries (a phenomenon that has become known as the *gender equality paradox effect*; Costa et al., 2001; Falk & Hermle, 2018; Schmitt et al., 2008; Schwartz & Rubel-Lifschitz, 2009; Stoet & Geary, 2018). For example, Falk and Hermle (2018) found that gender differences in preferences for taking risks, patience, altruism, positive reciprocity, and trust were more pronounced in countries that ranked higher on gender equality indices. Some researchers have interpreted the gender equality paradox effect as antithetical to the assumptions of social role theory (e.g., Falk & Hermle, 2018; Schmitt et al., 2008). However, as I pointed out earlier, a nation's gender segregation across roles does not necessarily correspond with its rankings on gender equality indices (Charles & Grusky, 2005), which are typically determined by indicators of equality across several aspects of life (e.g., health, political and economic participation). For example, Sweden, which typically ranks high on global gender equality indices, has 27% more occupational gender segregation than Japan (Charles, 1992), which typically ranks somewhere in the middle on global gender equality indices. In addition, recent research suggests that the gender equality paradox effect in STEM intentions can be explained by gender stereotypes, as gender stereotypes such as "math is not for girls" are more strongly endorsed in more gender-egalitarian countries (Breda et al., 2020; see also Miller et al., 2015). Thus, evidence for the gender equality paradox effect does not necessarily contradict social role theory because the gender equality paradox effect does not account for the influence of gender segregation across roles and related gender stereotypes.

In Chapter 4, I further explore the dynamic nature of gender differences from a social role perspective, looking at men's engagement with communal behavior as a function of perceiving more (or less) men in communal roles. Importantly, prior work on social role theory informs, but differs from, my own research as my work addresses the correspondence

between individuals' *perceptions* of gender segregation across different roles and their own behavior, rather than relying on statistics for actual gender segregation. In Chapter 5, I extend my exploration of gender segregation in communal roles to consider the effect of processes in early childhood, which I discuss in more detail in the next section.

1.6 Gender Roles in Early Childhood

Just like in adulthood, gender segregation across roles – for example in STEM – is reflected in young children's self-perceptions (in terms of their abilities and aspirations). In the US, research has shown that girls in 1st and 4th grade think the subjects they are worst at are computers and science (Freedman-Doan et al., 2000). In 5th grade, boys report higher ability beliefs and self-efficacy in math than girls (even when taking into account actual gender differences in achievement; Lindberg et al., 2008). Even at just 6 years of age, girls think that boys are more likely to be "really, really smart" and show less interest in games for the "really, really smart" (Bian et al., 2017). When asked about their future, 6-7-year-old girls expected they would be more family (than career) oriented, whereas boys expected they would be more career (than family) oriented (Block et al., 2018). Block and colleagues found that gender differences in future priorities were partially accounted for by girls endorsing more communal values than boys, and boys endorsing more agentic values than girls. Given that children may engage in activities and seek out roles that fit their values (Diekman et al., 2017; Tellhed et al., 2018; Weisgram et al., 2010) or where they think they can excel (Fulcher, 2011; Weisgram et al., 2011; Wigfield & Eccles, 2000), early gender differences in values or abilities may have cumulative meaningful consequences for children's aspirations and development. Notwithstanding the possibility that gender differences in abilities and career choices have biological underpinnings (Lutchmaya & Baron-Cohen, 2002; Manning et al., 2010; but see Rippon, 2019), it is pertinent to ask how the social and cultural environment contributes to these gender differences in early childhood.

Social role theory proposes that gender role beliefs promote differences in the socialization of girls and boys (Wood & Eagly, 2012). Specifically, girls and boys are socialized to develop the skills, traits, and preferences that will prepare them for their adult lives (i.e., the current gendered division of roles). In line with gender roles, research has shown that toys that are regarded as suitable for girls are associated with physical attractiveness, nurturance, and household skills, whereas toys that are regarded as suitable for boys are associated with danger, competition, spatial navigation, and attention (Blakemore & Centers, 2005). Moreover, research has shown that parents actively encourage

their sons more than their daughters to learn science and math, while encouraging more communal expressions in their daughters than their sons (Alexander et al., 2012; Gunderson et al., 2012; Tenenbaum & Leaper, 2003). In line with the asymmetric change in women's and men's gender roles, research suggests that, from early childhood, gender-incongruent behavior is especially discouraged for boys (Blakemore, 2003; Fagot & Hagan, 1991; Kane, 2006; Kågesten et al., 2016; Skočajić et al., 2020; Sullivan et al., 2018). For example, mothers and fathers are more likely to encourage their daughters than their sons to engage in activities that are associated with the opposite gender (PEW, 2017).

Gender-congruent behavior is, however, not only reinforced by others, but also learned through observing others. According to *gender schema theory* (Bem, 1981), observing women and men in different roles forms the basis of cognitive gender schemas, which include information about each gender (Martin et al., 2002). Gender stereotypes are, in turn, assumed to give rise to gender differences in behavior, as children are motivated to behave in line with gender norms as a means of defining themselves and attaining cognitive consistency. Whereas there are several moderating factors to children's adherence to gender-schematic information (such as the salience of schemas and situational demands), the basic premise is that a girl who chooses to play with a doll has engaged in the following thought process: dolls are "for girls" and "I am a girl" which means that "dolls are for me" (Martin & Halverson, 1981, p. 1120; see also Baron et al., 2014, for a review of how gender stereotypes about math abilities influence math self-perceptions in young girls). According to *social-cognitive theory*, children develop a sense of what behaviors are rewarded versus punished through the observation of others (Bussey & Bandura, 1999). Social-cognitive theory posits that children are active learners in that they do not simply mimic others around them. Instead, children select whom to emulate (through recognizing similarities between themselves and others, based on gender among other things). Children are further assumed to be able to infer rules of thumb from their observations. For example, a child may observe that boys engage in competitive play, whereas girls engage in cooperative play. This child is then able to apply the rule that "girls should share" to other contexts than that observed. Children's gender-congruent behavior is regulated through their self-efficacy beliefs (i.e., the belief that their behavior will produce the desired outcome), which are influenced by their observations as well as by their past mastery experiences.

Notwithstanding important theoretical distinctions (see Martin et al., 2002, for a discussion), the different theories outlined above are based on the same premise. Namely, they assert that gender-congruent behavior and preferences originate in children's

observations of their immediate environment, indicating that gender differences (in aspirations, for example) are dynamic and that there is, therefore, room to intervene. Indeed, descriptive gender stereotypes (e.g., women are nurses) in early childhood appear to be attuned to changes in gender segregation across roles. For example, research has shown that children between 8 and 9 years old think that girls can be doctors, but that boys can't be nurses (Wilbourn & Kee, 2010), which mirrors the asymmetry in recent changes to women's and men's gender roles. Such gender stereotypes may contribute to gender differences in aspirations (Weisgram et al., 2010), particularly toward communal roles. In chapter 5, I further contribute to research on men's underrepresentation in communal roles by looking at gender differences in communal aspirations among young children in Norway, one of the most gender-egalitarian countries in the world. I specifically explore the extent to which "external" factors (i.e., the perception of other people's behavior) as opposed to more "internal" factors (i.e., the perception of one's own behavior) shape and contribute to children's role aspirations.

1.7 The Present Research

This dissertation aims to explore the dynamic nature of gender differences in role aspirations and behavior. Specifically, I focus on identifying how changes to a traditional division of roles in paid and unpaid work can occur. To address this broad overarching question, I have included four separate papers that each test contextual factors related to counterstereotypical aspirations and behavior. Each investigation is discussed in a separate chapter, which I have outlined below.

To establish whether it is possible to reduce gender-congruent behavior and aspirations through exposure to counterstereotypical role models, Chapter 2 reviews social psychological research on such interventions in adolescence and adulthood with a particular focus on promoting girls' and women's interest and efficacy in STEM fields and leadership roles. The review identifies research suggesting that exposure to counterstereotypical role models has the potential to promote gender-counterstereotypical behavior and aspirations. Importantly, however, the effectiveness of said interventions depend on whether the role model actually succeeds in changing gender stereotypes and whether the role aspirant perceives similarities between herself and the role model. In addition, the review concludes that even though exposure to women in agentic roles seems to have the potential to inspire girls to pursue agentic roles, women's entry into agentic paid work may not be realized without the equal participation of men in communal unpaid work. Research on interventions

that aim to promote communal engagement in men, however, is sparse.

Thus, in a further exploration into how to actively target and counter a traditional gender division of roles, Chapter 3 examines the influence of policies on men's communal orientation. Across 37 countries, I investigate the effect of parental leave policies on the gender gap in intended uptake of leave. The findings from this study indicate a larger gender gap in countries that offer longer leave to be taken by either parent, as only women intend to take longer leave in such countries. This has implications for interventions that aim to promote communal priorities among men, as such interventions should do more than simply make parental leave available to men.

In Chapter 4, I explore gender differences in communal helping behavior across 10 countries that vary in gender equality. The results indicate that men who perceive more men in communal roles seem to engage more in communal behavior. These findings provide correlational evidence of the potential that exposure to men in communal roles could have in promoting more communal engagement in men.

In Chapter 5, I summarize data from 159 children between the ages of 4.5 and 6.25 in Norway. This data suggests that knowing that men engage in communal roles is not associated with greater interest in communal roles in boys. Instead, interest in communal roles in girls as well as boys is predicted by communal self-perceptions. Norwegian boys were less likely to see themselves as someone who engages in communal behavior than Norwegian girls. These findings have important implications for interventions, as Norwegian children displayed gendered self-concepts, despite efforts made by the Norwegian government to counter stereotypical aspirations in kindergartens through exposure to male kindergarten teachers.

Together, the studies presented in this dissertation provide insight into how to counter gender roles. Specifically, these studies provide evidence as to what can and cannot influence endorsement of and engagement with gender-counterstereotypical roles.

2 Chapter: Promoting Counterstereotypical Aspirations and Behavior through Exposure to Counterstereotypical Role Models

...relatable [female] role models will bring important future [female] scientists, mathematicians, technologists, engineers, innovators, and leaders into in the career pipeline.

1000 Girls, 1000 Futures

2.1 Overview of Review

Numerous initiatives and interventions have been implemented to encourage girls and boys to consider non-traditional occupational choices (e.g., Discover!; Little Miss Geek; 1000 girls, 1000 futures; Mind the Gap!; The Norwegian Government's gender equality action plan; The WISE Campaign). These initiatives and interventions are often based on the rationale that observing or interacting with women and men in non-traditional domains, providing a so-called *gender-counterstereotypical* role model, will promote non-traditional behavior. A gender-counterstereotypical role model is an individual who engages in a role that is antithetical to gender stereotypes (e.g., a female CEO, a female scientist, or a male preschool teacher). However, the effectiveness of these initiatives is often presumed rather than empirically verified.

For example, Norway is seeking to recruit more male preschool teachers under the presumption that exposure to men in communal roles will reduce gender stereotyping and promote non-traditional occupational choices among children (Norwegian Ministry of Children, Equality and Social Inclusion, 2014). While this specific initiative has not been empirically evaluated, qualitative analyses of children's perceptions of male preschool teachers have found no evidence that daily exposure to counterstereotypical role models (i.e., male preschool teachers) challenges or changes children's stereotypes. First, gender does not appear to be a notable factor in preschool children's descriptions of their male teacher (Sumsion, 2005), meaning that children may not learn to associate men with communal behavior. Second, analyses have suggested that children observe their male preschool teacher as someone who typically engages in gender-stereotypical behavior (e.g., Harris & Barnes, 2009; Sumsion, 2005). For example, Sumsion (2005) found that children never depicted their male preschool teacher engaging in traditional 'female' play but frequently depicted him as heroic and resourceful, as someone engaging in traditional 'male' play. Thus, based on the findings from these qualitative studies, one might conclude that exposure to

counterstereotypical role models (although intended to reduce stereotyping) may sometimes inadvertently reinforce traditional gender roles.

However, it might be the case that specific conditions need to be met in order to ensure that male preschool teachers are perceived as role models. For example, preschoolers might need to be exposed to more than one counterstereotypical role model. In order to infer the potential for so-called *role model interventions* to turn an individual into a role aspirant, i.e., someone who emulates and is inspired by the role model (Morgenroth et al., 2015), this review summarizes social psychological research that has measured gender stereotypes or behavior in children and young adults following exposure to a gender-counterstereotypical role model. In the following, I refer to role models that turn individuals into role aspirants as having exerted a *role model effect*. Although the underrepresentation of men in certain educational and occupational domains certainly warrants empirical attention, this review focuses on girls and women because the vast majority of research has focused on women's underrepresentation in male-dominated fields. Below, I present a shortened version of this narrative literature review. This summary puts particular emphasis on studies assessing whether exposure to counterstereotypical female role models enhance self-efficacy beliefs, aspirations, and performance in domains where women are underrepresented, as this is of most relevance to this dissertation (see appendix A for the published review).

2.2 Results

One assumption that underlies many role model interventions is that exposure to, for example, a successful female leader has the potential to reduce negative stereotypes about women's abilities or potential to succeed as leaders. In line with this assumption, research suggests that students presented with descriptions or portrayals of non-traditional women change their stereotypes about women, at least temporarily (Dasgupta & Asgari, 2004; Rosenberg-Kima et al., 2008; Savenye, 1990). For example, Dasgupta and Asgari (2004) presented female university students with pictures and descriptions of several famous women in leadership positions in counterstereotypic fields such as science, business, law, and politics. These students subsequently took part in an Implicit Association Test (Greenwald et al., 1998), which assessed the strength with which they associated women and men with being leaders and supporters. The results showed that, following exposure to female leaders, participants were quicker to associate women with leadership. This effect was replicated in a longitudinal design that took advantage of the pre-existing differences in the proportion of female faculty at two universities. Together, these findings suggest that exposure to

counterstereotypical exemplars can reduce gender stereotypes.

Another assumption that underlies many role model interventions is that women see themselves in line with prevailing stereotypes of women. From this it follows that if a woman starts to perceive women in general as more agentic, she should also view herself as more agentic. In other words, following exposure to gender-counterstereotypical information, role aspirants should see themselves in less stereotypical ways. In line with this assumption, several studies have shown that the way adult women see themselves changes following brief exposure to counterstereotypical female role models (e.g., Asgari et al., 2010; Lockwood, 2006; Shin et al., 2016; Stout et al., 2011). Furthermore, several studies have shown that brief exposure is followed with an increase in women's self-efficacy beliefs, determination to succeed, and performance in domains where women are underrepresented and negatively stereotyped (Marx & Roman, 2002; McIntyre et al., 2003; Plant et al., 2009; Rosenberg-Kima et al., 2008; Shin et al., 2016; Stout et al., 2011). However, not all these studies included a measure of gender stereotypes (e.g., Marx & Roman, 2002), and those that did sometimes failed to find an effect on gender stereotypes (Plant et al., 2009; Shin et al., 2016; Stout et al., 2011). For example, Plant et al. (2009) found that although middle-school girls reported greater self-efficacy and greater interest in engineering related careers after being exposed to female engineers, they still endorsed traditional gender stereotypes related to engineering-related fields. Thus, the evidence as to whether the role model effects are facilitated through a reduction in gender role beliefs and subsequent internalization of these beliefs remains inconclusive.

Even though the processes by which role model effects operate are unclear, research suggests that adolescent and adult women appear to engage in counterstereotypical behavior, at least in the short term, following brief exposure to counterstereotypical exemplars. However, since the majority of aforementioned studies did not include a follow-up design, it is not possible to affirm whether brief exposure to counterstereotypical role models has an enduring effect on role aspirants' academic performance and career-choices (but see Herrmann et al., 2016).

It seems likely that interactions over a long period of time with a counterstereotypical role model should have more than just temporary effects. In line with this, research that has tracked female students from foundational courses have found that female students who were taught by female professors were more likely to set high-achieving goals and take intermediate courses in their respective fields than those who were taught by male professors

(Asgari et al., 2010; Carrell et al., 2010). Interestingly, this role model effect was only observed in subjects where females are underrepresented, which indicates that female professors, rather than being better teachers than male professors, helped to break down some of the psychological barriers preventing women from pursuing certain fields (Carrell et al., 2010). Thus, it seems that longitudinal exposure to female counterstereotypical role models has the potential to have long-term effects on young women. However, it is not possible to conclude from these studies that female professors affected role aspirants by challenging gender-stereotypical beliefs. For example, it could be that the female professors facilitated a climate in which female students felt more comfortable actively participating, which had an effect on their performance, and ultimately their aspirations.

Some research involving longitudinal exposure to counterstereotypical exemplars, however, suggests that solely targeting gender role expectations in domains where women are underrepresented may not be sufficient. For example, Nhundu (2007) found that although girls' gender stereotypes and occupational aspirations appeared less gender-traditional following exposure to counterstereotypical role models, girls still embraced gender roles relating to domestic work and emphasized the importance of women prioritizing family over career. Thus, despite a positive effect on girls' career aspirations, girls' sense of the priority of domestic work for women may counteract these effects. It may be important therefore for interventions to be comprehensive and target gender stereotyping more broadly than the occupational domain. Moreover, it may be important for interventions to influence not only the role aspirant, but also her family and peers (Adler et al., 1992). Research on an affirmative action program promoting females into leadership positions in local communities showed that counterstereotypical role models who are observable by the entire community influence not only the behavior of the role aspirant but also those of the wider community (Beaman et al., 2012). Specifically, in communities where there had been more than one period with a female leader, girls reported more educational aspirations, better educational outcomes, and less responsibility for domestic tasks, and parents reported higher career expectations for their daughters. These findings suggest that when the entire community is exposed to female role models, it may make it easier for girls to choose non-traditional paths.

In addition to this, research suggests that it may not be enough for girls and women to become aware that other women have achieved success in a given domain. In fact, it may be critical that they see themselves as similar to the role model (e.g., Asgari et al., 2012; Cheryan et al., 2011; Rosenberg-Kima et al., 2008). This has been illustrated by Rosenberg-Kima et al. (2008), among others, who exposed undergraduate students to either a relevant role model

(young and cool) or an irrelevant role model (old and uncool). The results indicated that female students reported more self-efficacy if they had been exposed to a relevant role model than if they had been exposed to an irrelevant role model. Feelings of similarity may be important because they convey the "if they can, so can I" idea to the role aspirant.

Interventions that fail to facilitate identification with the role model may thus not result in a role model effect. Studies that have assessed interventions in which adolescent girls engaged in science tasks and interacted with female scientists revealed that girls did not immediately and spontaneously view the female scientists as potential role models (Buck et al., 2008; O'Brien et al., 2017). Rather, girls seemed to only begin to view the female scientists as role models *after* establishing personal connections with them (Buck et al., 2008). These findings suggest that it may be necessary for interventions to allow girls to establish personal bonds (and common ground) with the role model to facilitate aspirations toward a domain, particularly among younger girls who are not already invested in STEM.

Some initiatives have tried to make female counterstereotypical role models more relevant to girls by feminizing them. One example of this is the Science Cheerleaders initiative. In this initiative, women who pursue science also do cheerleading at public events. The goal of this initiative is to reduce negative stereotyping about female scientists. There has so far been no scientific evaluation of the Science Cheerleaders initiative. However, research suggests that employing highly feminine role models may be unsuccessful and even backfire. For example, Betz and Sekaquaptewa (2012) found that 6th and 7th grade girls who did not strongly identify with STEM reported less self-efficacy, less current interest in math, and less aspirations to pursue math after being exposed to a highly feminine role model in STEM. These counterproductive effects seemed to be largely driven by the view among girls that the combination of femininity and success in STEM is unachievable.

Thus, brief exposure to counterstereotypical role models (where there is no opportunity for establishing personal connections) may inadvertently deter girls and women from fields where they are underrepresented and negatively stereotyped. Such counterproductive role model effects may occur for the following reasons: (1) Girls and women see very successful women as exceptions to the rule and therefore not representative of their group (Kunda & Oleson, 1995); (2) Girls and women fail to see themselves in the role model. For example, Hoyt and Simon (2011) found that after reading about successful female leaders, female undergraduate students not only gave themselves worse evaluations on a leadership task, but they also perceived the task as more difficult. In this case, observing a

counterstereotypical role model may have resulted in a contrast-effect whereby the role aspirants think they cannot achieve the same level of success as the role model (also known as upward comparison threat, Rudman & Phelan, 2010). This is contrary to an assimilation-effect where participants' performance improves following exposure to a successful gender incongruent role model (Latu et al., 2013). Firm conclusions on why brief exposure to counterstereotypical role models appear to sometimes cause contrast-effects and sometimes cause assimilation-effects cannot be drawn by comparing the design of existing studies. However, it seems that a role model effect is less likely to occur when the participants perceive themselves as unable to achieve what the role model has achieved (Lockwood & Kunda, 1997). For example, when undergraduate women had made an incremental attribution, i.e., when they believed that successful women had achieved success through hard work, discipline, and persistence, they were more likely to associate themselves with leadership traits than when they had made an entity attribution, i.e., when they believed successful women had achieved success because of their talent (Hoyt et al., 2012). This suggests that in order for female counterstereotypical role models to be effective role models and reduce stereotypical beliefs about women's capabilities, it is important that they are seen as representative of women in general.

Taken together, the research reviewed above suggests that both brief and longitudinal exposure to counterstereotypical role models has the potential to change girls' and women's self-perceptions and behavior, at least on a temporary basis. If implemented at the right time (e.g., during foundational courses; Asgari et al., 2010; Carrell et al., 2010), role model interventions may have a long-term influence on girls and women by affecting their academic choices. It is of course also possible that role model interventions have long-term effects through an accumulation of processes. For example, a temporarily shift in an individual's self-efficacy for a particular behavior, following brief exposure to a counterstereotypical role model, may lead to engagement with said behavior, which in turn may enhance self-efficacy, and ultimately their career choice (Bandura et al., 2001). While exposure to counterstereotypical role models appears to break down some of the psychological barriers to women's participation in, or aspirations toward, fields where they are underrepresented, it is, however, not always possible to determine whether changes to girls' and women's self-concept following changes to gender role beliefs are responsible for these role model effects. Thus, more research is needed to identify when and to what extent internalization of gender role beliefs underlies role model effects. The process underlying role model effects is interesting from both a theoretical and practical point of view. If the presence of female role models facilitates active participation in class, for example, then active participation may be

important for enhancing feelings of self-efficacy and spurring interest toward domains where women are underrepresented (but see Weisgram & Bigler, 2007). If it is changes to gender role beliefs that drive role model effects, then interventions should focus more actively on challenging stereotypical beliefs about women through counterstereotypical exemplars. Such interventions may benefit from carefully selected role models as similarity between role aspirants and role models seems crucial to facilitating role model effects (McCrea et al., 2012).

2.3 Discussion

Many initiatives that aim to promote women's entry into fields where they are underrepresented and negatively stereotyped are based on the notion that this can be achieved through exposure to counterstereotypical female role models. The present review had two main aims. First, we aimed to give an overview of research on counterstereotypical role models. Second, we aimed to infer from this literature the potential of exposure to, or interactions with, counterstereotypical role models in promoting girls' and women's aspiration toward counterstereotypical occupational roles by counteracting the endless stream of gender-stereotypical information girls and women are faced with on a daily basis. This review presents research indicating that exposure to gender-counterstereotypical role models is sometimes able to change stereotypical beliefs about women, at least temporarily. Importantly, however, it seems to be the case that for gender-counterstereotypical role models to promote gender-counterstereotypical behavior, they must challenge existing gender stereotypes, but at the same time not be seen as *too* atypical, in which case the intervention may backfire.

This review includes a selection of articles that are relevant to the specific hypothesis that exposure to or interaction with counterstereotypical role models reduce gender stereotyping and promote counterstereotypical aspirations and behavior. This review did not include a systematic search due to counterstereotypical role models being variably defined in the literature. For this review, literature that both confirmed and challenged the hypothesis was selected, with the aim of producing a balanced overview.

Although the research reviewed above has implications for how interventions should be designed, more assessments of real-world interventions are nevertheless needed. First, one factor that should be considered is how we determine whether an intervention has been successful or not. Interventions are sometimes deemed successful based on a change in explicit gender stereotypes (e.g., Leblebicioglu et al., 2011). This could be problematic as

research has shown that exposure to counterstereotypical role models enhance women's self-concept and performance through implicit rather than explicit gender stereotypes (Dasgupta & Asgari, 2004). Second, it is important to consider changes in a range of domains, even those that were not directly targeted in the intervention. Interventions that focus primarily on changing gender role expectations in the occupational domain may not be comprehensive enough to facilitate real change in girls' future career choices because they do not also target gender role expectations in the domestic domain (Nhundu, 2007). Domestic expectations are present early on and may conflict with aspirations toward high-status careers. Thus, in order to demonstrate to girls that pursuing a career and raising children are not mutually exclusive, future interventions may benefit from portraying a female role model who has both a successful career and children. The risk of this approach, however, is that female role models who manage to excel in both occupational and domestic roles may be seen as achieving unattainable success. Future interventions thus need to take care to present relatable role models whose success appears attainable. In order to reduce expectations that women will take the bulk share of domestic work, it may also be important to conduct interventions with boys and men. Because without a corresponding shift in men's attitudes toward domestic work (Sinno & Killen, 2009), women may be unlikely to pursue high-status or demanding careers due to difficulties with pursuing a career while simultaneously being primarily responsible for domestic work (Hochschild & Machung, 2012).

Third, the underlying reason for why some field-based role model interventions are "successful" is not always clear. Most field-based studies have involved observational learning, active engagement, and sometimes instructional learning (e.g., Jayaratne et al., 2003; Leblebicioglu et al., 2011). Thus, the question as to whether role model effects are reliant on actively engaging with a counterstereotypical role model or whether role model effects can be facilitated by observational learning alone (i.e., just learning about successful women) warrants attention. This is important to assess since interventions that utilize mere observations of role models are potentially more cost-effective than interventions that require interactions with counterstereotypical role models over a long period of time (Herrmann et al., 2016). Future research should investigate whether different strategies are more or less successful depending on attributes (e.g., interest in STEM, age) in those that are being targeted in the intervention.

More research is also needed on whether exposure to counterstereotypical male role models influence boys' and men's gender stereotyping and career choices. Men are underrepresented in communal occupations and roles (Croft et al., 2015). However, very few

field-based role model interventions have been implemented to promote communal behavior in boys and men. Whilst it seems reasonable to suggest that the same processes that underlie role model effects would apply for boys and girls, experimental research has produced inconsistent findings. Sometimes studies have found a role model effect for girls but not boys, and sometimes studies have found a role model effect for boys but not girls (Buren et al., 1993; Green et al., 2004; Katz, 1986; Pike & Jennings, 2005). Future research should investigate the reason for these mixed findings.

On a final note, gender roles have changed over the last few decades and at a different rate in different countries. Thus, moving forward, more scientific evaluations of initiatives and interventions in childhood and early adulthood are warranted in order to see whether previous findings replicate across time and contexts.

3 Chapter: How Does the Broader Context Shape Women's and Men's Intentions to Take Leave from Work to Care for their Child?

3.1 Overview of Study

In the previous chapter, I presented an overview of empirical research on the potential to promote girls' and women's representation in high-status careers by exposing them to counterstereotypical role models. We noted that whereas exposure to, or interactions with, counterstereotypical role models sometimes seems to be able to shift aspirations and behavior in girls and women, it may be necessary for interventions to also counter gender role expectations in the domestic domain. However, there is a lack of empirical research on the potential and outcome of such interventions. In the current chapter, we address this research gap by looking at the role of the national policy and sociocultural context in shaping and contributing to young women's and men's intentions to take leave from work to care for their child across 37 countries. Below I present a shortened version of a manuscript that has been prepared for publication. See Appendix B for the full manuscript and supplementary materials.

3.1.1 Taking a Cross-National Perspective on the Gender Gap in Child Care

A gender-based division of paid and unpaid work is visible in many countries. For example, about 10% of women in the EU are either not working at all or working part-time due to care obligations, compared to less than 1% of men (EIGE, 2019). Much theoretical and empirical research has been conducted on why women and men behave in accordance with traditional gender roles (with men largely occupying breadwinning roles and women largely occupying caretaking roles; see Eagly & Wood, 2012). Attitudes have been shown to be a major driver of behavior (Haddock et al., 2020). For example, gender attitudes, particularly men's, contribute to couples' share of domestic work and parental leave uptake (Duvander, 2014; Knudsen & Wærness, 2008). Importantly, however, research indicates that (in line with traditional gender role expectations) mothers take the majority of parental leave despite holding gender-egalitarian attitudes (Brandén et al., 2018; Kroska, 2004).

Despite cross-national variations in the gender gap in child care and housework (after controlling for individual and couple characteristics; Fahlén, 2016), research tends to focus more on individual- rather than country-level factors. This focus deflects attention away from

how policy and the broader sociocultural context shape and contribute to a traditional share of child care and housework between couples (DeRose et al., 2019; Treas & Lui, 2013). It is important to consider that in countries where men are restricted from parental leave, men may engage less with child care, irrespective of their individual gender attitudes. Restrictions through legislation may not only prevent actual gender-equal share of leave, but may also communicate broader gender role expectations in terms of *who* should be the breadwinner vs. caretaker. Such expectations may trickle down and manifest themselves in young women's and men's expected family-career priorities. Thus, whereas there may be variance within a country (e.g., due to individual gender attitudes), there may also be variance between countries (due to gender role expectations; Fuwa, 2004).

The present research assesses parental leave intentions in a sample of young, highly educated adults who are in the process of making important career and life decisions. Young women's and men's expected leave uptake (which is indicative of their family-career priorities) may influence their respective career aspirations (Blakemore et al., 2005; Brown & Diekman, 2010), which in turn may facilitate gender-unequal leave uptake later in life. In line with recent calls for psychologists to increase their impact on social issues and contribute more to societal justice (Pettigrew, 2018), the present research extends previous research by shifting the focus from how the immediate environment shapes young people's expected family-work priorities (e.g., Fulcher et al., 2015) to how the broader environment shapes such priorities. Specifically, the present research examines the extent to which different parental leave policies correspond with women's and men's intended leave-uptake, over and above their individual-level attitudes, taking into account the wider sociocultural context (i.e., inequality in the labor market and cultural values). Such findings may inform interventions on a national scale. In the following, we provide a brief overview of research on country-level factors associated with actual uptake or actual share of domestic work, with the aim of testing whether these factors are also associated with future leave intentions.

3.1.1.1 Parental Leave Policies

Sixty-six countries have introduced parental leave (i.e., leave available to both mothers and fathers; International Labour Organization (ILO) 2014) with the aim of addressing gender inequality in the labor market (Burri & Prechal, 2013). However, statistics show that even in countries where mothers and fathers are able to share leave, mothers nevertheless tend to take most or all of the leave (Eurofound, 2019). Over the last decade, research has increasingly focused on whether equal uptake is facilitated by the extent to which leave policies are gender-egalitarian (i.e., available to both women and men, or more

or less exclusive to either parent) and generous (i.e., available over a long period of time and compensated at a high rate). For example, Castro-García and Pazos-Moran (2016) aimed to identify the parental leave policies most associated with fathers' leave uptake. In their analysis of leave policies in 21 European countries, 'use it or lose it' parental leave that was non-transferrable (i.e., reserved for fathers) and highly paid (approaching 100 percent of salary) was associated with the highest uptake by men. In contrast, women tended to take all the paid leave offered to them, not only leave paid at a high rate (for similar findings, see cross-national comparisons by O'Brien, 2009; Van Belle, 2016). It is unclear, however, whether egalitarian and generous parental leave policies only operate in facilitating gender equality by removing barriers to men's uptake at the time of the birth of their child or whether they also affect men's intentions prior to having children.

Given the consistent associations between policies and men's uptake of leave, it is an important next step to integrate these findings into the broader sociocultural context, and to examine whether the availability of leave similarly shapes young adults' intentions for their future behavior. The abovementioned cross-national comparisons only included parental leave policies in their analyses. The effect of policies may be confounded by social, cultural, or economic factors (Carriero, 2020). For example, countries with egalitarian leave policies also tend to rank high on gender equality indices. In order to disentangle the effect of policy factors from gender equality in a country, it is important to employ a large and heterogeneous sample of countries (e.g., countries that vary in their ranking on gender equality indices). As research has shown (see more below), gender equality in the labor market (with respect to women's relative income and presence in power positions) and cultural value orientation may also contribute to gender division in unpaid work.

3.1.1.2 Gender Inequality in the Labor Market

In countries with more egalitarian labor markets, women may expect greater opportunities in regard to income and status, which may afford them more 'bargaining power' (Blumberg, 1984) when negotiating their share of domestic work with their partners. In line with this, analyses of data from 22 (Fuwa, 2004) and 34 countries (Knudsen & Wærness, 2008) has shown that couples in more gender-egalitarian countries (where women are afforded a higher degree of professional opportunities, economic power, and representation in politics) tend to divide domestic work more equally than those in less gender-egalitarian countries. This prior research concerns division of unpaid work that can be done outside of paid work hours, and is thus related to, but at the same time different from division of parental leave, which include a break *away* from paid work, for which men

may expect to receive backlash (Miyajima & Yamaguchi, 2017; Wayne & Cordeiro, 2003). Thus, it is not clear whether gender equality in the labor market also corresponds with gender-equal uptake of parental leave or (of particular relevance to the present research) to gender-equal intentions to take leave from work. Moreover, although research suggests that women and men consider how taking an equal share of leave will affect their total household income at a time when they have children (O'Brien & Twamley, 2017), it is not clear whether the expectation of equal income (based on women's equality in the labor market) similarly shapes women's and men's intended leave uptake.

3.1.1.3 Cultural Value Orientation

In addition to this, it is important to take into account how values on a country level shape the gendered division of labor. Cultural values are "shared conceptions of what is good and desirable in the culture" (Schwartz, 2006, p.139) and may guide individuals' behavior over and above their individual-level characteristics (Elster & Gelfand, 2020). The degree to which cultures are oriented toward mastery and toward egalitarianism (Schwartz, 2012) may be relevant to the division of child-care responsibilities. Research across 19 countries has shown that individuals experience more family-work conflict (i.e., perceiving that their family interferes with their work) in countries that are oriented toward mastery, but less family-work conflict in countries that are oriented toward egalitarianism (Masuda et al., 2019). Whereas this research did not explore gender differences or intentions per se, it suggested that cultural value orientations influence care- or success-related goals in individuals, which, in turn, may correspond to intentions to take leave from work, and - if such values influence women and men differently - may contribute to a gendered divide of child care.

Taken together, previous research indicates that policies, as well as the social and cultural context, may relate to a gendered division of child care. However, it is not clear whether these factors similarly relate to future expectations of parental leave uptake. The present research extends existing cross-national research that has focused on the role that parental leave policies play in women's and men's leave uptake in specific regions (e.g., EU), by using a comparatively large sample of countries, and including countries from every major world region. Our large and diverse sample allows us to explore how robust policy influences appear to be when considering other aspects of the social and cultural context (i.e., cultural value orientation and gender equality in the labor market), and how each aspect uniquely relates to the gender gap in intended leave.

3.2 Study Goals and Hypotheses

The first goal of the present research was to document the gender gap in intended leave uptake across countries and how these intentions relate to career ambitions and family-career priorities. The second goal was to assess the extent to which parental leave policies, gender inequality in the labor market, and cultural value orientation predict cross-national variations in the gender gap over and above individual-level gender attitudes.

In a first step, we test the effect of different parental leave policies, indicators of gender equality in the labor market, and cultural values across 3 separate models. In each respective model, we capture the effect of one country-level indicator while controlling for the other indicator(s).

In Model 1, we test the role of different parental leave policies. We propose that the degree to which leave is exclusive to women or men reflects norms regarding who *should* take leave. We thus examine whether the gender gap in intended leave uptake is predicted by the length of leave exclusive to fathers as well as by the degree to which more leave is exclusive to mothers over fathers (i.e., *gender imbalance in exclusive leave*). We hypothesize that fathers intend to take more leave in countries where more leave is exclusively allocated to them (**H1a**). At the same time, we hypothesize that the gender gap in intended leave uptake is larger in countries with more gender imbalance in exclusive leave (**H1b**). In addition to leave that is exclusive to either the mother or the father, there is also leave that is available to either parent (i.e., *parental leave*). We hypothesize that the gender gap in intended leave is larger in countries that offer *longer* parental leave (**H2**), as women will be more motivated than men to take leave that is available (Duvander et al., 2019). However, we hypothesize that the gender gap is smaller in countries that offer more financial compensation as men will be more motivated than women to take parental leave that is paid (**H3**).

In Model 2, we test the role of different markers of gender equality in the labor market. We hypothesize that the gender gap in intended leave is smaller in countries where women's representation in politics (**H4**) and earnings (**H5**) are more equal to men's, as women will indicate less (and men will indicate more) leave intentions in these countries.

In Model 3, we test the role of different cultural value orientations. We hypothesize that the gender gap is smaller in more egalitarian-oriented countries (**H6**), but larger in countries that are more oriented toward mastery (**H7**), as men will report more and less leave intentions, respectively, in these cultures.

In a second step, in order to compare the most robust country-level effects over and above individuals' attitudes, we include into one final model the individual-level gender attitudes as well as the statistically significant interactions between gender and country-level indicators from Models 1, 2, and 3.

3.3 Method

3.3.1 Sample

Data were collected as part of an international research collaboration on gendered norms and social roles. To ensure relatively comparable samples across countries, collaborators from 49 countries were instructed to recruit a minimum sample of 160 university students (80 men) from either psychology or HEED (i.e., health, education, clinical psychology) and STEM (i.e., natural sciences, technology, engineering, and mathematics) degrees (with > 30 men and > 30 women from either category). Since the question about leave intentions may be interpreted as more hypothetical in countries that do not offer leave, we excluded data from hypothesis testing from 12 countries that did not offer leave to fathers either as part of parental leave or paternity leave. Given the present focus on a traditional gender division of labor and future child rearing intentions, participants who identified as *neither male or female* (1.41%), who defined their sexual orientation to be *homosexual* or *mostly homosexual* (4.18%), who reported *already having a child* or *not wanting children in the future* (10.77%), and who were younger than 18 or older than 30 years (11.53%) were excluded from the present analyses. In addition, participants who had not been socialized in the respective cultural context during their formative years (i.e., prior to 15 years of age, 13.46%) were excluded. A final sample of N = 13,942 (n = 8,880 females; n = 5,062 males) from 99 universities across 37 countries was analyzed (see Table 3.1).

3.3.2 Procedure and Materials

Participants completed a 45-minute survey instrument in the language of instruction at their university. To take into account any potential differences in sampling strategies across universities and variations in sample characteristics across countries, we controlled for participants' age, study major, and subjective socioeconomic status (SES; each of which have been linked to parental leave uptake; Borràs et al., 2018; Geisler & Kreyenfeld, 2019; Ma et al., 2020; Reimer, 2020).

3.3.2.1 Individual-Level Variables

3.3.2.1.1 Intended Uptake of Parental Leave

Participants' *intended uptake of parental leave* was assessed with: "If you had a child in the future, how much voluntary (non-medical) parental leave (paid or unpaid) would you like to take in the first 2 years of your child's life? Please indicate in weeks. For reference, 1 month ~ 4 weeks, 6 months ~ 26 weeks, 1 year ~ 52 weeks." Participants recorded their responses in an open-ended response box. Any values that exceed 104 weeks (2 years) were recoded into missing values (6.58%).

3.3.2.1.2 Career Ambitions

Two items assessed participants' *career ambitions*: "I have ambitious career goals," "I want to be an important person in my field." Participants recorded their responses on a scale that ran from 1 (Strongly disagree) to 7 (Strongly agree). Items correlated between .42 to .76 across countries.

3.3.2.1.3 Family-Career Priorities.

To assess participants' future *family-career priorities* we asked participants to "[...] think about your life in the future. Where do you feel your priorities will lie in your future in the period of time that your children are under 13?" Participants recorded their priorities on two scales. The first scale ran from 1 (Having a family) to 7 (Having a career). The second scale ran from 1 (Spending quality time with my future children) to 7 (Reaching my full career potential). Items correlated between .40 to .83 across countries[1]. The scale was recoded so that higher scores indicate a preference for family over career.

3.3.2.1.4 Gender

Participants were asked: "What best reflects your gender?" Participants could choose between the following answer options: Male, Female, or Neither best reflects my identity.

3.3.2.1.5 Age

Participants were asked: "How old are you?" and recorded their age in an open-ended response box.

[1] Data missing from Tanzania.

3.3.2.1.6 Subjective SES

Participants were asked to indicate their *subjective SES* along a ten-point ladder (using the MacArthur Subjective Status Scale; Adler et al., 2000): "Please think about where your family stands in comparison to others in [country]. This ladder conceptually represents society, where those with the highest socioeconomic status (Rung 10; i.e., those with the most money, highest education, and best jobs) are at the top and those with the lowest socioeconomic status (Rung 1; i.e., those with the least money, least education, and worst jobs) are at the bottom. Please choose the number that best represents where your family is on this ladder compared to others in [country]." The scale ranged from 1 (Low SES) to 10 (High SES)[2].

3.3.2.1.7 Study Major

One item assessed participants' *study major*. Participants were asked: "What field most closely describes your major or aspired major? If you have not decided yet, please select what is most likely out of the choices." Participants indicated which of the following options applied best: Science (Chemistry, Biology, etc.); Mathematics/Statistics; Computer Science; Engineering (coded as STEM); Psychology (General); Psychology with the goal to be a clinical practitioner; Medicine with the goal to become a doctor; Other Health/Social work professions; Education/Teaching (coded as HEED); Other Social Sciences (History, Sociology, etc.; coded as Social Sciences); Business (coded as Business); Law; Sport Sciences; Fine Arts (Music, Painting, Literature); Theology/Religious Studies (coded as Other).

3.3.2.1.8 Gender Attitudes

Two items assessed participants' *gender-traditional attitudes* (shortened from Larsen & Long, 1988): "In groups that have both male and female members, it is more appropriate that leadership positions be held by males"; "Men make better leaders." Participants recorded their responses on a scale that ran from 1 (Strongly disagree) to 7 (Strongly agree). Items correlated between .14 to .89 across countries[3]. People's gender-traditional attitudes were skewed toward the left (skewness = .90). Three items assessed participants' *gender-essentialist attitudes* (shortened from Gaunt, 2006): "Mothers are instinctively better caretakers than fathers"; "Mothers are naturally more sensitive to a baby's feelings than

[2] In Belgium and the Netherlands, the scale ran from 0 to 10. To make the scale comparable across sites, 0 was recoded as 1 (affecting a total of 3 responses).
[3] In Croatia (r = .14) and Macedonia (r = .32), the items were not highly correlated.

fathers are"; "In terms of child care, fathers have to learn what mothers are able to do naturally." Participants recorded their responses on a scale that ran from 1 (Strongly disagree) to 7 (Strongly agree; Cronbach's α ranged from .45 to .88 across countries[4]).

3.3.2.2 Country-Level Variables

Indicators of different parental leave policies, gender inequality in the labor market, and cultural value orientation were collected from publicly available datasets. To deal with missing data, we imputed 10 datasets from a larger dataset of 63 country-level economic, political, and social indicators and ran analyses with imputed data averaging across these data sets (1 data point was imputed for women's relative income and 7 data points were imputed for egalitarian and mastery value orientations).

3.3.2.2.1 Parental Leave Policies

Father-exclusive leave represents the days of leave exclusive to fathers in a given country (sample range 0 to 80 days). *Gender imbalance in exclusive leave* represents the extent to which leave is exclusive to mothers over fathers (in days) and is the sum of the total amount of leave reserved exclusively for the mother minus the total amount of leave reserved exclusively for the father in a given country (sample range: -10 to 393 days). *Length of parental leave* represents the total amount of leave (in weeks) that is available to either parent (i.e., no part of this leave is exclusive to mothers or fathers; sample range: 0 to 156 weeks). *Length of leave compensated at 100%* represents the number of weeks with 100 percent income compensation in a given country (e.g., 10 weeks compensated at 80% = 8 weeks) and is the product of duration of parental leave (in weeks) and the rate of compensation (% of previous earnings; sample range: 0 to 70.2 weeks). Data is retrieved from ILO (2014). If the ILO report stated a flat rate benefit, we computed the % of previous earnings based on OECD data on average salary in the respective country.

3.3.2.2.2 Gender Inequality in the Labor Market

Women's relative income represents the ratio of female (to male) income in a country and is estimated using the proportion of working women and men, their relative wages, and overall GDP of the country in question (scale ranges from 0-1; sample range: .43 to .79. *Women's relative representation in politics* is based on the ratio of females (to males) with

[4] Scale reliability was below the recommended Cronbach's α threshold of .7 in Ethiopia (.45) and Japan (.68).

seats in parliament, at the ministerial level, and number of years as head of state over the last 50 years in a given country (scale ranges from 0 to 1; sample range: .08 to .53). Data is retrieved from WEF (2017).

3.3.2.2.3 Cultural Value Orientation

The degree to which countries are oriented toward *egalitarianism* concerns the extent to which individuals in a country value social justice, equality, and helping others as a guiding principle in their life (sample range: 4.19 to 5.27). The degree to which countries are oriented toward *mastery* concerns the extent to which individuals in a country value attaining personal goals as a guiding principle in their life (sample range: 3.72 to 4.21). Data is retrieved from Schwartz (2008).

3.4 Results

Descriptive analyses showed that women intend to take longer leave than men in all countries (see Figure 3.1). The gender gap in leave intentions ranged from 0.79 weeks (in Tanzania) to 45.77 weeks (in Russia). Overall, leave intentions were negatively associated with career ambition in both women (r = -.14, p < .001) and men (r = -.08, p < .001), but more strongly in women. In addition, leave intentions were positively associated with prioritizing family over career in both women (r = .20, p < .001) and men (r = .17, p < .001).

3.4.1 Analytical Strategy

In order to examine whether there is sufficient variance at the site- and country-level to justify a 3-level hierarchical linear model, we first ran an 'intercept only' model that included no predictor variables but random intercepts at the site- and country-level. The intraclass correlation coefficient (ICC) for intended leave indicated sufficient clustering at the site- (ICC = 0.06) and country-level (ICC = 0.09, LeBreton & Senter, 2008). We noted a higher degree of clustering for women (ICC = 0.24) than for men (ICC = .06). When we added individual- and site-level control variables to the model, the clustering decreased for site (ICC = 0.03) but increased for country (ICC = 0.12), indicating that we successfully captured variance at the site level by including the control variables.

Given the limited degrees of freedom at the country level, prior to hypothesis testing we assessed whether we needed to control for women's relative labor force representation, as women may be more likely to indicate intentions to take leave from work in countries where they expect to be employed. We added an interaction term between gender and women's

relative representation in the labor force (as indicated by the proportion of a country's working-age population that engages actively in the labor market by either working or looking for work, WEF, 2017) to the 'intercept only' model (specified above). There was no evidence suggesting that women's relative labor force representation (b = -7.04, 95% CI [-48.70, 34.59]) related to the gender gap in intended uptake. Thus, to avoid unnecessary complexity, we did not control for women's relative labor force participation in the next set of analyses.

We also noted as part of the descriptive analyses that women and men in all countries reported career ambition above the scale midpoint of 4 (M = 5.44, ranging from 4.16 to 6.62 across countries), which indicates that our sample generally expects to be in employment.

We included a random effect of gender at the country level to account for between-country variability. Age and subjective SES (centered within sites) and study major (effect coded) were added as individual-level control variables. Age and subjective SES were also averaged across sites (grand mean centered) and added as site-level control variables. To test the pre-registered hypotheses, we added cross-level interactions between gender (centered at the grand mean in line with recommendations by Enders & Tofighi, 2007; female = -0.36, male = 0.64) and indicators of different parental leave policy contexts, gender inequality in the gender market, and cultural value orientation. All country-level indicators were centered at their grand mean (Enders & Tofighi, 2007). No multicollinearity was detected as indicated by VIF < 5 between hypothesized country-level variables in each model. In the following models, the predictors were entered simultaneously. Each effect is thus tested as the other effects are held constant.

3.4.2 Model 1: How do Parental Leave Policies Relate to the Gender Gap in Intended Uptake of Parental Leave?

In Model 1, we assessed whether the gender gap in intended leave was predicted by length of leave exclusive to fathers, the degree to which leave is exclusive to mothers over fathers, total length of leave available to either parent, and the length of parental leave compensated at 100 % (the results are summarized in Table 3.2). We predicted that longer leave exclusive to fathers would be associated with higher leave intentions among men (and possibly lower leave intentions among women), but that the gender gap would be larger in countries where more leave is exclusively allocated to mothers over fathers. Contrary to **H1a**, however, with all other leave policies held constant, there was no evidence suggesting that the gender gap in intended leave varied across countries that offer more or less exclusive leave to

fathers (b = 0.03, 95% CI [-0.19, 0.24]). However, we found that the degree to which leave is exclusive to mothers over fathers moderated gender differences in intended leave uptake (b = -0.05, 95% CI [-0.08, -0.01]). Specifically, the gender gap in leave uptake was larger in countries with a relatively large (+1 SD: b = -22.32, 95% CI [-26.17, -18.48]) versus small gender imbalance in exclusive leave (-1 SD: b = -13.92, 95% CI [-18.39, -9.45]). Simple slopes analyses indicated that this cross-national variation in the gender gap seemed to be driven by women's (rather than men's) leave intentions: the slope of the gender imbalance in exclusive leave was positive and significant for women (b = 0.05, 95% CI [0.02, 0.09]), but non-significant for men (b = 0.01, 95% CI [-0.02, 0.03]), indicating that women reported longer leave intentions in countries where relatively more leave is exclusive to mothers over fathers (in line with **H1b**). In addition, we predicted that the gender gap would be larger in countries where longer leave is available to either parent. In the context of length of exclusive leave to fathers, gender imbalance in exclusive leave, and length of leave compensated at 100% held constant, we found that total length of parental leave significantly moderated gender differences in intended leave uptake (b = 0.08, 95% CI [-0.13, -0.03]). The gender gap in intended uptake was larger in countries that offer relatively long (+1 SD: b = -22.63, 95% CI [-26.30, 18.96]) rather than short parental leave (-1 SD: b = -13.62, 95% CI [-17.93, -9.31]). Simple slopes analyses indicated that this cross-national variation in the gender gap seemed to be driven by women's (rather than men's) leave intentions: the slope of length of leave was significant and positive for women (b = 0.12, 95% CI [0.07, 0.17]), but not significant for men (b = 0.02, 95% CI [-0.01, 0.05]), indicating that when parents are offered longer leave, women (but not men) reported longer leave intentions (in line with **H2**). Finally, we predicted that the gender gap would be smaller in countries that offer more parental leave compensated at 100%. Contrary to **H3**, however, with all other leave policies held constant, length of leave compensated at 100% did not significantly moderate gender differences in intended leave uptake (b = -0.17, 95% CI [-.35, 0.004]).

3.4.3 Model 2: How does Gender Inequality in the Labor Market Relate to the Gender Gap in Intended Uptake of Parental Leave?

In Model 2, we assessed whether the gender gap in intended leave was predicted by women's relative representation in politics and women's relative income (the results are summarized in Table 3.3). We predicted that women's relative representation in politics would be associated with lower leave intentions among women and higher leave intentions among men. We found that, when women's relative income is held constant, women's relative representation in politics significantly moderated gender differences in intended

leave uptake (b = 42.97, 95% CI [14.53, 71.57]). Specifically, the gender gap was smaller in countries where women are relatively more (+1 SD: b = -15.20, 95% CI [-19.84, -10.56]) compared to less represented in politics (-1 SD: b = -25.98, 95% CI [-31.24, -20.54]). Simple slopes analyses indicated that this cross-national variation in the gender gap seemed to be driven by women's (rather than men's) leave intentions: the slope of women's representation in politics was negative and (marginally) significant for women (b = -36.44, 95% CI [-73.62, 0.74]), and positive but non-significant for men (b = 6.54, 95% CI [-10.17, 23.24]), indicating that women (but not men) report shorter leave intentions in countries where women are more represented in politics (in partial support of **H4**). We also predicted that, with women's relative representation in politics held constant, women's relative income would be associated with lower leave intentions among women and higher leave intentions among men. However, the interaction between gender and women's relative income was non-significant (b = -5.71, 95% CI [-49.82, 38.29]), indicating that the gender gap in intended uptake of leave is not associated with the gender gap in income (contrary to **H5**).

3.4.4 Model 3: How does Cultural Value Orientation Relate to the Gender Gap in Intended Uptake of Parental Leave?

In Model 3, we assessed whether the gender gap in intended leave was predicted by the degree to which a country is oriented toward egalitarianism and toward mastery (the results are summarized in Table 3.4). We predicted that the gender gap would be smaller in countries that are more oriented toward egalitarianism because men would intend to take more leave in these countries. We found that, with mastery value orientation held constant, egalitarian value orientation significantly moderated gender differences in intended uptake (b = 22.11, 95% CI [11.51, 32.70]). Specifically, the gender gap was smaller in countries that are relatively more (+1 SD: b = -12.69, 95% CI [-17.17, -8.20]) as compared to less oriented toward egalitarianism (-1 SD: b = -24.18, 95% CI [-27.96, -20.39]). Simple slopes analyses indicated that this cross-national variation seemed to be driven by women's (rather than men's) leave intentions: the slope of egalitarian value orientation was negative and significant for women (b = -21.53, 95% CI [-34.90, -8.17]), and positive but non-significant for men (b = 0.57, 95% CI [-6.19, 7.33]), indicating that women (but not men) reported shorter leave intentions in countries that are more oriented toward egalitarianism (contrary to **H6**). We also predicted that the gender gap would be larger in countries that are more oriented toward mastery because men would intend to take less leave in these countries. However, the interaction between gender and mastery values was non-significant (b = 25.45, 95% CI [-1.35, 52.13]), indicating that, with egalitarian value orientation held constant, the

gender gap in intended uptake of leave is not associated with the degree to which a country is oriented toward mastery (contrary to **H7**).

3.4.5 Final Model

We subsequently entered the statistically significant cross-level interactions between gender and national-level indicators from Models 1, 2, and 3, as well as the individual- and site-level control variables, into one final model. In addition, we added interaction terms between gender and individual-level gender-traditional attitudes and gender-essentialist attitudes to this model. When considering all the effects simultaneously, the slopes were comparable to those in Models 1, 2, and 3, but only the interaction between gender and length of available parental leave remained statistically significant in predicting intended uptake of parental leave. All other hypothesized cross-level interaction effects were reduced and consequently statistically non-significant (see Table 3.5). Thus, even though women had intentions of taking less parental leave in countries that are oriented toward egalitarianism or have more women in power, when controlling for these effects, longer available parental leave still related to women's intentions to take more of the leave that could be shared with their male partner.

3.4.6 Exploratory Analyses

Exploratory analyses revealed that gender-traditional attitudes significantly moderated gender differences in intended uptake (b = -1.21, 95% CI [-0.85, -0.18]). Simple slopes analyses indicated that this cross-national variation seemed to be driven by men's (rather than women's) leave intentions: the slope of gender-traditional attitudes was negative and significant for men (b = -1.82, 95% CI [-2.31, -1.32]), and positive but non-significant for women (b = 0.24, 95% CI [-0.26, 0.74]), indicating that men who endorsed gender-traditional attitudes intended to take less leave (see Figure 3.2).

Gender-essentialist attitudes also moderated gender differences in intended uptake (b = -1.97, 95% CI [-2.35, -1.32]). Simple slopes analyses showed that the slope of gender-essentialist attitudes was positive and significant for women (b = 0.61, 95% CI [0.27, 0.95]) and negative and significant for men (b = -1.32, 95% CI [-1.79, -0.85]), indicating that women who endorsed gender-essentialist beliefs intended to take more leave, whereas men who endorsed gender-essentialist beliefs intend to take less leave (see Figure 3.3).

3.5 Discussion

A gender-based division of paid and unpaid work is a pressing issue in many countries. The first aim of the present research was to document the gender gap in intentions to take leave from work to care for one's child in a wide range of countries. We found that, in all countries, women intended to take longer leave than men. Moreover, we found that leave intentions were inversely correlated with career ambitions for both women and men (but particularly for women), suggesting that leave intentions may come at a cost to one's career. The pervasive gender gap in intended leave uptake that we unveiled thus suggests that gender segregation in paid and unpaid work will remain an issue for future generations at a global level.

