Monograph:
Chowdhury, S.M. and Peter, N. (2026) Experiments on gender and competition in the field: a review. Working Paper. Sheffield Economic Research Paper Series, 2026005 (2026005). Department of Economics, University of Sheffield ISSN 1749-8368

The University Of Sheffield. | School Of Economics

Experiments on Gender and Competition in the Field: A Review

Subhasish M. Chowdhury and Noemi Peter

Sheffield Economic Research Paper Series

SERPS no. 2026005

ISSN 1749-8368

20 May 2026

Experiments on Gender and Competition in the Field: A Review *

Subhasish M. Chowdhury, [a] and Noemi Peter [b]

[a] School of Economics, University of Sheffield, Sheffield S10 2TU, UK. Email: subhasish.chowdhury@sheffield.ac.uk.

[b] Faculty of Economics and Business, University of Groningen, 9700 AV Groningen, The Netherlands. Email: a.n.peter@rug.nl.

20 May 2026

Abstract

This review synthesizes evidence from field and lab-in-the-field experiments on gender and competition (including artefactual, framed, and natural field experiments). We first document how the gender gap in willingness to compete varies with cultural, demographic, and task-related factors, highlighting substantial heterogeneity across societies, age groups, and forms of competition. We then review evidence linking competitiveness to educational and labor market outcomes and find that experimental measures of competitiveness are significant predictors of study and career choices and that competitive incentives have causal effects on job entry behavior. Next, we examine a set of interventions, such as information provision, role models, training and mentoring, institutional design, and affirmative action policies that aim to mitigate gender gaps in field settings. Overall, the literature suggests that social and institutional environments can both generate and mitigate gender differences in willingness to compete. We conclude by highlighting avenues for future research.

JEL Classification: C91; C93; D91; J16; J24; J71; M51
Keywords: Competition; Gender; Field experiment; Occupational sorting; Affirmative action

* Corresponding Author: Subhasish M. Chowdhury. We thank Edwin Ip, Joo Young Jeon, John List, Eva Ranehill, Ernesto Reuben, Matthias Sutter, Roel van Veldhuizen and the participants of the 'Workshop on the Economics of Gender' at the University of Sheffield for useful comments. We remain responsible for any remaining errors.

1. Introduction

Persistent gender disparities in labor market outcomes, educational trajectories, and leadership representation are well documented across academic and policy research. For example, the Global Gender Gap Report (2025) estimates that, at the current rate of progress, full gender parity remains more than a century away. Gender differences in competitive behavior have attracted significant attention as potential contributors to these disparities (see e.g., Bertrand, 2011; Bönte and Piegeler, 2013; Blau and Kahn, 2017). As researchers have moved from conventional laboratories to conducting experiments in the field, a rich literature has emerged examining the social and institutional drivers, external relevance, and malleability of these behavioral gaps. In this study, we survey the experimental results on gender and competition from the field.

While the earliest studies on gender and competition examined performance under competition (Gneezy et al. 2003; Gneezy and Rustichini, 2004), the landmark study of Niederle and Vesterlund (2007) introduced an experimental framework to examine individuals' willingness to compete.[1] Niederle and Vesterlund (2007) documented a large gap in entry into a winner-take-all competition: despite no gender differences in performance, men were twice as likely as women to choose a competitive compensation scheme for the subsequent performance round. This finding, observed initially in a pool of university students in the US, raised numerous questions about its generalizability, underlying mechanisms and potential to explain disparities in field outcomes. As a result, a large body of subsequent research emerged, establishing Niederle and Vesterlund (2007) as one of the most cited papers in economics.[2]

Our review focuses on an important strand of this gender and competition literature: experiments conducted in field settings and/or with subject pools beyond conventional laboratories. In the taxonomy of Harrison and List (2004), these studies can be categorized as artefactual, framed, and natural field experiments. To keep the discussion accessible to a broader audience, we use the more general labels 'lab-in-the-field' and 'field' experiments, where the former largely corresponds to artefactual and framed field experiments while the latter corresponds to natural field experiments. These lab-in-the-field and field experiments

[1] Gneezy et al. (2003) conducted a lab experiment where the compensation scheme (piece-rate or competition) was imposed on participants and found that men increased their performance in response to competition while women did not. Gneezy and Rustichini (2004) showed that this finding replicates in a field study that uses a running task and a sample of children in Israel.