Importantly, however, the gender gap in intended leave uptake varied notably across countries. The second aim of the present research was thus to examine whether some of this cross-national variance could be explained by parental leave policies and the broader sociocultural context. The results showed a larger gender gap in countries that offer longer parental leave to either parent (even when controlling for length of leave compensated at 100%, which we had hypothesized would counter a widening gender gap through increasing men's intended leave uptake). This indicates that longer parental leave, implemented with the intention to promote a more equal share of care, may paradoxically give rise to a less equal share of child care between women and men (for similar findings see Boeckmann et al., 2014; Tharp & Parks-Stamm, 2020). We found that this effect was largely associated with women's, rather than men's, leave intentions, in line with previous research suggesting that only women take advantage of leave that is unpaid, whereas men do not take advantage of leave unless it is highly paid or offered to them exclusively (Castro-García & Pazos-Moran, 2016; Jurado-Guerrero & Muñoz-Comet, 2020). In comparison to prior research on how generous and egalitarian leave policies promote uptake in men, however, we found that neither leave compensation nor exclusive leave was associated with higher intentions in young men. This suggests that even though these policies may (at least to some degree) help to counter a gender-traditional divide of paid and unpaid work when women and men have children, the presence or absence of such policies do not seem to correspond to more or less intended leave in men prior to having children – at least not in a comparison of men's leave intentions across countries. The fact that we found negligible effects of gender-egalitarian and generous parental leave policies on young women's and men's intentions is important to note as this is a time where women and men make important career and life decisions, which may shape and contribute to a gendered divide of paid and unpaid work later in life.

The results also showed a smaller gender gap in countries where women are more represented in politics and in countries that are more oriented toward egalitarianism. Again, we found that these effects seemed to be driven by women's, rather than men's, leave intentions. However, when all the effects of different country-level factors were tested simultaneously, the effect of women's relative representation in politics and egalitarian values were reduced and consequently no longer statistically significant, suggesting that parental leave policies play an important and perhaps more proximal role in the gender gap in intended uptake of parental leave over and above broader cultural signals of gender equality.

The reduction in the effect of the sociocultural context when taking into account leave policies illustrates the importance of weighing country-level factors against one another. That said, these statistically non-significant effects in the final model may reflect insufficient statistical power. Within cross-cultural research, it is important to consider statistical power when interpreting non-significant effects at the country level, i.e., to look beyond statistical significance, as non-significant trends or correlations between country-level factors may be informative. Thus, whereas the effect, for example, of women's relative representation in politics was reduced (and consequently statistically non-significant) when taking into account parental leave politics, it should not be taken to mean that women's representation in politics has no relation to women's intended uptake of leave.

3.5.1 Strengths, Limitations, and Perspectives for Future Research

Although we were able to make inferences about country-level factors with our large and diverse cross-national sample (something that is much more dubious with a smaller sample of countries; e.g., Craig & Mullan, 2011), it is important to recognize that these findings may not generalize to all populations (Heinrich et al., 2010). Given that gender roles have not changed similarly across different social stratifications (England, 2010), a gender gap of a different degree may emerge in a sample of individuals who are not enrolled in higher education. In addition, although we recruited university students both with the objective of having comparable samples across countries and to focus on those most likely to have a career, a university sample may be less representative of the general population in countries where attending higher education is more exclusive to the higher strata of society. This is important to consider when interpreting these findings. That said, university students' intentions are important as they indicate how societies are likely to develop, as young highly educated individuals are those who are most likely to hold positions of power to influence

policies at a national level or within organizations.

Interestingly, we found no evidence relating men's leave intentions to the broader policy or sociocultural context. The lack of correspondence between parental leave policies and men's intentions is perhaps not surprising given the low variability in policies (especially those that have been linked to men's uptake) across countries in our sample. The lack of correspondence between men's intentions and cultural value orientation and gender equality in the labor market, however, is somewhat more noteworthy given that there is more cross-national variance with respect to these variables in our sample. We noted that men's intentions corresponded with an ICC of .06 at the country level, which is just above the minimum recommended threshold of .05 (LeBreton & Senter, 2008), indicating that there is some (albeit not a lot of) variance to be explained at the country level. As none of the country-level factors we tested were significantly associated with men's leave uptake, this emphasizes the need for future research to identify contextual factors associated with men's intentions.

3.5.2 Implications for Society

That said, the finding that men's intentions were less clustered at the country level than women's (as indicated by the ICC statistics) is in line with previous research suggesting that men's (relative to women's) uptake of leave is rooted more strongly in individual-level factors (such as their gender attitudes and socioeconomic status; Duvander, 2014; Geisler & Kreyenfeld, 2019). Indeed, this is also what we find as men's (but not women's) gender-traditional attitudes related to their intended leave uptake. This indicates that in order to increase caregiving intentions in men, it may be prudent for interventions to focus directly on promoting gender-egalitarian attitudes. It is important, however, to remember that country-level initiatives and individual-level attitudes are not mutually exclusive. For example, as shown by previous research, policies that seek to promote fathers' involvement in child care (through reserving leave for fathers) seem to shift gender role attitudes in the general populations (Wrohlich & Unterhofer, 2017). Thus, the relatively low cross-national variance in men's intentions to take parental leave may be indicative of the lack of effective policies across countries that are able to shift attitudes.

Taken together, generous parental leave seems to relate to a larger gender gap in intended uptake of parental leave, over and above individual-level gender attitudes. The present findings suggest that merely offering both women and men the opportunity to take leave is not an effective way to promote future caretaking expectations in men, as length of available leave was not associated with greater intended uptake in men. As young people's

intentions may play a crucial role in their family and career decisions, more research is needed to identify contextual factors that impact gender differences in intentions to take leave.

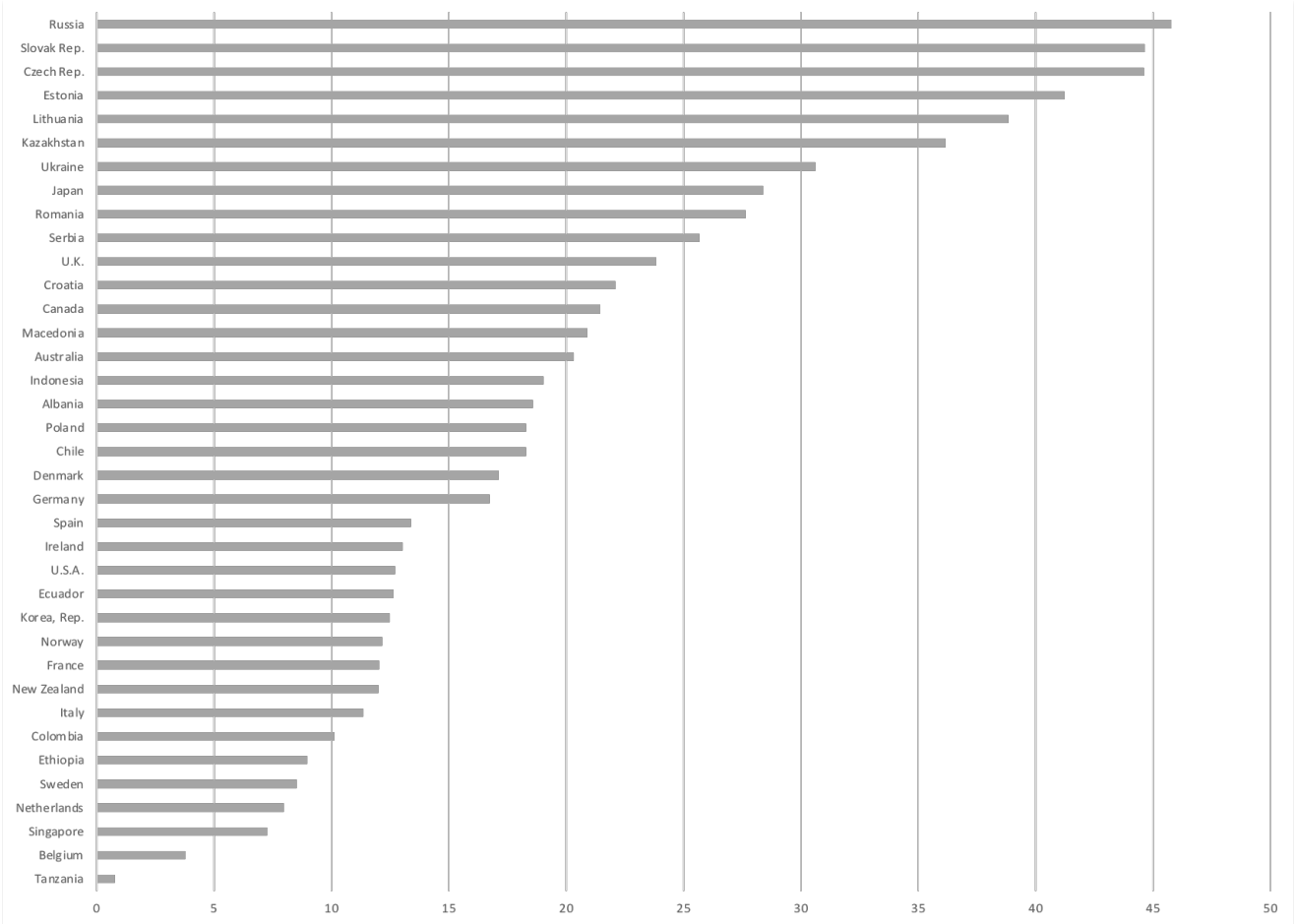
Table 3.1. Information about the Sample and about Parental Leave Policies for Each Country

Country (rank)	Total (% men)	Total Leave	Exclusive leave		Country (rank)	Total (% men)	Total leave	Exclusive leave	
			Women	Men				Women	Men
Albania (38)	148 (43)	365	365	0	**Korea, Rep.** (118)	136 (60)	52	90	3
Australia (35)	402 (38)	18	18	14	**Lithuania** (28)	171 (42)	156	120	30
Belgium (31)	322 (22)	75	75	10	**Macedonia** (67)	151 (44)	156	195	0
Canada (16)	1189 (40)	85	85	0	**Netherlands** (32)	509 (25)	26	80	3
Chile (63)	365 (37)	120	120	5	**New Zealand** (9)	222 (45)	52	70	14
Colombia (36)	308 (42)	70	70	8	**Norway** (2)	269 (38)	31	70	80
Croatia (54)	384 (54)	290	290	7	**Poland** (39)	439 (23)	156	130	14
Czech Rep. (88)	198 (35)	140	140	0	**Romania** (58)	215 (36)	104	126	5
Denmark (14)	148 (26)	90	90	14	**Russia** (71)	154 (39)	156	140	0
Ecuador (42)	134 (48)	60	60	10	**Serbia** (40)	740 (25)	0	400	7
Estonia (37)	190 (37)	140	140	10	**Singapore** (65)	189 (44)	0	80	7
Ethiopia (115)	194 (46)	90	90	5	**Slovak Rep.** (74)	253 (40)	156	170	0
France (11)	369 (38)	80	80	11	**Spain** (24)	327 (43)	156	80	15
Germany (12)	622 (31)	70	70	0	**Sweden** (5)	169 (50)	80	70	10
Indonesia (84)	240 (33)	65	65	2	**Tanzania** (68)	89 (51)	0	84	3
Ireland (8)	282 (41)	210	210	0	**Ukraine** (61)	238 (43)	156	126	0
Italy (82)	286 (37)	110	110	1	**U.K.** (15)	265 (18)	13	260	14
Japan (114)	463 (41)	70	70	0	**U.S.A.** (49)	3049 (34)	12	60	0
Kazakhstan (52)	113 (45)	126	126	5	**Total**	13942 (36)	-	-	-

Note. The table presents sample information for each country after exclusion criteria had been applied. Rank refers to countries' rank on the GGGI (WEF, 2017). Total leave represents the amount of leave (in weeks) available to either parent. Exclusive leave represents the amount of

leave (in days) that is either available to women or men.

Figure 3.1. The Gender Gap in Intended Uptake of Parental Leave Across Countries



Note. The gender gap score is based on the estimated means (i.e., the intercept for women - the intercept for men, when individual- and site-level control variables are held at zero). Values above 0 indicate the average number of weeks of leave women intend to take over and above the weeks of leave men intend to take.

Table 3.2. Hierarchical Linear Regression Results for Intended Uptake of Parental Leave Predicted by Gender, Father-Exclusive Leave, Gender Imbalance in Exclusive Leave, Total Length of Parental Leave, Length of Parental Leave Compensated at 100%.

			95% CI			
	Coefficient	*SE*	LL	UL	*t*	*p*
Fixed Effects						
Level 1						
Gender	-14.98	2.37	-19.73	-10.17	-6.31	< .001
Level 3						
Father-exclusive leave	-0.02	0.09	-0.20	0.16	-0.22	.830
Gender imbalance in exclusive leave	0.04	0.01	0.01	0.06	2.49	.020
Total length of parental leave	0.07	0.02	0.03	0.11	3.61	< .001
Length of leave compensated at 100%	0.21	0.07	0.06	0.35	2.87	.010
Cross-level interactions						
Gender x Father-exclusive leave	0.03	0.11	-0.19	0.24	0.25	.810
Gender x Gender imbalance in exclusive leave	-0.05	0.02	-0.08	-0.01	-2.72	.010
Gender x Total length of parental leave	-0.08	0.03	-0.13	-0.03	-3.16	< .001
Gender x Length of leave compensated at 100%	-0.17	0.09	-0.35	0.004	-1.97	.060
Random Effects	Coefficient	*SD*				
Intercept variance (site-level)	0.27	0.52				
Intercept variance (country-level)	45.25	6.73				
Slope variance	62.40	7.90				

Note. Gender was coded -0.36 for females and 0.64 for males. N = 13942 at Level 1 (individuals), N = 99 at Level 2 (sites), and N = 37 at Level 3 (countries). Coefficients represent unstandardized regression weights (fixed effects) and variances (random effects). Individual- and site-level control variables are not reported.

Table 3.3. Hierarchical Linear Regression Results for Intended Uptake of Parental Leave Predicted by Gender, Women's Relative Income, and Women's Relative Representation in Politics.

			95% CI			
	Coefficient	*SE*	LL	UL	*t*	*p*
Fixed Effects						
Level 1						
Gender	-22.14	2.06	-26.11	-18.17	-10.74	< .001
Level 3						
Representation in politics	-20.83	14.31	-48.34	6.75	-1.46	.160
Income	18.49	22.08	-24.16	60.84	0.84	.410
Cross-level interactions						
Gender x Representation in politics	42.97	14.82	14.53	71.57	2.90	.010
Gender x Income	-5.71	22.89	-49.82	38.29	-0.26	.760
Random Effects	Coefficient	*SD*				
Intercept variance (site-level)	0.39	0.63				
Intercept variance (country-level)	101.84	10.09				
Slope variance	103.15	10.16				

Note. Gender was coded -0.36 for females and 0.64 for males. N = 13942 at Level 1 (individuals), N = 99 at Level 2 (sites), and N = 37 at Level 3 (countries). Coefficients represent unstandardized regression weights (fixed effects) and variances (random effects). Individual- and site-level control variables are not reported.

Table 3.4. Hierarchical Linear Regression Results for Intended Uptake of Parental Leave Predicted by Gender, Egalitarian Value Orientation, and Mastery Value Orientation.

			95% CI			
	Coefficient	*SE*	LL	UL	*t*	*p*
Fixed Effects						
Level 1						
Gender	-21.50	1.66	-24.70	-18.29	-12.93	< .001
Level 3						
Egalitarian value orientation	-13.53	5.49	-24.06	-2.94	-2.47	.020
Mastery value orientation	-8.83	13.87	-35.52	17.85	-0.64	.540
Cross-level interactions						
Gender x Egalitarian value orientation	22.11	5.50	11.51	32.70	4.02	< .001
Gender x Mastery value orientation	25.45	13.88	-1.35	52.13	1.83	.090
Random Effects	Coefficient	*SD*				
Intercept variance (site-level)	0.40	0.63				
Intercept variance (country-level)	91.78	9.58				
Slope variance	85.41	9.24				

Note. Gender was coded -0.36 for females and 0.64 for males. N = 13942 at Level 1 (individuals), N = 99 at Level 2 (sites), and N = 37 at Level 3 (countries). Coefficients represent unstandardized regression weights (fixed effects) and variances (random effects). Individual- and site-level control variables are not reported in the table.

Table 3.5. Hierarchical Linear Regression Results for Intended Uptake of Parental Leave Predicted by Gender, Gender Imbalance in Exclusive Leave, Total Length of Parental Leave, Women's Relative Representation in Politics, and Egalitarian Value Orientation.

			95% CI			
	Coefficient	*SE*	LL	UL	*t*	*p*
Fixed Effects						
Level 1						
intercept	33.29	1.73	30.06	36.50	19.27	< .001
HEED[a]	1.85	0.38	1.11	2.60	4.88	< .001
STEM[b]	-0.64	0.44	-1.51	0.21	-1.47	.141
Soc Sci.[c]	0.12	0.75	-1.34	1.59	0.16	.875
Business[d]	-0.98	0.64	-2.23	0.28	-1.53	.127
Age	0.24	0.10	0.04	0.45	2.37	.018
Subjective SES	-0.54	0.13	-0.78	-0.29	-4.27	< .001
Gender-traditional attitudes	-0.59	0.19	-0.85	-0.18	-3.05	.002
Gender-essentialist attitudes	-0.07	0.14	-0.27	0.23	-0.52	.601
Gender	-16.24	1.83	-19.64	-12.84	-8.88	< .001
Gender x Gender-traditional attitudes	-1.21	0.37	-2.18	-0.89	-3.31	.001
Gender x Gender-essentialist attitudes	-1.97	0.30	-2.35	-1.32	-6.69	< .001
Level 2						
Age (site average)	0.43	0.34	-0.19	1.18	1.24	.219
Subjective SES (site average)	-3.58	0.91	-5.28	-1.53	-3.93	< .001
Level 3						
Gender imbalance in exclusive leave	0.02	0.02	-0.01	0.10	1.32	.200
Total length of parental leave	0.09	0.02	0.05	0.13	4.19	< .001
Representation in politics	2.70	14.30	-23.97	29.33	0.19	.848
Egalitarian value orientation	-8.33	6.33	-20.11	3.49	-1.31	.202
Cross-level interactions						
Gender x Gender imbalance in exclusive leave	-0.03	0.02	-0.06	0.001	-1.81	.083

Gender x Total length of parental leave	-0.09	0.02	-0.13	-0.05	-4.05	< .001
Gender x Representation in politics	20.25	15.15	-7.74	48.53	1.34	.202
Gender x Egalitarian value orientation	1.77	6.75	-10.83	14.25	0.26	.791
Random Effects	Coefficient	*SD*				
Intercept variance (site-level)	2.05	5.33				
Intercept variance (country-level)	2.30	5.99				
Slope variance	2.58	6.74				

Note. Gender was centered at the grand mean (coded -0.36 for females and 0.64 for males). *N* = 13,942 at Level 1 (individuals), *N* = 99 at Level 2 (sites), and *N* = 37 at Level 3 (countries). Coefficients represent unstandardized regression weights (fixed effects) and variances (random effects).

[a] HEED (i.e., Psychology (General); Psychology with the goal to be a clinical practitioner; Medicine with the goal to become a doctor; Other Health/Social work professions; Education/Teaching) coded as 1, STEM coded as 0, Social Sciences coded as 0, Business coded as 0, Other coded as -1.

[b] STEM (Science (Chemistry, Biology, etc.); Mathematics/Statistics; Computer Science; Engineering) coded as 1, HEED coded as 0, Social Sciences coded as 0, Business coded as 0, Other coded as -1.

[c] Social Sciences (Other Social Sciences (History, Sociology, etc.)) coded as 1, HEED coded as 0, STEM coded as 0, Business coded as 0, Other coded as -1.

[d] Business coded as 1, HEED coded as 0, STEM coded as 0, Social Sciences coded as 0, Other (Law; Sport Sciences; Fine Arts (Music, Painting, Literature); Theology/Religious Studies) coded as -1.

Figure 3.2. The Gender Gap in Intended Uptake of Parental Leave Predicted by Gender-Traditional Attitudes

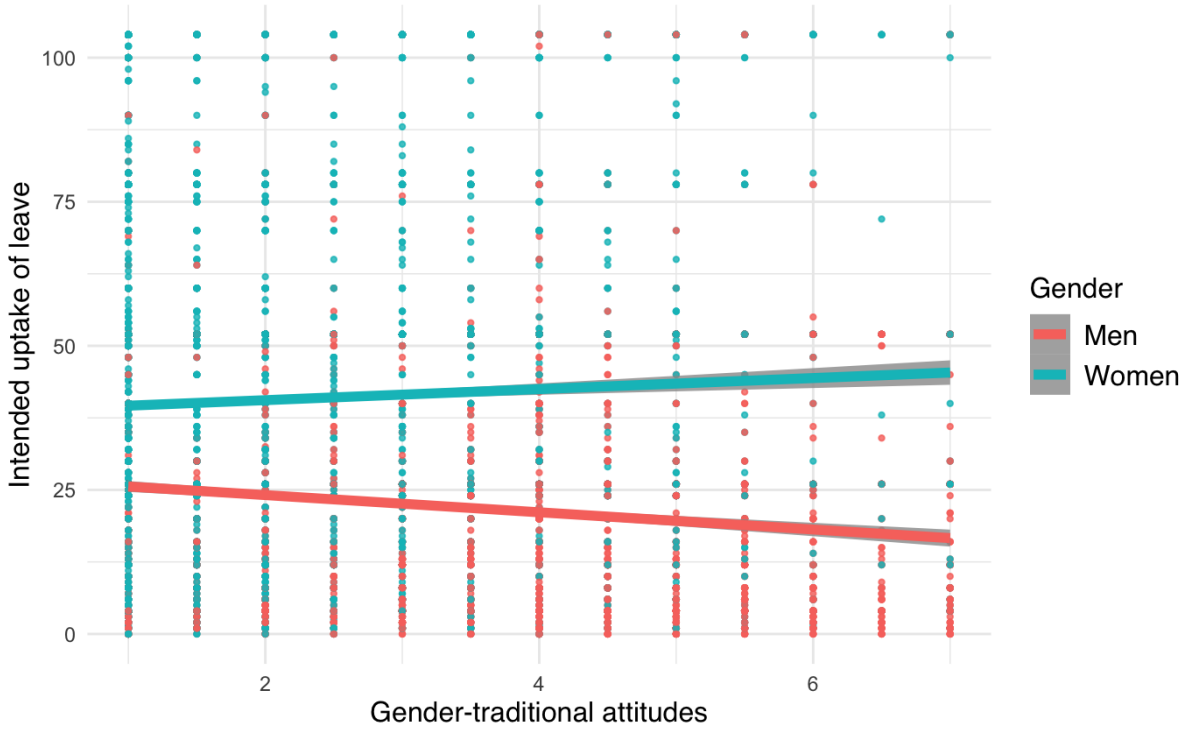
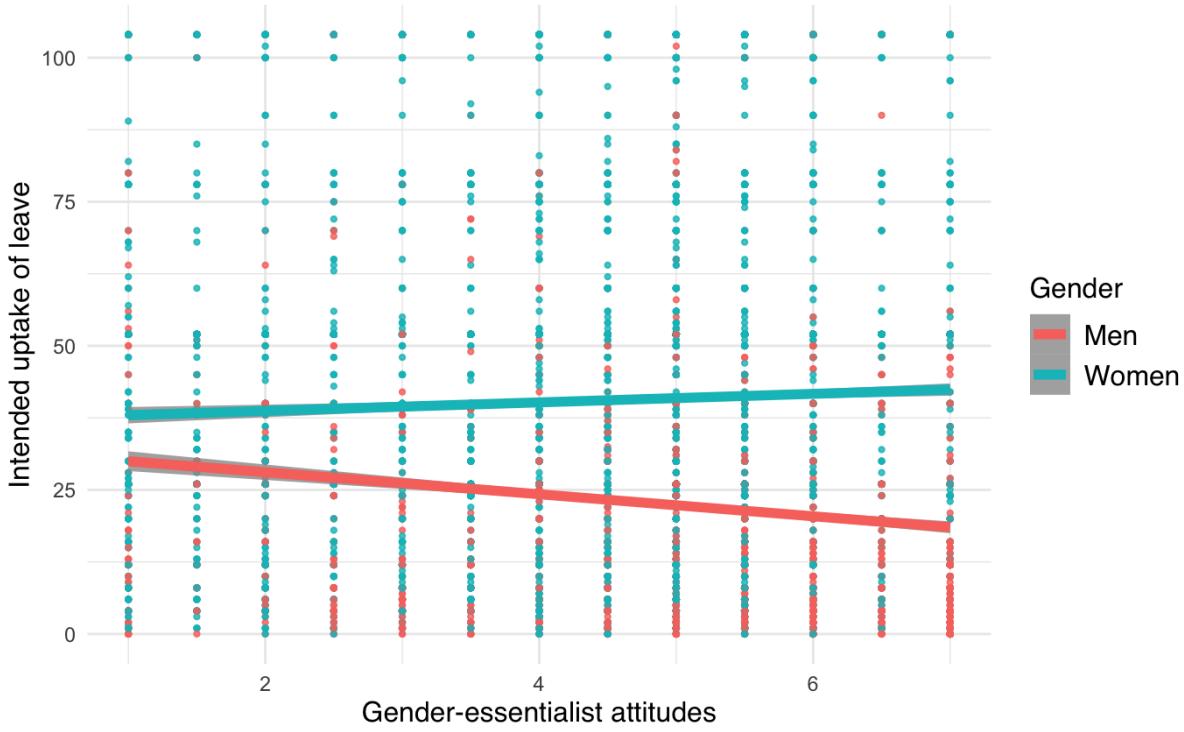


Figure 3.3. The Gender Gap in Intended Uptake of Parental Leave Predicted by Gender-Essentialist Attitudes



4 Chapter: Contextual Factors to Gender Differences in Communal Helping Behavior

4.1 Overview of Study

In the previous chapter, I presented data from 37 countries on gender differences in expected communal engagement. We found that men's expectations to engage communally in the future were predicted by their gender attitudes rather than by the broader policy and sociocultural context. In the current chapter, we further examine contextual factors to gender differences in communal engagement by assessing prosocial self-perceptions (based on self-reports), prosocial behavioral intentions (based on responses to hypothetical scenarios in a work context), and prosocial behavior toward a stranger (based on monetary transfers in a prisoner's dilemma game) in both same- and other-gender interactions across 10 countries. Furthermore, we examine whether perceiving more men in communal roles in one's society is associated with more communal behavior among men. Below I present a shortened version of a manuscript that has been accepted for publication. See Appendix C for the accepted manuscript in full and supplementary materials.

4.1.1 Gender Differences in Prosocial Behavior

Prosocial behaviors are broadly defined as acts that benefit others (Penner et al., 2005). Thus, prosocial behavior can involve helping, sharing, cooperating, comforting, guiding, rescuing, and defending another individual. Can previous research help us answer the question of whether there is a "more helpful" gender? At first glance, the research literature seems somewhat inconsistent. Some studies suggest that women are more prosocial than men (e.g., Carlo et al., 2001; Charbonneau & Nicol, 2002; Kumru et al., 2012), whereas other studies suggest that men are more prosocial than women (Carlo & Randall, 2002; De Caroli & Sagone, 2013; Meier, 2007). Reviews of the research literature conclude that women are not more or less helpful than men. Instead, gender differences in prosocial behavior depend on the context (i.e., some situations seem to elicit more prosocial behavior in women, whereas other situations seem to elicit more prosocial behavior in men; Balliet et al., 2011; Croft et al., 2020; Diekman & Clark, 2015; Espinosa & Kovářík, 2015; Simpson, 2003).

One important contextual factor identified by Balliet et al. (2011) is whether help is given to someone of the *same* as opposed to *other* gender. In a review of the economic game literature on gender differences in cooperation, Balliet et al. conclude that – consistent with sexual selection processes – men are more cooperative in same-gender interactions, whereas women are more cooperative in other-gender interactions. However, in a review of social

psychological research, Diekman and Clark (2015) conclude that – consistent with social role theory – men help more in situations that appeal to chivalrous norms (i.e., when interacting with the *other* gender; Eagly & Crowley, 1986). In the present study, we extend previous research on prosociality by investigating gender differences in cooperation (in an economic game) and in intentions to help (in a hypothetical work context) in same- and other-gender interactions. This allows us to investigate whether gender differences in helping behavior hinge on the gendered context (i.e., whether help is given to someone of the same or other gender) and/or the operationalization of prosocial behavior.

4.1.2 Communal Prosocial Behavior

According to a social role theory account of gender differences, women and men express prosocial behaviors in ways that are congruent with their gender role (Eagly, 2009). Gender roles are rooted in the unequal distribution of women and men across different occupational roles (e.g., Eagly et al., 2000). Across the world, women are overrepresented in communal (caring-oriented) roles, whereas men are overrepresented in agentic (achievement-oriented) roles (Kan et al., 2011; World Economic Forum, 2017).

Many aspects of prosociality are associated with communal qualities. For example, help can originate in altruistic motivations or take place within close relationships (Eagly, 2009). In line with gender role expectations for women, studies that have assessed gender differences in prosocial behavior in communication and leadership styles have shown that women are more likely than men to communicate in a supportive manner and to mentor employees (see reviews by Burleson & Kunkel, 2006; Eagly et al., 2003). In addition, research that has assessed gender differences in prosocial behavior through economic games, in which participants have to decide how to divide money between themselves and another player, has shown that women give more money to friends and people in need (Brañas-Garza et al., 2012). It may therefore be reasonable to assume that women are more likely to engage in "communal" helping. Men, on the other hand, may be more likely to engage in "agentic" helping, e.g., protecting someone from harm (Rankin & Eagly, 2008).

4.1.3 A Social Role Theory Account of Gender Differences in (Communal Prosocial) Behavior

Previous research shows that gender differences in prosocial behavior vary between countries (Carlo et al., 2001; Kumru et al., 2012), which suggests that gender differences in behavior are dynamic (as would be expected from a social role perspective) rather than universal and slow to change (as would be expected from an evolutionary perspective).

Social role theory postulates that "sex differences and similarities in behavior reflect

gender role beliefs that in turn represent people's *perceptions* [emphasis added] of men's and women's *social roles* in the society in which they live" (p. 459; Eagly & Wood, 2012). The extent to which gender differences in behavior correspond with gender segregation in the labour market is sometimes interpreted as evidence for social role theory (e.g., Falk & Hermle, 2018). Since it is women's and men's *perceptions* of gender-based division of roles that are theorized to influence their behavior (Eagly & Wood, 2012), previous evidence hinges on the premise that people can accurately estimate gender segregation in roles in their society. However, research suggests that although people are aware of occupational gender segregation, they tend to underestimate its magnitude (Beyer, 2018; Froehlich et al., 2020). In the present research, we therefore predicted gender differences from perceived gender segregation in occupational roles. Specifically, we examine the degree to which perceiving men in communal roles is associated with communal prosocial behavior in men.

4.2 Study Goals and Hypotheses

The first goal of our research was to test gender differences in prosociality. We selected and developed scales of prosocial self-perceptions and behavioral intentions, respectively, to measure interpersonal, altruistic, and empathic helping (i.e., "communal" helping). In line with gender role expectations of women, we hypothesize that women will report higher prosocial self-perceptions **(H1a)** and prosocial behavioral intentions in same-gender interactions than men **(H1b)**. In addition, we explore gender differences in prosocial behavioral intentions toward the other gender. In order to bring together different research traditions that have assessed gender differences in prosocial behavior using different measures, we also explore gender differences in actual prosocial behavior (based on a monetary transfer in an economic game) toward same- and other-gender interaction partners.

For theory development, it is important to generalize findings not only across measures and helping contexts, but also across countries (Henrich et al., 2010; Jones, 2010). We therefore assess gender differences in prosociality across 10 countries (Chile, China, Colombia, Indonesia, Japan, Mexico, Russia, Spain, Sweden, and the USA). These countries vary significantly in economic wealth, gender equality, and WEIRDness (Heinrich et al., 2010), which further increases generalizability.

The second goal of our research was to assess predictors of men's engagement with communal prosociality. On the basis of social role theory, we hypothesize that participant gender will interact with the perceived proportion of men in communal roles in predicting communal prosociality. Specifically, we expect that men who perceive a larger proportion of men in communal roles will report more prosocial self-perceptions **(H2a)** and prosocial

behavioral intentions in same-gender interactions **(H2b)**. Conversely, we hypothesise that the degree to which women perceive men in communal roles will have a non-existent or even reversed effect on their prosocial self-perceptions and prosocial behavioral intentions in same-gender interactions.

Previous research shows that subjective socioeconomic status (SES) and age correlate with individuals' engagement in prosocial behavior (Piff & Robinson, 2017; Sze et al., 2012). Moreover, gender differences increase with the economic development and degree of gender equality of a country (a phenomenon that has become known as the gender equality paradox effect; Falk & Hermle, 2018; Stoet & Geary, 2018). In order to test the robustness of gender differences in prosocial behavior (Wiepking & Bekkers, 2012), we control for individual-level subjective SES and age, as well as country-level GDP per capita and gender equality.

4.3 Method

4.3.1 Participants and Design

Data were collected via an online panel provider (Toluna: https://de.toluna.com/) at 2 time points. The sample was recruited to be representative of the population in each country in terms of age and gender. Participants were included in the analyses if they completed both parts of the questionnaire, entered a valid participant code, and indicated the same country of origin that they had registered with the panel provider. In addition, participants who reported an improbable age (n = 2) or specified *other* as their gender (n = 3) were excluded. A final sample of N = 1915 was analyzed. See Table 4.1 for sample size by country.

In line with recommendations for cross-cultural research by Sidanius et al. (2000), we sampled cultures across the whole spectrum of gender equality. Countries were selected based on their ranking on the Gender Inequality Index (GII, 2017, which measures gender equality with regards to reproductive health, empowerment, and economic status; http://hdr.undp.org/en/content/gender-inequality-index-gii). We divided the GII into 10 sections and selected one country from each section. The following countries were selected: Indonesia (GII rank 104 of 160), Colombia (rank 87), Mexico (rank 76), Chile (rank 72), Russia (rank 53), USA (rank 41), China (rank 36), Japan (rank 22), Spain (rank 15), and Sweden (rank 3). The materials were translated from English into the official language of each country by a professional translation agency (https://www.e-kern.com/). Each translation was subsequently checked by a researcher in psychology who was fluent in one of the languages as well as English. Following feedback from our colleagues, the translation

company revised the translations. Materials in all languages are available on the OSF (https://osf.io/7ybns/?view_only=13dce2ea4f2248f3b88934f9368b70f7).

4.3.2 Materials

4.3.2.1 Perceived Proportion of Men in Communal Occupations

We assessed the degree to which five occupations perceived in the U.S. to be female-dominated and communal (i.e., geriatric aide, nurse, nursery school teacher, secretary, and therapist; Cejka & Eagly, 1999; Koenig & Eagly, 2014) were perceived to be female-dominated and communal in each country in our sample. First, participants estimated the proportion of men working in these occupations in their country on a scale that ran from 0% men to 100% men. The results showed that each occupation was perceived to be dominated by women in each country in our sample (Froehlich et al., 2020). Second, participants indicated the extent to which communal traits (i.e., being sympathetic, supportive, kind, nurturing) described women or men (between-participants factor) working as a geriatric aide, nurse, nursery school teacher, secretary, and therapist on a scale from 1 (Do not agree) to 7 (Completely agree). The results showed that each occupation was associated with *communal* qualities (above the midpoint) in each country in our sample (Froehlich et al., 2020). The perceived proportion of men across these roles was averaged to form a measure of perceived gender segregation across communal roles (α ranged from .75 to .84 across countries).

4.3.2.2 Prosocial Self-Perceptions

We selected six items from Caprara et al. (2005) to assess prosocial self-perceptions. For example: "I try to be close to and take care of those who are in need" (α ranged from .81 to .90 across countries). The scale ran from 1 (Never true) to 5 (Always true).

4.3.2.3 Prosocial Behavioral Intentions

We developed five scenarios to assess participants' prosocial behavioral intentions. The scenarios were situated at an office as this is a context that would be familiar to both women and men across the countries in our sample. Each scenario depicted a work situation in which the participant had to report the extent to which they would help a colleague[5]. For

[5] In two of the five scenarios, a "perpetrator" was depicted. For example: "Take a moment and imagine the following scenario. You are at the office working together in a team towards an important goal. You observe that one of your work colleagues is suffering moderate verbal abuse from another [male/female] work colleague. How likely do you think it is that you would step in and comfort the victim?" In both scenarios, the gender of the "perpetrator" (i.e., the person who verbally abused another teammate) was matched to the gender of the participant.

example: “Take a moment and imagine the following scenario. You are at the office working together in a team towards an important goal. You observe that one of your [male/female] work colleagues is not feeling very well emotionally. How likely do you think it is that you would step in and support your work colleague emotionally?” The scenarios were presented in a randomized order (α ranged from .75 - .89 in same-gender interactions and .82 - .91 in other-gender interactions across countries). The scale ran from 1 (Very unlikely) to 7 (Very likely). We presented the scenarios to participants twice (first assessing intentions to be helpful to someone of the same gender, then assessing intentions to be helpful to someone of the other gender).

4.3.2.4 Prosocial (Transfer) Behavior

Participants’ transfer during a continuous version of the prisoner’s dilemma game (e.g., Dorrough & Glöckner, 2016) was used as a measure of prosocial behavior. We gave participants an initial endowment of 100 Talers (the experimental currency; 100 Talers = 1 USD). Participants were informed that they and their (anonymous) interaction partner had to decide how much of their respective endowment they would like to transfer to one another (but that neither they nor their interaction partner would be made aware of how much the other had transferred). To make cooperation more profitable, participants were informed that any amount transferred by themselves and their interaction partner would be doubled by the experimenter and may factor into their bonus payment (which could range from 0-400 Talers). If the prisoner’s dilemma result had been randomly selected to form the bonus payment, participants’ bonus would be the sum of their initial endowment plus the amount their interaction partner had transferred to them (multiplied by 2), minus the amount they had transferred to their interaction partner. For example, if participants transferred 50 Talers to their interaction partner and their interaction partner transferred 40 Talers to them, their bonus payment would be: 100 – 50 (i.e., the amount they transferred to their interaction partner) + 40 (i.e., the amount their interaction partner transferred to them) x 2 = 130. Participants had to pass four comprehension questions assessing whether they had understood how their bonus would be calculated before being asked to decide how much they would like to transfer to an interaction partner of the same gender, and then to an interaction partner of the other gender.

4.3.2.5 Subjective SES

Participants indicated their SES along a ten-point ladder (the MacArthur Subjective Status Scale; Adler et al., 2000) with higher level rungs indicating higher relative SES. The vignette read: “Imagine that this picture of a ladder shows how your society is set up. At the top of the ladder are the people who have the highest standing in your society – they have the

most money, the highest amount of schooling and the jobs that bring the most respect. At the bottom are people who have the lowest standing in your society – they have the least money, little or no education, no job or jobs that nobody wants or respects. Now think about yourself. Please select the number of the rung that shows where you think you would be on this ladder." The scale ran from 1 (Low SES) to 10 (High SES).

4.3.2.6 Age

Participants were asked to indicate their age (in years).

4.3.2.7 GDP per Capita

GDP per capita was used as a measure of country-level economic development. GDP per capita is a value based on a country's economic activity divided by its population. Since GDP per capita may spike from one year to another, we averaged the values from 2015 to 2017 to get a better estimate of the country's economic activities over recent years (data was retrieved from https://data.worldbank.org/indicator/NY.GDP.PCAP.CD). To address positive skew in the GDP per capita data, the scale was logarithmic (log) transformed.

4.3.2.8 Gender Equality

The global index score from the GGGI (WEF, 2017) was used as a proxy for country-level gender equality. The global index score is based on female-to-male ratios in economic participation and opportunity, educational attainment, health and survival, and political empowerment. The global index score ranged from 0 to 1 (a score of 1 indicates that the number of women is equal to (or greater than) the number of men).

4.4 Results

4.4.1 Descriptive Statistics

Prosocial self-perceptions, prosocial behavioral intentions, and prosocial (transfer) behavior were positively correlated (see Table 4.2 for zero-order correlations between outcome variables). Descriptive statistics showed that women and men see themselves as highly prosocial (the average response for prosocial self-perceptions and prosocial behavioral intentions was above the scale midpoint in all countries). Women and men transferred on average approximately half of their initial endowment of 100 Talers. However, men tended to transfer more than women. In the vast majority of countries, the average transfer by women was below the scale midpoint, whereas the average transfer by men was above the scale midpoint (see Table 4.3 for means and standard deviations for all outcome variables). Gender differences in prosocial self-perception, prosocial behavioral intentions in same- and other-gender interactions, and prosocial (transfer) behavior in same- and other-gender

interactions showed similar directions in the vast majority of countries.

4.4.2 Analytical Strategy

We used R and the *lme4* package (Bates et al., 2015) to fit linear mixed models to predict gender differences in prosociality. We used the *lmerTest* package (Kuznetsova et al., 2017) to obtain *p*-values for the fixed effects. The hypotheses were tested with age and subjective SES as control variables on the individual level, and log GDP per capita and gender equality as control variables on the country level. All control variables[6] were centered at the grand mean (in line with recommendations by Enders & Tofighi, 2007).

4.4.3 Model 1: Gender Differences in Prosocial Self-Perceptions

In Model 1, we assessed gender differences in prosocial self-perceptions and whether gender differences in prosocial self-perceptions varied as a function of the perceived proportion of men in communal roles. In order to examine whether there was sufficient variance at the different levels to justify a hierarchical linear model, we first ran a model that included no predictor variables. The intraclass correlation (ICC) indicated sufficient clustering at the country level (ICC = 0.16, LeBreton & Senter, 2008). To take into account that observations were non-independent and clustered within countries, we fitted a 2-level hierarchical linear model. We included intercept for country as a random effect, thereby accounting for between-country variability. We included gender (centered at the grand mean in line with recommendations by Enders & Tofighi, 2007; female = -0.48, male = 0.52) and perceived proportion of men in communal roles (centered within countries in line with recommendations by Enders & Tofighi, 2007) as predictors on the individual level. In addition, we included an interaction between gender and perceived proportion of men in communal roles.

The results of Model 1 are displayed in Table 4.4. We hypothesized that women would report higher prosocial self-perceptions than men (**H1a**). In line with our prediction, women reported higher prosocial self-perceptions than men. However, this difference was not statistically significant (b = -0.06, *SE* = .03, *p* = .066, 95% CI [-0.12, 0.004]). In addition, we hypothesized that perceiving more men in communal roles would be positively associated with men's, but negatively (or negligibly) associated with women's prosocial self-perceptions (**H2a**). Contrary to our prediction, the interaction between gender and perception of men in communal roles was not statistically significant (b = -0.002, *SE* = .002, *p* = .140, 95% CI [-

[6] Testing the hypotheses without control variables generated comparable results for all the reported findings.

0.01, 0.001]).

4.4.4 Model 2: Gender Differences in Prosocial Behavioral Intentions

In Model 2, we assessed gender differences in prosocial behavioral intentions and whether gender differences in prosocial behavioral intentions varied as a function of the perceived proportion of men in communal roles. We transformed the data into long format (1915 participants x 2 prosocial intentions in same- vs. other-gender interactions). To take into account that observations were non-independent at the individual (ICC = 0.82) and country level (ICC = 0.16), we fitted a 3-level hierarchical linear model. We included intercepts for country and individuals as random effects to account for within-individual and between-country variability. We included interaction type (i.e., whether helping took place in a same- vs. other-gender context) as a predictor on the observational level (centered within individuals; same-gender = -0.5, other-gender = 0.5) and gender and perception of men in communal roles as predictors on the individual level. In addition, we included a cross-level interaction between interaction type and gender and a cross-level interaction between interaction type, gender, and perception of men in communal roles.

The results of Model 2 are displayed in Table 4.5. We hypothesized that women would report higher prosocial behavioral intentions than men in same-gender interactions (**H1b**). In line with our prediction, simple slopes analyses showed that in same-gender interactions, women reported higher levels of prosocial behavioral intentions than men (b = -0.16, *SE* = .05, *p* = .003, 95% CI [-0.27, -0.06]). In other-gender interactions, on the other hand, men reported higher levels of prosocial behavioral intentions than women (b = 0.24, *SE* = .05, *p* < .001, 95% CI [0.13, 0.35])[7].

In addition, we hypothesized that gender would interact with the perception of men in communal roles in predicting prosocial behavioral intentions in same-gender interactions (**H2b**). Specifically, we predicted that perceiving more men in communal roles would be positively associated with men's, but negatively (or negligibly) associated with women's prosocial behavioral intentions. To test our hypothesis, we ran two simple slopes analyses in same-gender interactions. When examining the slope of gender at different levels of perceived proportion of men in communal roles, we noted that gender differences in prosocial behavioral intentions in same-gender interactions were larger when the proportion of men in communal roles was perceived to be relatively low (-1 SD: b = -0.20, *SE* = .08, *p* = .007, 95% CI [-0.35, -0.05]), than relatively high (+1 SD: b = -0.12, *SE* = .07, *p* = .107, 95% CI

[7] Testing gender differences across same- vs. other-gender interactions without including scenarios with a so-called perpetrator generated comparable results.

[-0.27, 0.03]). When examining the slope of perceived proportion of men in communal roles for women and men, respectively, we noted in line with our prediction that the slope was steeper for men (b = 0.01, *SE* =.002, *p* = .002, 95% CI [0.002, 0.01]) than for women (b = 0.004, *SE* = .002, *p* = .042, 95% CI [0.0002, 0.01]), indicating that perceiving more men in communal roles is associated with more prosocial behavioral intentions in same-gender interactions among men than women.

4.4.5 Model 3: Gender Differences in Prosocial (Transfer) Behavior

In Model 3, we assessed gender differences in prosocial (transfer) behavior and whether gender differences in prosocial (transfer) behavior varied as a function of the perceived proportion of men in communal roles. Again, we transformed the data into long format (1915 participants x 2 transfer in same- vs. other-gender interactions). The ICC indicated sufficient clustering at the individual level (ICC = 0.62), but not at the country level (ICC = 0.004, LeBreton & Senter, 2008), which indicates that the distribution of individuals' transfer was similar across countries. To take into account that observations were non-independent at the individual level, we fitted a 2-level hierarchical linear model. We included a random intercept for individuals to account for within-individual variability. As in Model 2, we included interaction type (i.e., whether helping took place in a same- vs. other-gender context) as a predictor on the observational level, and gender and perceived proportion of men in communal roles as predictors on the individual level. In addition, we included a cross-level interaction between gender and interaction type, and a cross-level interaction between interaction type, gender, and perception of men in communal roles.

The results of Model 3 are displayed in Table 4.6. Simple slopes analyses for the interaction between gender and interaction type showed, in line with the findings for prosocial behavioral intentions, that in other-gender interactions, men engaged in more prosocial (transfer) behavior than women (b = 5.51, *SE* = 1.20, *p* < .001, 95% CI [3.15, 7.86]). However, contrary to the findings for prosocial behavioral intentions, in same-gender interactions women engaged in less prosocial (transfer) behavior than men (b = 2.58, *SE* = 1.20, *p* = .032, 95% CI [0.23, 4.94]). The interaction between gender, interaction type, and perception of men in communal roles was not statistically significant (b = -0.08, *SE* = .05, *p* = .139, 95% CI [-0.19, 0.03]).

4.5 Discussion

The first aim of the present research was to investigate gender differences in prosociality. The present results only showed small gender differences in prosocial self-perceptions. The prosocial self-perceptions measure we used was very general and thus may

not have elicited specific gender role expectations as all people (regardless of their gender) are expected to be interpersonally helpful and supportive. However, by assessing help in different contexts (i.e., in same- vs. other-gender interactions), we seem to have elicited expectations specifically associated with the female and male gender role, which triggered larger gender differences. Specifically, we found that women reported higher helping intentions in same-gender interactions, whereas men reported higher helping intentions in other-gender interactions. These findings suggest that it may be more acceptable for women than for men to help members of their own gender. However, we did not find that women transferred more monetary resources than men in same-gender interactions (in fact, we found the contrary). Researchers have concluded that women transfer more than men because they have internalized gender role expectations to be more altruistic than men (Brañas-Garza et al., 2018; Rand et al., 2016). Our finding that men transfer more than women is not necessarily contrary to gender role expectations, as transfer could potentially lead to less profit (if the other player does not reciprocate). It is possible therefore that women transferred less than men (or men transferred more than women) because the prisoner's dilemma game elicited risk-taking, which is associated with agency (i.e., the male gender role; Charness & Gneezy, 2012). The scenarios, on the other hand, involved communal behavior (e.g., supporting one's colleague emotionally). Hence, our findings suggest that women only help more than men in same-gender situations *if* the situation makes gender role expectations salient.

In line with the findings for prosocial behavioral intentions in other-gender interactions, men also transferred more than women in other-gender interactions. Gender differences were larger in other-gender transfers than in same-gender transfers, which suggests that it may be particularly acceptable for (or expected of) men to help women. Our findings are congruent with previous research by Buunk and Massar (2012), who found that male players were more likely to share resources with female players than female players were with male players. Buunk and Massar argued that men's inclination to help women is rooted in sexual selection processes (i.e., men compete with other men for women's favour, which they gain by giving women gifts). Whereas Buunk and Massar's findings (and our own) could be explained by sexual selection processes, both findings could also be explained by benevolent sexism (i.e., the belief that a man's role is to protect and support women; Shnabel et al., 2016).

With the present data, we are not able to determine whether or to what extent sexual selection and/or gender role expectations explain gender differences in prosociality. However, social role theory makes assumptions about gender differences that can be tested with the present data. In line with social role theory, we found that men's greater tendency to

engage in “communal” helping (i.e., supporting a colleague of the same gender emotionally) was more pronounced among men who perceived relatively more men in communal roles in their society. However, contrary to the assumptions of social role theory, this effect, albeit weaker, was also visible for women, which raises the possibility that a third variable may explain (at least part of) this effect.

4.5.1 Strengths, Limitations, and Perspectives for Future Research

The present research design allowed us to test contextual factors of gender differences in prosociality. We assessed gender differences in prosociality across different measures (i.e., self-perceptions, behavioral intentions, and transfer behavior in a prisoner’s dilemma game), across different countries (that had been selected to represent a spectrum from low gender equality to high gender equality), and across same- vs. other-gender interactions. These contextual factors seem to elicit more or less helping behavior in women and men (even after controlling for individual-level subjective SES and age, and country-level log GDP per capita and gender equality).

Despite several strengths of the present design, we outline in what follows a few recommendations for future research on gender differences in prosociality. First, the present findings are interpreted within a same- vs. other-gender framework (in line with previous research traditions; e.g., Balliet et al., 2011). It is, however, important to point out that our findings could be re-interpreted to mean that “everyone intends to help women more.” Similarly, previous research by Balliet et al. (20011) could be re-interpreted to mean that “everyone helps men more.” These mixed conclusions suggest that gender differences in helping are not solely driven by similarity in the gendered context (i.e., whether help is given to someone of the same vs. other gender). To clarify what is driving gender differences in prosocial behavior, future research should test whether gender differences in helping are mediated by gender role expectations of the helper (e.g., the expectation for men to be chivalrous and for women to be caring) or by gender stereotypes about the potential recipient of help (e.g., perceiving that women need more help than men or that men do not want/need help). By identifying what processes underlie gender differences in helping behavior, these findings could determine whether interventions that aim to reduce gender differences in different helping contexts should target gender stereotypes and gender role expectations of women, men, or both. Second, we did not replicate gender differences in same-gender interactions across different helping contexts. Since cooperation in the prisoner’s dilemma game involves some financial risk-taking (which may have primed male gender role expectations), future research should test whether gender differences in prosocial intentions replicate with a dictator game, which does not involve risk-taking. Furthermore, future

research should further explore what underlies gender differences in prosocial behaviors. With a larger selection of countries (30 – 50; Maas & Hox, 2005), future research could compare the assumptions of different theoretical perspectives of gender differences (Falk & Hermle, 2018). Finally, future research should also test additional assumptions of social role theory (e.g., to what extent does the internalization of gender stereotypes account for the association between perceived gender segregation in roles and gender differences in behaviors?).

4.5.2 Implications for Society

As indicated by the range of the confidence intervals, the present effects of gender differences in prosocial behavioral intentions and prosocial (transfer) behavior are small. However, previous research suggests that even small gender differences in behavior can accumulate and have substantial consequences (see Hyde & Lindberg, 2007). It is important to address men's lesser inclination to engage in communal helping as men's relative lack of communal engagement has been linked to negative effects for both women and men (see Croft et al., 2015; Meeussen et al., 2020). The present data suggests that exposure to men in communal roles may be one possible way to reduce gender differences in communal prosocial behavior.

Table 4.1. Sample Information for Each Country

Country	*N* (*n* men)	Age range
USA	115 (52)	19-86
Sweden	210 (99)	18-86
Spain	217 (105)	18-78
Japan	212 (110)	20-81
China	185 (101)	18-87
Russia	229 (96)	19-77
Chile	158 (83)	18-82
Mexico	201 (100)	18-75
Colombia	203 (98)	18-71
Indonesia	185 (80)	18-69
Total	1915 (924)	18-87

Note. The sample size varies between countries due to participant drop-out.

Table 4.2. Zero-Order Correlations between Outcome Variables

Variables	1.	2.	3.	4.	5.
1. Self-perceptions[a]	-	.632***	.587***	.101**	.086**
2. Intentions (same-gender)[b]	.656***	-	.832***	.049	.057
3. Intentions (other-gender)[b]	.580***	.831***	-	.045	.056
4. Transfer (same-gender)[c]	.055	.079*	.050	-	.658***
5. Transfer (other-gender)[c]	.048	.086**	.042	.573***	-

Note. Correlations are aggregated over countries. Correlations for men are presented above the diagonal; for women, below. *$p < .05$ **$p < .01$, ***$p < .001$, two-tailed.

[a] The scale ranges from 1-5 (higher numbers indicating more prosocial self-perceptions).

[b] The scale ranges from 1-7 (higher numbers indicating more prosocial behavioral intentions).

[c] Transfers range from 0-100.

Table 4.3. Descriptive Statistics for Outcome Variables Within Countries

Country	Self-perceptions	Intentions (same-gender)	Intentions (other-gender)	Transfer (same-gender)	Transfer (other-gender)
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)
US					
Female	4.16 (0.63)	5.37 (1.13)	5.12 (1.35)	48.73 (26.73)	46.67 (27.47)
Male	4.06 (0.56)	4.73 (1.42)	4.88 (1.53)	51.15 (22.98)	50.96 (23.45)
Sweden					
Female	3.97 (0.63)	5.09 (1.10)	4.92 (1.25)	48.47 (25.38)	44.59 (24.67)
Male	3.94 (0.66)	5.11 (1.21)	5.35 (1.19)	51.21 (28.62)	53.33 (28.32)
Spain					
Female	4.05 (0.65)	5.53 (0.90)	5.35 (1.06)	45.71 (25.95)	47.41 (27.76)
Male	3.99 (0.59)	5.32 (0.97)	5.45 (1.01)	52.48 (27.24)	53.52 (26.09)
Japan					
Female	3.26 (0.76)	4.08 (1.06)	3.81 (1.02)	47.16 (27.70)	41.96 (26.37)
Male	3.37 (0.70)	4.10 (0.88)	4.20 (1.00)	43.27 (26.13)	44.18 (24.36)
China					
Female	3.97 (0.70)	4.97 (1.04)	4.74 (1.17)	47.38 (24.84)	47.74 (24.51)
Male	3.93 (0.57)	4.80 (1.03)	4.85 (1.05)	49.90 (27.59)	53.76 (25.05)
Russia					
Female	3.76 (0.72)	4.83 (1.18)	4.67 (1.38)	47.22 (21.75)	47.89 (22.63)
Male	3.61 (0.78)	4.76 (1.09)	4.89 (1.23)	53.23 (23.42)	57.60 (26.43)
Chile					
female	4.35 (0.62)	5.85 (0.90)	5.68 (1.18)	46.93 (22.42)	48.53 (23.75)
Male	4.18 (0.70)	5.64 (1.16)	5.92 (1.24)	47.35 (24.10)	51.45 (21.59)
Mexico					
Female	4.06 (0.66)	5.51 (1.17)	5.27 (1.35)	47.72 (22.80)	46.83 (23.19)
Male	4.25 (0.63)	5.48 (1.51)	5.82 (1.30)	54.80 (24.47)	52.70 (23.82)
Colombia					
Female	4.38 (0.57)	5.87 (1.01)	5.60 (1.19)	50.57 (25.75)	46.38 (24.62)
Male	4.34 (0.53)	5.68 (1.00)	6.10 (0.98)	54.18 (25.64)	53.98 (25.23)
Indonesia					
Female	4.09 (0.64)	5.44 (1.01)	5.13 (1.16)	49.43 (27.94)	49.24 (28.24)
Male	4.23 (0.69)	5.49 (1.11)	5.38 (1.23)	52.00 (28.08)	55.12 (28.51)

Table 4.4. Hierarchical Linear Regression Results for Prosocial Self-Perceptions Predicted by Gender and Perceived Proportion of Men in Communal Occupations.

				95% CI		
	Coefficient	*SE*	*t*	LL	UL	*p*
Fixed Effects						
Level 1						
Intercept	4.00	0.07	61.51	3.86	4.14	< .001
Age	0.01	0.001	4.44	0.003	0.01	< .001
Subjective SES	-0.05	0.01	-5.29	-0.07	-0.03	< .001
Gender	-0.06	0.03	-1.84	-0.12	0.004	.066
Perceived proportion of men	0.002	0.001	2.34	0.0003	0.003	.019
Gender * Perceived proportion of men	-0.002	0.002	-1.48	-0.01	0.001	.140
Level 2						
Log GDP per capita	-0.20	0.08	-2.50	-0.37	-0.03	.031
Gender equality	3.87	1.68	2.30	0.22	7.51	.045
Random Effects	Coefficient	*SD*				
Intercept variance (country level)	0.040	0.200				

Note. Gender was coded -0.48 for females and 0.52 for males. $N = 1915$ at Level 1 (individuals). Coefficients represent unstandardized regression weights (fixed effects) and variances (random effects).

Table 4.5. Hierarchical Linear Regression Results for Prosocial Behavioral Intentions Predicted by Gender, Interaction Type, and Perceived Proportion of Men in Communal Occupations.

				95% CI		
	Coefficient	*SE*	*t*	LL	UL	*p*
Fixed Effects						
Level 1						
Intercept	5.17	0.10	50.57	4.94	5.39	< .001
Interaction type	-0.03	0.02	-1.76	-0.06	0.004	.079
Level 2						
Age	0.004	0.002	2.24	0.0005	0.01	.025
Subjective SES	-0.08	0.02	-5.16	-0.11	-0.05	< .001
Gender	0.04	0.05	0.75	-0.06	0.14	.453
Perceived proportion of men	0.01	0.001	4.51	0.003	0.01	< .001
Gender * Perceived proportion of men	0.0003	0.003	0.10	-0.005	0.01	.918
Level 3						
Log GDP per capita	-0.35	0.13	-2.84	-0.62	-0.08	.017
Gender equality	7.41	2.64	2.81	1.68	13.13	.019
Cross-level interaction						
Interaction type * Gender	0.40	0.03	11.91	0.33	0.47	< .001
Interaction type * Perceived proportion of men	0.002	0.001	1.88	-0.0001	0.003	.060
Interaction type * Gender * Perceived proportion of men	-0.004	0.002	-2.15	-0.01	-0.0003	.032
Random Effects	Coefficient	*SD*				
Intercept variance (individual level)	1.01	1.01				
Intercept variance (country level)	0.10	0.31				

Note. Interaction type was coded -0.5 for same-gender interactions and 0.5 for other-gender interactions. Gender was coded -0.48 for females and 0.52 for males. N = 3830 at Level 1 (observations) and N = 1915 at Level 2 (individuals). Coefficients represent unstandardized regression weights (fixed effects) and variances (random effects).

Table 4.6. Hierarchical Linear Regression Results for Prosocial (Transfer) Behavior Predicted by Gender, Interaction Type, and Perceived Proportion of Men in Communal Occupations.

				95% CI		
	Coefficient	*SE*	*t*	LL	UL	*p*
Fixed Effects						
Level 1						
Intercept	49.44	0.52	94.89	48.42	50.46	< .001
Interaction type	0.18	0.51	0.35	-0.82	1.18	.727
Level 2						
Age	0.04	0.04	1.23	-0.03	0.11	.220
Subjective SES	-0.70	0.30	-2.31	-1.29	-0.11	.021
Gender	4.04	1.09	3.72	1.91	6.18	< .001
Perceived proportion of men	0.09	0.03	3.27	0.04	0.14	< .001
Gender * Perceived proportion of men	-0.05	0.06	-0.96	-0.16	0.06	.337
Level 3						
Cross-level interaction						
Interaction type * Gender	2.92	1.02	2.86	0.92	4.93	.004
Interaction type * Perceived proportion of men	-0.01	0.03	-0.23	-0.06	0.05	.818
Interaction type * Gender * Perceived proportion of men	-0.08	0.05	-1.48	-0.19	0.03	.139
Random Effects	Coefficient	*SD*				
Intercept variance (individual level)	394.9	19.87				

Note. Interaction type was coded -0.5 for same-gender interactions and 0.5 for other-gender interactions. Gender was coded -0.48 for females and 0.52 for males. N = 3830 at Level 1 (observations) and N = 1915 at Level 2 (individuals). Coefficients represent unstandardized regression weights (fixed effects) and variances (random effects).

5 Chapter: Internal and External Factors in Girls' and Boys' Communal Aspirations

5.1 Overview of Study

In the previous two chapters, I have presented empirical evidence that men's relatively low communal engagement, in terms of their future caregiving intentions (Chapter 3) and communal helping behavior (Chapter 4), is visible across countries. These data mirror global labor market statistics on men's underrepresentation in communal care-oriented work (ILO, 2017). Even in Norway, which is ranked as the second most gender-egalitarian country in the world (World Economic Forum, 2018), men are underrepresented in Health, Early Education, and Domestic functions (HEED; Utdanning, 2014). Researchers agree that the development of career aspirations starts in early childhood (see Hartung et al., 2005). Yet, the majority of research has focused on adolescents and young adults (Leung, 2008), overlooking processes that take place in early childhood (McMahon & Watson, 2008). In the current chapter, we investigate the extent to which internal factors such as communal self-perceptions and external factors such as (the perception of) gender segregation across communal roles influence young Norwegian children's aspirations toward communally oriented roles in HEED. Below I present a shortened version of a manuscript that has been submitted for publication. See Appendix D for the full manuscript and supplementary materials.

5.1.1 The Development of Children's Career Aspirations in Early Childhood

Girls and boys develop gender stereotype-congruent career aspirations in early childhood (Levy et al., 2000; Weisgram et al., 2010). Research from the US, for example, has shown that boys are more likely to aspire to stereotypically masculine careers in aviation and law, whereas girls are more likely to aspire to stereotypically feminine careers in healthcare and elementary education. For a number of reasons, people often do not end up pursuing the specific careers they aspired to as young children. However, early gender stereotype-congruent career aspirations may have a cumulative impact on children's interests and skills development (Wigfield & Eccles, 2000), and ultimately academic and career choices. Interventions that aim to promote gender stereotype-incongruent career aspirations may thus be effective if implemented in early childhood to steer girls and boys onto gender stereotype-incongruent career trajectories. However, due to a lack of research on the development of career aspirations, it is unclear how such interventions should be designed. Therefore, more direct tests of theoretical frameworks of career development in early childhood are needed (Leung, 2008).

5.1.2 Do Children's Self-Perceptions Influence Their Career Aspirations?

The extent to which career aspirations in early childhood are regulated internally, via self-perceptions, warrants empirical attention. *The developmental theory of occupational aspirations* (Gottfredson, 1981, 2005) posits that with increasing cognitive abilities, children (from 14 years of age) begin to aspire toward domains that they recognize are congruent with their values, interest, and perceived abilities. The link between self-perceptions and aspirations has been empirically established among US adolescents. For example, among 13-year-olds, agentic self-perceptions were associated with interests in STEM careers whereas communal self-perceptions were associated with interests in HEED careers (Lapan & Jingeleski, 1992). In addition, 11- to 14-year-old girls' and boys' self-perceptions predicted their gender stereotype-incongruent career aspirations: the extent to which girls saw themselves as instrumental (e.g., independent, assertive, and self-confident) predicted their interest in male-dominated careers, and the extent to which boys saw themselves as relational (e.g., kind, caring, and understanding) predicted their interest in female-dominated careers (Mendez & Crawford, 2002).

Some evidence suggests that, even prior to adolescence, children regulate their career aspirations from internal dispositions. For example, research from Canada has shown that already from six years of age, boys were less likely to prioritize family over career because they were less likely to endorse communal values than girls (Block et al., 2018). Self-efficacy (i.e., belief in one's ability to succeed in a given domain; Bussey & Bandura, 1999) has also been shown to influence the career aspirations of young children in the UK and the US (Dewitt et al., 2013; Fulcher, 2011). Self-efficacy beliefs originate partly from children's past behavior in that children may feel confident in their ability to enact a behavior they have enacted many times before. A girl who aspires toward becoming a nurse may have engaged in the following thought process: "I often look after others, thus, when I grow up, I want to be a nurse". In this research, we contribute to this literature by exploring whether self-perceptions (i.e., the degree to which children perceive themselves as someone who engages in communal behavior) also influence their aspirations toward communal roles in HEED.

5.1.3 Does Children's Gender Stereotyping Influence Their Career Aspirations?

The developmental theory of occupational aspirations also posits that from 6-8 years old, children's aspirations are influenced externally via descriptive gender stereotypes (e.g., nurses are women; Gottfredson, 1981, 2005). However, cognitive theorists propose that, from an even earlier age, children develop descriptive gender stereotypes from processing their observations of women and men in their immediate environment (Bigler & Liben, 2006).

Specifically, once children are able to distinguish between women and men, they observe them and store knowledge of both genders in cognitive networks (i.e., gender schemas, Martin et al., 2002). A central hypothesis of gender schema theory is that children subsequently internalize these descriptive gender stereotypes (Martin et al., 2002). For example, a girl who chooses to play with a doll has engaged in the following thought process: dolls are "for girls" and "I am a girl", which means "dolls are for me" (Martin & Halverson, 1981, p. 1120; see also Baron et al., 2014; Greenwald et al., 2002). In line with this hypothesis, research from Singapore has shown that elementary school-aged girls and boys associated math more with "boys", which corresponded with girls being less likely to associate themselves with math (Cvencek et al., 2015). Interestingly, girls did so prior to the emergence of gender difference in math abilities, which suggests that their sense of self was influenced externally, via gender stereotypes, rather than internally, via their own past performance (Cvencek et al., 2011, see also Hartley & Sutton, 2013). Thus, girls may form stronger communal career aspirations than boys based on the following reasoning: "girls work as nurses" and "I am a girl", which means that "I want to be a nurse".

However, the extent to which descriptive gender stereotypes influence children's career aspirations is underexamined, particularly in early childhood (for exceptions see Serbin et al., 1993; Weisgram et al., 2010). Instead, most research has focused on the relationship between descriptive gender stereotypes and children's toy preferences (for an overview see Miller et al., 2006). The literature examining the associations between descriptive gender stereotypes (e.g., "only girls" play with dolls) and children's preferences (e.g., whether they want to play with dolls) is inconsistent (Campbell et al., 2004), and even if significant, the relationship is weak (r = .09; Serbin et al., 1993). In addition, even though research has found significant correlations between descriptive gender stereotypes for novel careers and children's aspirations toward these careers in a laboratory setting in a US context (Weisgram et al., 2010), these effects may not generalize to familiar careers or other cultural contexts.

5.1.4 The Present Research Context

The majority of research on gender roles in early childhood has been conducted in a US context (Starr & Zurbriggen, 2017). It is important to test theoretical predictions in different cultural contexts for the following reasons. First, the degree to which children's aspirations are "internally" and "externally" regulated may be unique to the cultural context as the importance to self-express and to adhere to norms vary in different cultural contexts (Schwartz, 2012). Second, gender role expectations that may shape children's aspirations are influenced by the distribution of women and men in different (social and occupational) roles

within a given culture (Eagly et al., 2000) and may thus also vary across cultural contexts.

The present research investigated the development of children's aspirations toward communal roles in HEED in an underexamined cultural context – Norway. Norwegian children may be exposed to conflicting information about what are appropriate roles for women and men to engage in. On the one hand, Norwegian children are exposed to a gender segregated labor market. In Norway, women make up the vast majority of employees in kindergartens (92%) and in the health care system (84%; Statistisk sentralbyrå, 2019a; Statistisk sentralbyrå, 2019b). On the other hand, Norwegian children are exposed to males in communal roles at home (as 70% of Norwegian fathers take more than 10 weeks of parental leave; Statistisk sentralbyrå, 2018). In addition, Norwegian kindergartens are required to actively promote positive attitudes toward communal roles among boys (Norwegian Ministry of Children, Equality and Social Inclusion, 2014). As such, Norway is a unique cultural context to investigate gender differences in communal self-perceptions and communal aspirations among young children.

5.2 Hypotheses

Considering that women are overrepresented in communal roles, even in a relatively gender-egalitarian country such as Norway, we predicted that girls would report more communal self-concepts than boys. Specifically, we predicted that girls would aspire more toward communal roles (**H1**) and perceive themselves to be more communal (**H2**) than boys. In addition, we predicted that the more children identify with communal behaviors, the more they would report aspiring to communal roles (**H3**). Second, we assessed whether young children's aspirations are influenced via descriptive gender stereotypes. Since children have different socialization experiences, the extent to which they endorse gender stereotypes may vary (Weisgram, 2016). Thus, we predicted an interaction between degree of gender stereotyping and the child's gender. The more girls perceive communal roles to be "only for women" the *more* they will aspire toward communal roles (**H4a**). In contrast, for boys the more they perceive communal roles to be "only for women" the *less* they will aspire toward communal roles (**H4b**).

5.3 Method

5.3.1 Participants and Procedure

In total, we collected data from 177 children from 20 different kindergartens in the municipality of Troms, Norway. Eleven participants were excluded from analyses due to revoking consent during testing (n = 7), technical issues (n = 3), or not following instructions (n = 1). We also excluded children younger than 4.5 years old (n = 7) as the experimenters

reported that some of the young children showed difficulties with following the instructions and paying attention. Our final sample consists of 159 participants (84 boys, 75 girls) between the ages of 54 and 75 months (M = 66.10 months, SD = 4.45, missing age for 2 boys). Participants were predominantly monolingual (87.97%). The remaining children reported speaking another language in addition to Norwegian at home (regions of origin: Eastern Europe = 6, Northern Europe = 3, Western Europe = 4, Asia = 3, Middle East = 2, Oceania = 1), but all these children demonstrated high Norwegian language abilities, as determined by the experimenters.

Participants were tested in groups of up to four by two experimenters. The experimenters either took the role of the interviewer (i.e., reading the instructions aloud to participants) or the role of the secretary (i.e., taking notes and assisting participants if needed). Children were each given a tablet to record their responses.

5.3.2 Measures

Children's responses were recorded using two different kinds of scales. A 3-point smiley Likert scale was used to measure the extent to which children aspired toward a set of communal roles and identified with a range of communal behaviors. The children were instructed to use their tablet and "press on the face that does not smile if you disagree, press on the face with the little smile if you agree a little bit, or press on the face with the big smile if you agree a lot". In order to measure the extent to which children gender stereotyped these communal roles and behaviors, the children were asked to "press on the image of the boy if you think that *only boys* can do this, or press on the image of the girl if you think that *only girls* can do this, or press on the image of the boy and girl if you think that *both boys and girls* can do this (the positioning of the images on the tablet screen were counterbalanced).

5.3.2.1 Children's Self-Perceptions of Their Behavior

To measure the extent to which children perceive themselves as communal the experimenter told children that "I will now read short stories about some children I know. It is your job to tell me whether this child sounds like you." Four items assessed the extent to which participants identified with communal behaviors (i.e., help others who are upset, be close to others, hug others, comfort others who are upset; α = .71). For example, the experimenter asked the child: "I know a child who really, really likes to hug others and this child always gives hugs to other children. Does this sound like you?"

5.3.2.2 Children's Aspirations

To measure children's aspirations, the experimenter told the children: "I can imagine

that you have thought about what you want to be when you grow up. When I went to kindergarten and thought about what I wanted to be when I grew up, I wanted to be so many things, not just one thing. I will now show you a few images of people who have different jobs. Although you might have decided what job you want to do later in life, I want you to tell me how much you would like to do this job". Next, the experimenter, for example, showed the children an image depicting a nurse and asked: "What do we have here? Plasters and a syringe. Who uses this? A nurse who cares for people who are sick. Would you like to be a nurse when you grow up?". Children were asked to report aspirations toward three different communal roles (i.e., Would you like to be a nurse?, Would you like to stay home from work and look after your baby?, Would you like to be a kindergarten teacher?; $\alpha = .62$).

5.3.2.3 Children's Gender Stereotypes

The participants were then asked to report gender stereotypes for the same 3 communal roles. Children were instructed by the experimenter to "tell me who you think can do this job". For example: "Who do you think can be a nurse?" To compute a variable for gender stereotyping of communal roles, the responses only boys or both boys and girls were coded as 0, since these answers do not represent traditional gender stereotypes. Responding only girls was coded as 1 as it represents traditional gender stereotypes. A sum total score was calculated for each participant, with higher numbers indicating more gender stereotyping (Spinner et al., 2018).

5.3.2.4 Control variables

We recorded a number of potential factors which could influence the predicted effects. For example, we recorded the number of male and female teaching staff at each kindergarten as repeated exposure to gender stereotype-incongruent role models (i.e., male kindergarten teaching staff) may increase communal behavior among boys (see Bussey & Bandura, 1999). We also recorded the child's age, whether the child was bilingual, and the gender of the experimenter in order to take into account experimental effects.

5.4 Results

In the following analyses, we controlled for the child's age, bilingualism (monolingual coded as 0, bilingual coded as 1), gender of the experimenter (female coded as 0, male coded as 1), and whether the child attended a kindergarten with all female (coded as 0) versus both male and female (coded as 1) teaching staff. Table 5.1 presents the overall means and standard deviations for the variables as well as the zero-order correlations for the associations between the variables.

5.4.1 Do Children Regulate Their Aspirations from Internal Standards?

To assess the extent to which children regulate their aspirations from internal standards (i.e., the extent to which they perceived themselves as someone who engages in communal behavior), and whether gender influences aspirations via self-perceptions, we conducted an analysis of indirect effects using Hayes' Process macro (2017; Version 3.4.1, Model 4, 5000 bootstrap samples). Gender was entered as the predictor (X), communal aspirations as the outcome (Y), and communal self-perceptions as the mediator (M). The model accounted for a significant proportion of variance in children's communal aspirations, R^2 = .12, $F(5, 140) = 3.79$, p = .003. Gender did not predict communal aspirations independent of the mediator (b = 0.09, p = .417, 95% CI [-0.13; 0.32]). Gender predicted communal self-perceptions, b = 0.26, p = .009, 95% CI [0.07; 0.45], which in turn predicted aspirations, b = 0.30, p = .002, 95% CI [0.11; 0.49]. A bias-corrected bootstrap confidence interval for the indirect effect was above zero, b = 0.08, 95% CI [0.01; 0.17]. This indicates that although girls did not aspire more toward communal roles than boys (contrary to **H1**), girls identified more with communal behaviors than boys (in line with **H2**), which in turn was associated with higher communal aspirations (in line with **H3**; see Figure 5.1). This suggests that children's communal aspirations are internally regulated via their self-perceptions. Thus, girls may ultimately be more likely to aspire toward communal roles because they are more likely than boys to identify as communal. The covariate age was positively associated with communal aspirations (b = 0.03, p = .014, 95% CI [-0.06; -0.01]). When the experimenter was male, children also identified more with communal behaviors (b = 0.25, p = .011, 95% CI [0.06; 0.44]). Gender stereotype-incongruent exposure (i.e., exposure to male kindergarten teachers on a daily basis) was associated with lower communal aspirations (b = -0.30, p = .007, 95% CI [-0.52; -0.08]). The effect of bilingualism was non-significant (p = .365).

5.4.2 Do Children Regulate Their Aspirations from External Standards?

The majority of children (65%) reported gender-egalitarian attitudes across all three communal roles (26% of children gave gender-stereotypical responses for one role; 8% gave gender-stereotypical responses for two roles; 0% gave gender-stereotypical responses for three roles; 1% missing data). Girls and boys were equally likely to gender stereotype communal roles (M_{girls} = 0.50; M_{boys} = 0.37, $t(156) = -1.28$, p = .202, 95% CI [-0.32; 0.07]).

To assess the extent to which girls and boys regulate their aspirations from external standards (i.e., the extent to which they perceived communal work as something only girls do), we conducted an analysis of moderation effects using Hayes' Process macro (2017; Version 3.4.1, Model 4, 5000 bootstrap samples). Gender stereotypes toward communal roles

was entered as the predictor (X), communal aspirations as the outcome (Y), and gender of the child as the moderator (W). The overall model accounted for a significant proportion of variance in children's communal aspirations, $R^2 = .11$, $F(7, 138) = 2.37$, $p = .025$. There was neither a main effect of gender stereotypes on aspirations (b = -0.32, $p = .275$, 95% CI [-0.89; 0.25]) nor of gender (b = 0.03, $p = .806$, 95% CI [-0.23; 0.30]). Even though a bias-corrected bootstrap confidence interval for the hypothesized interaction (b = 0.28, $p = .127$, 95% CI [-0.08; 0.63]) spanned zero, there was a non-significant trend, indicating different tendencies for girls and boys. Simple slopes show that the effect of gender stereotyping on aspirations was non-significant among boys (contrary to **H4b**), b = -0.04, $p = .753$, 95% CI [-0.30; 0.22], but approached significance among girls, b = 0.24, $p = .059$, 95% CI [-0.01; 0.48]. The covariate gender stereotype-incongruent exposure (i.e., exposure to male kindergarten teachers on a daily basis) was associated with lower communal aspirations (b = -0.31, $p = .008$, 95% CI [-0.53; -0.08]. Age was also negatively associated with communal aspirations (b = -0.03, $p = .043$, 95% CI [-0.05; -0.001]. All other covariates were non-significant ($ps \geq .545$).

5.4.2.1 Exploratory Analyses

Children use everyday interactions to build cognitive schemas (i.e., mental representations) for roles (Martin et al., 2002). Young children might have fewer experiences with nurses than with kindergarten teachers and stay-at-home parents. As a consequence, children's schema for nurses may be less rich than their schema for kindergarten teachers and stay-at-home parents, and children may therefore be more inclined to use superficial information (such as descriptive gender stereotypes) rather than detailed information about the role when they determine their fit with that role. On the basis of that reasoning, we ran exploratory analyses to test the interaction between the gender of the child and gender stereotypes for each role. Gender did not significantly interact with gender stereotyping for stay-at-home parents (b = -0.45, $p = .274$, 95% CI [-1.26; 0.36]) or for kindergarten teachers (b = -0.38, $p = .439$, 95% CI [-0.59; 1.36]). However, gender significantly interacted with gender stereotyping of nurses (b = 1.11, $p = .013$, 95% CI [0.24; 1.98]). The effect of gender stereotyping of nurses on aspirations toward becoming a nurse was non-significant among boys, b = -0.50, $p = .151$, 95% CI [-1.18; 0.18], but significant among girls, b = 0.61, $p = .024$, 95% CI [0.08; 1.15]. This effect was in the expected direction: the more girls thought that "only girls" work as nurses, the more they aspired to become nurses themselves (in partial support of **H4a**).

5.5 Discussion

The present research investigated the development of communal role aspirations in

early childhood. The main aim was to assess whether young children's aspirations are internally and externally regulated. The extent to which aspirations are internally regulated was assessed by examining the relationship between children's aspirations and their self-perceptions of their behavior. The present findings showed that even though girls were no more likely to aspire toward communal roles than boys (contrary to **H1**), girls were more likely to identify with communal behaviors (**H2**). Since children's behaviors may influence their interests and skills development (Wigfield & Eccles, 2000), boys might over time become less likely to aspire toward communal roles than girls. Indeed, our findings showed that the more children perceive themselves as someone who engages in communal behaviors, the more they aspire toward communal roles (**H3**). This suggests that children's aspirations are, at least partly, internally regulated. These findings have important implications for interventions. As children appear to align their communal aspirations with their past behaviors, interventions that aim to promote communal aspirations among boys should focus on targeting boys' behaviors. Behaviors can be difficult to change once they have been established (see Olsson & Martiny, 2018). Given that boys at 4.5 years of age were already less likely to identify with communal behaviors than girls, interventions may have to be implemented earlier.

The extent to which aspirations are externally regulated (i.e., whether children internalize descriptive gender stereotypes) was assessed by relating gender stereotypes to a range of communal roles and children's aspirations toward these roles. The present research went beyond previous research (e.g., Carter & Levy, 1988; Serbin et al., 1993; Weisgram et al., 2010) by relating gender stereotypes and preferences in the same domains, at the domain specific level, and for familiar domains. In line with gender schema theory, which posits that children are motivated to act in line with gender norms (Martin et al., 2002), the present findings show that girls who were more likely to associate being a nurse with *only girls* aspired more toward becoming a nurse (in partial support of **H4a**). However, the present findings show that girls did not internalize gender stereotypes of stay-at-home parents and kindergarten teachers. This suggests that children do not internalize gender stereotypes of all roles. It is reasonable to assume that children have had more direct experience with stay-at-home parents and kindergarten teachers than with nurses. These mixed findings might reflect that when children are less familiar with what a role entails, they draw more upon superficial cues, such as descriptive gender stereotypes to determine their relative fit with that particular role.

Interestingly, we did not find the hypothesized negative relationship between descriptive gender stereotyping of communal roles and boys' aspirations toward these roles (**H4b**). This suggests that gender stereotype-congruent aspirations (i.e., communal

aspirations among girls) are more likely to be externally regulated than gender stereotype-incongruent aspirations (i.e., communal aspirations among boys). This further suggests that merely knowing that men engage in communal roles does not on its own promote communal aspirations among boys. It may be the case that although boys recognize that *some* men engage in communal roles, they may not feel inspired by those men because they have subtyped them (i.e., considered those men as exceptions to the rule; Richards & Hewstone, 2001). As such, communal men may be considered irrelevant models for what "normal" men *should do*. It may be the case that for men in communal roles to inspire communal engagement in young boys, boys need to be repeatedly exposed to men engaging in communal behavior. However, a comparison of boys who attended kindergartens with male and female kindergarten staff vs. only female kindergarten staff revealed no difference in boys' communal self-perceptions or aspirations toward communal roles (see Appendix D for a summary of these analyses).

The positive skew for the gender stereotyping of communal roles indicates that we may not have had sufficient variance to examine the relationship between gender stereotypes of communal roles and children's communal aspirations. As we only assessed gender stereotyping of communal roles with three categories (*only boys* vs *only girls* vs *both boys and girls*), we may not have been able to capture the nuances of gender stereotyping, which may have contributed to non-significant effects for stay-at-home parents and kindergarten teachers. Future research could explore whether measuring gender stereotypes on a 5-point scale ranging from *only boys, more boys than girls, equal numbers of boys and girls, more girls than boys, only girls* can capture the nuances in gender stereotyping in this age group (Trautner et al., 2005).

That being said, the non-significant association between descriptive gender stereotypes of stay-at-home parents and kindergarten teachers and children's aspirations toward these roles may not be rooted in low variance. In fact, the present findings are in line with previous research, which in itself is riddled with mixed effects, suggesting that there may be moderating factors. Future research should thus investigate whether there are underlying reasons as to why some roles, but not others, are externally regulated, for example by taking into account the child's familiarity with the role. In addition, the positive skew for the gender stereotyping of communal roles may be culturally bound as children in Norway (relative to children in other cultural contexts) have more experience with men in communal roles.

The present findings have implications for future research. Our findings suggest that boys see themselves as less communal than girls. This was the case even at such an early age

and in a cultural context where boys are actively encouraged to engage communally (Norwegian Ministry of Children, Equality and Social Inclusion, 2014). This raises questions about how and why these early gender differences arise. Some researchers argue that early gender differences in such an egalitarian context must represent intrinsic differences between women and men (Schmitt et al., 2008). Other researchers stress the role of the environment in fostering gender roles (see Liben & Coyle, 2014). To unpack the influence of innate versus environmental factors, future research could systematically assess children's self-perceptions and role aspirations in (cultural) contexts that vary in degrees of gender-equal representation across communal roles.

In conclusion, the present study addresses an underexamined but important question, namely men's underrepresentation in communal roles. The tendency for boys to identify less with communal behaviors than girls at such an early age, and in such an egalitarian context, is noteworthy and suggests that girls and boys enter different career trajectories from early childhood onwards.

Table 5.1. Descriptive Statistics and Correlations for All Study Variables

	Variables	Boys	Girls							
		M (*SD*)	*M* (*SD*)	1.	2.	3.	4.	5.	6.	7.
1.	Stereotypes of communal roles[a]	0.37 (0.64)	0.50 (0.65)	-	.23*	-.02	.00	-.09	-.10	-.02
2.	Communal aspirations[b]	1.79 (0.69)	1.93 (0.66)	.03	-	.09	-.05	-.11	-.10	-.26*
3.	Communal self-perceptions[c]	2.22 (0.62)	2.49 (0.55)	.02	.37**	-	-.15	-.01	.18	-.16
4.	Gender of experimenter[d]	0.48 (0.50)	0.33 (0.47)	.16	-.04	.20	-	.03	-.15	-.08
5.	Bilingualism[e]	0.10 (0.30)	0.15 (0.36)	-.12	.24*	.11	-.07	-	-.09	-.01
6.	Age (months)	65.96 (4.41)	66.19 (4.51)	-.01	-.20	-.01	-.16	-.08	-	-.33**
7.	Incongruent exposure[f]	0.48 (0.50)	0.57 (0.50)	-.08	-.10	.06	.08	-.08	-.03	-

Note. Values for girls are presented above the diagonal; for boys, below. *$p < .05$ **$p < .01$, two-tailed.

[a] The scale ranges from 0-3 (higher numbers indicating more gender stereotyping).

[b] The scale ranges from 1-3 (higher numbers indicating higher communal aspirations).

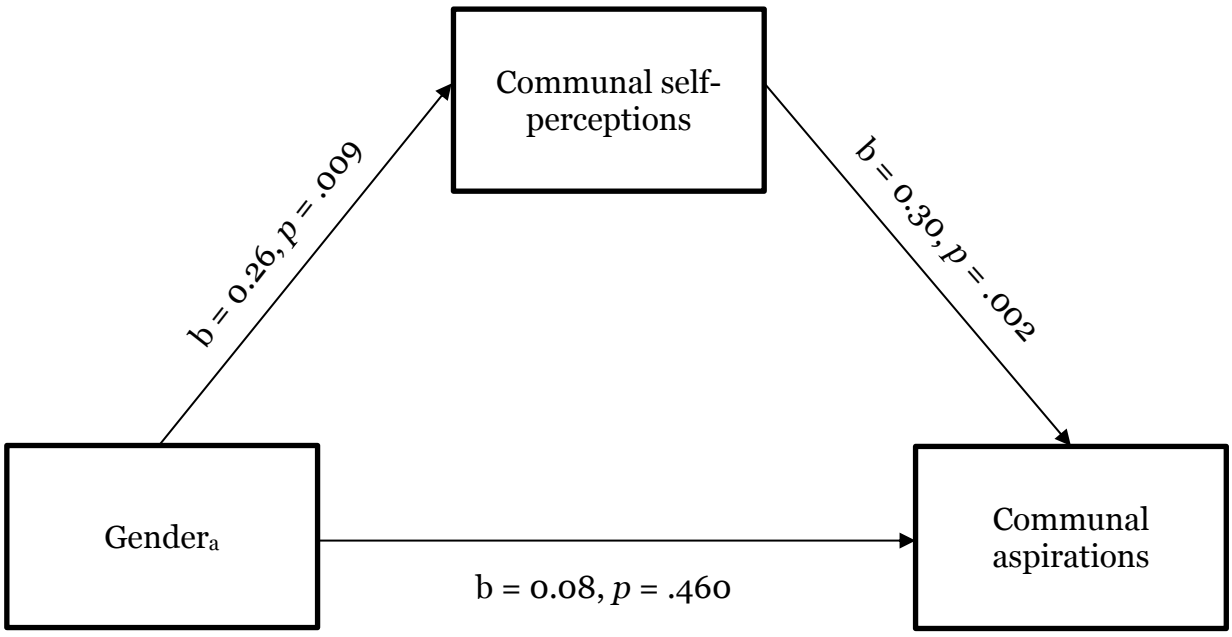
[c] The scale ranges from 1-4 (higher numbers indicating more communal self-perceptions).

[d] 0 = male and 1 = female.

[e] 0 = monolingual and 1 = bilingual.

[f] 0 = all female teaching staff and 1 = both male and female teaching staff.

Figure 5.1. Communal Aspirations as a function of Gender and Communal Self-Perceptions



Note. Standardized regression coefficients for the relationship between gender (69 = girls, 77 = boys), communal self-perceptions, and communal aspirations (N = 146).

[a] 0 = boys and 1 = girls.

6 Chapter: Conclusions about Causes and Consequences of Gender Roles

In this dissertation I have presented three different lines of research aimed at understanding the pervasive gender-based division across paid and unpaid work that is observed worldwide. Past research has repeatedly shown that girls and boys are socialized into different roles, resulting in women's underrepresentation in agentic achievement-oriented roles and men's underrepresentation in communal caring-oriented roles (see Wood & Eagly, 2012). However, a large proportion of gender research is concentrated on specific populations and cultural contexts (e.g., the US; Heinrich et al., 2010; Starr & Zurbriggen, 2017). The first aim of this research was to advance the literature on the contextual factors that contribute to a gendered division of paid and unpaid work by examining this issue across a wide range of countries. The second aim of this research was to identify how and when to intervene to promote an equal number of women and men in agentic and communal roles. In Chapter 2, I evaluated – based on empirical research – the potential for interventions employing counterstereotypical role models (e.g., female scientists or female leaders) for promoting girls' and women's efficacy for, and interest in, STEM or leadership roles. Chapter 3 looked more broadly at the role of different policies and the sociocultural context in promoting future caregiving intentions in young women and men across 37 countries. Chapter 4 and 5 further contributed to the emerging literature on how to promote communal engagement in boys and men by exploring the hypothesis that perceiving more men in communal roles is associated with more communal engagement.

6.1 Summary of Key Findings

The focus of Chapter 2 was to explore when and how exposure to, or interactions with, counterstereotypical role models promotes counterstereotypical aspirations and behavior. The review focused on research that addressed the potential of female counterstereotypical role models to shift gender role beliefs, self-perceptions, and aspirations in girls and women, as research involving male counterstereotypical role models is scarce. Our review indicated that exposure to successful women, in fields where women are underrepresented, sometimes (but not always) promotes higher self-efficacy beliefs and interest in girls and women toward these fields. Our hypothesis was that such role model effects operate through changing gender stereotypical beliefs about what women can do. Whereas there was some support for this hypothesis, it seems to be the case that role models need to be perceived as *different enough* to challenge gender stereotypes but at the same time not *too different* (as such interventions may have counterproductive effects!). For role model interventions to be

effective they need to consider the perspective of the role aspirant – for example, the degree to which the girl targeted in the intervention perceives similarities between herself and the role model. Merely sharing a gender with the role model may not be sufficient to promote efficacy and aspirations, as gender is not the sole basis of how one defines oneself (an issue I will return to later in this chapter). Therefore, it may be important to match the role model and the individual targeted in the intervention on not only their gender but also their ethnic and/or social class background.

Perhaps of most relevance to the focus of this dissertation was the notable lack of research involving role models in the domestic domain (i.e., involving boys as well as girls). This is problematic as in order for women to achieve gender equality in agentic domains, it is important to not only address girls' greater sense of priority for domestic work, but also boys' lower priority for this work. However, to date, there is not much research that can inform the design of interventions to promote greater communal engagement in boys and men.

With the aim of contributing to this research gap, the focus of Chapter 3 was to explore the role of parental leave policies in promoting communal intentions in young men. Across 37 countries (representing every major world region), we examined young women's and men's intentions to take leave from work to care for their future child. We found that, in all countries, women indicated longer leave intentions than men. The fact that a gender gap in leave intentions was visible in young adults before they even have children of their own (and that leave intentions were inversely related to their career ambitions) demonstrates the need for policies to not only try to promote men's leave uptake at a time when they have children but, importantly, also prior to this. However, we found no evidence linking different parental leave policies to intended leave uptake in young men. In fact, we found very little systematic cross-national variation in men's intended leave uptake. As far as our data could tell, men's intentions to engage communally in the future seemed to be more rooted in individual-level factors, such as their gender attitudes, than in the broader policy and sociocultural context.

Chapters 4 and 5 focused more on individual-level factors of boys' and men's communal engagement. Chapter 4 examined gender differences in communal helping behavior in a representative sample (in terms of age and gender) across 10 countries. We found that men, on average, reported lower communal helping intentions in same-gender interactions than women. Interestingly, men who perceived a relatively larger proportion of men in communal occupations in their country reported stronger intentions to engage in communal helping behavior. Although this effect was small, this relationship held when controlling for country-level indicators of gender equality and economic development. This

suggests that interventions that aim to promote more communal engagement in men may benefit from making communal male role models in societies more visible. In Chapter 5, which examined young children's aspirations toward communal roles in health care, early education, and domestic functions, we found that knowing that men engage with communal roles was not associated with higher aspirations toward those roles in boys. Instead, boys' and girls' communal aspirations were related to the degree to which they saw themselves as someone who engages in communal behavior. Our findings have implications for interventions aiming to promote caregiving aspirations in boys, as they suggest it may not be sufficient to merely make boys aware that men can be nurses or kindergarten teachers. Rather, our findings suggest that the majority of Norwegian boys already know that, but may nevertheless be less likely to enter communal roles as they are less likely to engage in communal behavior (and therefore less likely to envision themselves in communal roles in the future). Thus, in order to encourage caregiving aspirations in boys, it may be more effective for interventions to actively encourage communal behavior in boys.

6.2 Implications and Future Directions

My research on the causes and consequences of gender roles expands our understanding of what leads to a gendered division of paid and unpaid work by focusing on the relatively underexplored issue of men's underrepresentation in communal work. This work also contributes to the literature on contextual factors surrounding gender differences in aspirations and behavior by extending research to underexplored populations and to societal-level contextual factors. My data speaks to the pervasive nature of gender roles as I found that men's relatively lower communal engagement was evident across countries (even in countries that rank at the top on gender egalitarian indices) and from early childhood. As women's career opportunities may be restricted by men's lower domestic involvement (e.g., Croft et al., 2019), these data corroborate the prediction by WEF (2020) that global gender parity in economic participation and opportunity will not be achieved in this lifetime – unless active efforts are made to tackle gender roles in the domestic domain.

6.2.1 How to Design and Evaluate the Effectiveness of Interventions

As mentioned earlier, there is a scarcity of research on interventions that aim to address gender-unequal participation in the domestic domain. My data have some implications for how interventions that seek to reduce a gendered divide of paid and unpaid work should be designed. In Chapter 3, we noted that men's gender-traditional attitudes (e.g., "it is more appropriate that leadership positions are held by males") were associated with lower leave intentions. Promoting gender egalitarian attitudes may be an effective way to promote higher leave intentions in men, as such attitudes pertain to gender role

expectations with respect to *who should be the breadwinner*. Interestingly, our data suggested that women's gender-traditional attitudes were not associated with their leave intentions. It may be the case that women's higher priority for caregiving is rooted more specifically in gender role beliefs with respect to *who can care*. Indeed, our results indicated that gender-essentialist attitudes (e.g., "Mothers are naturally more sensitive to a baby's feelings than fathers are") were associated with higher leave intentions in women and lower leave intentions in men, suggesting that such beliefs may be important to address in an intervention. As beliefs about intrinsic differences between women and men with regard to their ability to care for a child originate in a gender-unequal division in childcare (Eagly et al., 2000), a role model-based intervention (presenting women and men with men in caring roles) may be the ideal way to reduce such beliefs.

It would be important, however, to explore the effectiveness of said interventions across different sociocultural contexts. Previous research has indicated that the broader sociocultural context moderates the relationship between internal dispositions and behavioral expressions. For example, Fuwa (2004) found that wives' gender egalitarian attitudes were more predictive of couples' share of household tasks in countries with more gender equality than in countries with less gender equality. In addition, Elster and Gelfand (2020) found that individuals' values were more predictive of behavior in so-called *loose* cultures that have weak norms and high tolerance for deviant behavior (e.g., the US) than in so-called *tight* cultures that have strong norms and low tolerance for deviant behavior (e.g., Malaysia). In light of these findings, as part of future analyses of this data I plan to explore whether cross-national differences in gender equality and tightness-looseness (Gelfand et al., 2011) moderate the relationship between gender attitudes and intended uptake of leave. I would further recommend that future research exploring the degree to which leave intentions predict actual leave uptake take into account how the sociocultural context may moderate this relationship.

My data also have some implications for evaluating interventions that target gender differences in communal aspirations and behavior in early childhood. As part of my research (discussed in Chapter 5), I have data that pertains to an initiative set by the Norwegian government to recruit more male kindergarten teachers based on the idea that exposure to men in caring activities promotes gender egalitarian attitudes and communal aspirations in boys (Norwegian Ministry of Children, Equality and Social Inclusion, 2014). The success of this initiative has not been systematically evaluated. Whereas I did not set out with the aim to evaluate this specific initiative, my data indicates that although boys who attended kindergartens with more than one male teacher reported more gender egalitarian attitudes about kindergarten teachers than boys who attended kindergartens with only female teaching

staff, these boys were not more likely to report more gender egalitarian attitudes about nurses, stay-at-home parents, or communal behaviors (see Table SM4 in Appendix D). Furthermore, boys who attended kindergartens with more than one male teacher were not more likely to aspire toward, or engage with, communal roles and behavior than boys who attended kindergartens with only female teaching staff.

I would like to stress that this data should not be interpreted to mean that this initiative has not worked. It is possible that exposure to male kindergarten teachers influences boys in ways that we were unable to pick up with our measures, sample size, or choice of analyses. However, based on these preliminary findings, I would like to encourage more evaluations of this initiative (and initiatives like this) and offer some direction for how this should be done based on insights from my own research.

First, as noted above, we found that exposure to male kindergarten teachers only seemed to promote gender egalitarian attitudes about kindergarten teachers (but not about other communal roles and behavior). This finding is in line with previous research by Martin et al. (1990), which has indicated that young children do not necessarily presume that just because a boy likes *a* "girly" toy that this boy also likes *other* girly toys. Children's overreliance on gender-schematic information (which may make it difficult for them to generalize counterstereotypical information) may make it difficult for role model interventions to have a substantial impact on children's gender-related attitudes or behavior. Although my research did not address how to overcome this obstacle (instead see Bigler & Liben, 1992), my data speaks to the importance of not designing and implementing interventions that assume that children simply generalize counterstereotypical information to other domains or that children internalize counterstereotypical information into their self-schema.

That said, it is of course possible that we only found a modest effect on gender stereotypes because of the way we measured them. As noted in Tables SM1-2 (Appendix D), the majority of Norwegian children reported egalitarian attitudes (e.g., *both boys and girls* can stay at home from work and look after their baby). Although explicit endorsements of gender egalitarian attitudes are important to track as they are indicative of societal norms, children may have learned that the answer "*both boys and girls*" is the most appropriate answer to give even though this is not what they actually think. In order to bypass this limitation, future research may wish to use child-friendly implicit measures of gender stereotypes (Banse et al., 2010; Most et al., 2007) when evaluating whether exposure to counterstereotypical role models succeeds in shifting gender stereotypes. My suggestion would be to use an auditory Stroop paradigm (see Most et al., 2007). In such a paradigm,

children would be presented with a male or female voice vocalizing either a communal or agentic trait/behavior, and immediately thereafter must indicate whether the voice is male or female by pressing a corresponding image on a tablet. Longer processing time for gender-incongruent pairings (e.g., a male voice saying a communal word) than for gender-congruent pairings (e.g., a female voice saying a communal word) would be indicative of more gender stereotyping. Based on the reasoning outlined above, I recommend that future research also replicate the non-significant relationships we observed (between boys' gender stereotypes of communal roles and aspirations toward communal roles) with an implicit measure of gender stereotypes.

It is also possible that we did not find significant effects on gender stereotypes for communal behavior or engagement with communal behavior because the boys did not perceive their male kindergarten teacher as someone who is communal (but instead as someone who is heroic and resourceful; Harris & Barnes, 2009; Sumison, 2005). Although a kindergarten is in many respects a communal workplace, kindergarten teachers also engage in agentic behavior (such as disciplining children and organizing activities). When both women and men work in kindergartens, tasks may be more likely to be divided along gender lines (Nordberg, 2002). In order to further explore the apparent lack of effect of on boys' stereotypes and behavior, it is important to consider how female and male teaching staff divide the tasks that children see. As I argue in Chapter 4, *perceptions* of a gender-based division of roles are more important in predicting related behavior than an *actual* gender-based division of roles. In line with this reasoning, I recommend future research that seeks to evaluate this initiative (or initiatives like this) to assess whether the role model effect (or rather lack thereof) is moderated by boys' perception of their male teacher as someone who engages in communal behavior. This could be easily achieved by, for example, asking children to rate how often they see their male and female teachers engaging in a range of communal and agentic activities and from this calculating the degree to which tasks are divided along gender lines. In addition to this, as our narrative review (in Chapter 2) revealed, the success of role model interventions may be contingent on the degree to which participants perceive similarities between themselves and the role model. I therefore recommend future research to also take into account children's perceptions of their male kindergarten teacher. This could be achieved by asking the participants the following: How similar do you perceive [name of male kindergarten teacher] is to other males? How similar are you to [name of male kindergarten teacher]? Do think you can be similar to [name of male kindergarten teacher] when you grow up?

6.2.2 Theoretical Advancement

The fact that we found gender differences in Norwegian children's communal self-perceptions is noteworthy considering efforts by Norwegian kindergartens to encourage communal behavior and aspirations in boys. It is important, however, to point out that whereas this effect was *statistically* significant, there was a great deal of overlap between girls and boys with some boys behaving in ways that are more typical of a "girlish" girl. We also noted very small gender differences in prosociality (in Chapter 4). Such small gender differences suggest that even if there is a biological (or evolutionary) basis for gender differences in communal engagement, it does not seem to have a substantial effect on women's and men's intentions or behavior. At the same time, small gender differences should not be dismissed, as even small gender differences can contribute to unequal gender representation in the labor market by one gender slightly outperforming the other in hiring processes. What is important is for research to look at contextual factors that may contribute to gender differences to better understand when and how such differences arise, with the aim of understanding how to reduce those gender differences that underlie gender inequality.

Social role theory proposes that gender differences in behavior originate in the unequal representation of women and men across different occupational roles (Eagly & Wood, 2012). The data I presented in Chapter 4 indicated some (albeit limited) support for social role theory in that perceiving less gender segregation in communal roles was associated with a convergence in women's and men's intentions to help in same-gender interactions. This effect suggests that making men in communal roles more visible may be a way to promote more communal engagement in men. It is, however, important to remain cautious in not over-interpreting the practical significance of this effect due to the correlational nature of the data and the size of this effect. Therefore, this effect needs to be replicated before it can be used to inform policy. To establish that perceiving men in communal roles preceeds men's engagement with communal behavior, rather than the other way around, future researchers would need to employ an experimental design. One simple way to establish causaility could be to randomly allocate men into two conditions; present men in respective conditions with different statistics about men's relative (low vs. high) representation in a range of communal occupational roles; subsequently record their communal behavioral intentions across a range of scenarios; and then compare communal intentions across the two conditions.

In Chapter 4, we aimed to replicate the direction of gender differences in same- and other-gender interactions across different operationalizations of prosocial behavior (in an attempt to bridge inconsistent findings across different research paradigms) and across

countries. Despite replicating previous research findings (e.g., that men help more in other-gender interactions) across measures and across countries, little empirical research has established the underlying process of this effect (for an exception see Shnabel et al., 2016). This effect has been interpreted to be in line with sexual selection processes (Buunk & Massar, 2012) as well as gender role expectations (i.e., that men's role is to protect and look after women; Diekman & Clark, 2015). Future research could extend our findings by exploring whether benevolent sexist beliefs predict men's intentions to help in same-gender interactions. In further exploring the assumptions of social role theory, I recommend future research to test whether *perceiving* more gender segregation in agentic roles is associated with more helping behavior in men in other-gender interactions (and whether this relationship is mediated by benevolent sexism). If so, that may indicate that in societies where men are more represented in high-status roles, they perceive protecting women to be part of that role. I remain agnostic as to how future research can evidence the role of sexual selection processes in explaining this effect (i.e., that *men* help *more* than women in other-gender interactions; Buunk & Massar, 2012). I have noted that contrary findings (i.e., that *women* help *more* in other-gender interactions) have also been interpreted to be in line with sexual selection processes (Balliet et al., 2011). In light of this, researchers who study gender differences in prosocial behavior from a sexual selection perspective will need to explain inconsistent findings rigorously or clarify their theoretical predictions.

6.2.3 Expected vs. Actual Engagement with Communal Roles

The use of self-report measures of gender stereotypes, past behavior, and forecasted expectations is a strength of this research because it allowed us to examine theoretical assumptions that girls and boys rely on perceptions of themselves and others in envisioning their future selves (as discussed in Chapter 5). At the same time, this method makes it difficult to draw conclusions regarding the longevity of gender-congruent or -incongruent behavior and preferences detected in early childhood. Longitudinal research tracking children from early childhood into adulthood is scant. However, there is some empirical evidence that gender development in early childhood continues to define children later in childhood and adolescence. For example, Golombok and colleagues found that children who were most gender-typed (in terms of their toy preferences, behavior, and characteristics) as toddlers were still the most gender-typed at age 8 (Golombok et al., 2008) and at age 13 (Golombok et al., 2012). Specifically, girls who parents rated as feminine at age 3 reported more self-efficacy for communal activities – such as babysitting or looking after younger children – at age 13. Boys who were categorized as feminine at age 3 reported lower self-efficacy for agentic activities such as building model planes and cars. Interestingly, boys who were categorized as feminine did not report more self-efficacy for communal activities, which

may be attributed to the tendency for boys, as they get older, to face backlash for engaging in counterstereotypical behavior (Skočajić et al., 2020). Considering how gender norms may change as children get older, and in order to evaluate the potential of interventions in early childhood to have long-term effects, I recommend that future research follows up our findings showing variability among boys in terms of their communal aspirations using longitudinal paradigms and an objective outcome measure. Specifically, I recommend that future research tracks girls and boys longitudinally – measuring their forecasted expectations in early childhood and how these relate to choices of elective courses and extracurricular activities in adolescence and their later occupational choices in adulthood.

In Chapter 3, we also measured forecasted expectations, assessing young adults' intended leave uptake. The aim of our research was not so much to use intentions as a proxy for actual uptake. Rather, we were interested in how the broader policy and sociocultural context relates to intentions at a time when women and men make important life and career choices that may contribute to a gender division in paid and unpaid work later in life. We linked higher expected leave uptake in young women and men to lower career ambition, which indicates that gender differences in caregiving intentions in early adulthood may very well materialize in gender division in paid as well unpaid work. In support of this presumption, longitudinal research has shown that young women who at age 16 express a strong desire to have children enter occupations that are dominated by women (Kanji et al., 2015). Although it seems reasonable to assume that women who prioritize family over career enter communal (female-dominated) work because these sectors tend to provide more opportunities for work-life balance, it is unclear how such priorities influence men's career choices. Even communally-oriented men may worry about the backlash they could face if they were to enter communal work (Miyajima & Yamaguchi, 2017). It would be interesting for future research to build on our findings by exploring how caregiving intentions influence career choices in men. In addition to this, researchers who are interested in advancing theory may wish to predict actual uptake from intentions within Ajzen's (1991) theory of planned behavior framework (which means also taking into account how norms, attitudes toward the behavior, and perceived behavioral control contribute to intentions). When exploring the association between intentions and behavior, it would also be important to take into account the couple dynamic, as men's actual leave uptake may be compromised by women's willingness to share leave (McKay & Doucet, 2010). Specifically, relatively high leave intentions in young men may not materialize into relatively high actual uptake if it is not aligned with their female partner's leave uptake preferences.

6.2.4 Country- vs. Individual-Level Predictors of Intentions

The data I presented in Chapter 3 expands our understanding of how the broader sociocultural context shapes and contributes to a gender-based division of paid and unpaid work. We opted to test the effect of different country-level factors simultaneously in order to bring together previous research and to test the relative importance of different country-level factors. In comparison to previous research, where inferences about the effect of country-level factors are sometimes made based on the comparison of a few countries, our sample was relatively large – large enough to allow for hierarchical nesting and inferential statistics (Maas & Hox, 2005). That said, with 37 countries we nevertheless lacked the statistical power to find small effects and it is therefore important to not overinterpret non-significant effects. Indeed, we noted that the effect of women's relative representation in politics (which was associated with lower leave intentions in women) was reduced and consequently statistically non-significant (based on an alpha level at .05) when controlling for other country-level indicators, but statistically significant when we re-analyzed this model with a larger sample size (i.e., including countries that do not have access to parental leave).

The issue of low statistical power is not limited to our research, but is almost an inevitable issue in cross-national research due to the time and cost associated with collecting cross-cultural data. Since replicating the finding that a higher proportion of women in politics is related to lower leave intentions in young women with a larger sample size is likely not feasible, future research may wish to replicate this effect by employing an experimental or longitudinal paradigm. I would recommend future research first establish what it is that is driving this relationship: (1) Is it the case that female politicians are more likely to push for gender-egalitarian policies and that the relationship between the relative proportion of women in politics and women's leave intentions is mediated by such policies? Our findings would suggest that this is not the case as we did not find a link between gender-egalitarian policies and lower leave intentions in women. However, this could be specifically tested by correlating the change in female representation in politics over the last 70 years with changes in family-related policies. To rule out the possibility that family-friendly policies enable women to enter politics (rather than the other way around), it would be important to carefully track whether policies are implemented prior to or after women enter these positions; (2) Is it the case that the presence of women in high-status positions inspire young women to prioritize high-status careers themselves through acting as role models? This could be tested longitudinally by drawing upon the design by Campbell and Wolbrecht (2006) to assess whether increasing media exposure of female politicians corresponds with lower leave intentions in girls or test this cross-sectionally by assessing whether perceiving more or fewer female politicians is associated with less or more leave intentions, respectively. Research

could test also this experimentally by presenting young women with female politicians and then assessing their leave intentions and motivations to enter agentic high-status careers.

6.2.5 How Should Researchers Study Gender Inequality

On a final note, when studying reasons for gender segregation in agentic high-status roles, it is important to not only look at gender but also at other aspects of identity. Individuals are categorized by others into several categories, including (but not exclusive to) their gender, sexual orientation, social class, and ethnicity (Cole, 2009). Social class is an underexamined but important determinant of how individuals are viewed and may (just as gender) shape and contribute to individuals' representation in high-status careers. Indeed, with respect to women's entry into agentic roles in the latter part of the 21st century, England (2010) notes that a gender-based segregation in labor has decreased for the middle class, but not for the working class. However, it is not clear whether this effect is explained by greater access to higher education among middle-class women, or whether it is discrimination, internalization of social class stereotypes (Durante et al., 2017), or a combination of these factors that prevent working-class women from entering high-status fields.

As psychological research often relies on university samples (Heinrich et al., 2010), we know a lot about gender-related issues that are relevant to middle-class young adults, but much less about issues that are relevant to working-class individuals. Admittedly, this shortcoming also pertains to my own research. In order to recruit a comparable sample across countries in Chapter 3, we sampled university students. We controlled for differences in subjective SES across countries and data collection sites but did not explore the interaction between subjective SES and gender, as our sample by and large consisted of individuals from the middle to higher strata of society in most countries. It is important to measure gender differences in intended leave uptake among high-SES individuals as they are more likely in the future to hold high-status positions with the opportunity to influence policies and public opinion. At the same time, with this sample, we are unable to generalize our findings to women and men from low-SES backgrounds. This limitation provides an opportunity for future studies to follow up our findings with a representative sample. I recommend that future researchers use multiple measures of social class to take into account the concept of social class as a combination of social, cultural, and economic factors (see Savage et al., 2013). I also recommend using both subjective and objective measures of social class, as people may very well identify as middle class based on their current socioeconomic status, but nevertheless be defined by others as working class based on features like an accent, and be discriminated against accordingly (see https://accentbiasbritain.org/).

6.3 Concluding Remarks

In conclusion, the research described in this dissertation has practical implications for interventions that seek to reduce gender division across paid and unpaid work and empirical research that seeks to explore this important issue further. Practically speaking, when designing and evaluating interventions, researchers need to take into account the multiple differences between individuals in the groups they seek to influence. The studies I have presented illustrate that men's underrepresentation in communal roles is pervasive and address the research gap on what contributes to men's communal engagement by pointing to the role of individual-level factors, such as attitudes, perceptions of one's own behavior, and perceptions of what other men do. Such findings imply opportunities for interventions toward achieving equality for both women and men.

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Appendices

Appendix A Chapter 2 Published Article

frontiers in Psychology

REVIEW
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Does Exposure to Counterstereotypical Role Models Influence Girls' and Women's Gender Stereotypes and Career Choices? A Review of Social Psychological Research

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Gender roles are formed in early childhood and continue to influence behavior through adolescence and adulthood, including the choice of academic majors and careers. In many countries, men are underrepresented in communal roles in health care, elementary education, and domestic functions (HEED fields, Croft et al., 2015), whereas women are underrepresented in the science, technology, engineering, and mathematical (STEM) fields (Beede et al., 2011) and top leadership positions (Leopold et al., 2016). Theories focusing on the development of gender roles suggest that across the lifespan people perceive certain roles to be more or less appropriate for their gender (e.g., Gender Schema Theory, Martin and Halverson, 1981; Social Role Theory, Eagly and Wood, 2011). Specifically, researchers have postulated that observing same-sex role models triggers learning processes whereby observers internalize gender-stereotypical knowledge of roles and act accordingly, which results in gender-congruent aspirations and behavior. It seems reasonable that if observing men and women in gender congruent roles fosters gender-congruent aspirations and behavior, then frequently observing gender-incongruent role models (e.g., male kindergarten teachers or female scientists and leaders) should reduce gender stereotyping and promote gender-counterstereotypical aspirations and behavior. In many countries, governments and societal decision-makers have formed initiatives based on the idea that exposure to gender-counterstereotypical role models influences aspirations and career choices among children, adolescents, and young adults. The present review gives an overview of research-based interventions involving observing or interacting with counterstereotypical role models, particularly focusing on outcomes for girls and women. Extending earlier reviews, we summarize laboratory-based and field-based studies and then critically discuss and integrate the findings in order to provide an overall picture of

how counterstereotypical role models shape observers' occupational aspirations and academic choices in childhood, adolescence, and young adulthood. We conclude by outlining suggestions for future research and briefly discussing implications for future interventions.