[2] IdeasRepec lists this study among the top 1% most cited papers in economics.

expanded the literature along several dimensions. First, they enabled researchers to study the role of culture, age, and tasks in greater depth, as field settings allow researchers to recruit from more diverse populations and to use a wider range of tasks than standard university labs. Second, they enabled the examination of the external relevance of competitiveness by linking experimental competition choices to field outcomes. Third, they made it possible to implement interventions in more diverse populations and more natural environments than conventional laboratory experiments, providing insights into how such policies operate in more natural settings.

Although field and lab-in-the-field experiments on gender and competition are an important and established area of research, our paper is the first to provide a dedicated and detailed review of this specific strand of the literature. Earlier reviews such as Niederle and Vesterlund (2011) provided valuable syntheses of the broader literature on gender and competition at the time, but they predate much of the recent expansion in field and lab-in-the-field experiments. More recent contributions tend to focus on specific aspects of the literature, and their focus differs from the objectives of the present review. For example, Markowsky and Beblo (2022) conducted a meta-analysis that quantifies the average gender gap in competition entry and its moderators, while Balafoutas and Peter (2026) reviewed experimental evidence on *policies* that aim at reducing gender gaps in labor markets. In contrast, our review focuses specifically on evidence from field and lab-in-the-field experiments on gender and competition and discusses how these studies advance our understanding of context dependence, external relevance, and the effects of interventions.

We conducted a systematic search for relevant studies in economics. We reviewed papers citing Niederle and Vesterlund (2007), examined the NEP-GEN and NEP-EXP lists[3] and their intersection, and searched Web of Science and Google Scholar with the keywords gender, competition, and field experiment. Since the NEP lists typically contain working papers, we also checked whether the studies had subsequently been published. The resulting set of papers was screened for duplicates and title changes and supplemented with additional studies identified through references and our knowledge of the literature. We then arranged the list of papers according to focus, methodology and contributions. This process inevitably involved some degree of subjectivity. For example, while our focus was on field and lab-in-the-field

[3] Lists from New Economics Papers – Gender, and New Economics Papers – Experimental Economics, available here: https://nep.repec.org/ .

experiments, in a few cases we included studies that use different methods (e.g. surveys or lab experiments) because they strongly complemented the discussion. Furthermore, while we aimed to cover field and lab-in-the-field experiments comprehensively, some judgment calls were unavoidable. When categorizing non-online experiments as lab-in-the-field, we considered not only the physical location but also the subject pool, as studies conducted in labs may still be informative about cultural variation when they involve distinctive populations. This approach is largely consistent with Harrison and List (2004), who classify lab experiments with nonstandard subject pools as artefactual field experiments. However, we applied a more restrictive standard to online experiments. Although such studies can technically fall under broad (lab-in-the-)field categories, we did not automatically include all of them, as many resemble conventional laboratory experiments more closely and do not meaningfully depart from laboratory paradigms.

We organized our literature review into the following sections:

Section 2. Culture, age and tasks: this section consists of three subsections. The first reviews cross-cultural evidence, including studies that compare societies with sharply different gender norms and institutional structures. It highlights striking variation in the gender gap across contexts, and discusses how social roles, cultural norms, and institutional environments shape competitive behavior. The second subsection examines how the gender gap in competitiveness evolves over the life cycle, from early childhood to older adulthood, and discusses the role of parents and peers. The third subsection examines how gender differences vary across task types, difficulty levels, and competitive formats, including self-competition and team-based competition.