Keywords: role models, stereotypes, STEM, leadership, women, girls, counterstereotypical

INTRODUCTION

> . . . relatable [female] role models will bring important future [female] scientists, mathematicians, technologists, engineers, innovators, and leaders into in the career pipeline.
>
> 1000 Girls, 1000 Futures

Gender roles concern the expectation of what conduct is appropriate for men and women based on the distribution of men and women in different roles (Eagly et al., 2000). Children from every walk of life are exposed to gender roles from an early age. First and foremost, children are exposed to gender roles in their immediate environment through their parents, siblings, relatives, neighbors, peers, and teachers, but also through educational resources, media, and popular culture. The social environment and media often depict traditional gender roles (Lauzen et al., 2008; Kahlenberg and Hein, 2010; Kan et al., 2011; Steyer, 2014; Koss, 2015; Murnen et al., 2016; Reich et al., 2018). For example, in many western countries, men spend more time in paid work whereas women spend more time in unpaid work (Kan et al., 2011). In addition, analyses of prime-time television programs show that men are typically represented in agentic (i.e., work-related) roles, whereas women are typically represented in communal (i.e., family related) roles (Lauzen et al., 2008). Given this widespread exposure to traditional gender roles, it does not seem surprising that children themselves report gender stereotypes, and gender-stereotypical ability beliefs, play preferences, peer preferences, and career aspirations from a very young age (Freedman-Doan et al., 2000; Levy et al., 2000; Serbin et al., 2002; Sebanc et al., 2003; Wilbourn and Kee, 2010; Baker et al., 2016; Bian et al., 2017; Golden and Jacoby, 2018). Specifically, research has shown that girls in 1st and 4th grade think the subjects they are worst at is computers and science, whereas boys think they are worst at reading (Freedman-Doan et al., 2000). Children's gender-stereotypical beliefs of their current ability may shape their behavior later in life as they select activities they believe they are good at (Wigfield and Eccles, 2000).

One way that gender-stereotypical ability beliefs may become visible later on is in career choices. In many Western countries, men are underrepresented in communal roles in health care, elementary education, and domestic functions (HEED), whereas women are underrepresented in agentic and high-status roles such as leadership positions (Croft et al., 2015; Leopold et al., 2016), and in the science, technology, engineering, and mathematical (STEM) fields (Beede et al., 2011). There are several reasons why it is important to promote an equal representation of men and women in different occupational fields. First, gender equality provides benefits to both men's and women's welfare and health (Seedat et al., 2009; Read and Grundy, 2011; Holter, 2014). Second, increasing the number of women interested in STEM can meet the demands of an ever-expanding labor market and reduce the gender wage gap (Beede et al., 2011). Likewise, promoting men's interest in HEED roles is important for overcoming labor shortages and promoting gender equality (Croft et al., 2015). Numerous initiatives and interventions have been implemented in several countries to encourage boys and girls to consider non-traditional occupational choices (e.g., Discover!; Little Miss Geek; 1000 girls, 1000 futures; Mind the Gap!; The Norwegian Government's gender equality action plan; the WISE Campaign). These initiatives and interventions are often based on the rationale that observing or interacting with men and women in non-traditional domains, providing a so-called *gender-counterstereotypical role model*, will promote non-traditional behavior.

A gender-counterstereotypical role model is an individual who engages in a role that is antithetical to gender stereotypes (e.g., a female CEO, a female scientist, or a male preschool teacher). Role models have been defined in various ways in the literature (for an overview, see Morgenroth et al., 2015). We follow the lead of other researchers and consider role models as "individuals who influence [children's, adolescents,' and young adults'] achievements, motivation, and goals by acting as behavioral models, representations of the possible, and/or inspirations" (Morgenroth et al., 2015, p. 468). The present review focuses on interventions that utilize counterstereotypical role models to influence women's aspirations to enter fields where they are underrepresented and negatively stereotyped. Role model interventions have been implemented with different goals in mind, such as promoting women's interest and confidence in pursuing a career in STEM or other high-status roles such as top leadership and politics.

The underrepresentation of women in certain academic or high-status fields cannot be solely attributed to essential differences between men and women. First, mean gender differences in ability tend to be influenced by extreme cases at the end of the distribution (Hyde, 2005), and sometimes gender differences in aspirations and abilities only appear when gender stereotypes have been made salient (Spencer et al., 1999; Quinn and Spencer, 2001; Davies et al., 2005). Second, research suggests that at least part of the reason women do not enter certain academic or high-status fields originates in psychological barriers created by stereotypes. For example, a lack of females in STEM and top leadership positions may signal to women that members of their gender lack the skills necessary to be successful in these domains (Eagly et al., 2000). Thus, in order to encourage women to enter

STEM and high-status positions where they are underrepresented and negatively stereotyped, it is important to expose women to female role models (Lockwood, 2006; Plant et al., 2009; Stout et al., 2011; but see Bagès and Martinot, 2011).

We will present literature on whether counterstereotypical role models have the potential to turn observers into role aspirants. Role aspirants are individuals who emulate and are inspired by role models (Morgenroth et al., 2015). Although the underrepresentation of men in certain educational and occupational domains certainly warrants empirical attention, we focus our review on girls and women because the vast majority of research has focused on women's underrepresentation in male-dominated fields (for a discussion of the dearth of research on men in female-dominated HEED fields, see Croft et al., 2015). We will discuss wide-ranging studies exploring the effects of observing or interacting with gender-counterstereotypical role models from childhood to young adulthood including experimental research, correlational data, and evaluations of real-life interventions. Thus, extending earlier work, we will build a bridge between interventions conducted in the laboratory and interventions conducted in the field. We will also highlight factors that ought to be considered when developing future role model interventions. Role model interventions can encompass many different goals but are here defined as explicit attempts to change children's, adolescents', and young adults' aspirations toward a gender-counterstereotypical occupational role by presenting them with a gender-counterstereotypical role model. In the following, we briefly summarize the main underlying theoretical assumptions about the effects of role models and then review the success of role model interventions in childhood, adolescence, and adulthood.

THEORETICAL UNDERPINNINGS OF INTERVENTIONS

Although there is some disagreement amongst scholars regarding the underlying processes in the development of gender-congruent behavior, many theories have identified the observation of models–particularly same-sex models–as a major factor (e.g., Gender Schema Theory, Bem, 1981; Developmental Intergroup Theory, Bigler and Liben, 2006; Social Cognitive Theory, Bussey and Bandura, 1999; Social Role Theory, Eagly and Wood, 2011). It is not surprising then that many interventions that aim to target the underrepresentation of women in certain occupations and academic fields have involved exposure to stereotype-incongruent role models. It has been theorized that gender-stereotypical beliefs (which are widespread beliefs about the attributes of men and women, Heilman, 2001) are one of multiple factors that determine females' achievement-related aspirations and choices (Wigfield and Eccles, 2000). While not all scholars agree that stereotypes play a major role in guiding gender-congruent behavior (e.g., Bussey and Bandura, 1999), some scholars argue that observational learning gives rise to stereotypical beliefs, which then foster stereotypical behavior through various mediating processes (Martin et al., 2002; Wood and Eagly, 2012).

Theories concerning the development of gender stereotypes and stereotype congruent behavior in childhood are very rarely applied to gender development in adulthood or vice versa (exceptions include Bigler and Liben, 2006; Wilbourn and Kee, 2010). Theories also differ in their terminology and emphasis on different cognitive processes. Nevertheless, some theories of gender development in childhood versus adulthood share the assumption that observational learning gives rise to stereotypical beliefs, which subsequently guide behavior (Gender Schema Theory, Bem, 1981; Social Role Theory, Eagly and Wood, 2011). For example, the assumption that children learn to associate men and women with certain attributes through observing their environment is a central tenet of Gender Schema Theory (Bem, 1981). This gender knowledge forms cognitive schemas, which give rise to stereotypical beliefs and influence behavior (Martin et al., 2002). According to Gender Schema Theory, a girl who chooses to play with a doll has engaged in the following thought process: dolls are "for girls" and "I am a girl" which means that "dolls are for me" (Martin and Halverson, 1981, p. 1120). If a gender-stereotypical environment fosters stereotypical knowledge, which in turn fosters stereotype congruent behavior, interventions involving exposure to gender-counterstereotypical role models should reduce gender stereotypes and enhance gender-counterstereotypical aspirations.

The assumption that adults' stereotypes stem from observational learning is a key tenet of Social Role Theory (Eagly and Wood, 2011). According to Social Role Theory, people attribute the underlying cause of the unequal distribution of men and women in various roles to inherent gendered characteristics. Thus, because people mostly observe women in communal domains (where they are concerned with others, Abele and Wojciszke, 2007), people associate women with being socially skilled, nurturing, and caring. Likewise, because people mostly observe men in agentic domains (where they are concerned with pursuing their goals, Abele and Wojciszke, 2007), people associate men with being assertive and dominant. Men and women may subsequently internalize stereotypes about their gender, which guide their behavior (Hogg, 2000; Greenwald et al., 2002; Eagly and Wood, 2011). According to Social Role Theory, stereotypes are dynamic: when people perceive a non-traditional division of labor, they associate men and women with counter-stereotypic characteristics (e.g., Diekman and Eagly, 2000; Wilde and Diekman, 2005). From this perspective, if the gender distribution of roles change, men's and women's gender stereotypes, self-concepts, and behavior should change accordingly. Thus, exposing men and women to counterstereotypical role models has the potential to change men's and women's aspirations and career choices.

Observational learning may operate differently at different stages of development. Notwithstanding this factor, it is possible to infer from theories applied in both childhood and adulthood that modeling is a precursor to the development of gender stereotypes (Gender Schema Theory, Bem, 1981; Social Role Theory,

Eagly and Steffen, 1984). That being said, gender-developmental theorists and role-model theorists alike assert that role aspirants are far from passive learners (Martin et al., 2002; Bigler and Liben, 2006; Morgenroth et al., 2015). The effect of the role model on the role aspirant is instead moderated by the role aspirant's previous experience, knowledge, and perceptions of the role model. The extent to which role models influence men's and women's aspirations and career choices may also interact with other factors such as direct instruction (Bussey and Bandura, 1999), parents' differing perceptions of their sons and daughters (Furnham et al., 2002; Tenenbaum and Leaper, 2003), parents' tendency to attribute their daughters' success to hard work and their sons' success to innate talent (Yee and Eccles, 1988; Räty et al., 2002), and biological sex differences (Eagly and Wood, 2013).

Because these theories propose that counterstereotypical role models influence child and adult role aspirants through the same processes, we review role model interventions that have been implemented from early childhood through early adulthood. Role model interventions have focused on a range of outcomes. Some interventions have targeted gender stereotypes, some have strived to promote self-efficacy and counterstereotypical behavior, and some have tried to enhance women's aspirations toward fields where they are underrepresented. Role model research in childhood, adolescence, and adulthood has emphasized different outcomes, which means that we are not able to compare exactly the same variables at different developmental stages. For the childhood literature, we review studies that test the success of exposure to gender-counterstereotypical role models on girls' gender stereotypes, aspirations, and behavior. For the adolescence and adulthood literature, we review studies that test the success of exposure to gender-counterstereotypical role models on girls' and women's gender stereotypes, self-concept, efficacy-beliefs (i.e., confidence in one's abilities, Bandura, 1977), career aspirations, and academic choices.

A LITERATURE OVERVIEW OF THE EFFECTS OF ROLE MODELS IN EARLY CHILDHOOD, ADOLESCENCE AND EARLY ADULTHOOD

In the following, we provide a comprehensive–but not exhaustive–overview of whether exposure to counterstereotypical role models influences children's, adolescents' and young adults' gender stereotyping. In line with gender theories (Gender Schema Theory, Bem, 1981; Social Role Theory, Eagly and Wood, 2011), we argue that learning about gender is a process that takes place throughout a person's lifespan. Exposure to or interaction with counterstereotypical role models may therefore influence role aspirants at every stage of development. Whereas research on exposure to counterstereotypical role models in adulthood has gained a lot of empirical attention over recent years, there has been a paucity of research on counterstereotypical role models in early childhood. In this review, we chose to include research spanning from early childhood into early adulthood, not because the literature easily lends itself to comparisons (in fact, it is quite the contrary!), but because we think that researchers and students interested in this topic would benefit from an overview. Previous research has tended to separate the study of gender in childhood from adulthood, which has resulted in different research foci in the two fields. Different research foci in childhood and adulthood literature can give the impression that learning about gender is vastly different across the lifespan. However, although adults and children may not be equally affected by observing or interacting with role models, the processes by which an adult learns is a continuation of processes by which a child learns. An overview can help to highlight both similarities and differences across the lifespan and potentially promote further research on role model processes in childhood.

An overview can also shed light on whether role model interventions are more effective in childhood or adulthood. Important and far-reaching decisions such as which classes to take in upper secondary school or at university are made during adolescence or early adulthood. Female participation in STEM subjects tends to diminish drastically at the secondary educational level and again at university (Cronin and Roger, 1999). This decrease suggests that the potential presence of psychological barriers at these educational stages demotivates adolescent girls and young women from pursuing careers in these fields. Role model interventions may thus be particularly critical during secondary and higher education. However, some scholars have argued that interventions aimed at changing stereotypes should take place in early childhood, preferably before children have developed a firm understanding of gender roles (e.g., Bigler and Liben, 2006). Early gender-stereotypical beliefs may shape children's interests and have an accumulative effect on their skill acquisition and aspirations. Thus, interventions that occur later in development may be less effective or may have to be more comprehensive to counteract established interests and skills. Interventions may also be less successful once cognitive schemas are established, as schemas influence subsequent information processing (e.g., causing counterstereotypical information to be forgotten or distorted; Bigler and Liben, 1990; Frawley, 2008). However, interventions that take place too early may not be as effective as young children may not be able to generalize counterstereotypical information from one domain to another. This is because young children are more knowledgeable of stereotypical behavior among their own sex than they are of stereotypical behavior among the opposite sex. For example, although a young girl assumes that a child who plays with dolls also plays with a make-up kit, she may not assume that a child who plays with cars also plays with airplanes (Martin et al., 1990). Considering young children's limited abilities in making logical inferences, interventions in early childhood may have to be more comprehensive than in adulthood as they have to model counterstereotypical behavior in many domains. These developmental factors support the need for an overview of how effective interventions have been at different stages in development.

EFFECTS OF EXPOSURE TO COUNTERSTEREOTYPICAL ROLE MODELS IN CHILDHOOD AND PREADOLESCENCE

As children observe men and women in different roles, they learn what it means to be a man or a woman within their cultural context. Put differently, children form gender stereotypes based on their observation of role models. Role models that influence observers in one way or another have exerted a 'role model effect.' The majority of research-based interventions in childhood and preadolescence have focused quite broadly on promoting a broader repertoire of behaviors by exposing children and preadolescents to counterstereotypical role models. We will first review indirect evidence for the role model effect by summarizing studies that assess whether the stereotypicality of parents' occupational roles correlate with the stereotypicality of their children's occupational aspirations or behavior. We then turn toward direct evidence by summarizing experimental and non-experimental between-subjects design interventions.

Correlational Evidence

Parents are the role models young children are exposed to most (Bandura and Bussey, 2004). In line with this, researchers have argued that parents' occupations have a notable influence on offsprings' gender stereotypes and career aspirations (e.g., Eagly et al., 2000). Numerous studies that have correlated mothers' occupational roles with their daughters' aspirations have found indirect evidence for the role model effect. For example, the stereotypicality of mothers' work is associated with the stereotypicality of daughters' occupational aspirations in both preschool and preadolescence (Marantz and Mansfield, 1977; Barak et al., 1991). In addition, daughters of mothers who work either full time or in counterstereotypical occupations also report more gender role flexibility in childhood, more counterstereotypical career plans in adolescence, more counterstereotypical behavior in adulthood, and less marriage-career-conflict concerns (Levy, 1989; Barnett et al., 2003; Fulcher and Coyle, 2011; Greene et al., 2013).

When interpreting these results, we have to keep several things in mind. First, all of the studies reported above have used a correlational design and therefore do not provide causal evidence for the role of observational learning in early childhood. Second, correlational relationships between parental occupational roles and children's aspirations may, in some cases, be confounded with third variables such as instructional learning or how parents engage differently with their sons and daughters (Bussey and Bandura, 1999; Moon and Hoffman, 2008). Third, parental roles only account for small amount of variance in adults' gender role attitudes (Barnett et al., 2003), and sometimes no significant relationship is found between mothers' roles and daughters' aspirations and behavior (Moen et al., 1997; Cunningham, 2001). Nevertheless, the findings reported above are important because they show that variations in gender roles within girls' social reality can affect their aspirations and behavior. It is not surprising that the relationship between parents' occupations and daughters' gender-related aspirations and behavior is mixed, as many factors such as the mothers' specific occupation and attitude toward work may influence daughters' gender–related aspirations and behavior (Helms-Erikson et al., 2000). Taken together, the results of empirical studies investigating the relationship between parents' occupational roles and daughters' gender-related aspirations and behavior are mixed.

Evidence From Interventions

In order to address the limitations of correlational designs and infer more conclusively the potential impact of role model interventions, it is important to review experimental research. Experimental interventions typically involve exposing children to counterstereotypical occupational role models for a relatively short period of time. Sometimes, interventions involve brief exposure that is repeated over several consecutive days. Occasionally, interventions involve exposure to counterstereotypical role models that span over several weeks or months. Studies that assess the effects of brief exposure to counterstereotypical role models are generally designed to assess the processes of observational learning, not the efficacy of role model interventions *per se*. Nevertheless, these studies provide useful information as many real-life interventions with counterstereotypical role models similarly involve only a brief exposure time. Following exposure to a counterstereotypical role model, children's gender stereotypes and sometimes their aspirations or actual behavior are assessed. The majority of brief experimental interventions were conducted in or prior to the 1990s and not many recent studies in this area have been published. Much of the early research has already been summarized in several reviews (e.g., Katz, 1986; Liben and Bigler, 1987; Bigler, 1999). For this reason, we merely give a brief overview of this earlier work and integrate these findings with more recent findings in the subsequent section. We conclude by outlining the potential of role model interventions, and making suggestions for future interventions and research.

Do Children's Gender Stereotypes Change Following Exposure to Counterstereotypical Role Models?

The methods used in role model interventions have typically consisted of exposing children to literature or commercials depicting men and women in counterstereotypical roles. In general, the literature shows that exposure to counterstereotypical role models influences girls' gender-related beliefs. Among girls from preschool-age to 4th grade, exposure to counterstereotypical female exemplars reduced their occupational gender stereotypes and traditional attitudes toward women (Flerx et al., 1976; Ashby and Wittmaier, 1978; Pingree, 1978; Scott and Feldman-Summers, 1979; Trepanier-Street and Romatowski, 1999; but see Karniol and Gal-Disegni, 2009; Pike and Jennings, 2005). For example, Pingree (1978) presented 3rd graders with commercials that either depicted traditional women (e.g., a housewife) or non-traditional women (e.g., a female physician). Girls who had been exposed to non-traditional women reported less traditional attitudes toward women than girls who had been exposed to traditional women. Meeting counterstereotypical role

models in real life also appear to reduce gender-stereotypical beliefs among children. Third graders reported less gender stereotypes after listening to men and women in counterstereotypical occupations talking about their careers (Tozzo and Golub, 1990). In addition, preadolescent girls were less likely to picture a scientist as male after interacting with female scientists during a 10-day long science camp (Leblebicioglu et al., 2011). Taken together, evidence shows that exposure to or interaction with counterstereotypical role models can reduce gender stereotyping.

Do Children Internalize Gender Stereotypes Following Exposure to Counterstereotypical Role Models?

Even though interventions involving exposure to counterstereotypical role models appear to change girls' gender stereotypes, the overarching aim of role model interventions is not only to change specific stereotype beliefs but also to influence children's subsequent behavior. It is therefore surprising that several of these studies have failed to include a measure of children's aspirations or behavior (e.g., Tozzo and Golub, 1990; Trepanier-Street and Romatowski, 1999; Karniol and Gal-Disegni, 2009). The failure to include a measure of children's aspirations or behavior may be due to a tendency among researchers to assume that boys and girls use gender stereotypes as a compass for behavior (Martin and Halverson, 1981). However, the assumption that stereotypes determine behavior is problematic. Research has repeatedly shown that changes in stereotypes do not reliably predict change in behavior (see Bigler, 1999). Specifically, studies have failed to find a significant change in girls' aspirations for counterstereotypical occupations (Ashby and Wittmaier, 1978; Bailey and Nihlen, 1990; Bigler and Liben, 1990; Liben et al., 2001; Coyle and Liben, 2016) or preferences for counterstereotypical toys following a brief exposure to gender-counterstereotypical role models (Spinner et al., 2018, but see Ashton, 1983). Thus, the lack of correspondence between girls' knowledge of what other women do and what *they* subsequently do suggests that stereotypes may not become internalized following short-term experimental interventions.

One factor that contributes to the lack of role model effects may be the extent to which the child perceives herself as similar to the role model. Anderson and Many (1992) analyzed 8- and 10-year-old children's spontaneous thoughts on reading material that depicted children in non-traditional roles and found that the children sometimes struggled to relate to the counterstereotypical role models. Since role model effects are partly driven by role aspirants' desire to become similar to the role model (Morgenroth et al., 2015), it seems crucial that the child identifies common ground with the counterstereotypical role model. Interventions that involve brief exposure to counterstereotypical exemplars may therefore benefit from explicitly highlighting similarities between the role model and the role aspirant to promote behavior change. Another factor that contributes to a lack of role model effects may be that children forget or distort counterstereotypical information, particularly if they are only briefly exposed to a counterstereotypical role model (Bigler and Liben, 1990; Frawley, 2008). Indeed, research has indicated that longitudinal interventions are more effective at eliciting changes. For example, Nhundu (2007) found that female primary school students who had been exposed to non-traditional educational material depicting females in non-traditional careers over a 3-year period expressed greater aspirations to pursue a non-traditional career than girls who had been exposed to traditional educational material. The education material explicitly encouraged young girls by including information such as: 'Anybody can do any job they like as long as they get trained for it and become skillful.' Thus, although this intervention was "successful," it is not possible to establish whether the girls' counterstereotypical aspirations were influenced by the repeated observation of counterstereotypical women, the direct encouragement, or a combination of these two factors.

Is the Role Model Effect Sustained and Does it Generalize to Other Domains?

Although children sometimes appear to internalize counterstereotypical information following exposure to counterstereotypical role models (e.g., Ashton, 1983), one must not assume that role model effects observed immediately after a brief exposure will be sustained. First, observations of behavior at one time point are not reliable indicators of permanent behavioral change in young children (Green et al., 2004). Second, stereotype change recorded immediately after an intervention is not always observed at a 1-week follow-up (Flerx et al., 1976; Savenye, 1990). This might be the case because children are exposed to traditional gender role information in their everyday life, which might overwhelm the effect of the intervention. The majority of studies, however, have failed to assess whether stereotype change following brief exposure to counterstereotypical role models is sustained. Thus, in order to draw firm conclusions regarding the longevity of role model effects following brief exposure to counterstereotypical exemplars, more research that assesses children's gender stereotyping, aspirations, and behavior at several time points following the intervention is needed.

Moreover, it is questionable whether brief exposure to counterstereotypical role models in one domain will influence what is considered gender-appropriate in another domain. Research suggests that if change in stereotyping is observed at all, it is limited to the specific domains modeled in the intervention. For example, 3rd and 4th grade students read eight stories over a 4-week period either depicting a majority of males or a majority of females engaging in traditionally masculine roles. Children who had read about counterstereotypical women reported less stereotypical beliefs about women, but only for the roles that were portrayed by the characters in the stories (Scott and Feldman-Summers, 1979). The limited potential for counterstereotypical role models to eradicate traditional gender role beliefs may be determined by cognitive abilities, which preclude young children from making generalizations to other domains (Bigler and Liben, 1992). However, Trepanier-Street and Romatowski (1999) found stereotype change for occupations that were not included in the intervention. Children from three different preschools read six books over the course of 2 months that depicted both children and adults in counterstereotypical occupational roles. After listening to the stories, children engaged in several activities (e.g., children participated in a group discussion or listened to an adult talking about their career). It is thus possible that children

reported less gender stereotypes for domains that were not included in the reading because they had also engaged in discussions about other occupational gender roles. Liben and Bigler (1987) also point out that although the abovementioned intervention was successful, the activities varied for each preschool and it therefore remains difficult to evaluate exactly which factor caused the effects and how to replicate them.

Evaluations of studies involving longitudinal exposure to counterstereotypical exemplars suggest that interventions focusing solely on targeting gender roles in one domain may not cause children to alter their gendered behavior in other domains. For example, Nhundu (2007) found that although girls' stereotypes about occupations and their occupational aspirations appeared less gender-traditional following exposure to counterstereotypical occupations, girls still embraced gender roles relating to domestic work and emphasized the importance of women prioritizing family over career. Thus, despite a positive effect on girls' career aspirations, girls' sense of the priority of domestic work for women may counteract these effects. Interventions must therefore be comprehensive and must target gender stereotyping more broadly than the occupational domain. Moreover, it may also be important for interventions to influence not only the role aspirant, but also her family and peers (Adler et al., 1992). Research on an affirmative action program promoting females into leadership positions in local communities showed that counterstereotypical role models who are observable by the entire community influence not only the behavior of the role aspirant but also those of the wider community (Beaman et al., 2012). Specifically, in communities where there had been more than one period with a female leader, girls reported more educational aspirations, better educational outcomes, and less responsibility for domestic tasks, and parents reported higher career expectations for their daughters. Thus, when the entire community is exposed to female role models, it may make it easier for girls to choose non-traditional paths.

To summarize, brief exposure to counterstereotypical role models appear to change children's gender stereotypes on a short-term basis. However, the changes in stereotypes are not always sustained and do not necessarily affect children's aspirations and behavior. These modest role model effects are not surprising given that the exposures to counterstereotypical exemplars in experimental interventions are brief and might stand in sharp contrast to what the children experience and observe in their everyday life when observing their parents or consuming media. Having said that, we conclude that based on the current literature it would be premature to dismiss the potential of brief exposure to counterstereotypical role models on children's aspirations and behavior. More research is needed to assess not only if, when, and why changes in stereotyping are sustained and internalized, but also whether changes in stereotyping have 'spill over effects' to other domains not present in the interventions. To our knowledge, no research to date has assessed how early exposure to counterstereotypical role models influences girls' later career choices. However, women sometimes attribute their motivation to pursue academic studies to a female role model they were exposed to early in life (Lockwood, 2006). It thus seems reasonable that small changes in interests in early childhood can set the child on a different trajectory that may accumulate into counterstereotypical behavior later on. While it appears that longitudinal exposure to counterstereotypical role models may change children's aspirations, the extent to which changes in aspirations in childhood are realized later on in adulthood is not clear. This is because there is a tendency for role model interventions to focus on gender stereotypes in one domain (e.g., the occupational domain) and not address gender expectations in other domains (e.g., the domestic domain). This may be problematic as some girls may see the home domain and the work domain as mutually exclusive. Due to greater exposure to female role models in the domestic domain than in the occupational domain, expectations to engage in the domestic role (e.g., to look after children at home) may be greater than expectations to engage in the agentic role (e.g., to pursue a high-status career). This means that even though girls may express counterstereotypical occupational aspirations following exposure to counterstereotypical exemplars, these aspirations may clash with gender expectations in the domestic domain later in life, which may preclude girls from pursuing high-status careers. In order for role model interventions to have the predicted effect in adulthood, interventions ought to confront the expectation that women will serve as the primary caregiver by also exposing girls to males engaging in the domestic domain.

Future Research on Interventions in Childhood

The aim of reviewing interventions in early childhood was not only to evaluate these interventions, but also to identify potential for new research. One implication of this review is that it is not clear whether role model effects are driven by children's propensity to emulate same-sex role models (Bussey and Bandura, 1999), or because counterstereotypical role models lead children to change the way they see themselves (Martin et al., 2002). Thus, future research on interventions should assess gender stereotypes, self-stereotyping, and subsequent behavior to determine whether a change in stereotypes is internalized and acted upon. This could potentially be assessed by observing children's behavior over a long period of time and using child-friendly implicit measures to assess stereotypes (e.g., Green et al., 2004; Most et al., 2007; Banse et al., 2010). Implicit measures may sometimes be preferred over explicit measures as implicit measures are less dependent on young children's ability to report their inner beliefs accurately and less susceptible to social desirability bias. A second future direction derives from the finding that children as young as 3 years old hold stereotypes about communal behavior (Baker et al., 2016). Thus, future research should assess whether children are able to infer communal and agentic traits from counterstereotypical role models, if they internalize them, and whether this influence a range of behaviors and preferences that were not necessarily targeted in the intervention. In addition, although it has been found that self-efficacy beliefs predict preadolescents' career choices (Bandura et al., 2001), there is to our knowledge no research on whether exposure to counterstereotypical role

models influences young children's self-efficacy beliefs. Finally, more research should evaluate existing field-based interventions.

Based on theoretical reasoning, we proposed that observing or interacting with counterstereotypical role models would change children's gender stereotypes and their sense of self. The research reviewed above only partially supports this claim. More research is needed to draw firm conclusions about the impact of counterstereotypical role models on role aspirants, and to integrate other processes that shape girls' aspirations and behavior.

EFFECTS OF EXPOSURE TO ROLE MODELS IN ADOLESCENCE AND EARLY ADULTHOOD

We now move our focus from childhood and preadolescence to adolescence and early adulthood. Many role model interventions in adolescence and early adulthood are based on the same underlying principle as in early childhood and preadolescence. Namely that observers internalize gender-stereotypical knowledge of roles and act accordingly, which results in gender-congruent aspirations and behavior. Interventions in adolescence and young adulthood are typically more focused on a specific domain than in childhood and preadolescence. The ultimate goals of interventions in this age-group are to influence girls' and women's academic aspirations and career-related choices, especially focusing on domains where women are underrepresented and negatively stereotyped. To provide a justification for role model interventions, we first review correlations between the number of female role models in non-traditional fields and non-traditional role aspirants. We then turn to direct evidence by summarizing interventions that involve brief exposure to a counterstereotypical role model in the laboratory, and brief or prolonged interactions with a counterstereotypical role model in real life. We finish by outlining recommendations for future research.

Correlational Evidence

If the proportion of female role models corresponds to the proportion of female role aspirants in non-traditional fields, then it provides prima facie evidence that the role models have influenced observers' achievements, motivation, or goals. There is correlational evidence for the role model effect in several domains where women are underrepresented, including politics, science, and engineering (Sonnert et al., 2007; Wolbrecht and Campbell, 2007). For example, adolescent girls talk more about politics and report more future intentions to engage politically in countries where there is a greater number of female politicians (Wolbrecht and Campbell, 2007). Moreover, research that has looked at the relationship between the number of counterstereotypical role models and the number of counterstereotypical role aspirants at United States universities over time has found that if the percentage of female faculty members in a science and engineering department increases by 10%, the percentage of female majors in biological sciences, physical sciences, and engineering can be expected to increase by 1.2% (Sonnert et al., 2007). The small effect sizes reported may seem to suggest that having more same-sex role models has little relevance to achieving overall gender equality. However, considering the cumulative impact small effects can have in real life over the course of time, these results should not be overlooked (Eagly, 1996). In addition, although the role model effect appears to be small, the effect is more pronounced in the presence of more than one gender-incongruent role model (Nixon and Robinson, 1999; Campbell and Wolbrecht, 2006; Sonnert et al., 2007; but see Canes and Rosen, 1995).

However, it is not possible to infer causal relationships from cross-sectional findings. It could be that a stronger presence of female role models encourages the participation of female role aspirants due to a role model effect or it could be that the corresponding increase in both female role aspirants and female role models is caused by a third unknown variable. Thus, despite promising evidence from correlational studies, experimental or between-subjects design studies are needed to make causal inferences about the impact of gender-incongruent role models on role aspirants.

Evidence From Interventions

The role model literature in adolescence and adulthood has gained attention in recent years. Experimental laboratory studies have typically involved providing female university students with information about women who are successful in fields where women are underrepresented and negatively stereotyped. Field-based between-subjects design studies have typically assessed the effect of interacting with female counterstereotypical role models. Following exposure to counterstereotypical role models, the extent to which girls or women have internalized the characteristics, behavior, or goals of the role model is assessed. In the following, we review interventions that involve exposure to or interaction with counterstereotypical role models from a broad range of academic or career-related settings. We focus exclusively on interventions in domains where women are underrepresented and negatively stereotyped. We propose that counterstereotypical female role models modify existing knowledge about women, which becomes internalized by the role aspirant, and this internalized knowledge then enhance self-efficacy beliefs, aspirations, and performance.

Do Adolescents' and Adults' Gender Stereotypes Change Following Exposure to Counterstereotypical Role Models?

One aim of role model interventions using counterstereotypical role models is to change girls' and women's perceptions of what they themselves can or should do by changing perceptions of what women in general can do. Studies have shown that students presented with descriptions or portrayals of non-traditional women changed their stereotypes about women, at least temporarily (Savenye, 1990; Dasgupta and Asgari, 2004; Rosenberg-Kima et al., 2008). For example, Dasgupta and Asgari (2004) presented female students with pictures and descriptions of several famous women in leadership positions in counterstereotypic fields such as science, business, law, and

politics. Female students subsequently took part in an Implicit Association Test (Greenwald et al., 1998), which assessed the strength with which they associated women and men with being leaders and supporters. The results showed that female students were quicker to associate women with leadership following exposure to counterstereotypical women. This effect was replicated in a longitudinal design that took advantage of the pre-existing differences in the proportion of female faculty at two universities. These findings suggest that exposure to counterstereotypical exemplars can reduce gender stereotypes.

Do Adolescents and Adults Internalize Gender Stereotypes Following Exposure to Counterstereotypical Role Models?

Brief exposure to just one counterstereotypical female role model in STEM can also enhance, at least temporarily, female role-aspirants' self-efficacy beliefs, determination to succeed, and performance in domains where women are underrepresented and negatively stereotyped (Marx and Roman, 2002; McIntyre et al., 2003; Rosenberg-Kima et al., 2008; Plant et al., 2009; Stout et al., 2011; Shin et al., 2016). The theoretical reasoning that underlie many role model interventions is that women see themselves in line with prevailing stereotypes (Guimond et al., 2006). From this follows that if a woman starts to perceive women in general as more agentic, she should also view herself as more agentic. In other words, following exposure to gender-counterstereotypical information, role aspirants should see themselves in less stereotypical ways. However, only a handful of studies have assessed the extent to which brief exposure to counterstereotypical role models causes women to internalize counterstereotypical information (also known as self-stereotyping, Guimond et al., 2006).

Several studies show that the way adult women see themselves change following brief and long-term exposure to counterstereotypical female role models (e.g., Lockwood, 2006; Asgari et al., 2010; Stout et al., 2011; Shin et al., 2016). However, not all role model interventions include a measure of gender stereotypes (e.g., Marx and Roman, 2002), and those that do sometimes fail to find a role model effect on gender stereotypes (Plant et al., 2009; Stout et al., 2011; Shin et al., 2016). For example, Plant et al. (2009) found that although middle-school girls reported greater self-efficacy and greater interest in engineering-related careers after being exposed to female engineers, they still endorsed traditional gender stereotypes related to engineering-related fields. Thus, the evidence as to whether the role model effects reported above were facilitated through a change in gender stereotypes and corresponding self-stereotyping remains inconclusive.

Is the Role Model Effect Sustained and Does it Generalize to Other Domains?

Adolescents and adults appear to internalize counterstereotypical information immediately following brief exposure to counterstereotypical exemplars. However, since the majority of laboratory-based studies have failed to use a follow-up design, it is not possible to affirm whether brief exposure to counterstereotypical role models has an enduring effect on role aspirants' academic performance and career-choices (but see Herrmann et al., 2016). It seems likely that interactions over a long period of time with a counterstereotypical role model have more substantial role model effects than a brief exposure. To address the decreasing proportion of women in advanced STEM courses, several field-based interventions have been implemented during foundational STEM courses. They have found that female students exposed to female role models are more likely to set high-achieving goals and take intermediate courses in their respective fields than those exposed to only male role models (Asgari et al., 2010; Carrell et al., 2010; Porter and Serra, 2017). This role model effect is only observed in subjects where females are underrepresented, which indicates that female professors, rather than being better teachers than male professors, help to break down some of the psychological barriers preventing women from pursuing certain fields (see also Carrell et al., 2010). Thus, it seems that longitudinal exposure to counterstereotypical role models has the potential to enhance the effects reported by studies on short-term exposure. However, we cannot conclude from these studies that female professors affected role aspirants by challenging gender stereotypes. For example, it could be that the female professors facilitated a climate in which female students felt more comfortable actively participating, which had an effect on their performance, and ultimately their aspirations.

For role models to change how role aspirants see themselves, it may not be enough for female role aspirants to become aware that other women have achieved success in a given domain. It may also be critical that the role aspirant see themselves as similar to the role model (e.g., Rosenberg-Kima et al., 2008; Cheryan et al., 2011; Stout et al., 2011; Asgari et al., 2012; Hoyt et al., 2012). For example, Rosenberg-Kima et al. (2008) exposed undergraduate students to either a relevant role model (young and cool) or an irrelevant role model (old and uncool). Female students reported more self-efficacy if they had been exposed to a relevant role model than if they had been exposed to an irrelevant role model. Feelings of similarity are important because they convey the "if she can, so can I" idea to the role aspirant, which facilitates gender-counterstereotypical self-stereotyping. Interventions that fail to facilitate identification with the role model may not result in a role model effect. Studies that have assessed interventions in which adolescent girls engaged in science tasks and interacted with female scientists revealed that girls did not immediately and spontaneously view the female scientists as potential role models (Buck et al., 2008; O'Brien et al., 2017). Specifically, girls only began to view the female scientists as role models after establishing personal connections with them (Buck et al., 2008). Thus, it may be necessary for interventions to allow girls to establish personal bonds with the role model to facilitate aspirations toward a domain, particularly among younger girls who are not already invested in STEM. To highlight similarities between role aspirants and role models, some initiatives have tried to make female counterstereotypical role models more relevant by feminizing them. One example of this is the Science Cheerleaders initiative. In this initiative, girls who pursue science also do cheerleading at public events. The goal of this initiative is to reduce negative stereotyping

about female scientists. To our knowledge, there has been no scientific evaluation of the Science Cheerleaders initiative. However, research suggests that employing *highly* feminine role models may be unsuccessful and even backfire. For example, Betz and Sekaquaptewa (2012) found that 6th and 7th grade girls who did not strongly identify with STEM reported less self-efficacy, less current interest in math, and less aspirations to pursue math after being exposed to a highly feminine role model in STEM. The feminine role model failed to produce a role model effect because the observers viewed the combination of femininity and success in STEM to be unachievable.

Taken together, brief exposure may inadvertently deter role aspirants from fields where they are underrepresented and negatively stereotyped because of two reasons. First, role aspirants see very successful women as exceptions to the rule and therefore not representative of their group (Kunda and Oleson, 1995). Second, role aspirants fail to see themselves in the role model (Rudman and Phelan, 2010; Hoyt and Simon, 2011). For example, Hoyt and Simon (2011) found that after reading about successful female leaders, female undergraduate students not only gave themselves worse evaluations on a leadership task but they also perceived the task as more difficult. This is because observing a counterstereotypical role model may result in a contrast-effect whereby the role aspirants think they cannot achieve the same level of success as the role model (also known as upward comparison threat, Rudman and Phelan, 2010). This is contrary to an assimilation-effect where observers' performance improves following exposure to a successful gender-incongruent role model (Latu et al., 2013). Firm conclusions on why brief exposure to counterstereotypical role models appear to sometimes cause contrast-effects and sometimes cause assimilation-effects cannot be drawn by comparing the design of existing studies. However, it seems that a role model effect is less likely to occur when the role aspirants perceive themselves as unable to achieve what the role model has achieved (Lockwood and Kunda, 1997). For example, when undergraduate women had made an incremental attribution, i.e., when they believed that successful women had achieved success through hard work, discipline, and persistence, they were more likely to associate themselves with leadership traits than when they had made an entity attribution, i.e., when they believed successful women had achieved success because of their talent (Hoyt et al., 2012). This suggests that in order for female counterstereotypical role models to be effective role models and reduce stereotypical beliefs about women's capabilities, it is important that female counterstereotypical role models are seen as representative of women in general.

The research reviewed above suggests that brief and longitudinal exposure to counterstereotypical role models can change women's gender stereotypes and self-stereotyping. Moreover, exposure to or interaction with counterstereotypical role models can enhance role aspirants' immediate self-efficacy beliefs and performance, and even influence role aspirants on a long-term basis by affecting their academic choices. While exposure to counterstereotypical role models appears to break down some of the psychological barriers to women's participation in, or aspirations toward, fields where they are underrepresented, it is not always possible to determine whether changes in self-stereotyping are responsible for these role model effects. Thus, more research is needed to identify when and to what extent changes in self-stereotyping underlie role model effects. The cause of role model effects is interesting from both a theoretical and practical point of view. If the presence of female role models facilitates active participation in class, for example, then active participation may be important for enhancing feelings of self-efficacy and spurring interest toward domains where women are underrepresented and negatively stereotyped (but see Weisgram and Bigler, 2007). If stereotypes drive role model effects, then interventions should focus more actively on challenging stereotypical beliefs about women. Such interventions may benefit from carefully selected role models as similarity between role aspirants and role models seems crucial to facilitate self-stereotyping (McCrea et al., 2012).

Future Research on Interventions in Adolescence and Adulthood

One of the goals of this review was to identify challenges and limitations in the role model literature for future research to address. Although numerous studies involving counterstereotypical role models have been conducted, they have been conducted with different goals in mind, with samples that are either partly invested or not invested in the role models' field of expertise, and within different academic fields (for an exception, see Shin et al., 2016). This provides a number of questions for future research. First, research should address whether exposure to counterstereotypical role models promotes the same degree of counterstereotypical aspirations in all fields where women are underrepresented and negatively stereotyped. Second, research is needed to explore in greater detail what psychological processes drive these effects. Third, research must systematically assess how interventions are affected by role aspirants' current interest or investment in the field. Fourth, future research must take a more holistic view to incorporate the role of the wider community (e.g., family, peers, or romantic partners) in depressing role model effects. Lastly, empirical research is needed to assess the efficacy of addressing gender roles in domains that seem incompatible with pursuing a career in a high-status field (e.g., marriage-career conflicts, childrearing) for longitudinal success.

Based on theoretical reasoning, we examined empirical support for the notion that observing or interacting with counterstereotypical role models would change adolescent's and adult's self-stereotyping. The research reviewed above only partially supports this claim. More research is required to establish the role of self-stereotyping in role model effects.

DISCUSSION

The current unequal distribution of women in various occupational roles acts as a psychological barrier to women's entry into certain academic and high-status professional fields. In other

words, occupational gender roles are both an antecedent to, and a consequence of, gender congruent behavior. Many initiatives that aim to promote women's entry into fields where they are underrepresented and negatively stereotyped are based on the notion that this can be achieved through exposure to counterstereotypical female role models. The main aim of this review was to infer from correlational, laboratory-based, and field-based studies the potential of counterstereotypical role models to promote girls' and women's aspiration toward counterstereotypical occupational roles by counteracting the endless stream of gender-stereotypical information children, adolescents, and young adults are faced with on a daily basis.

First, we established that long-term exposure to counterstereotypical role models (e.g., mothers in non-traditional work, female politicians, and female faculty) in role aspirants' natural environment positively correlated with their aspiration toward, and engagement with, counterstereotypical roles. Second, we assessed whether these role model effects could be simulated by time-limited role model interventions and, if so, what processes drive these role model effects. Our review of the role model literature showed that brief exposure to counterstereotypical role models in both childhood and adulthood is sometimes able to change stereotypical beliefs about women, at least temporarily. Despite this, we found that role aspirants-particularly young children did not always internalize characteristics of the role models. On the one hand, it is possible that brief exposure to counterstereotypical role models in early childhood is not sufficient to shift the way young girls perceive themselves. On the other hand, is possible that the lack of reported role model effects in early childhood are attributed to the limited number of times internalization has been assessed. We initially set out to provide an overview of interventions in childhood, adolescence, and adulthood in order to draw conclusions about what kinds of role model interventions are more effective in early childhood or later in development. However, the limited number of studies on how role models' influence children's aspirations and behavior means it would be premature to draw firm conclusions at this point. Third, we assessed whether long-term exposure to counterstereotypical role models generated more pronounced role model effects. We identified that longitudinal interventions, particularly those that involved the community, follow-up activities, or explicit encouragement, appeared to have an effect on children's and preadolescents' aspirations and behavior. Similarly, longitudinal exposure that facilitated active engagement appeared to enhance role model effects among young adults, particularly among highly motivated students. In comparison to role model research in adolescence and adulthood, role model research in early childhood and preadolescence has not assessed whether factors such as perceived dissimilarity suppresses role model effects. In adolescence and adulthood, it is clear that gender-counterstereotypical role models must challenge existing gender stereotypes, but at the same time not be seen as *too* atypical. Taken together, the reviewed literature suggests that interventions that aim to promote counterstereotypical behavior can be effective at any point in a person's lifespan but should be designed with the role aspirants in mind, considering their current interests and motivations to engage in that behavior.

POTENTIAL FOR FUTURE ROLE MODEL INTERVENTIONS

The underlying reason for why some role model interventions are "successful" is not always clear. Most field-based studies in childhood, adolescence, and adulthood have involved observational learning, active engagement, and sometimes instructional learning (e.g., Jayaratne et al., 2003). The question as to whether role model effects are reliant on both exposure to and interactions with counterstereotypical role models, or whether role model effects can be facilitated by observational learning alone warrants attention. This is important to assess since interventions that utilize mere observations of role models are potentially more cost-effective than interventions that require interactions with counterstereotypical role models over a long period of time (Herrmann et al., 2016). Moreover, there is no evidence to support the hypothesis that children's self-stereotypes change following exposure to counterstereotypical role models. As such, the role model effect observed in childhood may be driven by imitation processes (Social Cognitive Theory, Bussey and Bandura, 1999) rather than by self-stereotyping processes (Gender Schema Theory, Martin et al., 2002). Future research should thus address through what pathway role model effects in childhood occur so this can be directly addressed in interventions.

Although research has not established that mere exposure to counterstereotypical role models promotes counterstereotypical behavior and aspirations in early childhood, several large-scale initiatives have been developed based on this idea. For example, Norway is seeking to recruit more male preschool teachers under the assumption that exposure to men in communal roles will reduce gender stereotyping and promote non-traditional occupational choices among children (see Norwegian Government's Gender Equality Action Plan, 2014). While this initiative has not yet been empirically evaluated, qualitative analyses of children's perceptions of male preschool teachers have found no evidence that daily exposure to counterstereotypical role models (i.e., male preschool teachers) challenges or changes children's stereotypes. First, gender does not appear to be a notable factor in preschool children's descriptions of their male teacher (Sumsion, 2005), meaning that children may not learn to associate men with communal behavior. Second, analyses have suggested that children observe their male preschool teacher as someone who typically engages in stereotypical behavior (e.g., Sumsion, 2005; Harris and Barnes, 2009). For example, Sumsion (2005) found that children never depicted their male preschool teacher engaging in traditional 'female' play but frequently depicted him as heroic and resourceful, as someone engaging in traditional 'male' play. Thus, based on the findings from these qualitative studies, one might conclude that exposure to counterstereotypical role models (although intended to reduce stereotyping) may sometimes inadvertently reinforce traditional gender roles. However, in our opinion, these conclusions should be treated with caution. It might be the case that specific conditions need to be met in order to ensure that male preschool teachers are perceived as role models. For example, preschoolers might need to be exposed to more than one counterstereotypical role model

in order to generalize the communal behavior they observe in their male teachers to men in general.

More assessments of real world interventions are needed. One factor that should be considered is how the change in stereotypes is measured. Interventions are sometimes deemed successful based on a change in explicit stereotypes (e.g., Leblebicioglu et al., 2011). This could be problematic as research has shown that exposure to counterstereotypical role models enhance women's self-concept and performance through implicit rather than explicit stereotypes (Dasgupta and Asgari, 2004). Second, it is important to consider changes in a range of domains, even those that were not directly targeted in the intervention. Interventions that focus primarily on stereotypes in the occupational domain may not be comprehensive enough to facilitate real change in girls' future career choices because they do not also target gender roles in the domestic domain. Domestic expectations are present early on and may conflict with counterstereotypical aspirations. Thus, in order to demonstrate to girls that pursuing a career and raising children are not mutually exclusive, future interventions may benefit from portraying a female role model who has both a successful career and children. The risk of this approach is that female role models who manage to excel in both occupational and domestic roles may be seen as achieving unattainable success. Future interventions thus need to take care to present relatable role models whose success appears attainable. In order to reduce expectations that women will take the bulk share of domestic work, it may also be important to conduct interventions with boys. Without a corresponding shift in boys' attitudes toward communal roles (Sinno and Killen, 2009), girls may be unlikely to pursue high-status or demanding careers due to difficulties with pursuing a career while simultaneously being primarily responsible for domestic work (Hochschild and Machung, 2012).

LIMITATIONS AND FUTURE DIRECTIONS

This review includes a selection of articles that are relevant to our specific hypothesis that exposure to or interaction with counterstereotypical role models reduce gender stereotyping and promote counterstereotypical aspirations and behavior. We conducted a thorough literature review, but not a systematic search due to counterstereotypical role models being variably defined in the literature. We selected literature that both confirmed and challenged our hypothesis, with the aim to produce a balanced narrative review. We encourage researchers to conduct a meta-analysis on the studies reviewed above to integrate role model effects more systematically. More research is also needed on whether exposure to counterstereotypical male role models influence boys' and men's gender stereotyping and career choices. Men are underrepresented in communal occupations and roles (Croft et al., 2015). However, very few field-based role model interventions have been implemented to promote communal behavior in boys and men. Whilst we assume that the same processes that underlie role model effects would apply for boys and girls, experimental research has produced inconsistent findings. Sometimes studies have found a role model effect for girls but not boys, and sometimes studies have found a role model effect for boys but not girls (Katz, 1986; Buren et al., 1993; Green et al., 2004; Pike and Jennings, 2005). Future research should investigate the reason for these mixed findings. On a final note, gender roles have changed over the last few decades. Thus, moving forward, more carefully designed research on the impact of counterstereotypical role models in early childhood and scientific evaluations of initiatives and interventions in adolescence are warranted in order to see whether previous findings replicate across time and contexts.

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SM and MO conceived of the presented idea. MO reviewed the literature. SM supervised the findings of this work. Both authors discussed the results and contributed to the final manuscript.

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Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Appendix B Chapter 3 Prepared Manuscript

Short title: *GENDER GAP IN LEAVE UPTAKE*

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Abstract:

Many countries have introduced parental leave (i.e., leave available to both mothers and fathers) under the assumption that gender-equal leave uptake can contribute to gender equality in paid and unpaid work. Notwithstanding, in many countries women take the majority or all of the leave. In the present research, we aim to identify contextual factors that contribute to this inequality. We therefore measured leaving-taking intentions in young people who are about to make important career and life decisions across 37 countries that varied in cultural value orientation, parental leave policies, and gender equality. We found, in all countries, that women intend to take longer leave than men. Leave intentions were inversely related to career ambitions, particularly in women. A larger gender gap emerged in countries that offered longer parental leave (i.e., leave that can be taken by either women or men), even when controlling for cultural values and gender equality. This indicates that long parental leave, implemented with the intention to promote more gender equality, may paradoxically give rise to less gender equality.

Keywords:

Parental Leave, Gender, Cross-Cultural, Inequality, Values, Child Care

Mind the Gender Gap:
Parental Leave Policies, Gender Equality, Cultural Value Orientation, and the Intended Uptake of Parental Leave in 37 countries

Despite global commitments and efforts to tackle gender inequality in the domestic domain (e.g., https://promundoglobal.org/), in many countries, women still do the bulk of domestic work. For example, in the EU and the US, women with young children spend about twice as much time on unpaid work as men (Parent-Thirion et al., 2017; U.S. Bureau of Labor Statistics, 2018). The unequal share of domestic work means that many women–after having children–are faced with the decision of either doing a so-called "second shift" (one at work and another at home; Hochschild & Machung, 2012), leaving or scaling back their high-status and time-intensive career ambitions (Stone, 2007), or reducing their workhours to manage their work at home. Indeed, about 10% of women in the EU are either not working at all or working part-time due to care obligations, compared to less than 1% of men (EIGE, 2019).

Across the world, 66 countries have introduced parental leave (i.e., leave available to both mothers and fathers; International Labour Organization (ILO) 2014) with the aim of addressing gender inequality in the labor market (Burri & Prechal, 2013). In line with this aim, research shows that men who take parental leave continue after the leave ends to engage more with child care and housework (Patnaik, 2019; Reimer & Pfau-Effinger, 2020; Schober & Zoch, 2019), which makes it easier for their female partners to pursue a career (Croft et al., 2018; de Laat & Sevilla-Sanz, 2011; Evers & Sieverding, 2014; Meeussen et al., 2019; Nilsen et al., 2017; Offerman et al., 2020). Moreover, there is an expectation in many countries that women will engage more in child care (including taking the majority of leave), which motivates employers to favor men over women when hiring staff and setting wages (Becker et al., 2919; Nordberg, 2019). This expectation may change as more men take leave and engage with child care, which in turn may reduce the gender gap in wages and power. Men's uptake of parental leave may also benefit men themselves, as men who engage in the care of their young children report higher well-being, as well as better relationships with their children and their partners (Bamishigbin et al., 2020; O'Brien & Twamley, 2017; Petts & Knoester, 2020; Schober, 2012). However, statistics show that even in countries where mothers and fathers are able to share leave, mothers nevertheless tend to take most or all of the leave (Eurofound, 2019). Hence, many of the benefits linked to men's uptake of leave remain unrealized. As equal share of leave is (at least theoretically) possible in many countries, it is important to identify psychosocial barriers to women's and men's equal engagement with work and child care. The aim of the present research is two-fold. First, with the aim of identifying how young people's intentions may contribute to gender inequality in paid and unpaid work, we document - across 37 countries - whether the gender gap in *actual* leave uptake is manifested already in young women's and men's *intended* leave uptake, and whether intentions are related to different career ambitions and priority for family over work. In a second step, with the aim of identifying how the broader context shapes and contributes to this inequality, we examine the extent to which parental leave policies, over and above other cultural signals of gender equality in a given country, account for cross-national variance in the gender gap of intended leave uptake.

Taking a Cross-National Perspective on the Gender Gap in Child Care

Much theoretical and empirical research has been conducted on why women and men behave in accordance with traditional gender roles (with men largely occupying breadwinning roles and women largely occupying caretaking roles; see Eagly & Wood, 2012). Attitudes have been shown to be a major driver of behavior (Haddock et al., 2020). For example, gender attitudes, particularly men's, contribute to couples' share of domestic work and parental leave uptake (Duvander, 2014; Knudsen & Wærness, 2008). Importantly, however, research indicates that (in line with traditional gender role expectations) mothers take the majority of parental leave despite holding gender-egalitarian attitudes (Brandén et

al., 2018; Kroska, 2004). Despite cross-national variations in the gender gap in child care and housework (after controlling for individual and couple characteristics; Fahlén, 2016), research tends to focus more on individual- rather than country-level factors. This focus deflects attention away from how policy and the broader sociocultural context shape and contribute to a traditional share of child care and housework between couples (DeRose et al., 2019; Treas & Lui, 2013). It is important to consider that in countries where men are restricted from parental leave, men may engage less with child care, irrespective of their individual gender attitudes. Restrictions through legislation may not only prevent actual gender-equal share of leave, but may also communicate broader gender role expectations in terms of *who* should be the breadwinner vs. caretaker. Such expectations may trickle down and manifest themselves in young women's and men's expected family-career priorities. Thus, whereas there may be variance within a country (e.g., due to individual gender attitudes), there may also be variance between countries (due to gender role expectations; Fuwa, 2004).

The present research assesses parental leave intentions in a sample of young, highly educated adults who are in the process of making important career and life decisions. Young women's and men's expected leave uptake (which is indicative of their family-career priorities) may influence their respective career aspirations (Blakemore et al., 2005; Brown & Diekman, 2010), which in turn may facilitate gender-unequal leave uptake later in life. In line with recent calls for psychologists to increase their impact on social issues and contribute more to societal justice on a larger scale (Pettigrew, 2018), the present research extends previous research by shifting the focus from how the immediate environment shapes young people's expected family-work priorities (e.g., Fulcher et al., 2015) to how the broader environment shapes such priorities, with a specific focus on leave intentions. Specifically, the present research examines the extent to which different parental leave policies correspond with women's and men's intended leave-uptake, over and above their individual-level attitudes, taking into account the wider sociocultural context (i.e., inequality in the labor market and cultural values). Such findings may inform interventions on a national scale. In the following, we provide a brief overview of research on country-level factors associated with actual uptake or actual share of domestic work, with the aim of testing whether these factors are also associated with future leave intentions.

Parental Leave Policies

Leave can be afforded to parents *prior to* or *in connection with* the birth of their child (associated specifically with giving birth and recovery) and/or *after* birth (associated with caring for the child). *Maternity leave* is leave that is exclusive to mothers and *paternity leave* is leave that is exclusive to fathers. In many countries, part (or all) of the leave after the birth of a child is available to both mothers and fathers (i.e., *parental leave*). Parental leave ranges from 0 weeks to 156 weeks across the world (International Labour Organization, 2014). Long parental leave is a way to afford parents the time that they may need or want to take away from their work to care for their child. However, long parental leave uptake may undermine career progression for the person taking it (Arun et al., 2004; Evertsson & Duvander, 2011). Thus, long parental leave, which in Nordic countries is part of policies that seek to promote equality between women and men, may inadvertently contribute to women's inequality in the labor market, as women take a larger proportion of leave than men (Duvander et al., 2019). Over the last decade, research has increasingly focused on whether equal uptake is facilitated by the extent to which leave policies are gender-egalitarian (i.e., available to both women and men, or more or less exclusive to either parent) and generous (i.e., available over a long period of time and compensated at a high rate). For example, Castro-García and Pazos-Moran (2016) aimed to identify the parental leave policies most associated with fathers' leave uptake. In their analysis of leave policies in 21 European countries, 'use it or lose it' parental leave that was non-transferrable (i.e., reserved for fathers) and highly paid (approaching 100 percent of salary) was associated with the highest uptake by men. In contrast, women tended to take all the paid leave offered to them, not only leave paid at a high rate (for similar

findings, see cross-national comparisons by O'Brien, 2009; Van Belle, 2016). It is unclear, however, whether egalitarian and generous parental leave policies only operate in facilitating gender equality by removing barriers to men's uptake at the time of the birth of their child or whether they also affect men's intentions prior to having children.

Given the consistent associations between policies and men's uptake of leave, it is an important next step to integrate these findings into the broader sociocultural context, and to examine whether the availability of leave similarly shapes young adults' intentions for their future behavior. The abovementioned cross-national comparisons only included parental leave policies in their analyses. The effect of policies may be confounded by social, cultural, or economic factors (Carriero, 2020). For example, countries with egalitarian leave policies also tend to rank high on gender equality indices. In order to disentangle the effect of policy factors from gender equality in a country, it is important to employ a large and heterogeneous sample of countries (e.g., countries that vary in their ranking on gender equality indices). As research has shown (see more below), gender equality in the labor market (with respect to women's relative income and presence in power positions) and cultural value orientation may also contribute to gender division in unpaid work. Thus, the present research extends previous research on parental leave uptake that has focused exclusively on the role of parental leave by also assessing the independent effects of gender equality in the labor market and cultural value orientation, and whether the effect of policies hold when taking into account these other contextual factors.

Gender Inequality in the Labor Market

In addition to examining whether parental leave policies shape young women's and men's aspirations, it is important to consider how other facets of gender equality (e.g., women's relative representation in power positions and relative income) can shape the gendered division of labor. In countries with more egalitarian labor markets, women may expect greater opportunities in regard to income and status, which may afford them more 'bargaining power' (Blumberg, 1984) when negotiating their share of domestic work with their partners. In line with this, analyses of data from 22 (Fuwa, 2004) and 34 countries (Knudsen & Wærness, 2008) has shown that couples in more gender-egalitarian countries (where women are afforded a higher degree of professional opportunities, economic power, and representation in politics) tend to divide domestic work more equally than those in less gender-egalitarian countries. This prior research concerns division of unpaid work that can be done outside of paid work hours, and is thus related to, but at the same time different from division of parental leave, which include a break *away* from paid work, for which men may expect to receive backlash (Miyajima & Yamaguchi, 2017; Wayne & Cordeiro, 2003). Thus, it is not clear whether gender equality in the labor market also corresponds with gender-equal uptake of parental leave or (of particular relevance to the present research) to gender-equal intentions to take leave from work. Moreover, although research suggests that women and men consider how equal share of leave will affect their total household income at a time when they have children (O'Brien & Twamley, 2017), it is not clear whether the expectation of equal income (based on women's equality in the labor market) similarly shapes women's and men's intended leave uptake.

Cultural Value Orientation

In addition to this, it is important to take into account how values on a country level shape the gendered division of labor. Cultural values are "shared conceptions of what is good and desirable in the culture" (Schwartz, 2006, p.139) and may guide individuals' behavior over and above their individual-level characteristics (Elster & Gelfand, 2020). The degree to which cultures are oriented toward mastery and toward egalitarianism (Schwartz, 2012) may be relevant to the division of child-care responsibilities. Research across 19 countries has shown that individuals experience more family-work conflict (i.e., perceiving that their family interferes with their work) in countries that are oriented toward mastery, but less family-

work conflict in countries that are oriented toward egalitarianism (Masuda et al., 2019). Whereas this research did not explore gender differences or intentions per se, it suggested that cultural value orientations influence care- or success-related goals in individuals, which, in turn, may correspond to intentions to take leave from work, and - if such values influence women and men differently - may contribute to a gendered divide of child care.

Taken together, previous research indicates that policies, as well as the social and cultural context, may relate to a gendered division of child care. However, it is not clear whether these factors similarly relate to future expectations of parental leave uptake. Moreover, based on previous research, it is not clear whether the effect of gender equality in the labor market and cultural value orientation affect women and men differently. In order to attain gender equality for women and men, it is essential to obtain a comprehensive understanding of the broader context in which women and men share child care responsibilities. The present research extends existing cross-national research that has focused on the role that parental leave policies play in women's and men's leave uptake in specific regions (e.g., EU), by using a comparatively large sample of countries, and including countries from every major world region. The present research also focuses on intended rather than actual uptake of leave, in order to give insight into how the current broader context in a country informs future gender roles. Our large and diverse sample allows us to explore how robust policy influences appear to be when considering other aspects of the social and cultural context (i.e., cultural value orientation and gender equality in the labor market), and how each aspect uniquely relates to the gender gap in intended leave.

Overview and Hypotheses

The first aim of the present research was to document the gender gap in intended leave uptake across countries and how these intentions relate to career ambitions and family-career priorities. The second aim was to assess the extent to which parental leave policies, gender inequality in the labor market, and cultural value orientation predict cross-national variations in the gender gap over and above individual-level gender attitudes. The present study looked separately at the effect of different indicators of parental leave policies, gender equality in the labor market, and cultural value orientation, by examining the effect of each country-level indicator, while taking into account the role of the others, on the gender gap in intended uptake of parental leave. The hypotheses and analytical strategy were pre-registered on the Open Science Framework (OSF, osf.io/bgc3n; see supplementary materials (SM) for minor deviations from the pre-registration).

In a first step, we test the effect of different parental leave policies, indicators of gender equality in the labor market, and cultural values across 3 separate models. In each respective model, we capture the effect of one country-level indicator while controlling for the other indicator(s).

In Model 1, we test the role of different parental leave policies. We propose that the degree to which leave is exclusive to women or men reflects norms regarding who *should* take leave. We thus examine whether the gender gap in intended leave uptake is predicted by the length of leave exclusive to fathers as well as by the degree to which more leave is exclusive to mothers over fathers (i.e., *gender imbalance in exclusive leave*). We hypothesize that fathers intend to take more leave in countries where more leave is exclusively allocated to them (**H1a**). At the same time, we hypothesize that the gender gap in intended leave uptake is larger in countries with more gender imbalance in exclusive leave (**H1b**). In addition to leave that is exclusive to either the mother or the father, there is also leave that is available to either parent (i.e., *parental leave*). We hypothesize that the gender gap in intended leave is larger in countries that offer *longer* parental leave (**H2**), as women will be more likely than men to take leave that is available. However, we hypothesize that the gender gap is smaller in countries that offer more financial compensation as men will be more motivated than women to take parental leave that is paid (**H3**).

In Model 2, we test the role of different markers of gender equality in the labor market. We hypothesize that the gender gap in intended leave is smaller in countries where women's representation in politics (**H4**) and earnings (**H5**) are more equal to men's, as women will indicate less (and men will indicate more) leave intentions in these countries.

In Model 3, we test the role of different cultural value orientations. We hypothesize that the gender gap is smaller in more egalitarian-oriented countries (**H6**), but larger in countries that are more oriented toward mastery (**H7**), as men will report more and less leave intentions, respectively, in these cultures.

In a second step, in order to compare the most robust country-level effects over and above individuals' attitudes, we include into one final model the individual-level gender attitudes as well as the statistically significant interactions between gender and country-level indicators from Models 1, 2, and 3.

Method

Sample

Data were collected as part of an international research collaboration on gendered norms and social roles. To ensure relatively comparable samples across countries, collaborators from 49 countries were instructed to recruit a minimum sample of 160 university students (80 men) from either psychology or HEED (i.e., health, education, clinical psychology) and STEM (i.e., natural sciences, technology, engineering, and mathematics) degrees (with > 30 men and > 30 women from either category). Since the question about leave intentions may be interpreted as more hypothetical in countries that do not offer leave, we excluded data from hypothesis testing from 12 countries that did not offer leave to fathers either as part of parental leave or paternity leave (see SM for analyses with all 49 countries). Given the present focus on a traditional gender division of labor and future child rearing intentions, participants who identified as *neither male or female* (1.41%), who defined their sexual orientation to be *homosexual* or *mostly homosexual* (4.18%), who reported *already having a child* or *not wanting children in the future* (10.77%), and who were younger than 18 or older than 30 years (11.53%) were excluded from the present analyses. In addition, participants who had not been socialized in the respective cultural context during their formative years (i.e., prior to 15 years of age, 13.46%) were excluded. A final sample of N = 13,942 (n = 8,880 females; n = 5,062 males) from 99 universities across 37 countries was analyzed (see Table 1).

Procedure and Materials

Participants completed a 45-minute survey instrument in the language of instruction at their university (for materials and a complete list of variables: https://osf.io/rwxcj/?view_only=fc24946833c44642938bd592231af632). To take into account any potential differences in sampling strategies across universities and variations in sample characteristics across countries (see Tables SM1 and SM2), we controlled for participants' age, study major, and subjective socioeconomic status (SES; each of which have been linked to parental leave uptake; Borràs et al., 2018; Geisler & Kreyenfeld, 2019; Ma et al., 2020; Reimer, 2020).

Individual-Level Variables

Intended Uptake of Parental Leave. Participants' *intended uptake of parental leave* was assessed with: "If you had a child in the future, how much voluntary (non-medical) parental leave (paid or unpaid) would you like to take in the first 2 years of your child's life? Please indicate in weeks. For reference, 1 month ~ 4 weeks, 6 months ~ 26 weeks, 1 year ~ 52

Table 1

Information about the Sample and about Parental Leave Policies for Each Country

Country (rank)	Total (% men)	Total Leave	Exclusive leave		Country (rank)	Total (% men)	Total leave	Exclusive leave	
			Women	Men				Women	Men
Albania (38)	148 (43)	365	365	0	**Korea, Rep.** (118)	136 (60)	52	90	3
Australia (35)	402 (38)	18	18	14	**Lithuania** (28)	171 (42)	156	120	30
Belgium (31)	322 (22)	75	75	10	**Macedonia** (67)	151 (44)	156	195	0
Canada (16)	1189 (40)	85	85	0	**Netherlands** (32)	509 (25)	26	80	3
Chile (63)	365 (37)	120	120	5	**New Zealand** (9)	222 (45)	52	70	14
Colombia (36)	308 (42)	70	70	8	**Norway** (2)	269 (38)	31	70	80
Croatia (54)	384 (54)	290	290	7	**Poland** (39)	439 (23)	156	130	14
Czech Rep. (88)	198 (35)	140	140	0	**Romania** (58)	215 (36)	104	126	5
Denmark (14)	148 (26)	90	90	14	**Russia** (71)	154 (39)	156	140	0
Ecuador (42)	134 (48)	60	60	10	**Serbia** (40)	740 (25)	0	400	7
Estonia (37)	190 (37)	140	140	10	**Singapore** (65)	189 (44)	0	80	7
Ethiopia (115)	194 (46)	90	90	5	**Slovak Rep.** (74)	253 (40)	156	170	0
France (11)	369 (38)	80	80	11	**Spain** (24)	327 (43)	156	80	15
Germany (12)	622 (31)	70	70	0	**Sweden** (5)	169 (50)	80	70	10
Indonesia (84)	240 (33)	65	65	2	**Tanzania** (68)	89 (51)	0	84	3
Ireland (8)	282 (41)	210	210	0	**Ukraine** (61)	238 (43)	156	126	0
Italy (82)	286 (37)	110	110	1	**U.K.** (15)	265 (18)	13	260	14
Japan (114)	463 (41)	70	70	0	**U.S.A.** (49)	3049 (34)	12	60	0
Kazakhstan (52)	113 (45)	126	126	5	**Total**	13942 (36)	-	-	-

Note. The table presents sample information for each country after exclusion criteria had been applied. Rank refers to countries' rank on the Global Gender Gap Index (GGGI; World Economic Forum (WEF), 2017). Total leave represents the amount of leave (in weeks) available to either parent. Exclusive leave represents the amount of leave (in days) that is either available to women or men.

weeks." Participants recorded their responses in an open-ended response box. Any values that exceed 104 weeks (2 years) were recoded into missing values (6.58%).

Career Ambitions. Two items assessed participants' *career ambitions*: "I have ambitious career goals," "I want to be an important person in my field." Participants recorded their responses on a scale that ran from 1 (Strongly disagree) to 7 (Strongly agree). Items correlated between .42 to .76 across countries.

Family-Career Priorities. To assess participants' future *family-career priorities* we asked participants to "[…] think about your life in the future. Where do you feel your priorities will lie in your future in the period of time that your children are under 13?" Participants recorded their priorities on two scales. The first scale ran from 1 (Having a family) to 7 (Having a career). The second scale ran from 1 (Spending quality time with my future children) to 7 (Reaching my full career potential). Items correlated between .40 to .83 across countries[8]. The scale was recoded so that higher scores indicate a preference for family over career.

Gender. Participants were asked: "What best reflects your gender?" Participants could choose between the following answer options: Male, Female, or Neither best reflects my identity.

Age. Participants were asked: "How old are you?" and recorded their age in an open-ended response box.

Subjective SES. Participants were asked to indicate their *subjective SES* along a ten-point ladder (using the MacArthur Subjective Status Scale; Adler et al., 2000): "Please think about where your family stands in comparison to others in [country]. This ladder conceptually represents society, where those with the highest socioeconomic status (Rung 10; i.e., those with the most money, highest education, and best jobs) are at the top and those with the lowest socioeconomic status (Rung 1; i.e., those with the least money, least education, and worst jobs) are at the bottom. Please choose the number that best represents where your family is on this ladder compared to others in [country]." The scale ranged from 1 (Low SES) to 10 (High SES)[9].

Study Major. One item assessed participants' *study major*. Participants were asked: "What field most closely describes your major or aspired major? If you have not decided yet, please select what is most likely out of the choices." Participants indicated which of the following options applied best: Science (Chemistry, Biology, etc.); Mathematics/Statistics; Computer Science; Engineering (coded as STEM); Psychology (General); Psychology with the goal to be a clinical practitioner; Medicine with the goal to become a doctor; Other Health/Social work professions; Education/Teaching (coded as HEED); Other Social Sciences (History, Sociology, etc.; coded as Social Sciences); Business (coded as Business); Law; Sport Sciences; Fine Arts (Music, Painting, Literature); Theology/Religious Studies (coded as Other).

Gender Attitudes. Two items assessed participants' *gender-traditional attitudes* (shortened from Larsen & Long, 1988): "In groups that have both male and female members, it is more appropriate that leadership positions be held by males"; "Men make better leaders." Participants recorded their responses on a scale that ran from 1 (Strongly disagree) to 7 (Strongly agree). Items correlated between .14 to .89 across countries[10]. People's gender-

[8] Data missing from Tanzania.
[9] In Belgium and the Netherlands, the scale ran from 0 to 10. To make the scale comparable across sites, 0 was recoded as 1 (affecting a total of 3 responses).
[10] In Croatia (r = .14) and Macedonia (r = .32), the items were not highly correlated.

traditional attitudes were skewed toward the left (skewness = .90). Three items assessed participants' *gender-essentialist attitudes* (shortened from Gaunt, 2006): "Mothers are instinctively better caretakers than fathers"; "Mothers are naturally more sensitive to a baby's feelings than fathers are"; "In terms of child care, fathers have to learn what mothers are able to do naturally." Participants recorded their responses on a scale that ran from 1 (Strongly disagree) to 7 (Strongly agree; Cronbach's α ranged from .45 to .88 across countries[11]).

Country-Level Variables

In the present research, we predict gender differences in intentions to take parental leave from different parental leave policies (i.e., length of leave exclusive to fathers, the degree to which more leave is exclusive to mothers over fathers, leave length available to either parent, length of leave compensated at 100%), country-level gender inequality (i.e., women's relative income and representation in politics), and cultural values (i.e., the degree to which a culture is oriented toward egalitarianism and toward mastery). Indicators of different parental leave policies, gender inequality in the labor market, and cultural value orientation were collected from publicly available datasets. To deal with missing data, we imputed 10 datasets from a larger dataset of 63 country-level economic, political, and social indicators (imputation code available on OSF: https://osf.io/rwxcj/?view_only=fc24946833c44642938bd592231af632) and ran analyses with imputed data averaging across these data sets (1 data point was imputed for women's relative income and 7 data points were imputed for egalitarian and mastery value orientations).

Parental Leave Policies. *Father-exclusive leave* represents the days of leave exclusive to fathers in a given country (sample range 0 to 80 days). *Gender imbalance in exclusive leave* represents the extent to which leave is exclusive to mothers over fathers (in days) and is the sum of the total amount of leave reserved exclusively for the mother minus the total amount of leave reserved exclusively for the father in a given country (sample range: -10 to 393 days). *Length of parental leave* represents the total amount of leave (in weeks) that is available to either parent (i.e., no part of this leave is exclusive to mothers or fathers; sample range: 0 to 156 weeks). *Length of leave compensated at 100%* represents the number of weeks with 100 percent income compensation in a given country (e.g., 10 weeks compensated at 80% = 8 weeks) and is the product of duration of parental leave (in weeks) and the rate of compensation (% of previous earnings; sample range: 0 to 70.2 weeks). Data is retrieved from ILO (2014). If the ILO report stated a flat rate benefit, we computed the % of previous earnings based on OECD data on average salary in the respective country.

Gender Inequality in the Labor Market. *Women's relative income* represents the ratio of female (to male) income in a country and is estimated using the proportion of working women and men, their relative wages, and overall GDP of the country in question (scale ranges from 0-1; sample range: .43 to .79). *Women's relative representation in politics* is based on the ratio of females (to males) with seats in parliament, at the ministerial level, and number of years as head of state over the last 50 years in a given country (scale ranges from 0 to 1; sample range: .08 to .53). Data is retrieved from WEF (2017).

Cultural Value Orientation. The degree to which countries are oriented toward *egalitarianism* concerns the extent to which individuals in a country value social justice, equality, and helping others as a guiding principle in their life (sample range: 4.19 to 5.27). The degree to which countries are oriented toward *mastery* concerns the extent to which

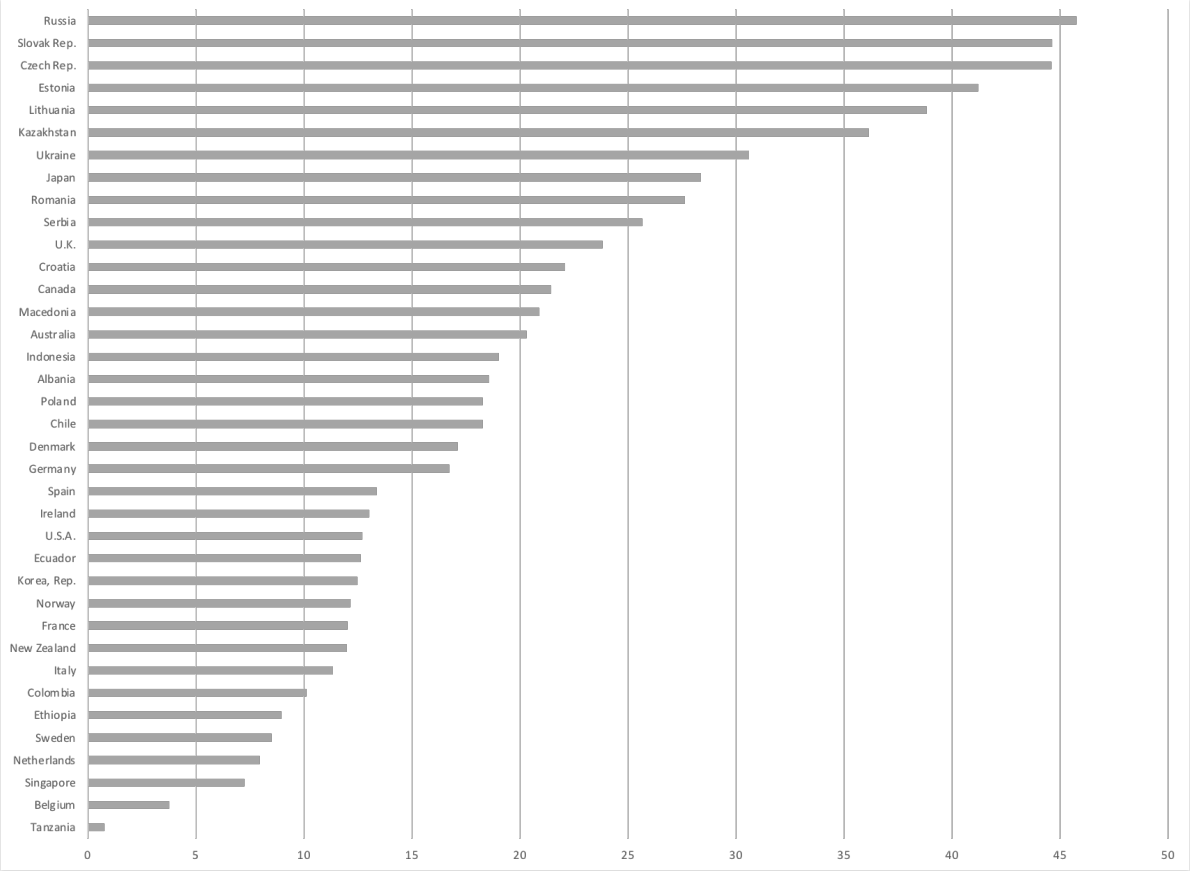
[11] Scale reliability was below the recommended Cronbach's α threshold of .7 in Ethiopia (.45) and Japan (.68).

individuals in a country value attaining personal goals as a guiding principle in their life (sample range: 3.72 to 4.21). Data is retrieved from Schwartz (2008).

Results

Descriptive analyses showed that women intend to take longer leave than men in all countries (see Figure 1). The gender gap in leave intentions ranged from 0.79 weeks (in Tanzania) to 45.77 weeks (in Russia; see Table SM3 for descriptive statistics for women and men in each country). Overall, leave intentions were negatively associated with career ambition in both women (r = -.14, p < .001) and men (r = -.08, p < .001), but more strongly in women. In addition, leave intentions were positively associated with prioritizing family over career in both women (r = .20, p < .001) and men (r = .17, p < .001).

Figure 1
The Gender Gap in Intended Uptake of Parental Leave Across Countries



Note. The gender gap score is based on the estimated means (i.e., the intercept for women - the intercept for men, when individual- and site-level control variables are held at zero). Values above 0 indicate the average number of weeks of leave women intend to take over and above the weeks of leave men intend to take.

Analytical Strategy

In order to examine whether there is sufficient variance at the site- and country-level to justify a 3-level hierarchical linear model, we first ran an 'intercept only' model that included no predictor variables but random intercepts at the site- and country-level. The intraclass correlation coefficient (ICC) for intended leave indicated sufficient clustering at the site- (ICC = 0.06) and country-level (ICC = 0.09, LeBreton & Senter, 2008). We noted a higher degree of clustering for women (ICC = 0.24) than for men (ICC = .06). When we

added individual- and site-level control variables to the model, the clustering decreased for site (ICC = 0.03) but increased for country (ICC = 0.12), indicating that we successfully captured variance at the site level by including the control variables.

Given the limited degrees of freedom at the country level, prior to hypothesis testing we assessed whether we needed to control for women's relative labor force representation, as women may be more likely to indicate intentions to take leave from work in countries where they expect to be employed. We added an interaction term between gender and women's relative representation in the labor force (as indicated by the proportion of a country's working-age population that engages actively in the labor market by either working or looking for work, WEF, 2017) to the 'intercept only' model (specified above). There was no evidence suggesting that women's relative labor force representation (b = -7.04, 95% CI [-48.70, 34.59]) related to the gender gap in intended uptake. Thus, to avoid unnecessary complexity, we did not control for women's relative labor force participation in the next set of analyses.

We also noted as part of the descriptive analyses that women and men in all countries reported career ambition above the scale midpoint of 4 (M = 5.44, ranging from 4.16 to 6.62 across countries), which indicates that our sample generally expects to be in employment.

We included a random effect of gender at the country level to account for between-country variability. Age and subjective SES (centered within sites) and study major (effect coded) were added as individual-level control variables. Age and subjective SES were also averaged across sites (grand mean centered) and added as site-level control variables. To test the pre-registered hypotheses, we added cross-level interactions between gender (centered at the grand mean in line with recommendations by Enders & Tofighi, 2007; female = -0.36, male = 0.64) and indicators of different parental leave policy contexts, gender inequality in the gender market, and cultural value orientation. All country-level indicators were centered at their grand mean (Enders & Tofighi, 2007). No multicollinearity was detected as indicated by VIF < 5 between hypothesized country-level variables in each model (see Table SM4 for correlations between country-level indicators). In the following models, the predictors were entered simultaneously. Each effect is thus tested as the other effects are held constant (for an overview of how each effect correlates to women's and men's respective intentions, see Table SM5).

Model 1: How do Parental Leave Policies Relate to the Gender Gap in Intended Uptake of Parental Leave?

In Model 1, we assessed whether the gender gap in intended leave was predicted by length of leave exclusive to fathers, the degree to which leave is exclusive to mothers over fathers, total length of leave available to either parent, and the length of parental leave compensated at 100 % (the results are summarized in Table 2). We predicted that longer leave exclusive to fathers would be associated with higher leave intentions among men (and possibly lower leave intentions among women), but that the gender gap would be larger in countries where more leave is exclusively allocated to mothers over fathers. Contrary to **H1a**, however, with all other leave policies held constant, there was no evidence suggesting that the gender gap in intended leave varied across countries that offer more or less exclusive leave to fathers (b = 0.03, 95% CI [-0.19, 0.24]). However, we found that the degree to which leave is exclusive to mothers over fathers moderated gender differences in intended leave uptake (b = -0.05, 95% CI [-0.08, -0.01]). Specifically, the gender gap in leave uptake was larger in countries with a relatively large (+1 SD: b = -22.32, 95% CI [-26.17, -18.48]) versus small gender imbalance in exclusive leave (-1 SD: b = -13.92, 95% CI [-18.39, -9.45]). Simple slopes analyses indicated that this cross-national variation in the gender gap seemed to be driven by women's (rather than men's) leave intentions: the slope of the gender imbalance in exclusive leave was positive and significant for women (b = 0.05, 95% CI [0.02, 0.09]), but non-significant for men (b = 0.01, 95% CI [-0.02, 0.03]), indicating that women reported longer

leave intentions in countries where relatively more leave is exclusive to mothers over fathers (in line with **H1b**). In addition, we predicted that the gender gap would be larger in countries where longer leave is available to either parent. In the context of exclusive leave and length of leave compensated at 100% held constant, we found that total length of parental leave significantly moderated gender differences in intended leave uptake (b = 0.08, 95% CI [-0.13, -0.03]). The gender gap in intended uptake was larger in countries that offer relatively long (+1 SD: b = -22.63, 95% CI [-26.30, 18.96]) rather than short parental leave (-1 SD: b = -13.62, 95% CI [-17.93, -9.31]). Simple slopes analyses indicated that this cross-national variation in the gender gap seemed to be driven by women's (rather than men's) leave intentions: the slope of length of leave was significant and positive for women (b = 0.12, 95% CI [0.07, 0.17]), but not significant for men (b = 0.02, 95% CI [-0.01, 0.05]), indicating that when parents are offered longer leave, women (but not men) reported longer leave intentions (in line with **H2**). Finally, we predicted that the gender gap would be smaller in countries that offer more parental leave compensated at 100%. Contrary to **H3**, however, with all other leave policies held constant, length of leave compensated at 100% did not significantly moderate gender differences in intended leave uptake (b = -0.17, 95% CI [-.35, 0.004]).

Table 2

Hierarchical Linear Regression Results for Intended Uptake of Parental Leave Predicted by Gender, Father-Exclusive Leave, Gender Imbalance in Exclusive Leave, Total Length of Parental Leave, Length of Parental Leave Compensated at 100%.

			95% CI			
	Coefficient	*SE*	LL	UL	*t*	*p*
Fixed Effects						
Level 1						
Gender	-14.98	2.37	-19.73	-10.17	-6.31	< .001
Level 3						
Father-exclusive leave	-0.02	0.09	-0.20	0.16	-0.22	.830
Gender imbalance in exclusive leave	0.04	0.01	0.01	0.06	2.49	.020
Total length of parental leave	0.07	0.02	0.03	0.11	3.61	< .001
Length of leave compensated at 100%	0.21	0.07	0.06	0.35	2.87	.010
Cross-level interactions						
Gender x Father-exclusive leave	0.03	0.11	-0.19	0.24	0.25	.810
Gender x Gender imbalance in exclusive leave	-0.05	0.02	-0.08	-0.01	-2.72	.010
Gender x Total length of parental leave	-0.08	0.03	-0.13	-0.03	-3.16	< .001
Gender x Length of leave compensated at 100%	-0.17	0.09	-0.35	0.004	-1.97	.060
Random Effects	Coefficient	*SD*				
Intercept variance (site-level)	0.27	0.52				
Intercept variance (country-level)	45.25	6.73				

Slope variance	62.40	7.90

Note. Gender was coded -0.36 for females and 0.64 for males. N = 13942 at Level 1 (individuals), N = 99 at Level 2 (sites), and N = 37 at Level 3 (countries). Coefficients represent unstandardized regression weights (fixed effects) and variances (random effects). Individual- and site-level control variables are not reported.

Model 2: How does Gender Inequality in the Labor Market Relate to the Gender Gap in Intended Uptake of Parental Leave?

In Model 2, we assessed whether the gender gap in intended leave was predicted by women's relative representation in politics and women's relative income (the results are summarized in Table 3). We predicted that women's relative representation in politics would be associated with lower leave intentions among women and higher leave intentions among men. We found that, when women's relative income is held constant, women's relative representation in politics significantly moderated gender differences in intended leave uptake (b = 42.97, 95% CI [14.53, 71.57]). Specifically, the gender gap was smaller in countries where women are relatively more (+1 SD: b = -15.20, 95% CI [-19.84, -10.56]) compared to less represented in politics (-1 SD: b = -25.98, 95% CI [-31.24, -20.54]). Simple slopes analyses indicated that this cross-national variation in the gender gap seemed to be driven by women's (rather than men's) leave intentions: the slope of women's representation in politics was negative and (marginally) significant for women (b = -36.44, 95% CI [-73.62, 0.74]), and positive but non-significant for men (b = 6.54, 95% CI [-10.17, 23.24]), indicating that women (but not men) report shorter leave intentions in countries where women are more represented in politics (in partial support of **H4**). We also predicted that, with women's relative representation in politics held constant, women's relative income would be associated with lower leave intentions among women and higher leave intentions among men. However, the interaction between gender and women's relative income was non-significant (b = -5.71, 95% CI [-49.82, 38.29]), indicating that the gender gap in intended uptake of leave is not associated with the gender gap in income (contrary to **H5**).

Table 3

Hierarchical Linear Regression Results for Intended Uptake of Parental Leave Predicted by Gender, Women's Relative Income, and Women's Relative Representation in Politics.

			95% CI			
	Coefficient	*SE*	LL	UL	*t*	*p*
Fixed Effects						
Level 1						
Gender	-22.14	2.06	-26.11	-18.17	-10.74	< .001
Level 3						
Representation in politics	-20.83	14.31	-48.34	6.75	-1.46	.160
Income	18.49	22.08	-24.16	60.84	0.84	.410
Cross-level interactions						
Gender x Representation in politics	42.97	14.82	14.53	71.57	2.90	.010
Gender x Income	-5.71	22.89	-49.82	38.29	-0.26	.760
Random Effects	Coefficient	*SD*				
Intercept variance (site-level)	0.39	0.63				
Intercept variance (country-level)	101.84	10.09				
Slope variance	103.15	10.16				

Note. Gender was coded -0.36 for females and 0.64 for males. N = 13942 at Level 1 (individuals), N = 99 at Level 2 (sites), and N = 37 at Level 3 (countries). Coefficients represent unstandardized regression weights (fixed effects) and variances (random effects). Individual- and site-level control variables are not reported.

Model 3: How does Cultural Value Orientation Relate to the Gender Gap in Intended Uptake of Parental Leave?

In Model 3, we assessed whether the gender gap in intended leave was predicted by the degree to which a country is oriented toward egalitarianism and toward mastery (the results are summarized in Table 4). We predicted that the gender gap would be smaller in countries that are more oriented toward egalitarianism because men would intend to take more leave in these countries. We found that, with mastery value orientation held constant, egalitarian value orientation significantly moderated gender differences in intended uptake (b = 22.11, 95% CI [11.51, 32.70]). Specifically, the gender gap was smaller in countries that are relatively more (+1 SD: b = -12.69, 95% CI [-17.17, -8.20]) as compared to less oriented toward egalitarianism (-1 SD: b = -24.18, 95% CI [-27.96, -20.39]). Simple slopes analyses indicated that this cross-national variation seemed to be driven by women's (rather than men's) leave intentions: the slope of egalitarian value orientation was negative and significant for women (b = -21.53, 95% CI [-34.90, -8.17]), and positive but non-significant for men (b = 0.57, 95% CI [-6.19, 7.33]), indicating that women (but not men) reported shorter leave intentions in countries that are more oriented toward egalitarianism (contrary to **H6**). We also predicted that the gender gap would be larger in countries that are more oriented toward mastery because men would intend to take less leave in these countries. However, the interaction between gender and mastery values was non-significant (b = 25.45, 95% CI [-1.35, 52.13]), indicating that, with egalitarian value orientation held constant, the gender gap in intended uptake of leave is not associated with the degree to which a country is oriented toward mastery (contrary to **H7**).

Table 4

Hierarchical Linear Regression Results for Intended Uptake of Parental Leave Predicted by Gender, Egalitarian Value Orientation, and Mastery Value Orientation.

			95% CI			
	Coefficient	*SE*	LL	UL	*t*	*p*
Fixed Effects						
Level 1						
Gender	-21.50	1.66	-24.70	-18.29	-12.93	< .001
Level 3						
Egalitarian value orientation	-13.53	5.49	-24.06	-2.94	-2.47	.020
Mastery value orientation	-8.83	13.87	-35.52	17.85	-0.64	.540
Cross-level interactions						
Gender x Egalitarian value orientation	22.11	5.50	11.51	32.70	4.02	< .001
Gender x Mastery value orientation	25.45	13.88	-1.35	52.13	1.83	.090
Random Effects	Coefficient	*SD*				

Intercept variance (site-level)	0.40	0.63
Intercept variance (country-level)	91.78	9.58
Slope variance	85.41	9.24

Note. Gender was coded -0.36 for females and 0.64 for males. N = 13942 at Level 1 (individuals), N = 99 at Level 2 (sites), and N = 37 at Level 3 (countries). Coefficients represent unstandardized regression weights (fixed effects) and variances (random effects). Individual- and site-level control variables are not reported in the table.

Final Model

We subsequently entered the statistically significant cross-level interactions between gender and national-level indicators from Models 1, 2, and 3, as well as the individual- and site-level control variables, into one final model. In addition, we added interaction terms between gender and individual-level gender-traditional attitudes and gender-essentialist attitudes to this model. When considering all the effects simultaneously, the slopes were comparable to those in Models 1, 2, and 3, but only the interaction between gender and length of available parental leave remained statistically significant in predicting intended uptake of parental leave[12]. All other hypothesized cross-level interaction effects were reduced and consequently statistically non-significant (see Table 5). Thus, even though women had intentions of taking less parental leave in countries that are oriented toward egalitarianism or have more women in power, when controlling for these effects, longer available parental leave still related to women's intentions to take more of the leave that could be shared with their male partner.

[12] Due to the non-normal distribution of length of parental leave across countries (see Figure SM3), the value at -1 SD is -36.50, which is outside the observed range of length of leave. See SM for robustness analyses with total length of leave as a categorical variable.

Table 5

Hierarchical Linear Regression Results for Intended Uptake of Parental Leave Predicted by Gender, Gender Imbalance in Exclusive Leave, Total Length of Parental Leave, Women's Relative Representation in Politics, and Egalitarian Value Orientation.

			95% CI			
	Coefficient	*SE*	LL	UL	*t*	*p*
Fixed Effects						
Level 1						
intercept	33.29	1.73	30.06	36.50	19.27	< .001
$HEED_a$	1.85	0.38	1.11	2.60	4.88	< .001
$STEM_b$	-0.64	0.44	-1.51	0.21	-1.47	.141
Soc $Sci._c$	0.12	0.75	-1.34	1.59	0.16	.875
$Business_d$	-0.98	0.64	-2.23	0.28	-1.53	.127
Age	0.24	0.10	0.04	0.45	2.37	.018
Subjective SES	-0.54	0.13	-0.78	-0.29	-4.27	< .001
Gender-traditional attitudes	-0.59	0.19	-0.85	-0.18	-3.05	.002
Gender-essentialist attitudes	-0.07	0.14	-0.27	0.23	-0.52	.601
Gender	-16.24	1.83	-19.64	-12.84	-8.88	< .001
Gender x Gender-traditional attitudes	-1.21	0.37	-2.18	-0.89	-3.31	.001
Gender x Gender-essentialist attitudes	-1.97	0.30	-2.35	-1.32	-6.69	< .001
Level 2						
Age (site level)	0.43	0.34	-0.19	1.18	1.24	.219
Subjective SES (site level)	-3.58	0.91	-5.28	-1.53	-3.93	< .001
Level 3						
Gender imbalance in exclusive leave	0.02	0.02	-0.01	0.10	1.32	.200
Total length of parental leave	0.09	0.02	0.05	0.13	4.19	< .001
Representation in politics	2.70	14.30	-23.97	29.33	0.19	.848
Egalitarian value orientation	-8.33	6.33	-20.11	3.49	-1.31	.202
Cross-level interactions						
Gender x Gender imbalance in exclusive leave	-0.03	0.02	-0.06	0.001	-1.81	.083
Gender x Total length of parental leave	-0.09	0.02	-0.13	-0.05	-4.05	< .001
Gender x Representation in politics	20.25	15.15	-7.74	48.53	1.34	.202
Gender x Egalitarian value orientation	1.77	6.75	-10.83	14.25	0.26	.791

Random Effects	Coefficient	*SD*
Intercept variance (site-level)	2.05	5.33
Intercept variance (country-level)	2.30	5.99
Slope variance	2.58	6.74

Note. Gender was centered at the grand mean (coded -0.36 for females and 0.64 for males). N = 13,942 at Level 1 (individuals), N = 99 at Level 2 (sites), and N = 37 at Level 3 (countries). Coefficients represent unstandardized regression weights (fixed effects) and variances (random effects).

[a] HEED (i.e., Psychology; Psychology with the goal to be a clinical practitioner; Medicine with the goal to become a doctor; Other Health/Social work professions; Education/Teaching) coded as 1, STEM coded as 0, Social Sciences coded as 0, Business coded as 0, Other coded as -1.

[b] STEM (Science (Chemistry, Biology, etc.); Mathematics/Statistics; Computer Science; Engineering) coded as 1, HEED coded as 0, Social Sciences coded as 0, Business coded as 0, Other coded as -1.

[c] Social Sciences (Other Social Sciences (History, Sociology, etc.)) coded as 1, HEED coded as 0, STEM coded as 0, Business coded as 0, Other coded as -1.

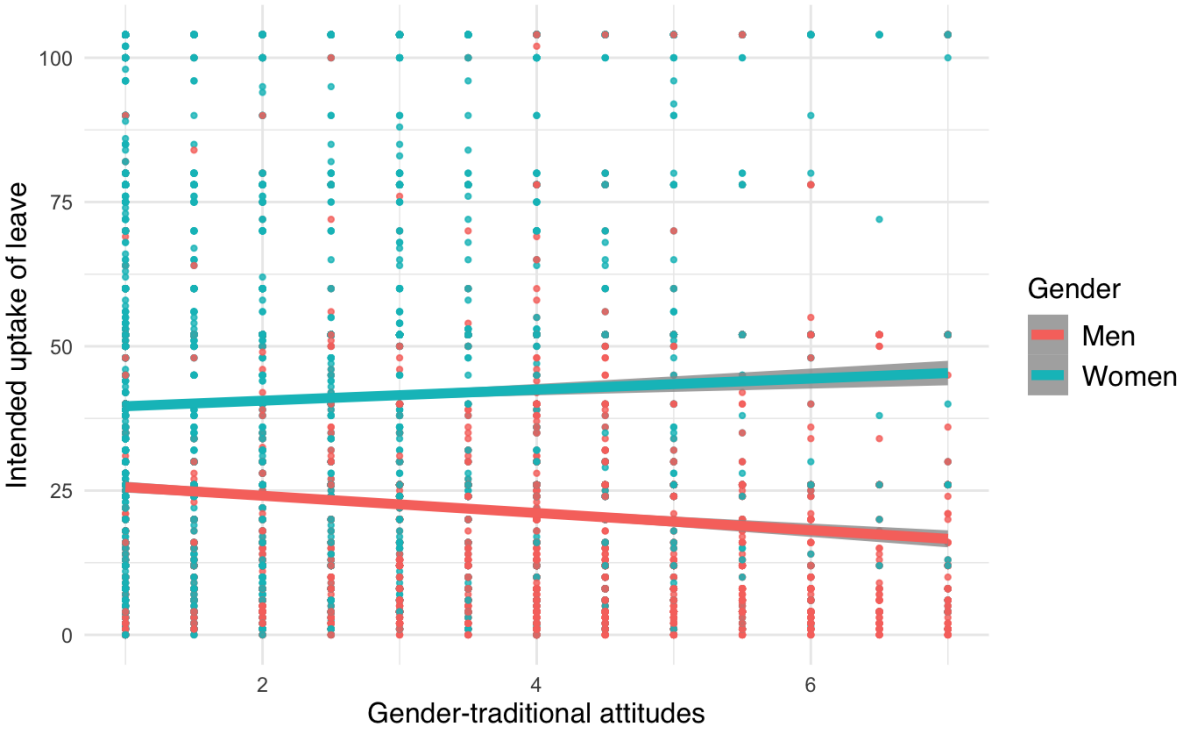
[d] Business coded as 1, HEED coded as 0, STEM coded as 0, Social Sciences coded as 0, Other (Law; Sport Sciences; Fine Arts (Music, Painting, Literature); Theology/Religious Studies) coded as -1.

Exploratory Analyses

Exploratory analyses revealed that gender-traditional attitudes significantly moderated gender differences in intended uptake (b = -1.21, 95% CI [-0.85, -0.18]). Simple slopes analyses indicated that this cross-national variation seemed to be driven by men's (rather than women's) leave intentions: the slope of gender-traditional attitudes was negative and significant for men (b = -1.82, 95% CI [-2.31, -1.32]), and positive but non-significant for women (b = 0.24, 95% CI [-0.26, 0.74]), indicating that men who endorsed gender-traditional attitudes intended to take less leave (see Figure 2).

Figure 2

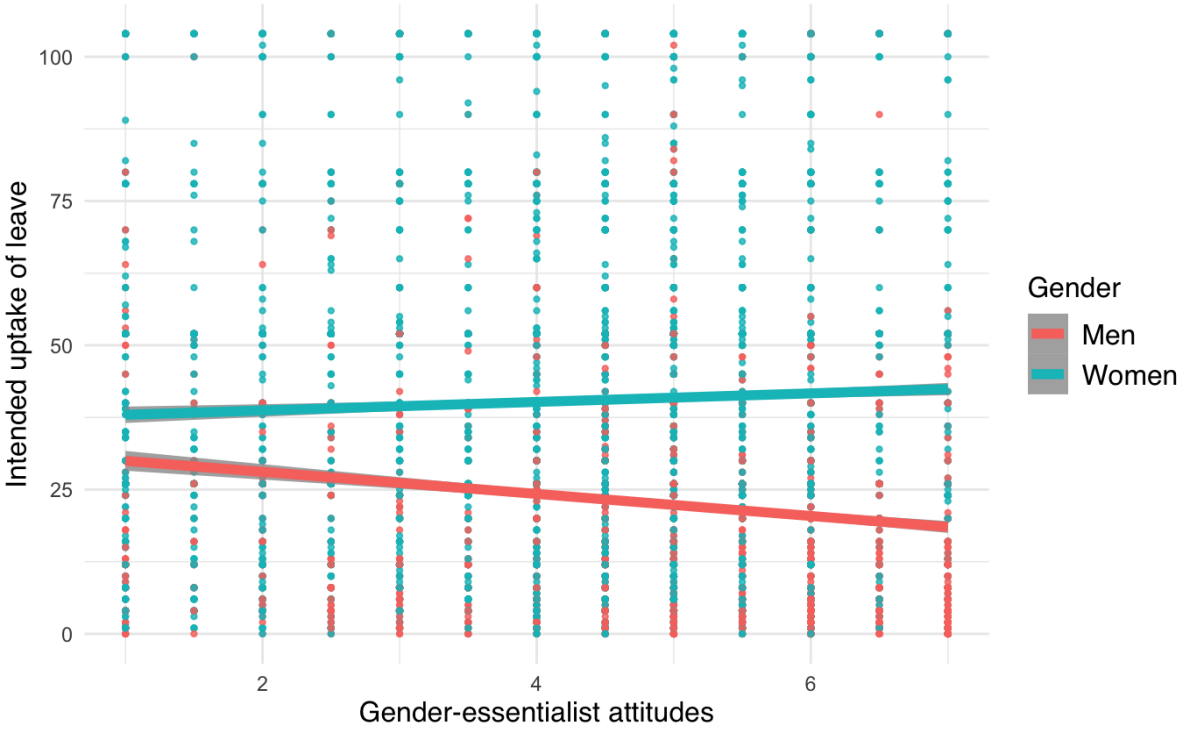
The Gender Gap in Intended Uptake of Parental Leave Predicted by Gender-Traditional Attitudes.



Gender-essentialist attitudes also moderated gender differences in intended uptake (b = -1.97, 95% CI [-2.35, -1.32]). Simple slopes analyses showed that the slope of gender-essentialist attitudes was positive and significant for women (b = 0.61, *SE* = .17, $p < .001$, 95% CI [0.27, 0.95]) and negative and significant for men (b = -1.32, *SE* = .24, $p < .001$, 95% CI [-1.79, -0.85]), indicating that women who endorsed gender-essentialist beliefs intended to take more leave, whereas men who endorsed gender-essentialist beliefs intend to take less leave (see Figure 3).

Figure 3

The Gender Gap in Intended Uptake of Parental Leave Predicted by Gender-Essentialist Attitudes.



Discussion

A gender-based division of paid and unpaid work is a pressing issue in many countries. The first aim of the present research was to document the gender gap in intentions to take leave from work to care for one's child in a wide range of countries. We found that, in all countries, women intended to take longer leave than men. Moreover, we found that leave intentions were inversely correlated with career ambitions for both women and men (but particularly for women), suggesting that leave intentions may come at a cost to one's career. The pervasive gender gap in intended leave uptake that we unveiled thus suggests that gender segregation in paid and unpaid work will remain an issue for future generations at a global level.

Importantly, however, the gender gap in intended leave uptake varied notably across countries. The second aim of the present research was thus to examine whether some of this cross-national variance could be explained by parental leave policies and the broader sociocultural context. The results showed a larger gender gap in countries that offer longer parental leave to either parent (even when controlling for length of leave compensated at 100%, which we had hypothesized would counter a widening gender gap through increasing men's intended leave uptake). This indicates that longer parental leave, implemented with the intention to promote a more equal share of care, may paradoxically give rise to a less equal share of child care between women and men (for similar findings see Boeckmann et al., 2014; Tharp & Parks-Stamm, 2020). We found that this effect was largely associated with women's, rather than men's, leave intentions, in line with previous research suggesting that only women take advantage of leave that is unpaid, whereas men do not take advantage of leave unless it is highly paid or offered to them exclusively (Castro-García & Pazos-Moran, 2016; Jurado-Guerrero & Muñoz-Comet, 2020). In comparison to prior research on how generous and egalitarian leave policies promote uptake in men, however, we found that neither leave compensation nor exclusive leave was associated with higher intentions in young men. This suggests that even though these policies may (at least to some degree) help to counter a gender-traditional divide of paid and unpaid work when women and men have children, the presence or absence of such policies do not seem to correspond to more or less

intended leave in men prior to having children – at least not in a comparison of men's leave intentions across countries. The fact that we found negligible effects of gender-egalitarian and generous parental leave policies on young women's and men's intentions is important to note as this is a time where women and men make important career and life decisions, which may shape and contribute to a gendered divide of paid and unpaid work later in life.

The results also showed a smaller gender gap in countries where women are more represented in politics and in countries that are more oriented toward egalitarianism. Again, we found that these effects seemed to be driven by women's, rather than men's, leave intentions. However, when all the effects of different country-level factors were tested simultaneously, the effect of women's relative representation in politics and egalitarian values were reduced and consequently no longer statistically significant, suggesting that parental leave policies play an important and perhaps more proximal role in the gender gap in intended uptake of parental leave over and above broader cultural signals of gender equality.

The reduction in the effect of the sociocultural context when taking into account leave policies illustrates the importance of weighing country-level factors against one another. That said, these statistically non-significant effects in the final model may reflect insufficient statistical power. Within cross-cultural research, it is important to consider statistical power when interpreting non-significant effects at the country level, i.e., to look beyond statistical significance, as non-significant trends or correlations between country-level factors may be informative. Thus, whereas the effect, for example, of women's relative representation in politics was reduced (and consequently statistically non-significant) when taking into account parental leave politics, it should not be taken to mean that women's representation in politics has no relation to women's intended uptake of leave.

Strengths, Limitations, and Perspectives for Future Research

Although we were able to make inferences about country-level factors with our large and diverse cross-national sample (something that is much more dubious with a smaller sample of countries; e.g., Craig & Mullan, 2011), it is important to recognize that these findings may not generalize to all populations (Heinrich et al., 2010). Given that gender roles have not changed similarly across different social stratifications (England, 2010), a gender gap of a different degree may emerge in a sample of individuals who are not enrolled in higher education. In addition, although we recruited university students both with the objective of having comparable samples across countries and to focus on those most likely to have a career, a university sample may be less representative of the general population in countries where attending higher education is more exclusive to the higher strata of society. This is important to consider when interpreting these findings. That said, university students' intentions are important as they indicate how societies are likely to develop, as young highly educated individuals are those who are most likely to hold positions of power to influence policies at a national level or within organizations.

By gaining insights into the combined and unique role of various political, social, and cultural factors on leave intentions, we pave the way for future investigations into the individual-level processes that countries may (or may not) trigger by addressing these societal conditions (Omidakhsh et al., 2020). It is important, however, to remember that the data is cross-sectional. Thus, it is possible that the relationship between length of parental leave and intentions may be driven by a third unknown variable. To take this into consideration, we explored a range of potential country-level confounds (in relation to economic development, preferences and cultural values; none moderated gender differences in intended uptake; see SM for more details).

Interestingly, we found no evidence relating men's leave intentions to the broader policy or sociocultural context. The lack of correspondence between parental leave policies

and men's intentions is perhaps not surprising given the low variability in policies (especially those that have been linked to men's uptake) across countries in our sample. The lack of correspondence between men's intentions and cultural value orientation and gender equality in the labor market, however, is somewhat more noteworthy given that there is more cross-national variance with respect to these variables in our sample. We noted that men's intentions corresponded with an ICC of .06 at the country level, which is just above the minimum recommended threshold of .05 (LeBreton & Senter, 2008), indicating that there is some (albeit not a lot of) variance to be explained at the country level. As none of the country-level factors we tested were significantly associated with men's leave uptake, this emphasizes the need for future research to identify contextual factors associated with men's intentions.

Implications for Society

That said, the finding that men's intentions were less clustered at the country level than women's (as indicated by the ICC statistics) is in line with previous research suggesting that men's (relative to women's) uptake of leave is rooted more strongly in individual-level factors (such as their gender attitudes and socioeconomic status; Duvander, 2014; Geisler & Kreyenfeld, 2019). Indeed, this is also what we find as men's (but not women's) gender-traditional attitudes related to their intended leave uptake. This indicates that in order to increase caregiving intentions in men, it may be prudent for interventions to focus directly on promoting gender-egalitarian attitudes. It is important, however, to remember that country-level initiatives and individual-level attitudes are not mutually exclusive. For example, as shown by previous research, policies that seek to promote fathers' involvement in child care (through reserving leave for fathers) seem to shift gender role attitudes in the general populations (Wrohlich & Unterhofer, 2017). Thus, the relatively low cross-national variance in men's intentions to take parental leave may be indicative of the lack of effective policies across countries that are able to shift attitudes.

Taken together, generous parental leave seems to relate to a larger gender gap in intended uptake of parental leave, over and above individual-level gender attitudes. The present findings suggest that merely offering both women and men the opportunity to take leave is not an effective way to promote future caretaking expectations in men, as length of available leave was not associated with greater intended uptake in men. In order to tackle gender equality across paid and unpaid work, it may be crucial to earmark leave for men and offer generous compensation (as has been successfully done in several countries to increase men's uptake; see Meeussen et al., 2020). However, as the present findings suggest, this may still not shift intentions in early adulthood. As young people's intentions may play a crucial role in their family and career decisions, more research is needed to identify contextual factors that impact gender differences in intentions to take leave. Our findings suggest that since intentions were related to gender attitudes, particularly in men, an effective way to promote a more gender-equal division of paid and unpaid work in the future may be to address gender-traditional and -essentialist attitudes.

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Supplementary Materials

Deviations from the Pre-Registration

The hypotheses and analytical strategy were pre-registered on the Open Science Framework (OSF, osf.io/bgc3n) at the end of data collection but prior to analyses. Below, we outline how and why we deviated from the pre-registration. These deviations did not have a substantial impact on the planned analyses nor the conclusions we made.

Sample Criteria

We pre-registered several inclusion criteria at the country and individual level. We deviated slightly from these exclusion criteria. First, we planned to include countries that had sampled a minimum of 50 participants from each gender in our analyses. However, to maximize country-level degrees of freedom, we made one exception to this rule as we included Denmark (that had sampled 46 men after exclusions) in the analyses. Second, in order to sample individuals who were most likely to be in a heterosexual relationship in the future (and thus be more likely to anticipate a gender-traditional division of roles; Fulcher et al., 2008) we pre-registered that we would exclude participants who self-identified as 'bisexual', 'asexual', or 'other' from the analyses. However, we reconsidered these exclusion criteria when we observed a significant loss in *N* in some countries. Feedback from collaborators pointed to a potential misunderstanding of the term "asexuality" in some countries as not being sexually active. Given our goal to achieve a sample of > 50 of each gender in each country and that identifying with any of the stated categories does not preclude currently being in, or imaging oneself being in, a heterosexual relationship, we decided (prior to hypothesis testing) to deviate from our inclusion criteria in order to include participants who self-identified as bisexual and asexual into the analyses.