Section 3. Willingness to compete and field outcomes: this section reviews evidence on the external relevance of experimentally measured competitiveness. It shows that willingness to compete is a strong predictor of educational and career choices, including specialization decisions, occupational paths, and earnings expectations, and that its predictive power extends beyond traditional determinants such as risk preferences and confidence. At the same time, the evidence highlights important nuances, as the returns to competitiveness depend on context and may differ across stages of the career and across institutional environments. Finally, the section discusses field experiments that establish a causal link between competitiveness and labor market behavior, demonstrating that competitive preferences directly influence job entry decisions.

Section 4. Interventions to mitigate the gap: This section reviews experimental evidence on interventions aimed at reducing gender differences in competitiveness and related outcomes. It covers approaches such as information provision, role models, mentoring and training, changes in task framing and institutional design, as well as broader policies including affirmative action and AI-based hiring tools. The evidence shows that competitive behavior is responsive to policy interventions, but that effect is often context-dependent and may involve important trade-offs.

We conclude the chapter with a discussion that identifies some key unresolved puzzles and proposes an agenda for future research, including the long-term effects of interventions, the role of intersectionality, and the broader welfare implications of competitive behavior. We hope that this chapter serves as a useful reference for researchers and helps guide future work in this rapidly evolving field.

2. Culture, age and tasks

One of the key advantages of moving beyond the laboratory is the ability to study competitive behavior across a broader range of cultures, demographic groups, and settings. Field and lab-in-the-field experiments allow researchers to observe individuals from more diverse backgrounds than standard university student samples and to implement a wider range of tasks than is typically feasible in the laboratory. This is particularly important in the study of gender and competition, where preferences and choices may be shaped by social norms and prior experiences that vary across settings. By varying the population under study and the nature of the task, this literature helps to clarify the importance of context for the competitive behavior of men and women. In this section, we review field and lab-in-the-field experiments that vary along these dimensions relative to the standard Niederle–Vesterlund laboratory paradigm. When a study varies in multiple dimensions (e.g., both culture and tasks), we discuss it only once to conserve space, placing it in the most relevant subsection.

2.1. Different cultures

We begin with the landmark cross-cultural study of Gneezy et al. (2009), which conducted lab-in-the-field experiments among the Maasai of Tanzania, a patriarchal society, and the Khasi of India, a matrilineal and matrilocal society. In Khasi society, women are the household heads and control its resources, while men move to their wife's household and contribute to its economic activities without holding authority over it. Consistent with findings from Western

cultures, Gneezy et al. (2009) reported that Maasai men are significantly more competitive than Maasai women. However, this pattern was reversed among the Khasi, where women were more competitive than Khasi men, and even chose to compete weakly more often than Maasai men.

Following up, Andersen et al. (2013) examined children aged 7–15 from the Khasi society and from the Kharbi, a patriarchal society in India. They found that there is no significant gender gap among pre-pubertal children in either society, and that girls become less competitive only in the patriarchal society around the age of puberty. This indicates that the gender gap is not present at birth but rather forms during developmental stages, likely through processes of socialization. In a closely related study, Klonner et al. (2021) conducted competition experiments with adults from the Khasi, Karbi and Dimasa communities (Kharbi and Karbi refer to the same ethnic group with different spellings). The Dimasa is an interesting case because this is a traditional society where both genders have similar rights and entitlements. Klonner et al. (2021) found that only in the patriarchal society were men significantly more competitive than women. In the other two societies there was no significant difference between the competition choices of men and women.

The above studies clearly indicate that cultural factors play an important role in shaping willingness to compete. However, they do not pinpoint the exact factor. Relatedly, Lowes (2021) conducted a competition experiment with individuals from 27 ethnic groups in Central Africa and found no evidence that matrilineal kinship per se reduces the gender gap in competition. Importantly, in the matrilineal groups studied in Lowes (2021), matrilocality is not commonly practiced and men retain substantial authority over resources. As a result, women's relative status remains lower than in societies that are both matrilineal and matrilocal, such as the Khasi examined in Gneezy et al. (2009), Andersen et al. (2013), and Klonner et al. (2021).