Third, as part of data preparation, we applied some general exclusions to the data set (exclusion criteria pre-registered on OSF: https://osf.io/rv4wf). Specifically, participants were excluded from the dataset for completing less than 80% of the questionnaire (29.19%), failing one or both attention checks (e.g., "If you are reading this, please select three", 15.17%), completing the questionnaire in less than 10 minutes (1.10%), or not indicating their gender identity (0.80%). During data preparation, we noticed that the survey had sometimes been accessed by individuals who were not affiliated with the university where the data was collected. In order to nest participants' responses within universities, we decided (prior to data analysis) to apply an additional exclusion criterion to exclude participants who either failed to indicate which university they attended, or who attended a university with < 6 responses (0.68%).

Measures

We pre-registered that we would control for traditional gender attitudes (using a shortened version of a scale by Larsen & Long, 1988). However, Confirmatory Factor Analysis (CFA) with multigroup comparisons indicated unacceptable fit for the 4-item scale (X^2 (222)= 28267, $p < .001$, CFI = .96, TLI = .87, RMSEA = .21, SRMR = .04. Two items referred to attitudes toward gender roles at work ("In groups that have both male and female members, it is more appropriate that leadership positions be held by males"; "Men make better leaders"), whereas two items referred to attitudes toward gender roles at home ("A woman's place is in the home"; "Some equality in marriage is good, but by and large the husband ought to have the main say-so in family matters). Correlational statistics indicated that the two latter items correlated less strongly with each other across countries. We

therefore formed a scale of the first two items and included it as a control variable in the final model.

Analyses

We made some minor changes to the pre-registered analytical strategy. First, during data analysis, we realized that it may be of interest to readers to also see the effect of *father-exclusive leave*. Thus, we added father-exclusive leave as a country-level predictor in Model 1 and formulated H1a. This hypothesis was not pre-registered but was in line with the reasoning outlined in the pre-registration. Contrary to our prediction, however, we found no evidence suggesting that the gender gap in intended leave varied across countries that offer more or less exclusive leave to fathers (b = 0.03, 95% CI [-0.19, 0.24]).

Second, we replaced the variable *total length of available paternal leave* (i.e., total amount of parental leave that both men and women have equal access to + total amount of leave that only men have access to) with *total length of available parental leave* (i.e., total amount of parental leave that both men and women have equal access to). The overall effects in Model 1 remain comparable regardless of whether we predict gender differences in intended uptake from total length of available paternal leave or total length of available parental leave, but the latter has a stronger effect on women's leave uptake.

Third, we reconsidered the meaning of women's relative labor force participation. We had pre-registered the hypothesis that women's relative labor force participation would be associated with a smaller gender gap in intended leave uptake, as both women and men would be more inclined to share child care if they both expected to be active in the labor force, and therefore report less and more leave intentions, respectively. However, we recognized that it is of course also reasonable to assume that in countries where women are relatively more represented in the labor market, women may expect to be in paid work and therefore indicate higher intentions to take a leave from work than women in countries where women are relatively less represented in the labor force. Due to the dubious meaning of women's relative representation in the labor market, we excluded it from hypothesis testing and instead explored it as a potential control variable. There was, however, no evidence suggesting that women's relative labor force representation (b = -7.04, 95% CI [-48.70, 34.59]) related to the gender gap in intended uptake.

Expanded Method Section

Data Collection in Different Countries

Ethical Approval

Collaborators were instructed to obtain formal ethics clearance from their respective university (if required by the ethics standard in their country).

Translation of Materials

The survey was originally constructed in English. Each collaborating team was provided with the survey in English to translate to the official language of the country where they would collect data (unless a translation was already available in their language that could be adapted to their national context). Collaborators who translated the survey from English to another language were required to have the translation checked by another collaborator. Each collaborating team completed a site survey after data collection, in which they could report how confident they were in the accuracy of their translation/the translated

file they received on a scale that ranged from 1 (Not confident at all) to 7 (Very confident). Confidence in translation ranged from 6 to 7 (M = 6.41) across the sample.

In the site survey, collaborators were also given the opportunity to indicate difficulties with translating certain words/phrases with an open-ended item. With respect to the item 'intended uptake of parental leave,' two collaborating teams indicated that they opted to omit words such as 'non-medical' from the item description to facilitate comprehension. In addition, a few collaborating teams indicated that they had asked respondents to report the amount of leave they would like to take in the first three (rather than two) years of their child's life to better reflect the parental leave policy in that country.

Data Preparation

Selection of Predictor Variables

We applied a data-driven approach to selecting the variables to be included in the hypothesis testing. Prior to data analysis, we ran correlational statistics to determine which indicator of women's relative representation in power positions (politics vs. management), care values (Harmony vs. Egalitarianism), and success values (Hierarchy vs. Mastery) to include as a predictor in Models 2 and 3, respectively. We pre-registered that we would include in our models the indicators that were most strongly correlated with the gender gap in intended uptake of parental leave. With respect to women's relative representation in power, correlational analyses showed that the gender gap in intentions was more highly correlated with women's relative representation in politics (r = .44, p = .006) than women's relative representation in management (r = .07, p = .669). With respect to care values, correlational analyses showed that the gender gap was more highly correlated with egalitarian values (r = -.50, p = .002) than with harmony values (r = .10, p = .568). With respect to success values, correlational analyses showed that the gender gap was more highly correlated with mastery values (r = -.13, p = .462) than with hierarchy values (r = .06, p = .708).

Table SM1

Age and Subjective SES by Gender and Country

	Age		SES			Age		SES	
	Women	Men	Women	Men		Women	Men	Women	Men
Country	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*	Country	*M (SD)*	*M (SD)*	*M (SD)*	*M (SD)*
Albania	20.39 (1.51)	20.75 (1.62)	6.05 (1.64)	6.18 (1.68)	**Korea, Rep.**	25.18 (2.41)	25.02 (2.08)	5.85 (1.67)	5.95 (1.73)
Australia	19.76 (2.33)	20.57 (2.46)	6.49 (1.49)	6.49 (1.59)	**Lithuania**	21.14 (1.74)	20.13 (1.47)	6.43 (1.44)	6.32 (1.64)
Belgium	18.34 (0.86)	18.92 (1.30)	6.52 (1.43)	6.58 (1.84)	**Macedonia**	19.56 (1.46)	20.40 (1.94)	6.19 (1.71)	6.36 (2.06)
Canada	19.58 (1.83)	19.93 (2.03)	6.16 (1.50)	6.27 (1.52)	**Netherlands**	19.75 (1.75)	21.19 (2.17)	6.64 (1.61)	6.60 (1.55)
Chile	20.77 (2.01)	20.79 (2.14)	6.23 (1.62)	6.23 (1.75)	**New Zealand**	18.61 (1.01)	18.92 (1.31)	6.37 (1.57)	6.52 (1.56)
Colombia	20.20 (1.74)	20.51 (1.94)	6.48 (1.68)	7.02 (1.68)	**Norway**	22.16 (2.29)	23.24 (3.01)	6.57 (1.17)	6.15 (1.63)
Croatia	21.07 (1.87)	22.38 (1.43)	6.09 (1.31)	6.09 (1.53)	**Poland**	22.12 (2.21)	22.26 (2.17)	5.70 (1.54)	5.56 (1.64)
Czech Rep.	22.25 (2.03)	22.20 (2.04)	6.09 (1.41)	6.20 (1.46)	**Romania**	20.63 (1.92)	21.51 (2.48)	5.93 (1.45)	6.03 (1.57)
Denmark	21.18 (1.62)	22.74 (2.86)	6.66 (1.58)	6.33 (1.51)	**Russia**	19.57 (1.80)	21.12 (3.07)	6.09 (1.64)	6.17 (1.40)
Ecuador	21.50 (2.44)	21.80 (2.77)	5.81 (1.07)	5.95 (1.09)	**Serbia**	21.19 (2.53)	20.74 (2.38)	5.60 (1.42)	5.87 (1.49)
Estonia	20.45 (2.34)	21.07 (2.66)	6.14 (1.67)	5.83 (1.70)	**Singapore**	21.00 (1.78)	23.11 (1.38)	5.65 (1.55)	5.39 (1.59)
Ethiopia	20.87 (1.24)	21.72 (2.16)	5.75 (1.91)	4.88 (2.11)	**Slovak Rep.**	22.30 (1.70)	22.08 (1.52)	5.99 (1.30)	6.11 (1.30)
France	19.43 (1.42)	20.42 (2.43)	5.55 (1.38)	5.4 (1.64)	**Spain**	20.56 (2.13)	21.26 (2.33)	6.22 (1.38)	6.44 (1.26)
Germany	21.57 (2.71)	22.47 (2.88)	6.53 (1.44)	6.43 (1.53)	**Sweden**	23.03 (2.81)	23.76 (3.25)	5.72 (1.84)	5.99 (1.85)
Indonesia	19.51 (1.32)	21.40 (2.80)	5.86 (1.40)	5.74 (1.57)	**Tanzania**	22.05 (1.78)	22.33 (1.85)	6.50 (1.53)	5.69 (2.23)
Ireland	19.84 (1.63)	20.09 (1.28)	5.85 (1.51)	6.06 (1.61)	**Ukraine**	19.06 (1.56)	20.06 (2.07)	5.68 (1.70)	5.39 (1.57)
Italy	20.71 (1.93)	21.98 (2.78)	5.57 (1.34)	5.69 (1.62)	**U.K.**	18.72 (0.92)	18.90 (1.08)	6.31 (1.51)	6.22 (1.92)
Japan	19.57 (1.29)	19.91 (1.59)	6.43 (1.39)	6.03 (1.59)	**U.S.A.**	19.27 (1.63)	19.36 (1.68)	6.12 (1.58)	6.43 (1.66)
Kazakhstan	19.42 (1.42)	20.06 (2.28)	6.94 (1.46)	6.31 (1.70)	**Total**	20.19 (2.19)	20.77 (2.48)	6.13 (1.54)	6.17 (1.66)

Table SM2
Study Major by Gender and Country

	B		HEED		S. Sci.		STEM		O			B		HEED		S. Sci.		STEM		O	
	W	M	W	M	W	M	W	M	W	M		W	M	W	M	W	M	W	M	W	M
	n	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	Country	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*	*n*
Country																					
Albania	5	7	34	10	4	8	38	35	4	3	**Korea, R.**	1	3	29	21	2	2	22	51	1	4
Australia	14	12	158	84	12	2	46	44	21	9	**Lithuania**	0	0	68	11	0	0	31	60	1	0
Belgium	0	0	251	69	0	0	0	2	0	0	**Macedon.**	0	0	49	20	4	7	19	35	12	5
Canada	38	46	378	193	37	19	174	164	87	53	**Nether.**	0	1	376	122	3	2	1	2	0	2
Chile	2	3	161	89	13	8	40	31	15	3	**N.Z.**	7	6	90	66	8	2	10	16	8	9
Colombia	46	49	85	26	6	3	32	44	9	8	**Norway**	4	6	118	58	0	2	35	33	9	4
Croatia	1	1	88	23	31	14	50	170	6	0	**Poland**	16	9	196	28	20	5	86	55	19	5
Czech Rep.	5	2	87	28	9	3	21	35	7	1	**Romania**	6	3	108	58	6	0	4	6	14	10
Denmark	1	5	103	25	2	2	0	5	3	2	**Russia**	5	3	83	41	3	4	3	7	0	5
Ecuador	0	2	68	60	1	0	1	0	0	2	**Serbia**	2	3	368	76	69	27	113	78	3	1
Estonia	3	0	31	7	33	18	51	45	1	1	**Singapore**	15	8	41	30	15	8	31	38	3	0
Ethiopia	0	0	70	56	0	0	34	34	0	0	**Slovak**	18	12	107	21	1	2	24	62	1	5
France	1	2	174	95	3	1	50	39	1	3	**Spain**	31	27	93	63	2	3	45	43	15	5
Germany	44	19	282	117	36	15	47	36	22	4	**Sweden**	2	9	44	40	7	5	32	28	0	2
Indonesia	5	3	132	62	4	2	4	2	17	9	**Tanzania**	0	0	24	24	0	0	20	21	0	0
Ireland	4	3	117	29	0	0	35	81	11	2	**Ukraine**	11	13	106	68	1	2	1	5	17	14
Italy	0	0	167	84	3	17	9	3	1	2	**U.K.**	2	2	209	44	1	0	0	3	4	0
Japan	9	8	95	53	35	18	100	93	32	20	**U.S.A.**	227	266	1129	340	78	32	400	298	172	107

Kazakhstan	2	4	36	9	4	5	19	31	1	2	**Total**	527	537	5755	2250	453	238	1628	1735	517	302

Note. B = Business, W = Women, M = Men. S. Sci. = Social Sciences. O = Other. HEED (i.e., Psychology (General); Psychology with the goal to be a clinical practitioner; Medicine with the goal to become a doctor; Other Health/Social work professions; Education/Teaching). Social Sciences (Other Social Sciences (History, Sociology, etc.)). STEM (Science (Chemistry, Biology, etc.); Mathematics/Statistics; Computer Science; Engineering). Other (Law; Sport Sciences; Fine Arts (Music, Painting, Literature); Theology/Religious Studies). N.Z. = New Zealand. Macedon = Macedonia. Nether = Netherlands. Slovak = Slovak Republic. Korea, R. = Republic of Korea.

Table SM3

Estimated Means and Estimated Standard Errors of Intended Uptake of Parental Leave

	Women	Men		Women	Men
Country	*EM* (*ESE*)	*EM* (*ESE*)	Country	*EM* (*ESE*)	*EM* (*ESE*)
Albania***	41.60 (2.51)	23.02 (3.02)	**Korea, Rep.****	43.73 (3.45)	31.25 (2.97)
Australia***	42.04 (1.49)	21.73 (1.86)	**Lithuania*****	58.39 (2.30)	19.55 (2.76)
Belgium	23.62 (1.63)	19.85 (2.81)	**Macedonia*****	48.94 (2.53)	28.04 (2.83)
Canada***	43.05 (0.91)	21.59 (1.08)	**Netherlands*****	26.04 (1.30)	18.08 (2.05)
Chile***	44.61 (1.52)	26.34 (1.96)	**New Zealand*****	33.51 (2.15)	21.5 (2.36)
Colombia***	41.55 (1.77)	31.42 (2.08)	**Norway*****	38.21 (2.00)	26.04 (2.43)
Croatia***	43.81 (1.78)	21.71 (1.69)	**Poland*****	37.08 (1.37)	18.79 (2.30)
Czech Rep.***	67.70 (2.11)	23.09 (2.83)	**Romania*****	59.31 (1.97)	31.67 (2.56)
Denmark***	40.04 (2.34)	22.92 (3.7)	**Russia*****	65.04 (2.39)	19.25 (2.89)
Ecuador**	33.51 (2.79)	20.85 (2.97)	**Serbia*****	49.63 (1.06)	23.94 (1.72)
Estonia***	66.60 (2.14)	25.36 (2.67)	**Singapore***	17.76 (2.26)	10.51 (2.51)
Ethiopia**	25.72 (2.29)	16.75 (2.45)	**Slovak Rep.*****	72.19 (1.99)	27.53 (2.34)
France***	32.98 (1.70)	20.95 (2.04)	**Spain*****	35.65 (1.73)	22.26 (1.96)
Germany***	56.19 (1.33)	39.44 (1.78)	**Sweden***	46.69 (2.64)	38.16 (2.67)
Indonesia***	26.18 (1.83)	7.15 (2.62)	**Tanzania**	24.99 (3.43)	24.2 (3.40)
Ireland***	34.90 (1.84)	21.86 (2.2)	**Ukraine*****	57.16 (2.12)	26.54 (2.37)
Italy***	28.98 (1.86)	17.63 (2.35)	**U.K.*****	41.91 (1.69)	18.07 (3.27)
Japan***	52.52 (1.45)	24.14 (1.65)	**U.S.A.*****	28.23 (0.69)	15.52 (0.83)
Kazakhstan***	63.78 (3.19)	27.62 (3.22)	**Total*****	40.54 (0.36)	22.39 (0.41)

Note. EM = Estimated Means; ESE = Estimated Standard Errors (i.e., the intercept for women and men when individual- and site-level control variables are held at zero). The significance of gender differences in each country is indicated by $^{*}p < .05$ $^{**}p < .01$ $^{***}p < .001$.

Table SM4

Correlations Between National-Level Indicators

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1. F-EXCL$_a$													
2. EXCL$_a$	**-.307**†												
3. PAR$_a$	-.041	-.009											
4. COM$_a$	.114	-.157	**.424****										
5. GIS	**.526****	-.125	-.012	.089									
6. WLF$_b$	**.368***	-.244	.239	.232	**.532****								
7. WI$_b$	**.464****	-.167	.191	.255	**.521****	**.592****							
8. WP	**.454****	-.106	-.151	.017	**.887*****	**.375***	**.328***						
9. WM$_b$	.263	-.197	.117	-.060	**.447****	**.367***	**.468****	.122					
10. EV$_c$	**.315**†	**-.325**†	-.229	-.100	**.583*****	.284	.149	**.666*****	.125				
11. HAV$_c$	.260	-.118	.200	**.334**†	.203	.263	.147	**.315**†	-.186	**.456****			
12. MV$_c$	-0.190	.179	-.215	-.201	-.129	-.263	-.152	-.169	-.029	-.262	**-.629*****		
13. HV$_c$	**-0.367***	.062	.052	-.182	**-.503****	**-.346***	-.204	**-.533****	-.045	**-.636*****	**-.659*****	**.376***	-

Note. Correlations computed using Pearson-method with pairwise-deletion. †$p < .07$ *$p < .05$ **$p < .01$ ***$p < .001$, two-tailed. F-EXCL = Father-exclusive leave; EXCL = Gender imbalance in exclusive leave; PAR = Total length of available parental leave; COM = Length of leave compensated at 100%; GIS = Global index score of gender equality; WLF = Women's relative representation in the labor force; WI = Women's relative income; WP = Women's relative representation in politics; WM = Women's relative representation in management; EV = Egalitarian value orientation; HAV = Harmony value orientation; MV = Mastery value orientation; HV = Hierarchy value orientation.

$_a$ Missing values (*NA*s) in the ILO (2014) report were not imputed but recoded as 0 (i.e., no parental leave available).

$_b$ 1 imputation

$_c$ 7 imputations

Table SM5

Correlations Between the Gender Gap in the Intended Uptake of Parental Leave and National-Level Indicators

	1.	2.	3.
1. Women's intended uptake	-	-	-
2. Men's intended uptake	**.539****	-	-
3. Gender gap in intended uptake	**.890*****	.097	-
Parental leave policies (ILO, 2014)			
Father-exclusive leave	-.093	.012	-.116
Gender imbalance in exclusive leave	.262	.012	.304
Total length of available parental leave	**.617*****	**.326***	**.554*****
Length of parental leave compensated at 100%	**.508****	.372*	**.400***
Gender inequality in the labor market (WEF, 2017)			
Global index score of gender equality	-.113	.219	-.251
Gender-equal labor force participation	.101	.106	.062
Women's relative income	.019	.257	-.116
Women's relative representation in politics	-.286	.198	**-.444****
Women's relative representation in management	.091	.064	.073
Cultural value orientation (Schwartz, 2008)			
Egalitarianism value orientation	**-.427***	-.013	**-.498****
Harmony value orientation	.178	.205	.100
Mastery value orientation	-.038	.155	-.129
Hierarchy value orientation	.009	-.096	.062

Note. Correlations computed using Pearson-method with pairwise-deletion. $^{*}p < .05$ $^{**}p < .01$ $^{***}p < .001$, two-tailed. Women's and men's intended uptake are based on estimated means (i.e., the respective intercept for women and men when individual- and site-level control variables are held at zero). The gender gap in intended uptake is based on women's estimated intended uptake - men's estimated intended uptake.

Robustness Analyses

To assess the robustness of our reported findings, we ran a series of robustness checks. First, due to a combination of our large sample and the lack of generous and egalitarian parental leave policies across the world, several parental leave policies were non-normally distributed (see Figures SM1, SM3, SM4). To check that our findings were not due to non-normality, we recoded these parental leave variables into categorical variables and replicated the analyses. We categorized father-exclusive leave into 4 categories: 0 days (no leave), 1-5 days (short leave), 7-10 days (moderate leave), and 11-80 days (long leave). From these 4 categories we created 3 effect codes comparing each of the first 3 categories to the last category. In line with the findings obtained with father-exclusive leave as a continuous predictor, neither effect code significantly interacted with gender in predicting intended uptake (*p*s > .090). We also categorized the rate at which parental leave is compensated into 4 categories: 0% (no compensation), 11-45% (low compensation), 50-80% (moderate compensation), and 100% (completely compensated), and created 3 effect codes comparing each of the first 3 categories to the last category. In line with the findings with length of parental leave compensated at 100%, neither effect code significantly interacted with gender in predicting intended uptake (*p*s > .195). Finally, we categorized total length of available parental leave into 4 categories: 0 weeks (no leave), 6-17 weeks (short leave), 26-52 weeks (moderate leave), and 104-156 weeks (long leave), and created 3 effect codes comparing each of the first 3 categories to the last category. In line with the findings with total length of available parental leave as a continuous predictor, the gender gap was significantly smaller

in countries that offer no leave as opposed to long leave (p = .001). There was no significant difference in the gender gap between countries that offer short as opposed to long leave (p = .5126), but there was a marginally significant difference between countries that offer moderate in comparison to long leave (p = .098).

Second, we re-ran all models without outlier data on intended uptake of parental leave (+/- 2.5 Z-scores from zero) in each country and with the full sample (N = 49 countries). We also re-ran Models 1-3 controlling for gender-traditional attitudes and gender-essentialist beliefs. Testing the models with these robustness checks generated comparable findings to those reported (see Table SM6), with a few exceptions. Namely, when controlling for gender attitudes, we found that length of parental leave compensated at 100% significantly moderated gender differences in intended leave uptake. Simple slopes analyses indicated that this cross-national variation in the gender gap seemed to be driven by women's (rather than men's) leave intentions: the slope of length of parental leave compensated at 100% was significant and positive for women (b = 0.27, 95% CI [0.08, 0.46]), but not significant for men (b = 0.10, 95% CI [-0.01, 0.20]). In addition, when replicating the analyses with the full sample (across 49 as opposed to 37 countries), we found that (1) the interaction terms between gender and gender imbalance in exclusive leave and between gender and women's relative representation in politics in the Final Model and (2) the interaction term between gender and mastery value orientation in Model 2 were statistically significant. Simple slopes analyses indicated that the slope of mastery value orientation was negative (and marginally significant) for women (b = -25.17, 95% CI [-51.53, 1.20]), but non-significant for men (b = -1.51, 95% CI [-15.71, 12.69]), which is consistent with the reported findings that cross-national variance in the gender gap in intended leave uptake is largely driven by women's (rather than men's) intentions. The change from statistical non-significance to statistical significance in response to increasing the sample size indicates that the non-significant effects in the final model reported in the main text should be interpreted with caution.

Table SM6

Hierarchical Linear Regression Results for all Models with Robustness Checks

	No outlier data			*N* = 49 countries			Controlling for gender attitudes		
		95% CI			95% CI			95% CI	
	Coefficient	LL	UL	Coefficient	LL	UL	Coefficient	LL	UL
Model 1									
Gender x Father-exclusive leave	-0.04	-.26	.19	0.03	-0.19	0.24	-0.004	-0.21	0.20
Gender x Gender imbalance in exclusive leave	0.04	0.001	0.07	-0.05	-0.08	-0.01	-0.04	-0.07	-0.01
Gender x Total length of available leave	0.08	0.03	0.13	-0.08	-0.13	-0.03	-0.08	-0.12	-0.03
Gender x Length of leave compensated at 100%	0.18	-0.01	0.36	-0.17	-0.35	0.004	-0.18	-0.34	-0.01
Model 2									
Gender x Representation in politics	-47.11	-76.08	-.18.26	35.33	12.49	58.25	33.93	13.62	70.65
Gender x Income	19.58	-25.82	65.02	-11.67	-34.34	10.97	-6.40	-49.80	38.27
Model 3									
Gender x Egalitarian value orientation	-22.34	-33.29	-11.39	18.77	9.05	28.48	17.11	11.51	32.70
Gender x Mastery value orientation	-22.31	-49.99	5.48	23.71	3.35	44.08	23.02	-1.35	52.13
Final model									

Gender x Gender imbalance in exclusive leave	0.02	-0.01	0.05	-0.04	-0.06	-0.01	-	-	-
Gender x Total length of available leave	0.09	0.05	0.14	-0.09	-0.13	-0.06	-	-	-
Gender x Representation in politics	-20.12	-49.64	9.22	20.72	1.57	41.36	-	-	-
Gender x Egalitarian value orientation	-3.16	-16.47	10.25	-0.63	-10.35	8.92	-	-	-

Note. Gender was coded -0.36 for females and 0.64 for males. N = 13,942 at Level 1 (individuals), N = 99 at Level 2 (sites), and N = 37 at Level 3 (countries). Coefficients represent unstandardized regression weights (fixed effects) and variances (random effects). Individual- and site-level control variables are not reported.

Figure SM1

Histogram of Length of Leave Exclusive to Fathers Across 37 Countries

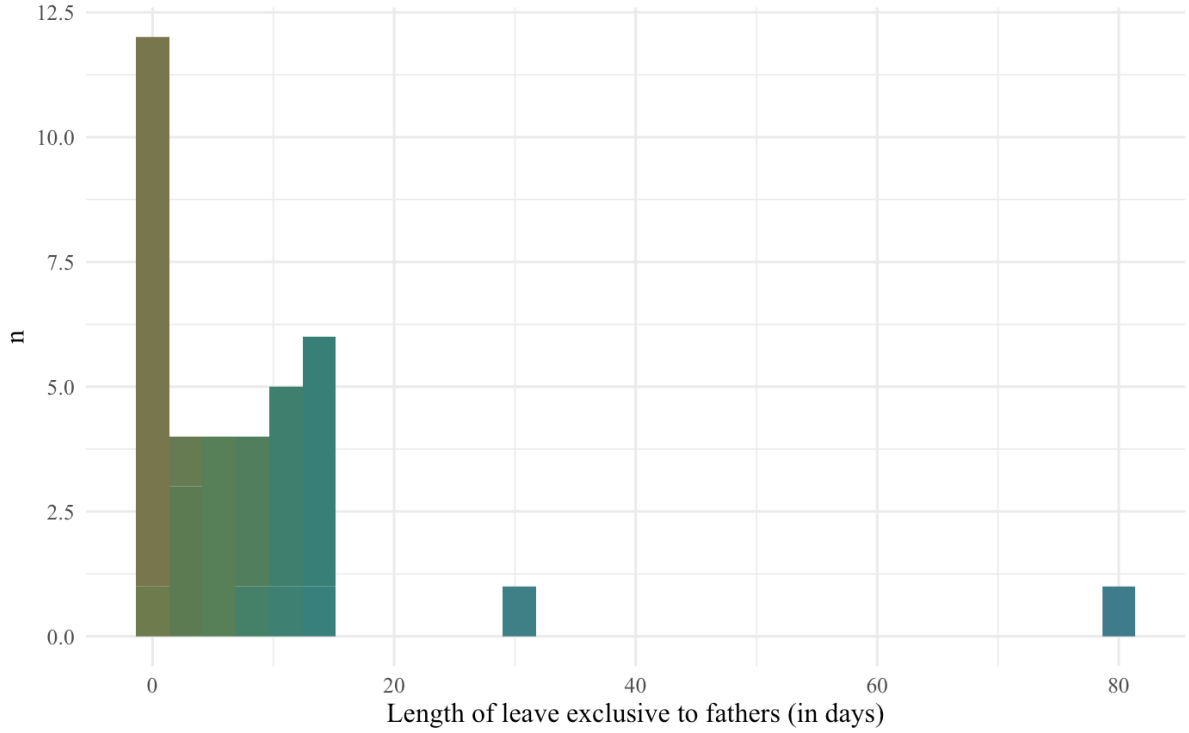


Figure SM2

Histogram of Gender Imbalance in Exclusive Leave Across 37 Countries

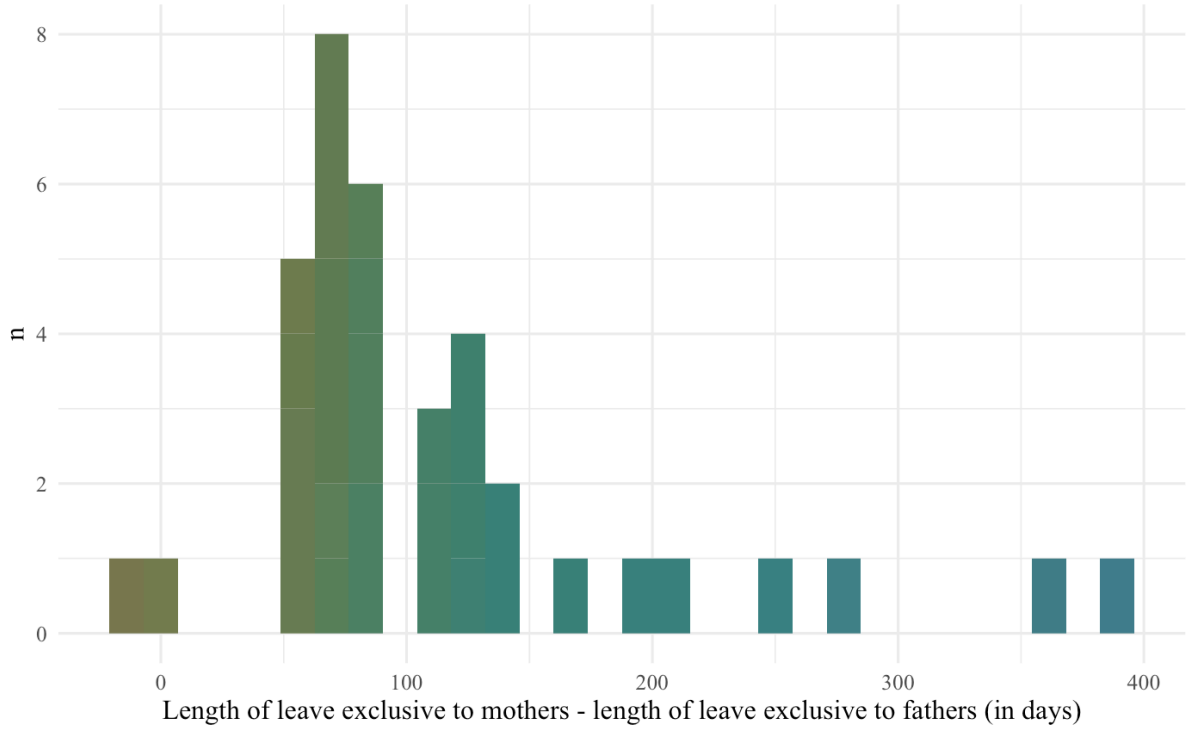


Figure SM3

Histogram of Total Length of Available Parental Leave Across 37 Countries

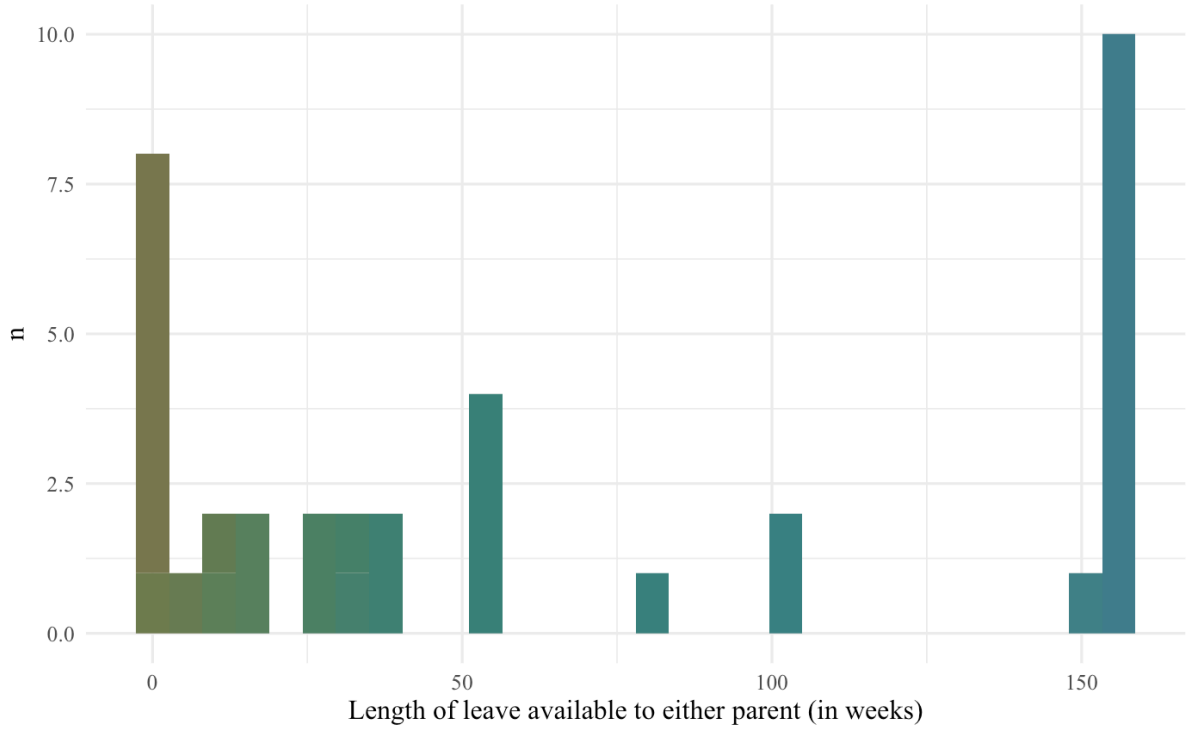


Figure SM4

Histogram of Length of Leave Compensated at 100%

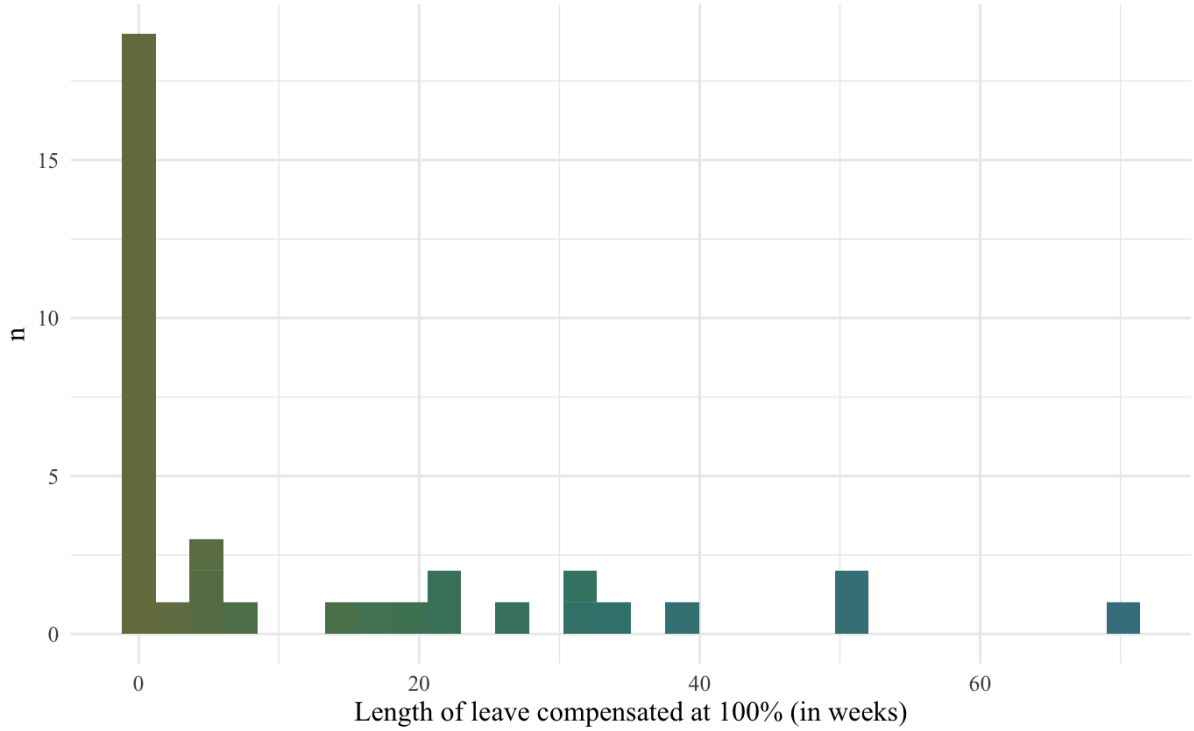


Figure SM5

Histogram of Women's Relative Representation in Politics

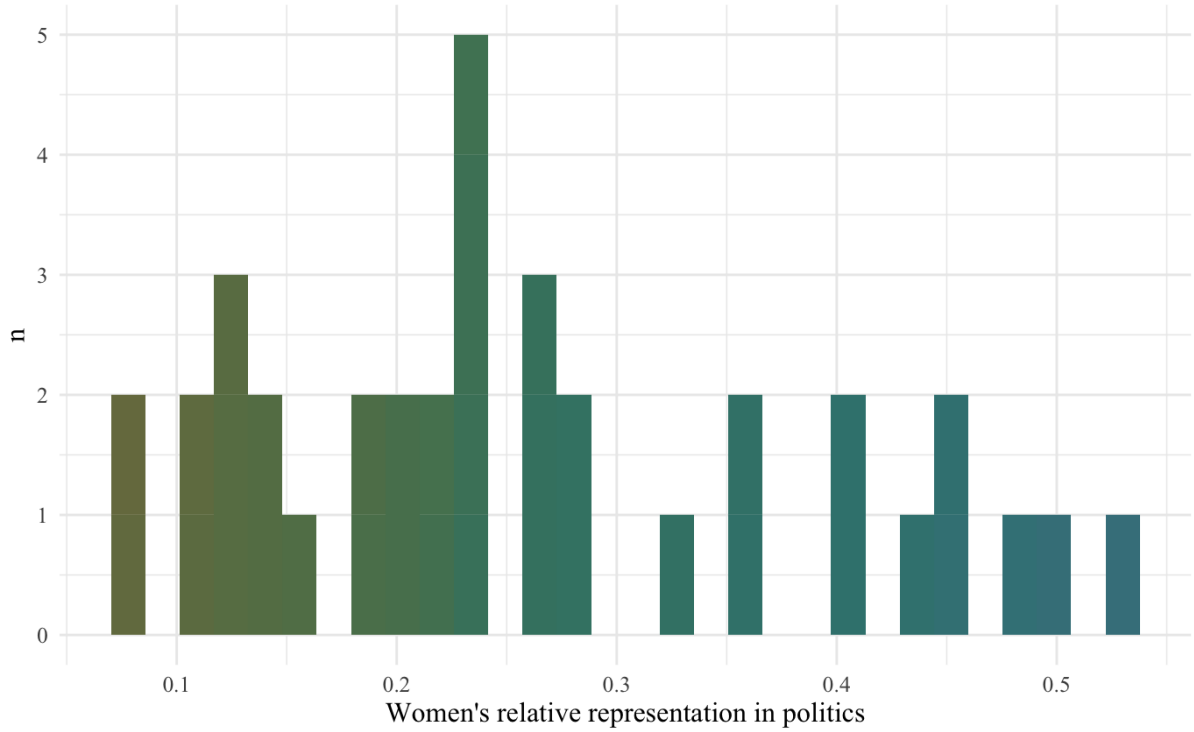


Figure SM6

Histogram of Women's Relative Income

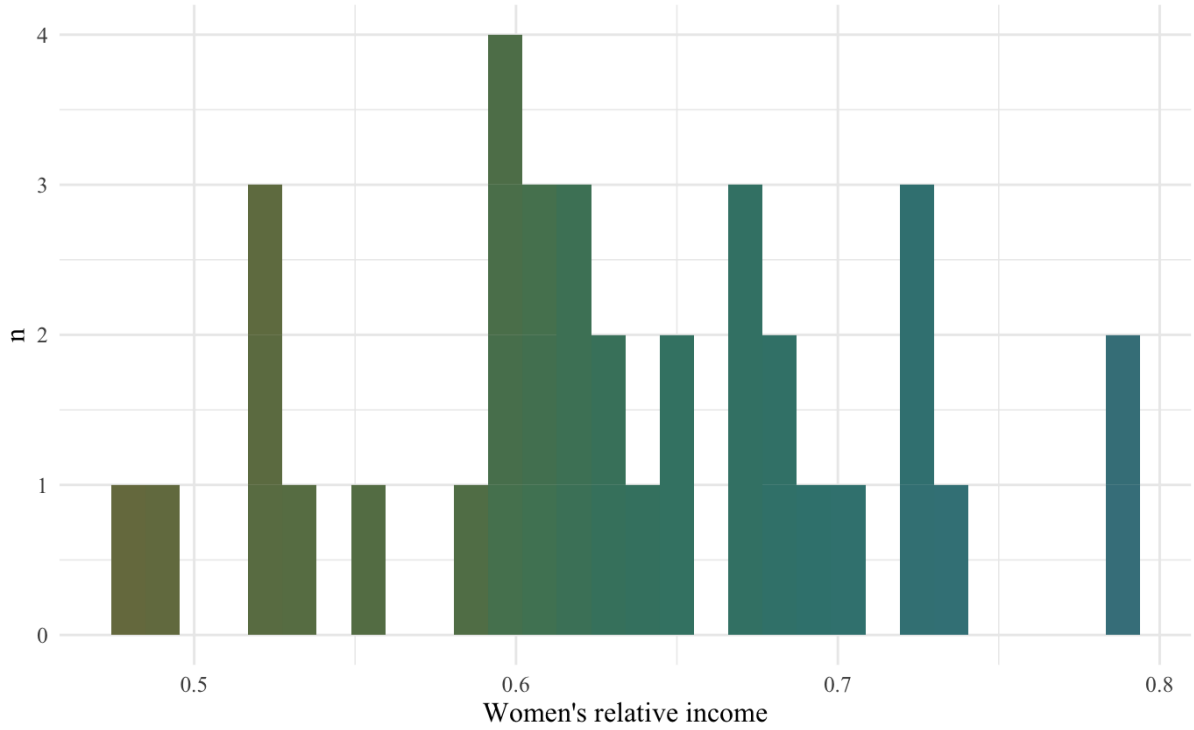


Figure SM7

Histogram of Egalitarian Value Orientation

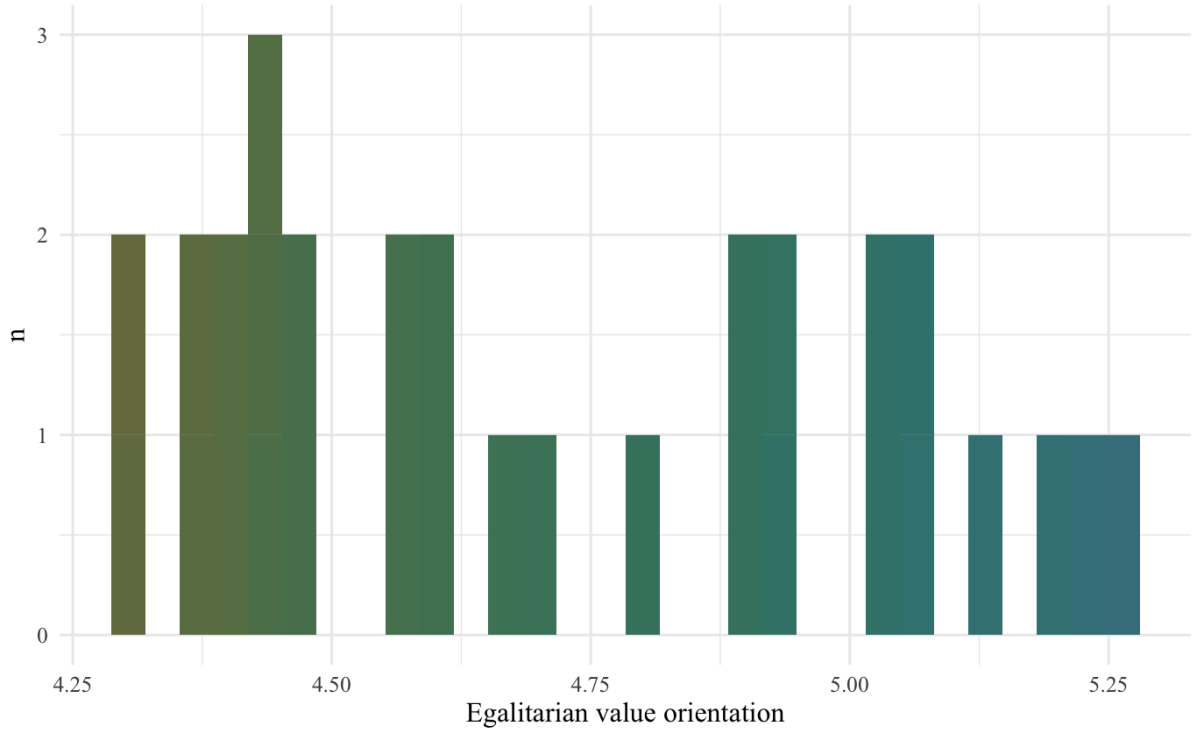
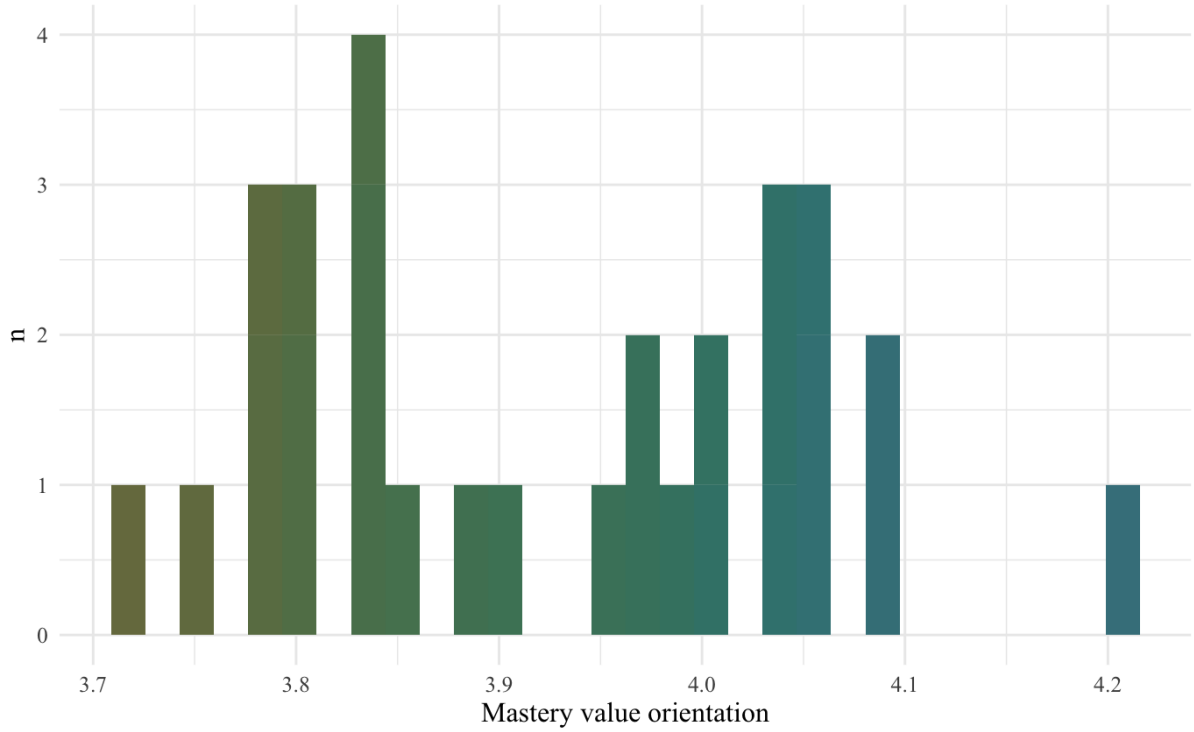


Figure SM8

Histogram of Mastery Value Orientation



Exploratory Analyses

In line with pre-registered procedures, prior to hypothesis testing we assessed whether to control for potential country-level confounds in the final model. We assessed whether the following indicators interacted with participant gender in predicting intended uptake of parental leave: preference for altruism and positive reciprocity (Global Preference Survey, 2012[13]); Affective autonomy values (Schwartz, 2008); Intellectual autonomy values (Schwartz, 2008); Embeddedness values (Schwartz, 2008); and Wage equality for similar work (GGGI, 2017); log GDP per capita[14] (https://data.worldbank.org/indicator/NY.GDP.PCAP.CD); and the Human Development Index (HDI, 2017; http://hdr.undp.org/sites/default/files/2018_human_development_statistical_update.pdf). The above-mentioned national-level indicators did not significantly moderate gender differences in intended leave uptake (*p*s > .168) and hence were not included as control variables in the final model.

[13] Country-level preferences for altruism and positive reciprocity were averaged into a composite score of country-level communal norms.

[14] Since GDP per capita may spike from one year to another, we averaged values from 2015 to 2017, which gives us a better estimate of the country's economic activities over recent years. To address positive skew in the GDP per capita data (skewness = 1.83), the scale was logarithmic (log) transformed (i.e., one unit change on the GDP scale corresponds to a GDP ten times higher).

Appendix C Chapter 4 Accepted† Manuscript

Short title: *GENDER DIFFERENCES IN PROSOCIALITY*

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Abstract:

Is there a "more helpful" gender? The present research assessed gender differences in prosocial self-perceptions, prosocial behavioural intentions, and prosocial (transfer) behaviour in same- and other-gender interactions in 10 countries (N = 1,915). The present results showed negligible differences in the degree to which women and men saw themselves as prosocial. However, larger gender differences emerged in regard to prosocial behavioural intentions and prosocial (transfer) behaviours across different help contexts (i.e., same- vs. other-gender interactions). In a hypothetical work scenario, women reported greater prosocial behavioural intentions than men when the recipient of the help was of the same gender. In contrast, when the recipient of the help was of the other gender, men reported greater prosocial behavioural intentions than women. In addition, men transferred more than women to both same- and other-gender interaction partners in a prisoner's dilemma game. Taken together, the present findings suggest that there is no "more helpful" gender. Instead, gender differences in prosociality are dynamic and contextual. Different theoretical perspectives are taken into consideration in discussing gender differences in the present research.

Keywords:

prosocial behaviour, gender roles, social role theory, communal, prisoner's dilemma

Data availability statement:

The data that support the findings of this study are openly available on the Open Science Framework at: https://osf.io/24bdf/?view_only=71682180d88a44c99fea807ac1840acf

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The Hers and His of Prosociality Across 10 Countries

For the past half-century, research has documented gender differences across a range of behaviours, including prosocial behaviours. Previous research has attributed gender differences in prosocial behaviour to different reasons, including gender role expectations (in line with a social role theory account of gender differences; Croft et al., 2020) or sexual selection processes (in line with an evolutionary account of gender differences; Balliet et al., 2011). In the present research, we bring together previous mixed findings in regard to the question of who is the most "helpful gender" by assessing gender differences in prosocial self-perceptions (based on self-reports), prosocial behavioural intentions (based on responses to hypothetical scenarios in a work context), and prosocial behaviour toward a stranger (based on monetary transfers in a prisoner's dilemma game) in both same- and other-gender interactions across 10 countries. Furthermore, we investigate a central tenet of social role theory (Eagly & Wood, 2012): Is the perceived gender segregation in communal roles in one's society associated with gender differences in communal prosocial behaviours?

Gender Differences in Prosocial Behaviour

Prosocial behaviours are broadly defined as acts that benefit others (Penner et al., 2005). Thus, prosocial behaviour can involve helping, sharing, cooperating, comforting, guiding, rescuing, and defending another individual. Numerous studies have documented gender differences in prosocial behaviours (see reviews by Eagly, 2009; Wiepking & Bekkers, 2012). Can previous research help us answer the question of whether there is a "more helpful" gender? At first glance, the research literature seems somewhat inconsistent. Some studies suggest that women are more prosocial than men (e.g., Carlo et al., 2001; Charbonneau & Nicol, 2002; Kumru et al., 2012), whereas other studies suggest that men are more prosocial than women (Carlo & Randall, 2002; De Caroli & Sagone, 2013; Meier, 2007). Reviews of the research literature conclude that women are not more or less helpful than men. Instead, gender differences in prosocial behaviour depend on the context (i.e., some situations seem to elicit more prosocial behaviour in women, whereas other situations seem to elicit more prosocial behaviour in men; Balliet et al., 2011; Croft et al., 2020; Diekman & Clark, 2015; Espinosa & Kovářík, 2015; Simpson, 2003).

One important contextual factor identified by Balliet et al. (2011) is whether help is given to someone of the *same* as opposed to *other* gender. In a review of the economic game literature on gender differences in cooperation, Balliet et al. conclude that–consistent with sexual selection processes–men are more cooperative in same-gender interactions, whereas women are more cooperative in other-gender interactions. However, in a review of social psychological research, Diekman and Clark (2015) conclude that–consistent with social role theory–men help more in situations that appeal to chivalrous norms (i.e., when interacting with the *other* gender; Eagly & Crowley, 1986). In the present study, we extend previous research on prosociality by investigating gender differences in cooperation (in an economic game) and in intentions to help (in a hypothetical work context) in same- and other-gender interactions. This allows us to investigate whether gender differences in helping behaviour hinge on the gendered context (i.e., whether help is given to someone of the same or other gender) and/or the operationalization of prosocial behaviour.

Communal Prosocial Behaviour

According to a social role theory account of gender differences, women and men express prosocial behaviours in ways that are congruent with their gender role (Eagly, 2009). Gender roles are rooted in the unequal distribution of women and men across different occupational roles (e.g., Eagly et al., 2000). Across the world, women are overrepresented in communal (caring-oriented) roles, whereas men are overrepresented in agentic (achievement-oriented) roles (Kan et al., 2011; World Economic Forum (WEF), 2017).

Repeatedly observing women and men in roles that are associated with different degrees of communion and agency gives rise to gender stereotypes (Koenig & Eagly, 2014). For example, men's underrepresentation in communal roles has led to the assumption that women are more communal–warm, nurturing, and sensitive–than men. Women's underrepresentation in agentic roles, on the other hand, has led to the assumption that men are more agentic–dominant and assertive–than women. Such gender stereotypes are, in turn, assumed to give rise to gender differences in behaviour (Eagly & Wood, 2012), as women and men internalise stereotypes and regulate their behaviour against their internal standards (Corrigal & Konrad, 2006; Witt & Wood, 2010) or against other people's expectations (Wood et al., 1997).

Many aspects of prosociality are associated with communal qualities. For example, help can originate in altruistic motivations or take place within close relationships (Eagly, 2009). In line with gender role expectations for women, studies that have assessed gender differences in prosocial behaviour in communication and leadership styles have shown that women are more likely than men to communicate in a supportive manner and to mentor employees (see reviews by Burleson & Kunkel, 2006; Eagly et al., 2003). In addition, research that has assessed gender differences in prosocial behaviour through economic games, in which participants have to decide how to divide money between themselves and another player, has shown that women give more money to friends and people in need (Brañas-Garza et al., 2012). It may therefore be reasonable to assume that women are more likely to engage in "communal" helping. Men, on the other hand, may be more likely to engage in "agentic" helping, e.g., protecting someone from harm (Rankin & Eagly, 2008).

A Social Role Theory Account of Gender Differences in (Communal Prosocial) Behaviour

Recently, researchers have called for more research on how to promote communal behaviour in men (e.g., Croft et al., 2015). To inform the design of this research and related interventions and to advance theorising on gender differences, it is important to identify contexts in which gender differences are reduced (Hyde, 2014). According to social role theory, gender differences are malleable based on the extent to which women and men are perceived to engage in different roles. Previous research shows that gender differences in prosocial behaviour vary between countries (Carlo et al., 2001; Kumru et al., 2012), which suggests that gender differences in behaviour are dynamic (as would be expected from a social role perspective) rather than universal and slow to change (as would be expected from an evolutionary perspective).

Social role theory postulates that "sex differences and similarities in behaviour reflect *gender role beliefs* that in turn represent people's *perceptions* [emphasis added] of men's and women's *social roles* in the society in which they live" (p. 459; Eagly & Wood, 2012). The extent to which gender differences in behaviour correspond with gender segregation in the labour market is sometimes interpreted as evidence for social role theory (e.g., Falk & Hermle, 2018). Since it is women's and men's *perceptions* of the gender-based division of roles that are theorized to influence their behaviour (Eagly & Wood, 2012), previous evidence hinges on the premise that people can accurately estimate gender segregation in roles in their society. However, research suggests that although people are aware of occupational gender segregation, they tend to underestimate its magnitude (Beyer, 2018; Froehlich et al., 2020). In the present research, we therefore predicted gender differences from perceived gender segregation in occupational roles. Specifically, we examine the degree to which perceiving men in communal roles is associated with communal prosocial behaviour in men.

Overview and Hypotheses

The first goal of our research was to test gender differences in prosociality. We selected and developed scales of prosocial self-perceptions and behavioural intentions, respectively, to measure interpersonal, altruistic, and empathic helping (i.e., "communal" helping). In line with gender role expectations of women, we hypothesise that women will report higher prosocial self-perceptions **(H1a)** and prosocial behavioural intentions in same-gender interactions than men **(H1b)**. In addition, we explore gender differences in prosocial behavioural intentions toward the other gender. In order to bring together different research traditions that have assessed gender differences in prosocial behaviour using different measures, we also explore gender differences in actual prosocial behaviour (based on a monetary transfer in an economic game) toward same- and other-gender interaction partners.

For theory development, it is important to generalize findings not only across measures and helping contexts, but also across countries (Henrich et al., 2010; Jones, 2010). We therefore assess gender differences in prosociality across 10 countries (Chile, China, Colombia, Indonesia, Japan, Mexico, Russia, Spain, Sweden, and the USA). These countries vary significantly in economic wealth, gender equality, and WEIRDness (Heinrich et al., 2010), which further increases generalizability.

The second goal of our research was to assess predictors of men's engagement with communal prosociality. On the basis of social role theory, we hypothesise that participant gender will interact with the perceived proportion of men in communal roles in predicting communal prosociality. Specifically, we expect that men who perceive a larger proportion of men in communal roles will report more prosocial self-perceptions **(H2a)** and prosocial behavioural intentions in same-gender interactions **(H2b)**. Conversely, we hypothesise that the degree to which women perceive men in communal roles will have a non-existent or even reversed effect on their prosocial self-perceptions and prosocial behavioural intentions in same-gender interactions.

The data reported here are part of a larger data set (used to test several other research questions[15, 16, 17]). The hypotheses tested here were pre-registered on the Open Science Framework (OSF; https://osf.io/w289c/?view_only=19e360c3c7b248f0816429d56f5d40c1) prior to analyses but after data collection (see SM for details of minor deviations from planned analyses).

Previous research shows that subjective socioeconomic status (SES) and age correlate with individuals' engagement in prosocial behaviour (Piff & Robinson, 2017; Sze et al., 2012). Moreover, gender differences increase with the economic development and degree of gender equality of a country (a phenomenon that has become known as the gender equality paradox effect; Falk & Hermle, 2018; Stoet & Geary, 2018). In order to test the robustness of gender differences in prosocial behaviour (Wiepking & Bekkers, 2012), we control for individual-level subjective SES and age, as well as country-level GDP per capita and gender equality (see SM for descriptive analyses related to the gender equality paradox effect).

Method

[15] The extent to which risk preferences mediate gender differences in the amount transferred in a prisoner's dilemma game is reported in Dorrough and Glöckner (2020).
[16] The extent to which women and men in female- and male-dominated occupations are perceived as agentic and communal is reported in Froehlich et al. (2020).
[17] Gender differences in compensation and punishment is reported in Dorrough et al. (2020).

Participants and Design

Data were collected via an online panel provider (Toluna: https://de.toluna.com/). The sample was recruited to be representative of the population in each country in terms of age and gender (see Table SM1 for targeted and achieved gender and age distribution per country). Data were collected at 2 time points (at an interval of approximately 1 week, see OSF for an overview of measures included at Part 1 and Part 2: https://osf.io/qbp87/?view_only=edb518da969f4a3da3c3db6b62109d9f). A total of 2,467 participants from 10 countries were invited to participate in the study via an online questionnaire in September 2018 (attrition rate = 17%). Participants were included in the analyses if they completed both parts of the questionnaire, entered a valid participant code, and indicated the same country of origin that they had registered with the panel provider. In addition, participants who reported an improbable age (n = 2) or specified *other* as their gender (n = 3) were excluded. A final sample of N = 1915 was analysed (see SM for power analyses). See Table 1 for sample size by country.

Table 1

Sample Information for Each Country

Country	N (n men)	Age range
USA	115 (52)	19-86
Sweden	210 (99)	18-86
Spain	217 (105)	18-78
Japan	212 (110)	20-81
China	185 (101)	18-87
Russia	229 (96)	19-77
Chile	158 (83)	18-82
Mexico	201 (100)	18-75
Colombia	203 (98)	18-71
Indonesia	185 (80)	18-69
Total	1915 (924)	18-87

Note. The sample size varies between countries due to participant drop-out.

In line with recommendations for cross-cultural research by Sidanius et al. (2000), we sampled cultures across the whole spectrum of gender equality. Countries were selected based on their ranking on the Gender Inequality Index (GII, 2017, which measures gender equality with regards to reproductive health, empowerment, and economic status; http://hdr.undp.org/en/content/gender-inequality-index-gii). We divided the GII into 10 sections and selected one country from each section. The following countries were selected: Indonesia (GII rank 104 of 160), Colombia (rank 87), Mexico (rank 76), Chile (rank 72), Russia (rank 53), USA (rank 41), China (rank 36), Japan (rank 22), Spain (rank 15), and Sweden (rank 3).

The materials were translated from English into the official language of each country by a professional translation agency (https://www.e-kern.com/). Each translation was subsequently checked by a researcher in psychology who was fluent in one of the languages as well as English. Following feedback from our colleagues, the translation company revised the translations. Materials in all languages (https://osf.io/7ybns/?view_only=13dce2ea4f2248f3b88934f9368b70f7) and data for the present analyses are available on the OSF (https://osf.io/24bdf/?view_only=71682180d88a44c99fea807ac1840acf).

Materials

Perceived Proportion of Men in Communal Occupations

We assessed the degree to which five occupations perceived in the U.S. to be female-dominated and communal (i.e., geriatric aide, nurse, nursery school teacher, secretary, and therapist; Cejka & Eagly, 1999; Koenig & Eagly, 2014) were perceived to be female-dominated and communal in each country in our sample (see SM for more details). The perceived proportion of men across these roles was averaged to form a measure of perceived gender segregation across communal roles. The scale ran from 0% men to 100% men (α ranged from .75 to .84 across countries.

Prosocial Self-Perceptions

We selected six items from Caprara et al. (2005) to assess *prosocial self-perceptions*. For example: "I try to be close to and take care of those who are in need" (α ranged from .81 to .90 across countries; see SM for testing of structural equivalence with Confirmatory Factor Analysis (CFA) with multigroup comparison). The scale ran from 1 (Never true) to 5 (Always true).

Prosocial Behavioural Intentions

We developed five scenarios to assess participants' *prosocial behavioural intentions*. The scenarios were situated at an office as this is a context that would be familiar to both women and men across the countries in our sample. Each scenario depicted a work situation in which the participant had to report the extent to which they would help a colleague[18]. For example: "Take a moment and imagine the following scenario. You are at the office working together in a team towards an important goal. You observe that one of your [male/female] work colleagues is not feeling very well emotionally. How likely do you think it is that you would step in and support your work colleague emotionally?" The scenarios were presented in a randomized order (α ranged from .75 - .89 in same-gender interactions and .82 - .91 in other-gender interactions across countries; see SM for testing of structural equivalence with CFA with multigroup comparison). The scale ran from 1 (Very unlikely) to 7 (Very likely). We presented the scenarios to participants twice (first assessing intentions to be helpful to someone of the same gender, then assessing intentions to be helpful to someone of the other gender).

Prosocial (Transfer) Behaviour

Participants' transfer during a continuous version of the prisoner's dilemma game (e.g., Dorrough & Glöckner, 2016) was used as a measure of *prosocial behaviour*. We gave participants an initial endowment of 100 Talers (the experimental currency; 100 Talers = 1 USD). Participants were informed that they and their (anonymous) interaction partner had to decide how much of their respective endowment they would like to transfer to one another (but that neither they nor their interaction partner would be made aware of how much the other had transferred). To make cooperation more profitable, participants were informed that any amount transferred by themselves and their interaction partner would be doubled by the experimenter and may factor into their bonus payment (which could range from 0-400 Talers). Participants' bonus payment was either determined by the outcome of (1) the prisoner's dilemma game, (2) expectations in the prisoner's dilemma, (3) the Holt and Laury lotteries (Holt & Laury, 2005), (4) the SVO slider measure (Murphy et al., 2011), or (5) a compensation/punishment game that participants also completed as part of this study. If the

[18] In two of the five scenarios, a "perpetrator" was depicted. For example: "Take a moment and imagine the following scenario. You are at the office working together in a team towards an important goal. You observe that one of your work colleagues is suffering moderate verbal abuse from another [male/female] work colleague. How likely do you think it is that you would step in and comfort the victim?" In both scenarios, the gender of the "perpetrator" (i.e., the person who verbally abused another teammate) was matched to the gender of the participant.

prisoner's dilemma result had been randomly selected to form the bonus payment, participants' bonus would be the sum of their initial endowment plus the amount their interaction partner had transferred to them (multiplied by 2), minus the amount they had transferred to their interaction partner. For example, if participants transferred 50 Talers to their interaction partner and their interaction partner transferred 40 Talers to them, their bonus payment would be: 100 – 50 (i.e., the amount they transferred to their interaction partner) + 40 (i.e., the amount their interaction partner transferred to them) x 2 = 130. Participants had to pass four comprehension questions assessing whether they had understood how their bonus would be calculated before being asked to decide how much they would like to transfer to an interaction partner of the same gender, and then to an interaction partner of the other gender.

Control Variables

Subjective SES

Participants indicated their SES along a ten-point ladder (the MacArthur Subjective Status Scale; Adler et al., 2000) with higher level rungs indicating higher relative SES. The vignette read: "Imagine that this picture of a ladder shows how your society is set up. At the top of the ladder are the people who have the highest standing in your society – they have the most money, the highest amount of schooling and the jobs that bring the most respect. At the bottom are people who have the lowest standing in your society – they have the least money, little or no education, no job or jobs that nobody wants or respects. Now think about yourself. Please select the number of the rung that shows where you think you would be on this ladder." The scale ran from 1 (Low SES) to 10 (High SES).

Age

Participants were asked to indicate their age (in years).

GDP per capita

GDP per capita was used as a measure of country-level *economic development*. GDP per capita is a value based on a country's economic activity divided by its population. Since GDP per capita may spike from one year to another, we averaged the values from 2015 to 2017 to get a better estimate of the country's economic activities over recent years (data was retrieved from https://data.worldbank.org/indicator/NY.GDP.PCAP.CD). To address positive skew in the GDP per capita data, the scale was logarithmic (log) transformed.

Gender Equality

The global index score from the Global Gender Gap Index (GGGI, WEF, 2017) was used as a proxy for country-level *gender equality*. The global index score is based on female-to-male ratios in economic participation and opportunity, educational attainment, health and survival, and political empowerment. The global index score ranged from 0 to 1 (a score of 1 indicates that the number of women is equal to (or greater than) the number of men).

Results

Descriptive Statistics

Prosocial self-perceptions, prosocial behavioural intentions, and prosocial (transfer) behaviour were positively correlated (see Table 2 for zero-order correlations between outcome variables).

Table 2

Zero-Order Correlations between Outcome Variables

Variables	1.	2.	3.	4.	5.
1. Self-perceptions[a]	-	.632***	.587***	.101**	.086**
2. Intentions (same-gender)[b]	.656***	-	.832***	.049	.057
3. Intentions (other-gender)[b]	.580***	.831***	-	.045	.056
4. Transfer (same-gender)[c]	.055	.079*	.050	-	.658***
5. Transfer (other-gender)[c]	.048	.086**	.042	.573***	-

Note. Correlations are aggregated over countries. Correlations for men are presented above the diagonal; for women, below. *p < .05 **p < .01, ***p < .001, two-tailed.

[a] The scale ranges from 1-5 (higher numbers indicating more prosocial self-perceptions).

[b] The scale ranges from 1-7 (higher numbers indicating more prosocial behavioural intentions).

[c] Transfers range from 0-100.

Descriptive statistics showed that women and men see themselves as highly prosocial (the average response for prosocial self-perceptions and prosocial behavioural intentions was above the scale midpoint in all countries). Women and men transferred on average approximately half of their initial endowment of 100 Talers. However, men tended to transfer more than women. In the vast majority of countries, the average transfer by women was below the scale midpoint, whereas the average transfer by men was above the scale midpoint (see Table 3 for means and standard deviations for all outcome variables).

Gender differences in prosocial self-perception, prosocial behavioural intentions in same- and other-gender interactions, and prosocial (transfer) behaviour in same- and other-gender interactions showed similar directions in the vast majority of countries (see Table SM2).

Analytical Strategy

We used R and the *lme4* package (Bates et al., 2015) to fit linear mixed models[19] to predict gender differences in prosociality. We used the *lmerTest* package (Kuznetsova et al., 2017) to obtain *p*-values for the fixed effects. The hypotheses were tested with age and subjective SES as control variables on the individual level, and log GDP per capita and gender equality as control variables on the country level. All control variables[20] were centered at the grand mean (in line with recommendations by Enders & Tofighi, 2007). Interactions were created by first centering variables and then multiplying them.

Table 3

Descriptive Statistics for Outcome Variables within Countries

Country	Self-perceptions	Intentions (same-gender)	Intentions (other-gender)	Transfer (same-gender)	Transfer (other-gender)
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)
US					

[19] Testing the hypotheses with OLS regression with clustered *SE*s generated comparable results for all the reported findings (for more details, see SM).

[20] Testing the hypotheses without control variables generated comparable results for all the reported findings.

Female	4.16 (0.63)	5.37 (1.13)	5.12 (1.35)	48.73 (26.73)	46.67 (27.47)
Male	4.06 (0.56)	4.73 (1.42)	4.88 (1.53)	51.15 (22.98)	50.96 (23.45)
Sweden					
Female	3.97 (0.63)	5.09 (1.10)	4.92 (1.25)	48.47 (25.38)	44.59 (24.67)
Male	3.94 (0.66)	5.11 (1.21)	5.35 (1.19)	51.21 (28.62)	53.33 (28.32)
Spain					
Female	4.05 (0.65)	5.53 (0.90)	5.35 (1.06)	45.71 (25.95)	47.41 (27.76)
Male	3.99 (0.59)	5.32 (0.97)	5.45 (1.01)	52.48 (27.24)	53.52 (26.09)
Japan					
Female	3.26 (0.76)	4.08 (1.06)	3.81 (1.02)	47.16 (27.70)	41.96 (26.37)
Male	3.37 (0.70)	4.10 (0.88)	4.20 (1.00)	43.27 (26.13)	44.18 (24.36)
China					
Female	3.97 (0.70)	4.97 (1.04)	4.74 (1.17)	47.38 (24.84)	47.74 (24.51)
Male	3.93 (0.57)	4.80 (1.03)	4.85 (1.05)	49.90 (27.59)	53.76 (25.05)
Russia					
Female	3.76 (0.72)	4.83 (1.18)	4.67 (1.38)	47.22 (21.75)	47.89 (22.63)
Male	3.61 (0.78)	4.76 (1.09)	4.89 (1.23)	53.23 (23.42)	57.60 (26.43)
Chile					
Female	4.35 (0.62)	5.85 (0.90)	5.68 (1.18)	46.93 (22.42)	48.53 (23.75)
Male	4.18 (0.70)	5.64 (1.16)	5.92 (1.24)	47.35 (24.10)	51.45 (21.59)
Mexico					
Female	4.06 (0.66)	5.51 (1.17)	5.27 (1.35)	47.72 (22.80)	46.83 (23.19)
Male	4.25 (0.63)	5.48 (1.51)	5.82 (1.30)	54.80 (24.47)	52.70 (23.82)
Colombia					
Female	4.38 (0.57)	5.87 (1.01)	5.60 (1.19)	50.57 (25.75)	46.38 (24.62)
Male	4.34 (0.53)	5.68 (1.00)	6.10 (0.98)	54.18 (25.64)	53.98 (25.23)
Indonesia					
Female	4.09 (0.64)	5.44 (1.01)	5.13 (1.16)	49.43 (27.94)	49.24 (28.24)
Male	4.23 (0.69)	5.49 (1.11)	5.38 (1.23)	52.00 (28.08)	55.12 (28.51)

Model 1: Gender Differences in Prosocial Self-Perceptions

In Model 1, we assessed gender differences in prosocial self-perceptions and whether gender differences in prosocial self-perceptions varied as a function of the perceived proportion of men in communal roles. In order to examine whether there was sufficient variance at the different levels to justify a hierarchical linear model, we first ran a model that included no predictor variables. The intraclass correlation (ICC) indicated sufficient clustering at the country level (ICC = 0.16, LeBreton & Senter, 2008). To take into account that observations were non-independent and clustered within countries, we fitted a 2-level hierarchical linear model. We included intercept for country as a random effect, thereby accounting for between-country variability. We included gender (centered at the grand mean in line with recommendations by Enders & Tofighi, 2007; female = -0.48, male = 0.52) and perceived proportion of men in communal roles (centered within countries in line with recommendations by Enders & Tofighi, 2007) as predictors on the individual level. In addition, we included an interaction between gender and perceived proportion of men in communal roles.

The results of Model 1 are displayed in Table 4. We hypothesized that women would report higher prosocial self-perceptions than men (**H1a**). In line with our prediction, women reported higher prosocial self-perceptions than men. However, this difference was not statistically significant (b = -0.06, *SE* = .03, *p* = .066, 95% CI [-0.12, 0.004]).

In addition, we hypothesized that perceiving more men in communal roles would be positively associated with men's, but negatively (or negligibly) associated with women's prosocial self-perceptions (**H2a**). Contrary to our predictions, the interaction between gender and perception of men in communal roles was not statistically significant (b = -0.002, *SE* = .002, *p* = .140, 95% CI [-0.01, 0.001]).

Table 4

Hierarchical Linear Regression Results for Prosocial Self-Perceptions Predicted by Gender and Perceived Proportion of Men in Communal Occupations.

				95% CI		
	Coefficient	*SE*	*t*	LL	UL	*p*
Fixed Effects						
Level 1						
Intercept	4.00	0.07	61.51	3.86	4.14	< .001
Age	0.01	0.001	4.44	0.003	0.01	< .001
Subjective SES	-0.05	0.01	-5.29	-0.07	-0.03	< .001
Gender	-0.06	0.03	-1.84	-0.12	0.004	.066
Perceived proportion of men	0.002	0.001	2.34	0.0003	0.003	.019
Gender * Perceived proportion of men	-0.002	0.002	-1.48	-0.01	0.001	.140
Level 2						
Log GDP per capita	-0.20	0.08	-2.50	-0.37	-0.03	.031
Gender equality	3.87	1.68	2.30	0.22	7.51	.045
Random Effects	Coefficient	*SD*				
Intercept variance (country level)	0.040	0.200				

Note. Gender was coded -0.48 for females and 0.52 for males. *N* = 1915 at Level 1 (individuals). Coefficients represent unstandardized regression weights (fixed effects) and variances (random effects).

Model 2: Gender Differences in Prosocial Behavioural Intentions

In Model 2, we assessed gender differences in prosocial behavioural intentions and whether gender differences in prosocial behavioural intentions varied as a function of the perceived proportion of men in communal roles. We transformed the data into long format (1915 participants x 2 prosocial intentions in same- vs. other-gender interactions). To take into account that observations were non-independent at the individual (ICC = 0.82) and country level (ICC = 0.16), we fitted a 3-level hierarchical linear model. We included intercepts for country and individuals as random effects to account for within-individual and between-country variability. We included interaction type (i.e., whether helping took place in a same- vs. other-gender context) as a predictor on the observational level (centered within individuals; same-gender = -0.5, other-gender = 0.5) and gender and perception of men in communal roles as predictors on the individual level. In addition, we included a cross-level interaction between interaction type and gender and a cross-level interaction between interaction type, gender, and perception of men in communal roles.

The results of Model 2 are displayed in Table 5. We hypothesised that women would report higher prosocial behavioural intentions than men in same-gender interactions (**H1b**). In line with our prediction, simple slopes analyses showed that in same-gender interactions, women reported higher levels of prosocial behavioural intentions than men (b = -0.16, *SE* = .05, *p* = .003, 95% CI [-0.27, -0.06]). In other-gender interactions, on the other hand, men reported higher levels of prosocial behavioural intentions than women (b = 0.24, *SE* = .05, *p*

< .001, 95% CI [0.13, 0.35])[21].

In addition, we hypothesised that gender would interact with the perception of men in communal roles in predicting prosocial behavioural intentions in same-gender interactions (**H2b**). Specifically, we predicted that perceiving more men in communal roles would be positively associated with men's, but negatively (or negligibly) associated with women's prosocial behavioural intentions. To test our hypothesis, we ran two simple slopes analyses in same-gender interactions. When examining the slope of gender at different levels of perceived proportion of men in communal roles, we noted that gender differences in prosocial behavioural intentions in same-gender interactions were larger when the proportion of men in communal roles was perceived to be relatively low (-1 SD: b = -0.20, *SE* = .08, *p* = .007, 95% CI [-0.35, -0.05]), than relatively high (+1 SD: b = -0.12, *SE* = .07, *p* = .107, 95% CI [-0.27, 0.03]). When examining the slope of perceived proportion of men in communal roles for women and men, respectively, we noted in line with our prediction that the slope was steeper for men (b = 0.01, *SE* = 0.002, *p* = .002, 95% CI [0.002, 0.01]) than for women (b = 0.004, *SE* = 0.002, *p* = .042, 95% CI [0.0002, 0.01]), indicating that perceiving more men in communal roles is associated with more prosocial behavioural intentions in same-gender interactions among men than women.

Table 5

Hierarchical Linear Regression Results for Prosocial Behavioural Intentions Predicted by Gender, Interaction Type, and Perceived Proportion of Men in Communal Occupations.

				95% CI		
	Coefficient	*SE*	*t*	LL	UL	*p*
Fixed Effects						
Level 1						
Intercept	5.17	0.10	50.57	4.94	5.39	< .001
Interaction type	-0.03	0.02	-1.76	-0.06	0.004	.079
Level 2						
Age	0.004	0.002	2.24	0.0005	0.01	.025
Subjective SES	-0.08	0.02	-5.16	-0.11	-0.05	< .001
Gender	0.04	0.05	0.75	-0.06	0.14	.453
Perceived proportion of men	0.01	0.001	4.51	0.003	0.01	< .001
Gender * Perceived proportion of men	0.0003	0.003	0.10	-0.005	0.01	.918
Level 3						
Log GDP per capita	-0.35	0.13	-2.84	-0.62	-0.08	.017
Gender equality	7.41	2.64	2.81	1.68	13.13	.019
Cross-level interaction						
Interaction type * Gender	0.40	0.03	11.91	0.33	0.47	< .001
Interaction type * Perceived proportion of men	0.002	0.001	1.88	-0.0001	0.003	.060
Interaction type * Gender * Perceived proportion of men	-0.004	0.002	-2.15	-0.01	-0.0003	.032
Random Effects	Coefficient	*SD*				
Intercept variance (individual level)	1.01	1.01				

[21] Testing gender differences across same- vs. other-gender interactions without including scenarios with a so-called perpetrator generated comparable results.

Intercept variance (country level)	0.10	0.31

Note. Interaction type was coded -0.5 for same-gender interactions and 0.5 for other-gender interactions. Gender was coded -0.48 for females and 0.52 for males. N = 3830 at Level 1 (observations) and N = 1915 at Level 2 (individuals). Coefficients represent unstandardized regression weights (fixed effects) and variances (random effects).

Model 3: Gender Differences in Prosocial (Transfer) Behaviour

In Model 3, we assessed gender differences in prosocial (transfer) behaviour and whether gender differences in prosocial (transfer) behaviour varied as a function of the perceived proportion of men in communal roles. Again, we transformed the data into long format (1915 participants x 2 transfer in same- vs. other-gender interactions). The ICC indicated sufficient clustering at the individual level (ICC = 0.62), but not at the country level (ICC = 0.004, LeBreton & Senter, 2008), which indicates that the distribution of individuals' transfer was similar across countries. To take into account that observations were non-independent at the individual level, we fitted a 2-level hierarchical linear model. We included a random intercept for individuals to account for within-individual variability. As in Model 2, we included interaction type (i.e., whether helping took place in a same- vs. other-gender context) as a predictor on the observational level, and gender and perceived proportion of men in communal roles as predictors on the individual level. In addition, we included a cross-level interaction between gender and interaction type, and a cross-level interaction between interaction type, gender, and perception of men in communal roles.

The results of Model 3 are displayed in Table 5. Simple slopes analyses for the interaction between gender and interaction type showed, in line with the findings for prosocial behavioural intentions, that in other-gender interactions, men engaged in more prosocial (transfer) behaviour than women (b = 5.51, SE = 1.20, p < .001, 95% CI [3.15, 7.86]). However, contrary to the findings for prosocial behavioural intentions, in same-gender interactions women engaged in less prosocial (transfer) behaviour than men (b = 2.58, SE = 1.20, p = .032, 95% CI [0.23, 4.94])[22]. The interaction between gender, interaction type, and perception of men in communal roles was not statistically significant (b = -0.08, SE = .05, p = .139, 95% CI [-0.19, 0.03]).

Table 6

Hierarchical Linear Regression Results for Prosocial (Transfer) Behaviour Predicted by Gender, Interaction Type, and Perceived Proportion of Men in Communal Occupations.

				95% CI		
	Coefficient	*SE*	*t*	LL	UL	*p*
Fixed Effects						
Level 1						
Intercept	49.44	0.52	94.89	48.42	50.46	< .001
Interaction type	0.18	0.51	0.35	-0.82	1.18	.727
Level 2						
Age	0.04	0.04	1.23	-0.03	0.11	.220
Subjective SES	-0.70	0.30	-2.31	-1.29	-0.11	.021

[22] Fitting a 3-level model, in which we controlled for country-level log GDP per capita and gender equality generated comparable results for gender differences in same- vs. other-gender interactions.

Gender	4.04	1.09	3.72	1.91	6.18	< .001
Perceived proportion of men	0.09	0.03	3.27	0.04	0.14	< .001
Gender * Perceived proportion of men	-0.05	0.06	-0.96	-0.16	0.06	.337
Level 3						
Cross-level interaction						
Interaction type * Gender	2.92	1.02	2.86	0.92	4.93	.004
Interaction type * Perceived proportion of men	-0.01	0.03	-0.23	-0.06	0.05	.818
Interaction type * Gender * Perceived proportion of men	-0.08	0.05	-1.48	-0.19	0.03	.139

Random Effects	Coefficient	*SD*
Intercept variance (individual level)	394.9	19.87

Note. Interaction type was coded -0.5 for same-gender interactions and 0.5 for other-gender interactions. Gender was coded -0.48 for females and 0.52 for males. N = 3830 at Level 1 (observations) and N = 1915 at Level 2 (individuals). Coefficients represent unstandardized regression weights (fixed effects) and variances (random effects).

Discussion

The first aim of the present research was to investigate gender differences in prosociality. The present results only showed small gender differences in prosocial self-perceptions. The prosocial self-perceptions measure we used was very general and thus may not have elicited specific gender role expectations as all people (regardless of their gender) are expected to be interpersonally helpful and supportive. However, by assessing help in different contexts (i.e., in same- vs. other-gender interactions), we seem to have elicited expectations specifically associated with the female and male gender role, which triggered larger gender differences. Specifically, we found that women reported higher helping intentions in same-gender interactions, whereas men reported higher helping intentions in other-gender interactions. These findings suggest that it may be more acceptable for women than for men to help members of their own gender. However, we did not find that women transferred more monetary resources than men in same-gender interactions (in fact, we found the contrary). Researchers have concluded that women transfer more than men because they have internalized gender role expectations to be more altruistic than men (Brañas-Garza et al., 2018; Rand et al., 2016). Our finding that men transfer more than women is not necessarily contrary to gender role expectations, as transfer could potentially lead to less profit (if the other player does not reciprocate). It is possible therefore that women transferred less than men (or men transferred more than women) because the prisoner's dilemma game elicited risk-taking, which is associated with agency (i.e., the male gender role; Charness & Gneezy, 2012). The scenarios, on the other hand, involved communal behaviour (e.g., supporting one's colleague emotionally). Hence, our findings suggest that women only help more than men in same-gender situations *if* the situation makes gender role expectations salient.

In line with the findings for prosocial behavioural intentions in other-gender interactions, men also transferred more than women in other-gender interactions. Gender differences were larger in other-gender transfers than in same-gender transfers, which suggests that it may be particularly acceptable for (or expected of) men to help women. Our findings are congruent with previous research by Buunk and Massar (2012), who found that

male players were more likely to share resources with female players than female players were with male players. Buunk and Massar argued that men's inclination to help women is rooted in sexual selection processes (i.e., men compete with other men for women's favour, which they gain by giving women gifts). Whereas Buunk and Massar's findings (and our own) could be explained by sexual selection processes, both findings could also be explained by benevolent sexism (i.e., the belief that a man's role is to protect and support women; Shnabel et al., 2016).

With the present data, we are not able to determine whether or to what extent sexual selection and/or gender role expectations explain gender differences in prosociality. However, social role theory makes assumptions about gender differences that can be tested with the present data. In line with social role theory, we found that men's greater tendency to engage in "communal" helping (i.e., supporting a colleague of the same gender emotionally) was more pronounced among men who perceived relatively more men in communal roles in their society. However, contrary to the assumptions of social role theory, this effect, albeit weaker, was also visible for women, which raises the possibility that a third variable may explain (at least part of) this effect.

Strengths, Limitations, and Perspectives for Future Research

The present research design allowed us to test contextual factors of gender differences in prosociality. We assessed gender differences in prosociality across different measures (i.e., self-perceptions, behavioural intentions, and transfer behaviour in a prisoner's dilemma game), across different countries (that had been selected to represent a spectrum from low gender equality to high gender equality), and across same- vs. other-gender interactions. These contextual factors seem to elicit more or less helping behaviour in women and men (even after controlling for individual-level subjective SES and age, and country-level log GDP per capita and gender equality).

Despite several strengths of the present design, we outline in what follows a few recommendations for future research on gender differences in prosociality. First, the degree to which women and men interact with members of the opposite gender in their daily lives may vary between countries. Participants were therefore informed that they were first interacting with players of the same gender. We did not find any order effects (as men recorded more prosocial intentions in the second round of interactions, whereas women recorded more prosocial intentions in the first round of interactions). Nevertheless, counterbalancing is good practice and should be considered in future research.

Second, the present findings are interpreted within a same- vs. other-gender framework (in line with previous research traditions; e.g., Balliet et al., 2011). It is, however, important to point out that our findings could be re-interpreted to mean that "everyone intends to help women more." Similarly, previous research by Balliet et al. (20011) could be re-interpreted to mean that "everyone helps men more." These mixed conclusions suggest that gender differences in helping are not solely driven by similarity in the gendered context (i.e., whether help is given to someone of the same vs. other gender). To clarify what is driving gender differences in prosocial behaviour, future research should test whether gender differences in helping are mediated by gender role expectations of the helper (e.g., the expectation for men to be chivalrous and for women to be caring) or by gender stereotypes about the potential recipient of help (e.g., perceiving that women need more help than men or that men do not want/need help). By identifying what processes underlie gender differences in helping behaviour, these findings could determine whether interventions that aim to reduce gender differences in different helping contexts should target gender stereotypes and gender role expectations of women, men, or both. Furthermore, future research can inform interventions by replicating these effects across different contexts, as

gender differences in helping may be particularly pronounced in contexts that are dominated by one gender (e.g., the domestic domain; Bareket et al., 2020; Shnabel et al., 2016).

Third, we did not replicate gender differences in same-gender interactions across different operationalisations of prosociality. Since cooperation in the prisoner's dilemma game involves some financial risk-taking (which may have primed male gender role expectations), future research should test whether gender differences in prosocial intentions replicate with a dictator game, which does not involve risk-taking. Further, sensitivity power analyses showed that we had sufficient power to detect small-to-medium (but not very small effects) within countries. Whereas the effects for prosocial behavioural intentions and prosocial (transfer) behaviour were in the same direction in most countries, they were not always statistically significant. Larger p-values represents a greater likelihood that (if the null hypothesis is true), effects of that size (or larger) may not replicate in random samples. Future research may thus wish to replicate this study with larger samples in each respective country to assess whether gender differences in prosocial behavioural intentions and prosocial (transfer) behaviour are in fact smaller in some countries and therefore present but undetectable with the current sample size. Finally, future research should further explore what underlies gender differences in prosocial behaviours. With a larger selection of countries (30 – 50; Maas & Hox, 2005), future research could compare the assumptions of different theoretical perspectives of gender differences (Falk & Hermle, 2018).

Implications for Society

As indicated by the range of the confidence intervals, the present effects of gender differences in prosocial behavioural intentions and prosocial (transfer) behaviour are small. However, previous research suggests that even small gender differences in behaviour can accumulate and have substantial consequences (see Hyde & Lindberg, 2007). It is important to address men's lesser inclination to engage in communal helping as men's relative lack of communal engagement has been linked to negative effects for both women and men (see Croft et al., 2015; Meeussen et al., 2020). The present data suggests that exposure to men in communal roles may be one possible way to reduce gender differences in communal prosocial behaviour.

Conclusion

In line with the conclusions of past researchers, we conclude that there is no "more helpful" gender. Instead, gender differences in prosocial behaviour are dynamic and contextual.

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Supplementary Materials

Deviations from Planned Analyses

We developed a measure of agentic prosocial behavioural intentions. However, as part of data preparation, we noted that the agentic prosocial behavioural intentions items were not highly correlated in all countries. As we were unable to form a composite scale of these items, we decided to exclude agentic prosocial behavioural intentions from the present analyses, and therefore did not pre-register hypotheses for this measure.

All the pre-registered hypotheses are reported (albeit in a slightly different order). In the exploratory analysis section of the pre-registration, we specified that we would re-run the analyses including data from other-gender interactions. We deviated slightly from the pre-registration of the exploratory analyses. Rather than controlling for the gender of the recipient of help as we pre-registered, we explored whether the interaction type (i.e., whether help was given to someone of the same vs. other gender) moderated gender differences in behavioural intentions. In addition to this, we added some variables to the analyses. Firstly, we added log GDP per capita and gender equality as control variables on the country level based on the suggestions of a reviewer. Secondly, we added prosocial (transfer) behaviour as an outcome variable. Prosocial (transfer) behaviour in same- and other-gender interactions were measured as part of this project but were initially planned to be included in a different report, and therefore were not outlined in the present pre-registration.

Expanded Method Section

Recruitment

The sample was recruited to be representative of age and gender in each country (see Table SM1).

Table SM1

The Proportion of Women, Men, and Age Groups that were Targeted by the Panel Provider in Each Country.

	China	Chile	Colombia	Indonesia	Japan	Mexico	Russia	Sweden	Spain	USA
Gender:										
Men	51(55)	49(53)	49(48)	49(43)	48(52)	48(50)	45(42)	49(47)	49(49)	49(45)
Women	49(45)	51(47)	51(52)	51(57)	52(48)	52(50)	55(58)	51(53)	51(51)	51(55)
Age:										
18-24	13(06)	15(13)	18(17)	17(18)	08(05)	18(16)	09(08)	11(11)	08(06)	12(06)
25-34	21(26)	21(20)	23(26)	22(28)	13(13)	24(24)	21(19)	17(15)	15(13)	18(07)
35-44	19(27)	18(16)	19(22)	22(21)	16(18)	20(24)	19(21)	16(15)	21(25)	16(13)
45-54	21(22)	19(20)	18(19)	17(21)	15(18)	16(15)	17(20)	17(19)	19(20)	17(18)
55-64	14(14)	14(16)	13(11)	12(10)	15(16)	11(12)	18(17)	15(15)	14(16)	17(25)
> 64	25(05)	14(14)	11(04)	10(03)	32(30)	10(10)	17(16)	25(25)	22(20)	30(30)

Note. The target was not always achieved due to attrition and following exclusions. In parentheses are the actual proportion that were included in the analyses. The difference between targeted and achieved sample size was not statistically significant in any country (*p*s ≥ .317).

Table SM2

Regression Statistics for Outcome Variables within Countries

Country	Self-perceptions		Intentions (same-gender)		Intentions (other-gender)		Transfer (same-gender)		Transfer (other-gender)	
	b [95% CI]	*p*	*b* [95% CI]	*p*	*b* [95% CI]	*p*	*b* [95% CI]	*p*	*b* [95% CI]	*p*
US	-0.16 [-0.38, 0.07]	.174	-0.72 [-1.21, -0.24]	.004	-0.37 [-0.92, 0.18]	.185	0.55 [-9.13, 10.24]	.910	2.44 [-7.48, 12.36]	.627
Sweden	-0.03 [-0.21, 0.15]	.764	-0.06 [-0.38, 0.27]	.723	0.37 [0.02, 0.71]	.038	3.81 [-3.79, 11.40]	.324	8.88 [1.40, 16.35]	.020
Spain	-0.10 [-0.28, 0.08]	.256	-0.26 [-0.53, 0.01]	.061	0.03 [-0.27, 0.33]	.839	6.34 [-1.36, 14.05]	.106	2.83 [-4.88, 10.55]	.470
Japan	-0.01 [-0.21, 0.20]	.943	0.002 [-0.28, 0.28]	.991	0.32 [0.03, 0.61]	.033	-5.52 [-13.31, 2.27]	.164	1.03 [-6.32, 8.37]	.783
China	-0.09 [-0.28, 0.10]	.352	-0.13 [-0.44, 0.18]	.424	0.16 [-0.17, 0.49]	.327	1.01 [-7.02, 9.04]	.805	5.67 [-1.93, 13.27]	.143
Russia	-0.26 [-0.46, -0.06]	.010	-0.17 [-0.48, 0.14]	.271	0.09 [-0.27, 0.45]	.610	5.95 [-0.24, 12.15]	.060	10.21 [3.51, 16.91]	.003
Chile	-0.28 [-0.50, -0.06]	.014	-0.35 [-0.69, 0.00]	.051	0.20 [-0.21, 0.61]	.333	0.38 [-7.51, 8.27]	.924	2.23 [-5.43, 9.89]	.567
Mexico	0.14 [-0.05, 0.32]	.149	-0.10 [-0.50, 0.31]	.632	0.50 [0.10, 0.90]	.015	4.81 [-2.41, 12.03]	.191	4.21 [-3.00, 11.41]	.251
Colombia	-0.06 [-0.22, 0.09]	.421	-0.23 [-0.51, 0.05]	.110	0.46 [0.15, 0.77]	.004	4.35 [-2.90, 11.61]	.238	7.43 [0.37, 14.49]	.039
Indonesia	0.13 [-0.07, 0.34]	.191	0.12 [-0.20, 0.44]	.456	0.33 [-0.03, 0.68]	.072	-0.42 [-8.85, 8.01]	.921	4.54 [-4.16, 13.24]	.304

Note. Prosocial self-perceptions, prosocial behavioural intentions, and prosocial (transfer) behaviour predicted by gender (coded -0.48 for females and 0.52 for males) in each country. The table contains unstandardized regression coefficients.

Sample Size

The data reported here were collected as part of a larger project. Prior to data collection, an a priori power analysis was conducted (using G*Power; Faul et al., 2007) to determine the minimum required sample to detect small gender differences in game behaviour (based on an effect size of d = 0.14; Dorrough & Glöckner, 2019). The power calculation was based on a repeated-measures mixed ANOVA as the closest pragmatic approximation for the planned cluster-corrected regression analysis (Dorrough & Glöckner, 2020). The required sample size was estimated at 200 participants per country with a desired power of 80%. We aimed to achieve this sample size in each country. However, due to participant dropout, some countries had sample sizes smaller than 200. Sensitivity power analyses assuming linear multiple regression (with 3 predictor variables) showed that the smallest effect (i.e., gender difference) that could be detected within countries (with a power of 95; alpha = .05) ranged from f^2 = 0.08 (Russia; n = 229) to f^2 = 0.15 (USA; n = 115), which corresponds to a small to medium effect size (Cohen, 1988). Given that the majority of gender differences in the cognitive and social domain are in the close-to-zero or small range (Hyde, 2005), the significance of gender differences within countries should be interpreted with caution.

Confirmatory Factor Analysis

In order to assess whether the factorial structure of the scales measuring prosocial self-perceptions and behavioural intentions were equivalent across countries, we conducted Confirmatory Factor Analysis with multigroup comparisons. For prosocial self-perceptions, fit of the one-factor model was acceptable (χ^2 (65)= 168.85, p < .001, RMSEA = 0.09, CFI = 0.98; TLI = 0.95, SRMR = 0.03) when correlations between error terms for the following items were allowed: “I am willing to make my knowledge and abilities available to others” and “I easily share with friends any good opportunity that comes to me” in the United States, China, and Russia; “I try to help others” and “I easily share with friends any good opportunity that comes to me” in the United States, Chile, China, Mexico, and Indonesia; as well as “I try to console those who are sad” and “I try to be close to and take care of those who are in need” in Sweden, Japan, Chile, Mexico, and Colombia. For same-gender behavioural intentions, fit of the single-factor model was also acceptable (χ^2 (47)= 113.67, p < .001, RMSEA = 0.09, CFI = 0.98; TLI = 0.96, SRMR = 0.03) when correlated error terms were allowed for behavioural intentions in the two scenarios involving a perpetrator in Japan, Mexico, and Indonesia. For other-gender behavioural intentions, fit of the single-factor model was acceptable (χ^2 (39)= 111.43, p < .001, RMSEA = 0.10, CFI = 0.99; TLI = 0.96, SRMR = 0.02) when correlated error terms were allowed for behavioural intentions in the two scenarios involving a perpetrator in Sweden, Japan, China, Chile, Mexico, Colombia, and Indonesia. Further, error terms were correlated for the two scenarios involving performance issues of a team member in Spain, Mexico, Russia, and Colombia.

Robustness Analyses

In order to determine the robustness of gender differences (or lack thereof) across prosocial self-perceptions, prosocial behavioural intentions, and prosocial (transfer) behaviour in same- and other-gender interactions, we replicated our analyses with an ordinary least squares (OLS) regression analysis with cluster-corrected standard errors at the country level to account for dependencies in error terms. As in the hierarchical linear model (HLM) analyses, we controlled for individual-level age and subjective SES, and country-level log GDP per capita and gender equality.

The results are displayed in Table SM4. Testing the hypotheses with OLS regressions with clustered SEs generated comparable conclusions to testing the hypotheses with HLM. However, the effect of the interaction between gender, interaction type, and perception of men in communal roles was reduced and consequently marginally significant.

Table SM4

Ordinary Least Squares (OLS) Regression Results for Prosocial Self-Perceptions, Prosocial Behavioural Intentions, and Prosocial (Transfer) Behaviour Predicted by Gender, Interaction Type, and Perceived Proportion of Men in Communal Occupations.

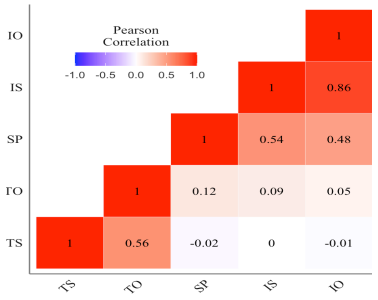
	Self-perceptions		Behavioural intentions		(Transfer) behaviour	
	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI
Intercept	3.97*** (63.14)	[3.85, 4.09]	5.14*** (51.83)	[4.94, 5.33]	49.34*** (141.46)	[48.66, 50.02]
Gender (G)	-0.05 (-1.26)	[-0.12, 0.03]	0.06 (0.95)	[-0.06, 0.17]	3.88*** (3.99)	[1.98 5.79]
Interaction type (IT)			-0.03 (-1.14)	[-0.08, 0.02]	0.18 (0.27)	[-1.10, 1.46]
Perceived proportion of men (PPM)	0.002* (2.51)	[0.0004, 0.003]	0.01*** (3.73)	[0.003, 0.01]	0.09** (2.74)	[0.03, 0.15]
G *IG			0.40*** (8.05)	[0.30, 0.50]	2.92*** (3.57)	[1.32, 4.53]
PPM * G	-0.003 (-1.54)	[-0.01, 0.001]	0.0003 (0.09)	[-0.01, 0.01]	-0.05 (-0.76)	[-0.18, 0.08]
PPM * IT			0.002 (1.38)	[-0.001, 0.004]	-0.01 (-0.17)	[-0.08, 0.06]
PPM * G * IG			-0.004† (-1.82)	[-0.01, 0.0003]	-0.08 (-1.08)	[-0.22, 0.06]
Observations			3830		3830	
Participants	1915		1915		1915	
Countries/clusters	10		10		10	

Note. The interaction type was coded -0.5 for same-gender interactions and 0.5 for other-gender interactions. Gender was coded -0.48 for females and 0.52 for males. Control variables (age, SES, log GDP per capita, gender equality) are not reported. Coefficients represent unstandardized regression weights. t-statistics are in parentheses. † $p < .07$, *$p < .05$, **$p < .01$, ***$p < .001$

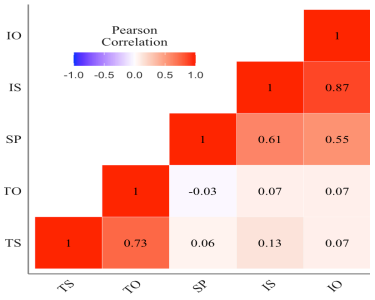
Expanded Result Section

Correlations Between Outcome Variables Within Countries

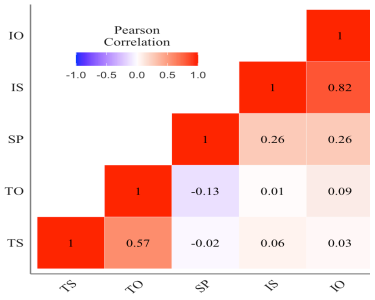
USA



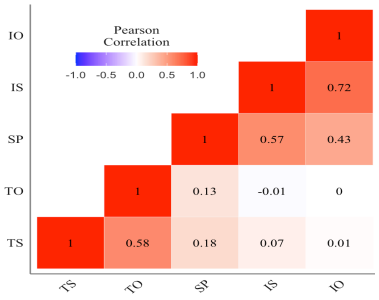
Spain



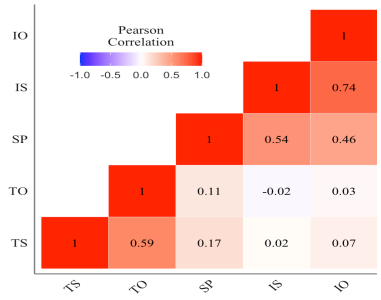
China



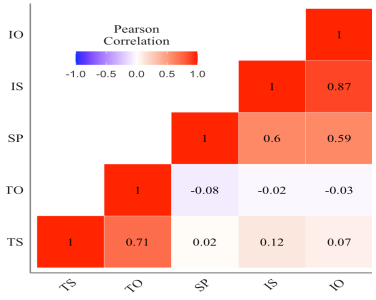
Chile



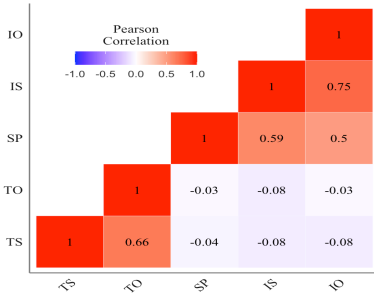
Colombia



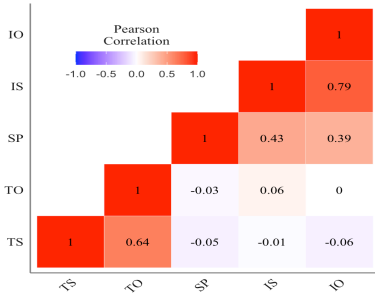
Sweden



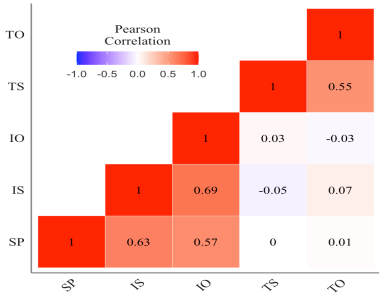
Japan



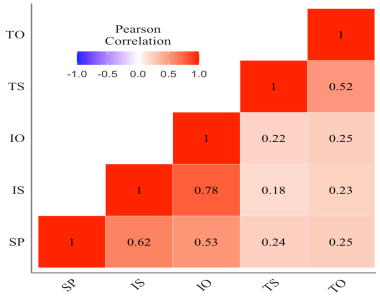
Russia



Mexico



Indonesia

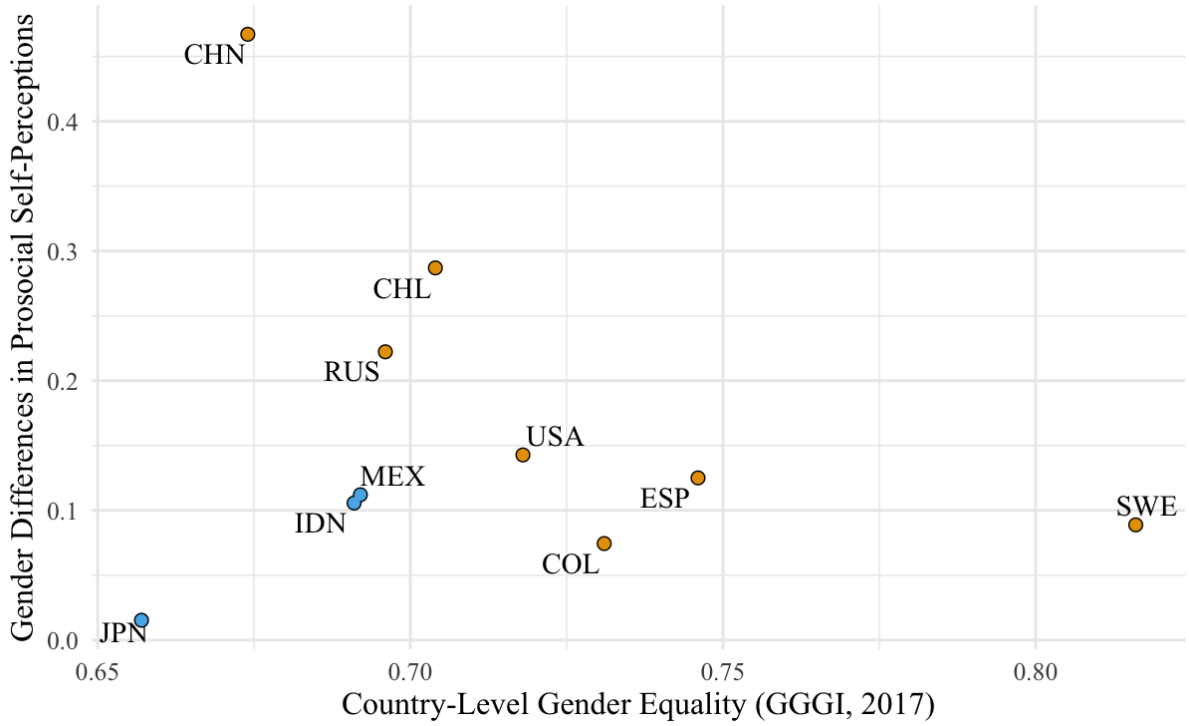


Gender Differences in Prosociality by Country-Level Gender Equality

The present descriptive results provide mixed support for the gender equality paradox effect (see Figures SM1-SM5 for gender differences in prosocial self-perceptions, prosocial behavioural intentions, and prosocial (transfer) behaviour in same- and other-gender gender interactions).

Figure SM1

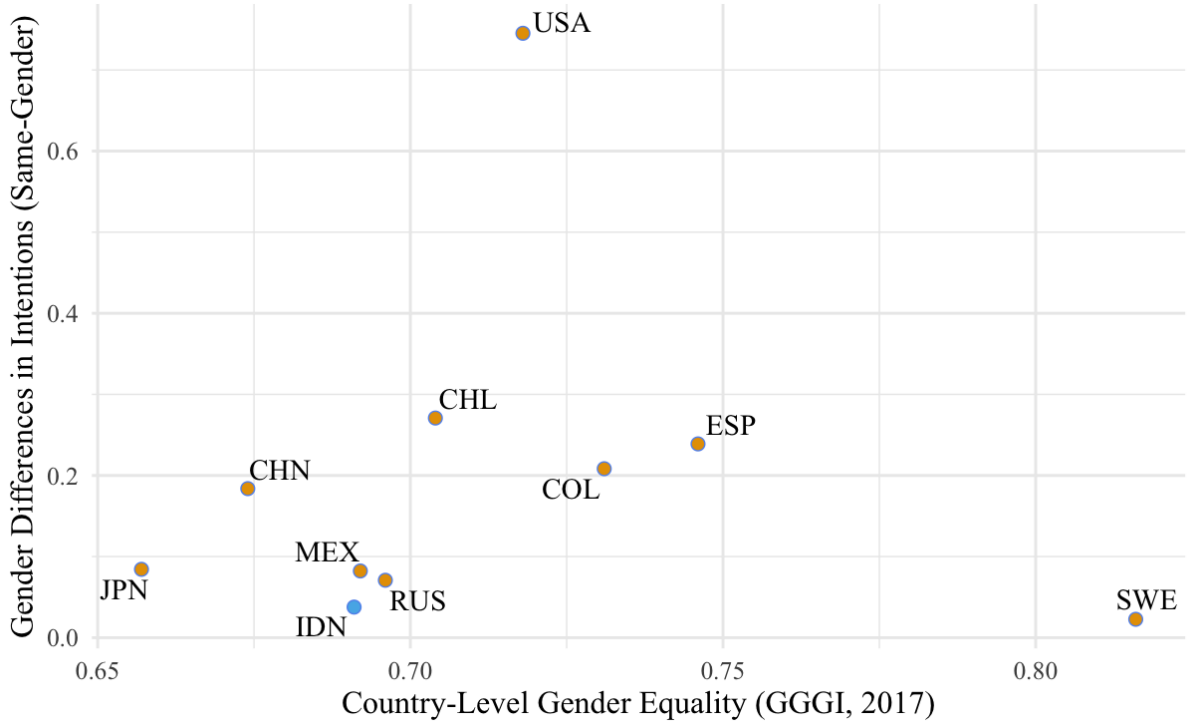
Gender Differences in Prosocial Self-Perceptions by Country-Level Gender Equality



Note. The gender difference score represents the difference between women's and men's estimated means (i.e., the intercept for women - the intercept for men, when individual-level control variables are held at zero). A score of 0 indicates no gender difference. Positive scores indicate larger gender differences (yellow = women report higher prosocial self-perceptions than men; blue = men report higher self-perceptions than women).

Figure SM2

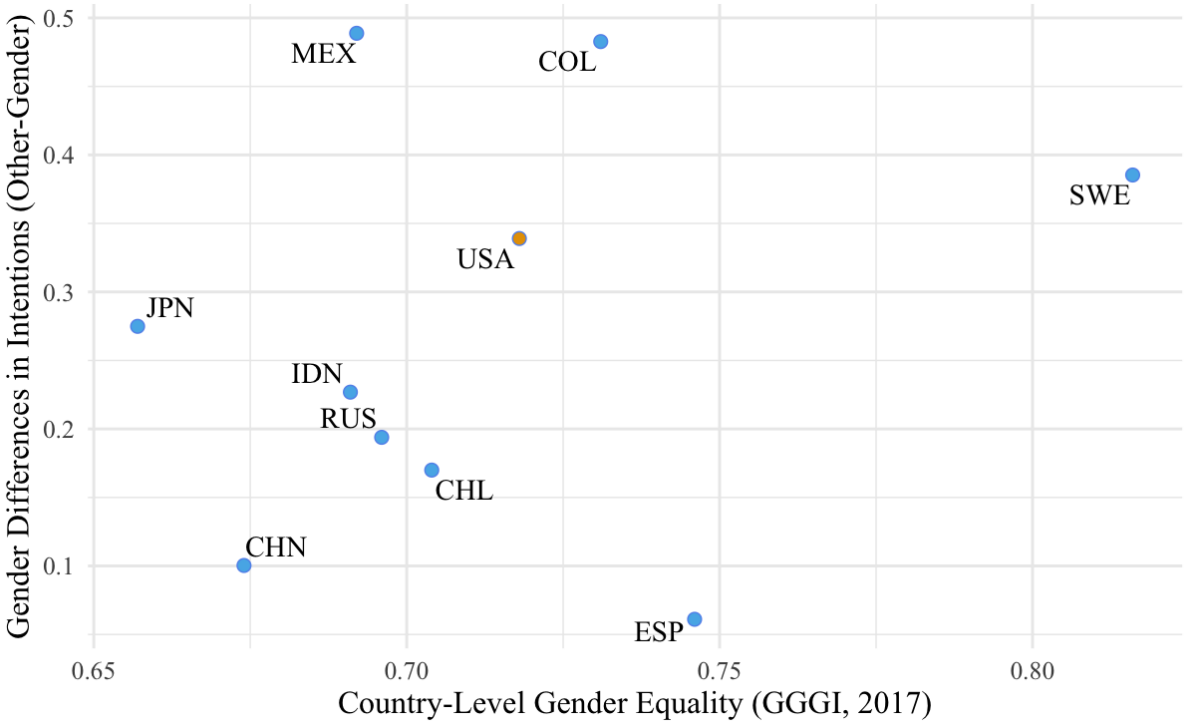
Gender Differences in Prosocial Behavioural Intentions in Same-Gender Interactions by Country-Level Gender Equality



Note. The gender difference score represents the difference between women's and men's estimated means (i.e., the intercept for women - the intercept for men, when individual-level control variables are held at zero). Positive scores indicate larger gender differences (yellow = women report higher prosocial behavioural intentions than men; blue = men report higher prosocial behavioural intentions than women).

Figure SM3

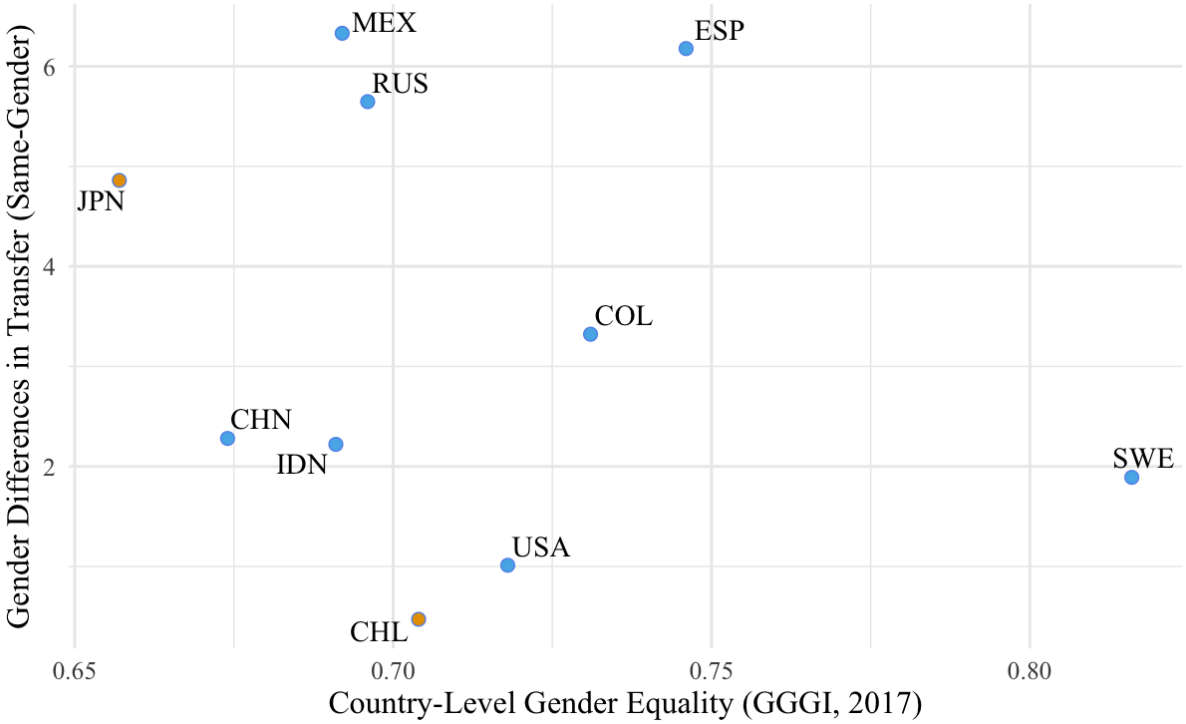
Gender Differences in Prosocial Behavioural Intentions in Other-Gender Interactions by Country-Level Gender Equality



Note. The gender difference score represents the difference between women's and men's estimated means (i.e., the intercept for women - the intercept for men, when individual-level control variables are held at zero). Positive scores indicate larger gender differences (yellow = women report higher prosocial behavioural intentions than men; blue = men report higher prosocial behavioural intentions than women).

Figure SM4

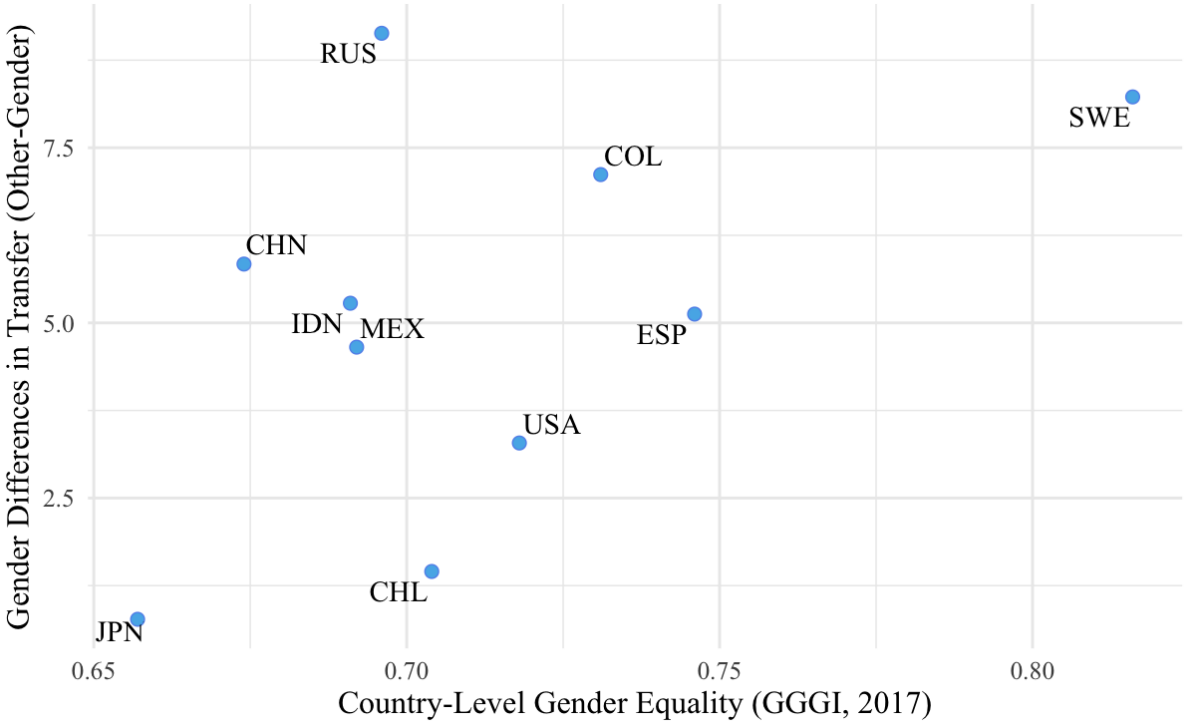
Gender Differences in Prosocial (Transfer) Behaviour in Same-Gender Interactions by Country-Level Gender Equality



Note. The gender difference score represents the difference between women's and men's estimated means (i.e., the intercept for women - the intercept for men, when individual-level control variables are held at zero). Positive scores indicate larger gender differences (yellow = women transfer more than men; blue = men transfer more than women).

Figure SM5

Gender Differences in Prosocial (Transfer) Behaviour in Other-Gender Interactions by Country-Level Gender Equality



Note. The gender difference score represents the difference between women's and men's estimated means (i.e., the intercept for women - the intercept for men, when individual-level control variables are held at zero). Positive scores indicate larger gender differences (blue = men transfer more than women).

Appendix D Chapter 5 Submitted Manuscript

Short title: *CHILDREN'S COMMUNAL ROLE ASPIRATIONS*

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Abstract:

Developmental career theorists have long recognized that career choices are influenced by psychological processes in early childhood. Yet, there is a dearth of empirical research examining the development of career aspirations among young children, particularly toward communal roles in health, education, and domestic functions. The present work investigated predictors of young children's communal aspirations. One hundred and fifty-nine children (75 girls, 84 boys, 4.50-6.25 years old) reported their self-perceptions of communal behavior (e.g., I see myself as someone who comforts others who are upset), descriptive gender stereotypes of communal roles (e.g., "only girls" can be nurses), and aspirations toward communal roles (e.g., I want to be a nurse when I grow up). The results suggest that role aspirations are regulated internally: the more children identified with communal behavior the more they aspired toward communal roles. Children's gender was indirectly related to communal aspirations as girls identified more with communal behavior than boys. The results also suggest that aspirations may be regulated externally: the more girls associated "only girls" with communal roles the more they aspired toward some, albeit not all, communal roles. However, whether or not boys associated "boys" with communal roles was not related to their communal aspirations. Taken together, these findings suggest that girls and boys enter different career trajectories at an earlier age than previously assumed.

Keywords:

Gender Stereotyping, Children, Communal, Aspirations

When I Grow Up, I Want to Be a Nurse: Do Young Children's Self-Perceptions and Descriptive Gender Stereotypes Predict their Communal Career Aspirations?

Despite increasing gender equality worldwide (Oinas, 2018), gender segregated labor markets persist in many countries. Even in Norway – the context of the present research, which is ranked as the second most gender-egalitarian country in the world (World Economic Forum, 2018), women and men are unequally represented in agentic and communal roles (Utdanning, 2014). Research on gender inequality has mostly focused on women's underrepresentation in agentic roles, such as top leadership positions (Hoobler et al., 2011; Sheppard, 2018), and in science, technology, engineering, and mathematics (STEM; Riegle-Crumb et al., 2020; Saucerman & Vasquez, 2014). Much less research has investigated men's underrepresentation in communal roles in health care, elementary education, and domestic functions (HEED, Croft et al., 2015). Most recently, researchers have identified several benefits to men's communal engagement for their health, children's welfare, and women's well-being and career advancement (Aldous & Mulligan, 2002; Ciciolla & Luthar, 2019; Heikkinen et al., 2014; Holt-Lunstad, 2010; Le et al., 2012; Petts et al., 2020). These findings highlight the need for more research on the psychological reasons for men's underrepresentation in communal roles. Researchers agree that the development of career aspirations starts in early childhood (see Hartung et al., 2005). Yet, the majority of research has focused on adolescents and young adults (Leung, 2008), overlooking processes that take place in early childhood (McMahon & Watson, 2008). Therefore, in the present research we investigate predictors of communal aspirations among young children.

The Development of Children's Career Aspirations in Early Childhood

Girls and boys develop gender stereotype-congruent career aspirations in early childhood (Levy et al., 2000; Weisgram et al., 2010). Research from the US, for example, has shown that boys are more likely to aspire to stereotypically *masculine* careers in aviation and law, whereas girls are more likely to aspire to stereotypically *feminine* careers in healthcare and elementary education. For a number of reasons, people often do not end up pursuing the specific careers they aspired to as young children. However, early gender stereotype-congruent career aspirations may have a cumulative impact on children's interests and skills development (Wigfield & Eccles, 2000), and ultimately academic and career choices. Interventions that aim to promote gender stereotype-incongruent career aspirations may thus be effective if implemented in early childhood to steer girls and boys onto gender stereotype-incongruent career trajectories. However, due to a lack of research on the development of career aspirations, it is unclear how such interventions should be designed. Therefore, more direct tests of theoretical frameworks of career development in early childhood are needed (Leung, 2008).

One of the few frameworks that focuses on career development in childhood is the *developmental theory of occupational aspirations*, which proposes that children's self-concept influences their career aspirations (Gottfredson, 1981, 2005). Specifically, different aspects of the self-concept are presumed to emerge and influence career aspirations at different developmental stages. In Stage 1 (at 3-5 years of age), children's career aspirations are proposed to be influenced by the status of occupations (and not yet by their self-concept). In Stage 2 and 3 (at 6-13 years of age), children's career aspirations become influenced by external standards such as gender and social class. In Stage 4 (from 14 years of age on), career aspirations are said to become more and more internally regulated through personal interests, values, and competencies. However, little research has investigated whether these internal and external influences of aspirations are exclusive to these developmental stages or whether they develop earlier in childhood. We thus investigate the extent to which *internal* factors such as self-perceptions (i.e., a person's view of themselves) and *external* factors such

as (the perception of) gender segregation across roles influence young children's career aspirations.

Do Children's Self-Perceptions Influence Their Career Aspirations?

The extent to which career aspirations in early childhood are regulated internally, via self-perceptions, warrants empirical attention. The developmental theory of occupational aspirations (Gottfredson, 1981, 2005) posits that with increasing cognitive abilities, children (from 14 years of age) begin to aspire toward domains that they recognize are congruent with their values, interest, and perceived abilities. The link between self-perceptions and aspirations has been empirically established among US adolescents. For example, among 13-year-olds, agentic self-perceptions were associated with interests in STEM careers whereas communal self-perceptions were associated with interests in HEED careers (Lapan & Jingeleski, 1992). In addition, 11- to 14-year-old girls' and boys' self-perceptions predicted their gender stereotype-incongruent career aspirations: the extent to which girls saw themselves as instrumental (e.g., independent, assertive, and self-confident) predicted their interest in male-dominated careers, and the extent to which boys saw themselves as relational (e.g., kind, caring, and understanding) predicted their interest in female-dominated careers (Mendez & Crawford, 2002).

The claim that children do not regulate their career aspirations via self-perceptions prior to adolescence has not been directly tested (Gottfredson, 1981, 2005). Instead, it rests upon research showing that, as children develop, they increasingly describe themselves from internal (how they see themselves) rather than external dispositions (how others see them; see Gottfredson, 1981). However, previous research has not excluded the possibility that young children have developed a self-view that contains information about who they are, what they like, and what things they are good at (Gottfredson, 1981), from which they visualize their future selves. In fact, some evidence suggests that, prior to adolescence, children regulate their career aspirations from internal dispositions. Values have been shown to influence the career aspirations of young children. For example, research from Canada has shown that already from six years of age, boys were less likely to prioritize family over career because they were less likely to endorse communal values than girls (Block et al., 2018). Self-efficacy (i.e., belief in one's ability to succeed in a given domain; Bussey & Bandura, 1999) has also been shown to influence the career aspirations of young children in the UK and the US (Dewitt et al., 2013; Fulcher, 2011). Self-efficacy beliefs originate partly from children's past behavior in that children may feel confident in their ability to enact a behavior they have enacted many times before. A girl who aspires toward becoming a nurse may have engaged in the following thought process: "I often look after others, thus, when I grow up, I want to be a nurse". In this research, we contribute to this literature by exploring whether self-perceptions (i.e., the degree to which children perceive themselves as someone who engages in communal behavior) also influence their aspirations toward communal roles in HEED.

Do Children's Gender Stereotyping Influence Their Career Aspirations?

The developmental theory of occupational aspirations also posits that from 6-8 years old, children's aspirations are influenced externally via descriptive gender stereotypes (e.g., nurses are women; Gottfredson, 1981, 2005). However, cognitive theorists propose that, from an even earlier age, children develop descriptive gender stereotypes from processing their observations of women and men in their immediate environment (Bigler & Liben, 2006). Specifically, from infancy, once children are able to distinguish between women and men, they observe them and store knowledge of both genders in cognitive networks (i.e., gender schemas, Martin et al., 2002). This knowledge guides children's subsequent information processing making gender stereotype-congruent information easier to remember and facilitating gender stereotyping (Frawley, 2008). Children are more likely to observe women

in communal roles than men (Kahlenberg & Hein, 2010; Koss, 2015; Moon & Hoffman, 2008; Oinas, 2018; Reich et al., 2018; Steyer, 2014) and hence stereotype women as more communal than men (Giles & Heyman, 2005; Levy et al., 2000; Miller et al., 2009; Tisak et al., 2007).

A central hypothesis of *gender schema theory* is that children subsequently internalize these descriptive gender stereotypes (Martin et al., 2002). For example, a girl who chooses to play with a doll has engaged in the following thought process: dolls are "for girls" and "I am a girl", which means "dolls are for me" (Martin & Halverson, 1981, p. 1120; see also Baron et al., 2014; Greenwald et al., 2002). In line with this hypothesis, research from Singapore has shown that elementary school-aged girls and boys associated math more with "boys", which corresponded with girls being less likely to associate themselves with math (Cvencek et al., 2015). Interestingly, girls did so prior to the emergence of gender difference in math abilities, which suggests that their sense of self was influenced externally, via gender stereotypes, rather than internally, via their own past performance (Cvencek et al., 2011, see also Hartley & Sutton, 2013). Thus, girls may form stronger communal career aspirations than boys based on the following reasoning: "girls work as nurses" and "I am a girl", which means that "I want to be a nurse".

However, the extent to which descriptive gender stereotypes influence children's career aspirations is underexamined, particularly in early childhood (for exceptions see Serbin et al., 1993; Weisgram et al., 2010). Instead, most research has focused on the relationship between descriptive gender stereotypes and children's toy preferences (for an overview see Miller et al., 2006). The literature examining the associations between descriptive gender stereotypes (e.g., "only girls" play with dolls) and children's preferences (e.g., whether they want to play with dolls) is inconsistent (Campbell et al., 2004), and even if significant, the relationship is weak (r = .09; Serbin et al., 1993). In addition, even though research has found significant correlations between descriptive gender stereotypes for novel careers and children's aspirations toward these careers in a laboratory setting in a US context (Weisgram et al., 2010), these effects may not generalize to familiar careers or other cultural contexts.

Overview and Hypotheses

The majority of research on gender roles in early childhood has been conducted in a US context (Starr & Zurbriggen, 2017). It is important to test theoretical predictions in different cultural contexts for the following reasons. First, the degree to which children's aspirations are "internally" and "externally" regulated may be unique to the cultural context as the importance to self-express and to adhere to norms vary in different cultural contexts (Schwartz, 2012). Second, gender role expectations that may shape children's aspirations are influenced by the distribution of women and men in different (social and occupational) roles within a given culture (Eagly et al., 2000) and may thus also vary across cultural contexts.

The present research investigated the development of children's aspirations toward communal roles in HEED in an underexamined age group, and cultural context – Norway. Norwegian children may be exposed to conflicting information about what are appropriate roles for women and men to engage in. On the one hand, Norwegian children are exposed to a gender segregated labor market. In Norway, women make up the vast majority of employees in kindergartens (92%) and in the health care system (84%; Statistisk sentralbyrå, 2019a; Statistisk sentralbyrå, 2019b). On the other hand, Norwegian children are exposed to males in communal roles at home (as 70% of Norwegian fathers take more than 10 weeks of parental leave; Statistisk sentralbyrå, 2018). In addition, Norwegian kindergartens are required to actively promote positive attitudes toward communal roles among boys (Norwegian Ministry of Children, Equality and Social Inclusion, 2014). As such, Norway is a

unique cultural context to investigate gender differences in communal self-perceptions and communal aspirations among young children.

The broad aim of the present research is to contribute to the emerging literature on men's underrepresentation in communal roles. In the present research we focus on predictors of communal aspirations among young children. First, we assessed whether young children's aspirations are influenced *internally* via their perceptions of their own behaviors. Considering that women are overrepresented in communal roles, even in a relatively gender-egalitarian country such as Norway, we predicted that girls would report more communal self-concepts than boys. Specifically, we predicted that girls would aspire more toward communal roles (**H1**) and perceive themselves to be more communal (**H2**) than boys. In addition, we predicted that the more children identify with communal behaviors, the more they would report aspiring to communal roles (**H3**). Second, we assessed whether young children's aspirations are influenced *externally* via descriptive gender stereotypes. Since children have different socialization experiences, the extent to which they endorse gender stereotypes may vary (Weisgram, 2016). Thus, we predicted an interaction between degree of gender stereotyping and the child's gender. The more girls perceive communal roles to be "only for women" the *more* they will aspire toward communal roles (**H4a**). In contrast, for boys the more they perceive communal roles to be "only for women" the *less* they will aspire toward communal roles (**H4b**).

Method

Participants and Procedure

We aimed to recruit as many participants as possible. However, the final sample[23] was ultimately determined by the number of kindergartens which allowed us to recruit participants. In total, we collected data from 177 children from 20 different kindergartens in the municipality of [masked for peer review], Norway. Eleven participants were excluded from analyses due to revoking consent during testing (n = 7), technical issues (n = 3), or not following instructions (n = 1). We also excluded children younger than 4.5 years old (n = 7) as the experimenters reported that some of the young children showed difficulties with following the instructions and paying attention. Our final sample consists of 159 participants (84 boys, 75 girls) between the ages of 54 and 75 months (M = 66.10 months, SD = 4.45, missing age for 2 boys). Participants were predominantly monolingual (87.97%). The remaining children reported speaking another language in addition to Norwegian at home (regions of origin: Eastern Europe = 6, Northern Europe = 3, Western Europe = 4, Asia = 3, Middle East = 2, Oceania = 1), but all these children demonstrated high Norwegian language abilities, as determined by the experimenters.

Participants were tested in groups of up to four by two experimenters. The experimenters either took the role of the interviewer (i.e., reading the instructions aloud to participants) or the role of the secretary (i.e., taking notes and assisting participants if needed). The gender of the interviewer was counterbalanced. The testing took place in a separate room in the kindergarten. Children were seated at a table in a row facing the interviewer. The secretary sat next to the children. Children were seated as far away from

[23] A post hoc power analysis was conducted (using G-Power; Faul et al., 2007) with N = 146, alpha = .05, and 5 predictor variables as a baseline for medium (f^2 = .15) and large (f^2 = .35) effects (see Cohen, 1977). The statistical power exceeded .96 for the detection of a moderate to large effect size. Thus, there was more than adequate power (i.e., power > .80) at the moderate to large effect size level.

each other as possible (depending on the layout and furnishing of the testing room). The experimenters repeatedly reminded the children not to talk to each other and not to look at each other's tablets, but to keep their answers secret from one another.

Prior to the testing, the experimenters recorded the child's gender, whether they were bilingual, and if so in what languages. Children were informed that they could terminate their participation in the study at any time without being penalized for doing so. After verbal consent was gained from each child, the testing commenced. Children were each given a tablet to record their responses. In order to familiarize the children with the use of Likert scales, the interviewer ran two training items (how much do you like ice cream?; how do you feel when your parents tell you that you are no longer allowed to watch TV?). Children first recorded their implicit gender stereotypes (in an auditory Stroop task) and their perceptions of one of their kindergarten teachers, but these results are not included in this report. Children subsequently recorded their aspirations toward a range of roles and their identification with a range of behaviors, followed by the degree to which they gender stereotyped these roles and behaviors. If a child refused to answer a particular question, the experimenter gave a random response on the tablet in order for the child to proceed with the subsequent question. Such instances were recorded by the experimenter and these data points were treated as missing values in the data file.

Measures

Children's responses were recorded using two different kinds of scales. A 3-point smiley Likert scale was used to measure the extent to which children aspired toward a set of communal roles and identified with a range of communal behaviors. The children were instructed to use their tablet and "press on the face that does not smile if you disagree, press on the face with the little smile if you agree a little bit, or press on the face with the big smile if you agree a lot". In order to measure the extent to which children gender stereotyped these communal roles and behaviors, the children were asked to "press on the image of the boy if you think that *only boys* can do this, or press on the image of the girl if you think that *only girls* can do this, or press on the image of the boy and girl if you think that *both boys and girls* can do this (the positioning of the images on the tablet screen were counterbalanced). All scales and images can be found in the Supplementary Materials in the order in which they were presented.

Children's Self-Perceptions of Their Behavior

To measure the extent to which children perceive themselves as communal the experimenter told children that "I will now read short stories about some children I know. It is your job to tell me whether this child sounds like you." Four items assessed the extent to which participants identified with communal behaviors (i.e., help others who are upset, be close to others, hug others, comfort others who are upset; $\alpha = .71$). For example, the experimenter asked the child: "I know a child who really, really likes to hug others and this child always gives hugs to other children. Does this sound like you?"

Children's Aspirations

To measure children's role aspirations, the experimenter told the children: "I can imagine that you have thought about what you want to be when you grow up. When I went to kindergarten and thought about what I wanted to be when I grew up, I wanted to be so many things, not just one thing. I will now show you a few images of people who have different jobs. Although you might have decided what job you want to do later in life, I want you to tell me how much you would like to do *this* job". Next, the experimenter, for example, showed the children an image depicting a nurse and asked: "What do we have here? Plasters and a

syringe. Who uses this? A nurse who cares for people who are sick. Would you like to be a nurse when you grow up?". Children were asked to report aspirations toward three different communal roles (i.e., Would you like to be a nurse?, Would you like to stay home from work and look after your baby?, Would you like to be a kindergarten teacher?; $\alpha = .62$).

Children's Gender Stereotypes

The participants were then asked to report gender stereotypes for the same 3 communal roles. Children were instructed by the experimenter to "tell me who you think can do this job". For example: "Who do you think can be a nurse?" We additionally assessed children's gender stereotypes for communal behaviors (see Supplementary Materials).

To compute a variable for gender stereotyping of communal roles, the responses *only boys* or *both boys and girls* were coded as 0, since these answers do not represent traditional gender stereotypes. Responding *only girls* was coded as 1 as it represents traditional gender stereotypes. A sum total score was calculated for each participant, with higher numbers indicating more gender stereotyping (Spinner et al., 2018).

Control variables

We recorded a number of potential factors which could influence the predicted effects. For example, we recorded the number of male and female teaching staff at each kindergarten as repeated exposure to gender stereotype-incongruent role models (i.e., male kindergarten teaching staff) may increase communal behavior among boys (see Bussey & Bandura, 1999). We also recorded the child's age, whether the child was bilingual, and the gender of the experimenter in order to take into account experimental effects.

Results

All the hypotheses were pre-registered on the Open Science Framework: https://osf.io/cq3zf/?view_only=5cc42135af034628a932665247f59f2a (see supplementary materials (SM) for minor deviations from the pre-registration). In the following analyses, we controlled for the child's age, bilingualism (monolingual coded as 0, bilingual coded as 1), gender of the experimenter (female coded as 0, male coded as 1), and whether the child attended a kindergarten with all female (coded as 0) versus both male and female (coded as 1) teaching staff. Table 1 presents the overall means and standard deviations for the variables as well as the zero-order correlations for the associations between the variables.

Do Children Regulate Their Aspirations from Internal Standards?

To assess the extent to which children regulate their aspirations from internal standards (i.e., the extent to which they perceived themselves as someone who engages in communal behavior), and whether gender influences aspirations via self-perceptions, we

Table 1

Descriptive Statistics and Correlations for All Study Variables as a Function of Participants' Gender

	Variables	Boys	Girls							
		M (*SD*)	*M* (*SD*)	1.	2.	3.	4.	5.	6.	7.
1.	Stereotypes of communal roles[a]	0.37 (0.64)	0.50 (0.65)	-	.23*	-.02	.00	-.09	-.10	-.02
2.	Communal aspirations[b]	1.79 (0.69)	1.93 (0.66)	.03	-	.09	-.05	-.11	-.10	-.26*
3.	Communal self-perceptions[c]	2.22 (0.62)	2.49 (0.55)	.02	.37**	-	-.15	-.01	.18	-.16
4.	Gender of experimenter[d]	0.48 (0.50)	0.33 (0.47)	.16	-.04	.20	-	.03	-.15	-.08
5.	Bilingualism[e]	0.10 (0.30)	0.15 (0.36)	-.12	.24*	.11	-.07	-	-.09	-.01
6.	Age (months)	65.96 (4.41)	66.19 (4.51)	-.01	-.20	-.01	-.16	-.08	-	-.33**
7.	Incongruent exposure[f]	0.48 (0.50)	0.57 (0.50)	-.08	-.10	.06	.08	-.08	-.03	-

Note. Values for girls are presented above the diagonal; for boys, below. *$p < .05$ **$p < .01$, two-tailed.

[a] The scale ranges from 0-3 (higher numbers indicating more gender stereotyping).

[b] The scale ranges from 1-3 (higher numbers indicating higher communal aspirations).

[c] The scale ranges from 1-4 (higher numbers indicating more communal self-perceptions).

[d] 0 = male and 1 = female.

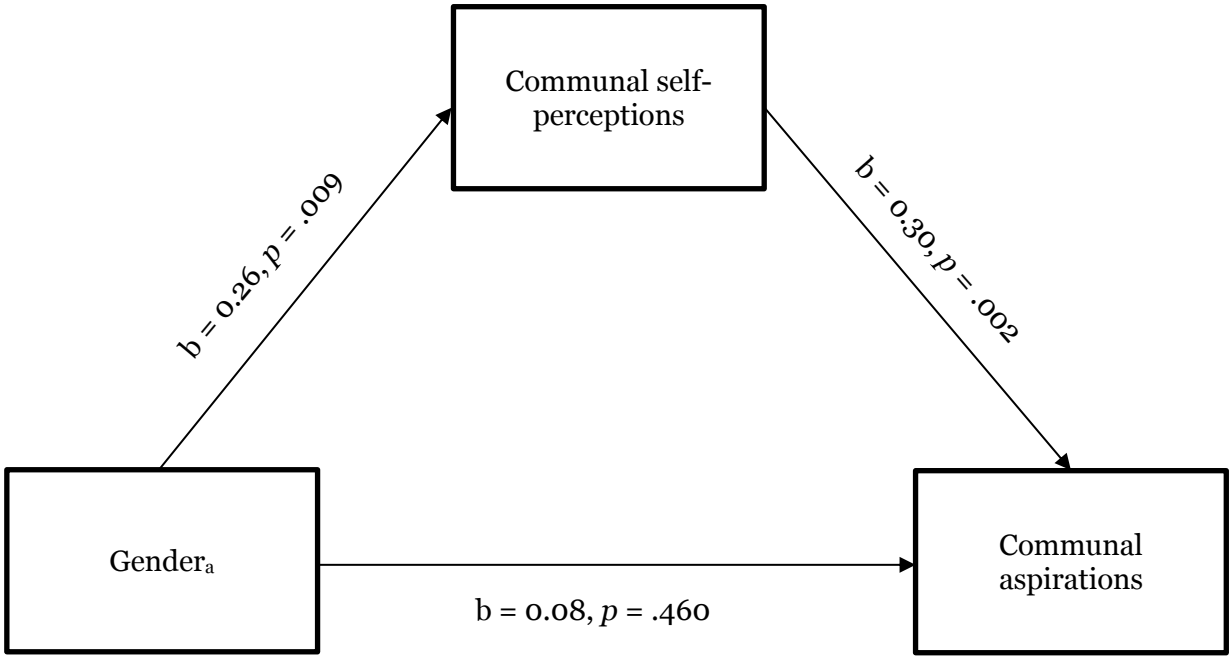
[e] 0 = monolingual and 1 = bilingual.

[f] 0 = all female teaching staff and 1 = both male and female teaching staff.

conducted an analysis of indirect effects using Hayes' Process macro (2017; Version 3.4.1, Model 4, 5000 bootstrap samples). Gender was entered as the predictor (X), communal aspirations as the outcome (Y), and communal self-perceptions as the mediator (M). The model accounted for a significant proportion of variance in children's communal aspirations, R^2 = .12, $F(5, 140) = 3.79$, p = .003. Gender did not predict communal aspirations independent of the mediator (b = 0.09, p = .417, 95% CI [-0.13; 0.32]). Gender predicted communal self-perceptions, b = 0.26, p = .009, 95% CI [0.07; 0.45], which in turn predicted aspirations, b = 0.30, p = .002, 95% CI [0.11; 0.49]. A bias-corrected bootstrap confidence interval for the indirect effect was above zero, b = 0.08, 95% CI [0.01; 0.17]. This indicates that although girls did not aspire more toward communal roles than boys (contrary to **H1**), girls identified more with communal behaviors than boys (in line with **H2**), which in turn was associated with higher communal aspirations (in line with **H3**; see Figure 1). This suggests that children's communal aspirations are internally regulated via their self-perceptions. Thus, girls may ultimately be more likely to aspire toward communal roles because they are more likely than boys to identify as communal. The covariate age was positively associated with communal aspirations (b = 0.03, p = .014, 95% CI [-0.06; -0.01]). When the experimenter was male, children also identified more with communal behaviors (b = 0.25, p = .011, 95% CI [0.06; 0.44]). Gender stereotype-incongruent exposure (i.e., exposure to male kindergarten teachers on a daily basis) was associated with lower communal aspirations (b = -0.30, p = .007, 95% CI [-0.52; -0.08]). The effect of bilingualism was non-significant (p = .365).

Figure 1

Communal Aspirations as a Function of Gender and Communal Self-Perceptions



Note. Standardized regression coefficients for the relationship between the child's gender (69 = girls, 77 = boys), communal self-perceptions, and communal aspirations (N = 146).
[a] 0 = boys and 1 = girls

Do Children Regulate Their Aspirations from External Standards?

The majority of children (65%) reported gender-egalitarian attitudes across all three communal roles (26% of children gave gender-stereotypical responses for one role; 8% gave gender-stereotypical responses for two roles; 0% gave gender-stereotypical responses for three roles; 1% missing data). The data were positively skewed. Girls and boys were equally likely to gender stereotype communal roles (M_{girls} = .50; M_{boys} = .37, $t(156)$ = -1.28, p = .202, 95% CI [-0.32; 0.07]). See SM for an overview of girls' and boys' gender stereotypes of communal roles and communal behaviors.

To assess the extent to which girls and boys regulate their aspirations from external standards (i.e., the extent to which they perceived communal work as something *only girls* do), we conducted an analysis of moderation effects using Hayes' Process macro (2017; Version 3.4.1, Model 4, 5000 bootstrap samples). Gender stereotypes toward communal roles was entered as the predictor (X), communal aspirations as the outcome (Y), and gender of the child as the moderator (W). The overall model accounted for a significant proportion of variance in children's communal aspirations, R^2 = .11, $F(7, 138)$ = 2.37, p = .025. There was neither a main effect of gender stereotypes on aspirations (b = -0.32, p = .275, 95% CI [-0.89; 0.25]) nor of gender (b = 0.03, p = .806, 95% CI [-0.23; 0.30]). Even though a bias-corrected bootstrap confidence interval for the hypothesized interaction (b = 0.28, p = .127, 95% CI [-0.08; 0.63]) spanned zero, there was a non-significant trend, indicating different tendencies for girls and boys. Simple slopes show that the effect of gender stereotyping on aspirations was non-significant among boys (contrary to **H4b**), b = -0.04, p = .753, 95% CI [-0.30; 0.22], but approached significance among girls, b = 0.24, p = .059, 95% CI [-0.01; 0.48]. The covariate gender stereotype-incongruent exposure (i.e., exposure to male kindergarten teachers on a daily basis) was associated with lower communal aspirations (b = -0.31, p = .008, 95% CI [-0.53; -0.08]. Age was also negatively associated with communal aspirations (b = -0.03, p = .043, 95% CI [-0.05; -0.001]. All other covariates were non-significant ($p \geq$ .545).

Exploratory analyses

Children use everyday interactions to build cognitive schemas (i.e., mental representations) for roles (Martin et al., 2002). Young children might have fewer experiences with nurses than with kindergarten teachers and stay-at-home parents. As a consequence, children's schema for nurses may be less rich than their schema for kindergarten teachers and stay-at-home parents, and children may therefore be more inclined to use superficial information (such as descriptive gender stereotypes) rather than detailed information about the role when they determine their fit with that role. On the basis of that reasoning, we ran exploratory analyses to test the interaction between the gender of the child and gender stereotypes for each role. Gender did not significantly interact with gender stereotyping for stay-at-home parents (b = -.45, p = .274, 95% CI [-1.26; 0.36]) or for kindergarten teachers (b = -.38, p = .439, 95% CI [-0.59; 1.36]). However, gender significantly interacted with gender stereotyping of nurses (b = 1.11, p = .013, 95% CI [0.24; 1.98]). The effect of gender stereotyping of nurses on aspirations toward becoming a nurse was non-significant among boys, b = -.50, p = .151, 95% CI [-1.18; 0.18], but significant among girls, b = .61, p = .024, 95% CI [0.08; 1.15]. This effect was in the expected direction: the more girls thought that "only girls" work as nurses, the more they aspired to become nurses themselves (in partial support of **H4a**).

Discussion

The present research investigated the development of communal role aspirations in early childhood. The main aim was to assess whether young children's aspirations are internally and externally regulated. The extent to which aspirations are internally regulated was assessed by examining the relationship between children's aspirations and their self-

perceptions of their behavior. The present findings showed that even though girls were no more likely to aspire toward communal roles than boys (contrary to **H1**), girls were more likely to identify with communal behaviors (**H2**). Since children's behaviors may influence their interests and skills development (Wigfield & Eccles, 2000), boys might over time become less likely to aspire toward communal roles than girls. Indeed, our findings showed that the more children perceive themselves as someone who engages in communal behaviors, the more they aspire toward communal roles (**H3**). This suggests that children's aspirations are, at least partly, internally regulated. These findings have important implications for interventions. As children appear to align their communal aspirations with their past behaviors, interventions that aim to promote communal aspirations among boys should focus on targeting boys' behaviors. Behaviors can be difficult to change once they have been established (see Olsson & Martiny, 2018). Given that boys at 4.5 years of age were already less likely to identify with communal behaviors than girls, interventions may have to be implemented earlier.

These findings add to the small number of studies that have shown that children regulate their aspirations from internal standards in early childhood (Block et al., 2018; Dewitt et al., 2013; Fulcher, 2011). This is contrary to previous claims that children's aspirations are not influenced by internal processes until adolescence (Gottfredson, 1981, 2005). It is important to note that Gottfredson's theory states that career aspirations in adolescence (stage 4) are driven by *conscious* efforts by adolescents to find a good fit between their internal dispositions (such as their interests, competencies, and values) and career options. In early childhood, however, these processes may be more *subconscious*: Children may not consciously engage in the following thought process: "Nurses are caring", "I am caring", thus "when I grow up, I want to be a nurse".

The extent to which aspirations are externally regulated (i.e., whether children internalize descriptive gender stereotypes) was assessed by relating gender stereotypes to a set of communal roles and children's aspirations toward these roles. The present research went beyond previous research (e.g., Carter & Levy, 1988; Serbin et al., 1993; Weisgram et al., 2010) by relating gender stereotypes and preferences in the same domains, at the domain specific level, and for familiar domains. In line with gender schema theory, which posits that children are motivated to act in line with gender norms (Martin et al., 2002), the present findings show that girls who were more likely to associate being a nurse with *only girls* aspired more toward becoming a nurse (in partial support of **H4a**). However, the present findings show that girls did not internalize gender stereotypes of stay-at-home parents and kindergarten teachers. This suggests that children do not internalize gender stereotypes of all roles. It is reasonable to assume that children have had more direct experience with stay-at-home parents and kindergarten teachers than with nurses. These mixed findings might reflect that when children are less familiar with what a role entails, they draw more upon superficial cues, such as descriptive gender stereotypes to determine their relative fit with that particular role.

Interestingly, we did not find the hypothesized negative relationship between descriptive gender stereotyping of communal roles and boys' aspirations toward these roles (**H4b**). This suggests that gender stereotype-congruent aspirations (i.e., communal aspirations among girls) are more likely to be externally regulated than gender stereotype-incongruent aspirations (i.e., communal aspirations among boys). This further suggests that merely knowing that men engage in communal roles does not on its own promote communal aspirations among boys. It may be the case that although boys recognize that *some* men engage in communal roles, they may not feel inspired by those men because they have subtyped them (i.e., considered those men as exceptions to the rule; Richards & Hewstone, 2001). As such, communal men may be considered irrelevant models for what "normal" men *should do*.

Limitations and Perspectives for Future Research

Despite the theoretical and practical implications of this work, it is important to acknowledge some limitations. The data showed that gender stereotypes of communal roles were positively skewed (as the majority of children reported that *both boys and girls* can be nurses/kindergarten teachers/stay-at-home parents). The positive skew for the gender stereotyping of communal roles indicates that we may not have had sufficient variance to examine the relationship between gender stereotypes about communal roles and children's aspirations. As we only assessed gender stereotyping of communal roles with three categories (*only boys* vs *only girls* vs *both boys and girls*), we may not have been able to capture the nuances of gender stereotyping, which may have contributed to non-significant effects for stay-at-home parents and kindergarten teachers. Future research could explore whether measuring gender stereotypes on a 5-point scale ranging from *only boys, more boys than girls, equal numbers of boys and girls, more girls than boys, only girls* can capture the nuances in gender stereotyping in this age group (Trautner et al., 2005).

That being said, the non-significant association between descriptive gender stereotypes of stay-at-home parents and kindergarten teachers and children's aspirations toward these roles may not be rooted in low variance. In fact, the present findings are in line with previous research, which in itself is riddled with mixed effects, suggesting that there may be moderating factors. Future research should thus investigate whether there are underlying reasons as to why some roles, but not others, are externally regulated, for example by taking into account the child's familiarity with the role. In addition, the positive skew for the gender stereotyping of communal roles may be culturally bound as children in Norway (relative to children in other cultural contexts) have more experience with men in communal roles.

The present findings have implications for future research. Our findings suggest that boys see themselves as less communal than girls. This was the case even at such an early age and in a cultural context where boys are actively encouraged to engage communally (Norwegian Ministry of Children, Equality and Social Inclusion, 2014). This raises questions about how and why these early gender differences arise. Some researchers argue that early gender differences in such an egalitarian context must represent intrinsic differences between women and men (Schmitt et al., 2008). Other researchers stress the role of the environment in fostering gender roles (see Liben & Coyle, 2014). To unpack the influence of innate versus environmental factors, future research could systematically assess children's self-perceptions and role aspirations in (cultural) contexts that vary in degrees of gender-equal representation across communal roles.

Moreover, further research is needed on career development throughout the lifespan. Each individual's self-concept continues to develop throughout childhood and adolescence, due in part to cognitive development, but also experience (Savickas, 2002). Thus, the extent to which role aspirations in early childhood influence career choice in adolescence and adulthood may be best answered with a cross-cultural longitudinal research design in order to take into account cultural as well as cognitive factors across development. Further theory development is also needed. The present findings extend the developmental theory of occupational aspirations (Gottfredson, 1981, 2005) by demonstrating that children regulate their future selves from internal dispositions prior to adolescence. However, it may be the case that young children can reflect upon internal 'observable' dispositions such as behavior but not yet on internal 'abstract' dispositions such as personality traits. This is consistent with Gottfredson (1981, 2005), who suggests that, as children develop, they acquire the abilities to deal with abstract information. Future research should thus examine the predictive value of different internal predictors of career aspirations across different age cohorts.

In line with previous research on individual differences in gender schema (Weisgram, 2016; Xiao et al., 2019), the present findings also highlight individual differences with regards to communal self-perceptions and gender stereotyping. Future research is needed to identify to what extent individual characteristics interact with internal and external influences on aspirations. Finally, while there is ample theoretical reasoning on what predicts children's gender stereotype-congruent aspirations (see Martin et al., 2002), more theory development and empirical research is needed on what predicts children's gender stereotype-incongruent aspirations.

Conclusion

The present study addresses an underexamined but important question, namely men's underrepresentation in communal roles. The tendency for boys to identify less with communal behaviors than girls at such an early age, and in such an egalitarian context is noteworthy and suggests that girls and boys enter different career trajectories from early childhood.

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Supplementary Materials

Pre-registration

As part of this data collection, we also recorded agentic self-perceptions and aspirations. The agentic role (police, boss, r = .27) and behavior (compete, decide, r = .24) items were only weakly correlated with each other. Therefore, we were unable to form composite scores for these variables and to test pre-registered hypotheses H3b, H4a, H5b. We also recorded children's gender stereotypes about these agentic roles and behaviors. Due to an error with the agentic materials during testing, which may have primed gender-stereotypical responses, we opted not to report gender stereotypes about agentic roles and behaviors (H1c, H1d, H2c, and H2d).

Expanded Method Section

Ethics and Recruitment

The project was registered with the Norwegian Centre for Research Data. Ethical approval was provided by the internal committee for ethics in research at the Department of Psychology at [masked for peer review]. Participants were recruited by contacting managers of local kindergartens and providing details of the research aim. Subject to the managers' approval, we then provided parents with information about the study and consent forms. Either the day before, or on the day of testing, the experimenters (two trained psychology students; one woman and one man) spent approximately one hour in the kindergarten to build rapport with the children. Only children whose parents had given informed consent were invited to participate in the study.

Pilot Studies

To test whether the behaviors and roles selected as stimulus materials for the main study were gender-typed in Norway we ran two pilot studies with adults. We drew behavioral items from past research on adults (e.g., caring for others; Diekman et al., 2010) and generated role items from a brainstorming session (e.g., nurse). In the first pilot study, we asked Norwegian adults (N = 28) to report descriptive gender stereotypes for a range of occupations/roles (e.g., "What % of kindergarten teachers in Norway are male?"). The participants reported their answers on a 100-point Likert scale that ranged from 0% to 100%. We also asked participants to report descriptive gender stereotypes for behaviors (e.g., "I associate comforting others with …"). Participants reported their answers on a 7-point Likert scale that ranged from Only women (scored as 1) to Only men (scored as 7). The behaviors and roles that were stereotyped as either female (i.e., mean score < 50% and < 4) or male (i.e., mean score > 50% and > 4) were then included in a second pilot study. In the second pilot, we provided Norwegian adults (N = 37) with definitions of communion and agency. We then asked participants to rate the extent to which they associated the stereotypically female and male roles and behaviors with communion and agency, respectively. Participants reported their answers on a 7-point Likert scale (1 = Not at all to 7 = Very much).

A third and fourth pilot study were run with kindergarten children. The aim of the third pilot study was to assess children's ability to understand and engage with the study materials. Children were presented with behaviors and roles from Pilots 1 and 2 which were highly gender stereotyped. Specifically, any behavior or role which was associated with women (i.e., mean score < 50% and < 4) and rated as high in communion (i.e., mean score > 4), or associated with men (i.e., mean score > 50% and > 4) and agency (i.e., mean score > 4). The experimenters described behaviors of people (e.g., "I know someone who likes to comfort others if they see that they are sad") and asked the children (N = 8) "Do you know someone

who behaves like that?" The experimenters took a record of the children's reactions and responses. The experimenters also showed participants images related to different jobs (e.g., an image depicting a doctor's coat and stethoscope) and asked: "What job is depicted here?" and "Do you know what working as a [...] involves?". From the items which children ostensibly appeared to understand (i.e., the children did not appear hesitant or confused by the descriptions or images) we selected the behaviors and roles that (Pilots 1 and 2 had identified) were mostly associated with women and communion or men and agency for the main study.

In a fourth pilot study, the experimenters assessed the study length and observed children's (N = 8) ability to concentrate, and to understand and use a 3-point smiley face Likert scale. This pilot study showed that four to six-year-old children were able to maintain concentration for the duration of the study. We piloted smiley Likert scales with different face anchors (angry, neutral, little happy). Previous research by Hall et al. (2016) has shown that children do not tend to select negative or neutral smiley options. However, we found that children in the pilot study repeatedly chose the negative face option. We thus opted for a negative smiley face anchor.

Measures

Images used for Communal Roles

Figure SM1
Stay-at-home parent

Figure SM2
Nurse

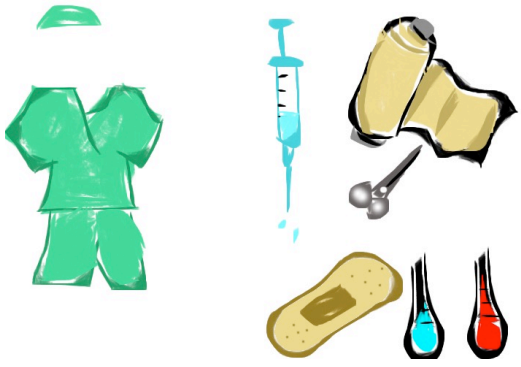
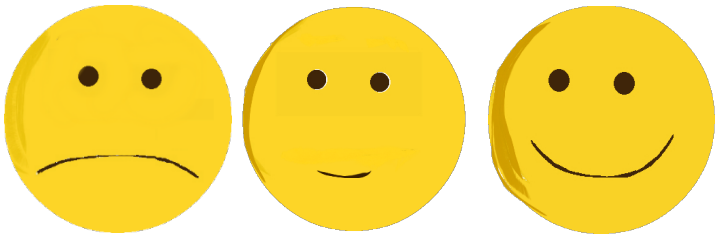


Figure SM3
Kindergarten Teacher

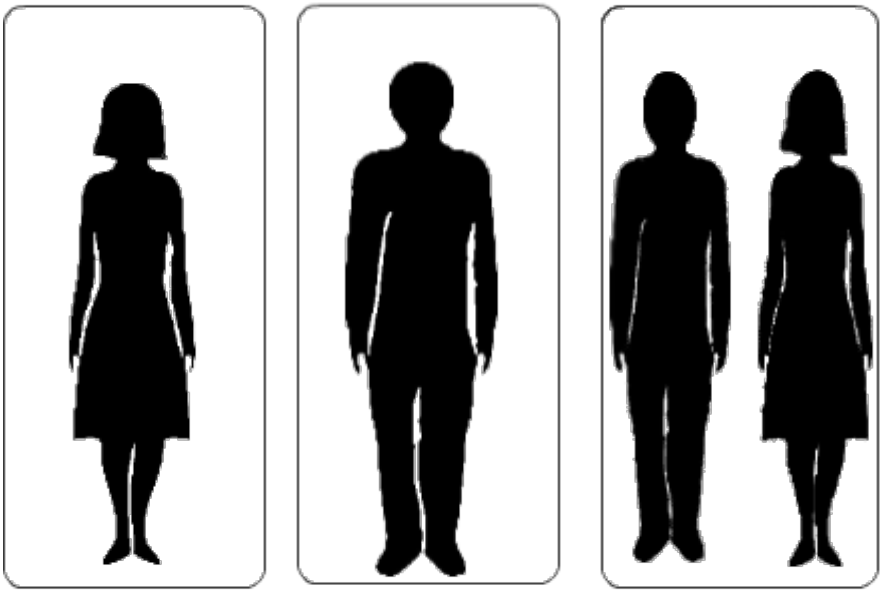
Images used for Likert Scale Options

Figure SM4
Not at all, Little, A lot



Images used for Gender Stereotypes

Figure SM5
Only girls, Only boys, Both boys and girls



Item Descriptions

Communal Aspirations. "I can imagine that you have thought about what you want to be when you grow up. When I went to kindergarten and thought about what I wanted to be when I grew up, I wanted to be so many things, not just one thing. I will now show you a few images of people who have different jobs. Although you might have decided what job you want to do later in life, I want you to tell me how much you would like to do *this* job."

Experimenter shows image of [...]

(1) [nurse] "What have we got here? Plasters and syringe. Who uses this? A Nurse who cares for people who are sick. Would you like to be a nurse when you grow up?"
(2) [stay-at-home parent] "What have we got here? Someone who feeds a baby. Who does that? Someone who does not work but stays at home and looks after their baby instead. Would you like to stay at home and look after your baby when you grow up?"
(3) [kindergarten teacher] "What have we got here? There are children here. Who looks after children? A kindergarten teacher. Would you like to be a kindergarten teacher when you grow up?"

"Press on the face that does not smile if you disagree, press on the face with the little smile if you agree a little bit, or press on the face with the big smile if you agree a lot."

Self-Perceptions of Communal Behaviors. "I will now read short stories about some children I know. It is your job to tell me whether this child sounds like you."

(1) "I know a child who tries to help other children, if they see that they are upset. Does this sound like you?"
(2) "I know a child who really, really likes to be together with others and be close to others. Does this sound like you?"

(3) “I know a child who really, really likes to hug others and this child always gives hugs to other children. Does this sound like you?”
(4) “I know a child who always comforts others when they see that they are upset. Does this sound like you?”

“Press on the face that does not smile if you disagree, press on the face with the little smile if you agree a little bit, or press on the face with the big smile if you agree a lot.”

Descriptive Gender Stereotypes of Communal Roles. “I will now ask some questions about different jobs. I want you to tell me who you think can do this job.”

Experimenter shows each of the following images in turn:

(1) [image of nurse] “This is an image of a nurse. Who do you think can be a nurse? Only boys? Only girls? Or, both boys and girls?”
(2) [image of stay-at-home parent] “This is an image of someone who does not work but instead stays at home and looks after their baby. Who do you think can stay at home from work and look after their baby? Only boys? Only girls? Or, both boys and girls?”
(3) [image of kindergarten teacher] “This is an image of a a kindergarten teacher. Who do you think can be a kindergarten teacher? Only boys? Only girls? Or, both boys and girls?”

“If you think only boys can be a […], press the picture of the boy. If you think only girls can be […], press the picture of the girl. If you think that both boys and girls can be […], press the picture of the boy and girl.”

Descriptive Gender Stereotypes of Communal Behavior. “I will now read a short description of someone I know. It is your task to tell me whether this person is like most other girls, like most other boys, or like both boys and girls.”

(1) “I know someone who tries to help others, if they see that they are upset.”
(2) “I know someone who really, really likes to be together with others and be close to others.”
(3) “I know someone who really, really likes to hug others and this person always gives hugs to others.”
(4) “I know someone who always comforts others when they see that they are upset.”

“If you think only boys can […], press the picture of the boy. If you think only girls can […], press the picture of the girl. If you think that both boys and girls can […], press the picture of the boy and girl.

Expanded Result Section

Descriptive Statistics

Gender Differences in Gender Stereotyping of Roles and Behaviors

Table SM1
Cross Tabulation of Child’s Gender and Descriptive Gender Stereotypes of Communal Roles.

Variable	Gender	
	Boys	Girls

Nurse		
Only men	13_a	1_b
Only women	7_a	13_a
Both men and women	64_a	60_a
Stay-at-home parent		
Only men	14_a	4_b
Only women	15_a	16_a
Both men and women	55_a	54_a
Kindergarten teacher		
Only men	8_a	6_a
Only women	9_a	8_a
Both men and women	67_a	60_a

Note. Significant gender differences at the Bonferroni-corrected α .016 level are represented by different subscript letters.

Table SM2

Cross Tabulation of Child's Gender and Descriptive Gender Stereotypes of Communal Behaviors

Variable	Gender	
	Boys	Girls
Help		
Only men	27_a	8_b
Only women	7_a	24_b
Both men and women	48_a	41_a
Being close		
Only men	34_a	7_b
Only women	9_a	20_b
Both men and women	39_a	46_a
Hug		
Only men	21_a	10_b
Only women	9_a	23_b
Both men and women	42_a	37_a
Comfort		
Only men	17_a	3_b
Only women	15_a	24_a
Both men and women	37_a	42_a

Note. Significant gender differences at the Bonferroni-corrected α .016 level are represented by different subscript letters.

Exploratory Analyses

The Norwegian Government has set Norwegian kindergartens the target to increase the proportion of male teachers in kindergartens to 25% on the basis that exposure to men in caregiving roles promotes communal aspirations and behavior among boys (Norwegian Ministry of Children, Equality and Social Inclusion, 2014). However, the extent to which exposure to male kindergarten teachers promotes communal behaviour among boys has not been empirically evaluated. As we collected data from children in kindergartens with varying degrees of male teachers (see Table SM3), these data can be used to give some insight into whether the goals in this initiative have been achieved.

Table SM3

Sample Distribution Across Kindergartens

% of male teachers	0	20	25	27	33	38	50
N boys	41	13	3	2	6	2	12
% boys	51.90 %	16.50 %	3.80 %	2.50 %	7.60 %	2.50 %	15.20 %

In a first step, we compared gender stereotypes for communal roles and behavior, communal self-perceptions, and communal aspirations in boys (n = 71) that attended a kindergarten with both male and female teaching staff vs. only female teaching staff.

A between-subjects t-test indicated that boys who attended kindergartens with only female staff were more likely to report gender stereotypes for kindergarten teachers (i.e., *only women* can be kindergarten teachers) than boys who attended kindergartens with both male and female staff. No other significant differences were found with respect to gender stereotypes for nurses and stay-at-home parents or with respect to communal self-perceptions and aspirations.

Table SM4

Gender Stereotypes, Self-Perceptions, and Aspirations in Children who Attended Kindergartens with Both Male and Female Teaching staff vs. Only Female Teaching Staff.

Variables	Only female staff (n = 41)	Both male and female staff (n = 38)
	M (*SD*)	*M* (*SD*)
Gender stereotypes		
Nurse[c]	0.05 (0.22)$_a$	0.13 (0.34)$_a$
Stay-at-home parent[c]	0.17 (0.38)$_a$	0.16 (0.37)$_a$
Kindergarten teacher[c]	0.20 (0.40)$_a$	0.03 (0.16)$_b$
Communal behavior[d]	1.67 (1.22)$_a$	1.87 (1.17)$_a$
Self		
Communal self-perceptions[d]	2.20 (0.65)$_a$	2.27 (0.59)$_a$
Communal aspirations[e]	1.86 (0.68)$_a$	1.72 (0.70)$_a$

Note. Significant differences at the $\alpha < .05$ level are represented by different subscript letters.

[c] Responses could range from 0-1 (higher scores indicate more gender stereotyping).

[d] Responses could range from 0-4 (higher scores indicate more gender stereotyping).

[e] Responses could range from 0-3 (higher scores indicate more gender stereotyping).

In a second step, on the basis that boys may be more likely to internalize counterstereotypical aspirations and behavior if they are exposed to more than one counterstereotypical exemplar, we explored whether exposure to more than one male kindergarten teacher was associated with more communal self-perceptions and aspirations in boys. We formed a continuous scale of the proportion of male kindergarten teachers (ranging from 0-50%). We found no evidence suggesting that exposure to more than one male kindergarten teacher was associated with more communal self-perceptions (b = -0.004, p = .332, 95% CI [-0.004; 0.01]) or communal aspirations in boys (b = -0.001, p = .775, 95% CI [-0.01; 0.01]).