Another key contribution to this literature is Palacios-Huerta (2022), who studied the Nandi in Kenya, where inheritance customs lead some women to undergo an 'inversion' ceremony to become 'female husbands' and assume a socially male role. The study found that while Nandi men competed at twice the rate of Nandi women, 'female husbands' competed at the same rate as the men. By disentangling biological sex from socially assigned gender roles within the same society, this study provides a remarkably clean, plausibly causal link between social norms and competitive behavior.

A broader set of papers from around the globe reinforces the view that gender differences in willingness to compete are context dependent. In the United Arab Emirates, Dariel et al. (2017) found no evidence that women shy away from competition; if anything, conditional on performance, Emirati women were more likely to enter competition than men. Among younger populations in Armenia, Khachatryan et al. (2015) found no evidence of the standard Western pattern in competitive entry; instead, they found no gender difference in willingness to compete in either a math or a verbal task, and that girls increased their performance more than boys in response to competition in a running task, with no gender differences in other tasks. Cárdenas et al. (2012) examined children aged 9-12 in Colombia and Sweden, using four different tasks: running, skipping rope, math and word search. In Colombia, they found no gender difference in competitiveness. In Sweden the results were mixed: girls were more competitive in some tasks in terms of performance change, while boys were more likely to choose competition in general.

Hauge et al. (2023) used a different strategy to investigate the role of culture. Rather than focusing on specific societies or comparing samples across countries, they examined individuals in Norway whose parents were born in 59 different countries. Using female labor force participation in the parents' country of origin as a proxy for ancestral culture, they found that the gender gap in competitiveness is smaller among individuals with more gender-equal ancestries.

A group of studies focused on China. Carlsson et al. (2020) stressed that China combines a long-standing official emphasis on gender equality with persistent patriarchal features, making it a particularly interesting setting to study. They conducted a lab-in-the-field experiment with adult Han Chinese and found that men are more than twice as likely to choose competition than women. Booth et al. (2019), using cohorts from Beijing and Taipei, found a pattern that suggested that exposure during formative years to different institutions and social norms substantially affects competitive choices. Zhang (2019) compared ethnic groups differentially exposed to communist reforms and found that such reforms could raise women's competitive inclination, although they did not eliminate the gender gap in all cultural settings.

Another cluster of papers focused on competitiveness in rural areas of various low- and lower-middle-income countries. In rural Rwanda, Klege et al. (2021) ran an experiment with energy entrepreneurs and found no significant gender difference either in competitive preferences or performance in competition. Business performance in the field corroborated the external

validity of the experimental results. In rural Vietnam, Fletschner et al. (2010) found that women are both more risk averse and less likely than men to choose competition, even conditional on success probabilities. In Uganda, Bjorvatn et al. (2016) showed that the gender gap in competitiveness is present in rural areas but not in urban ones, suggesting that local context matters even within the same country. In Zambia, Khadjavi et al. (2024) conducted a lab-in-the-field experiment with smallholders and their children in an agricultural setting where large-scale farms had recently been established near smallholder communities. They found that smallholders behaved more competitively when located closer to large-scale farms. This pattern was particularly pronounced among female smallholders, closing the gender gap in competitiveness. Similar patterns were observed among their children. The authors point to changes in the intra-household division of tasks as a potential mechanism.

The literature reviewed so far exhibits remarkable heterogeneity in findings, not only in the gender gap in competitiveness, but also in the relationship between culture and this gap. While many studies found lower or no gender gap in more gender-equal cultures, others document the opposite pattern, particularly when making comparisons *across countries*. To address the cross-country issue, it is worthwhile to consider two studies that do not conduct experiments themselves but help synthesize evidence: Markowsky and Beblo (2022) and Klinowski and Niederle (2025).

Markowsky and Beblo (2022) conducted a meta-analysis, including results from standard lab experiments, typically ran in US and Europe, and related the gap to the Gender Gap Index (GGI) of the World Economic Forum. They found that higher gender equality at the country level is associated with a larger gender gap in competitiveness. Building on this result, Klinowski and Niederle (2025) examined cross-country variation using a survey measure of competitiveness from the 2018 PISA (Programme for International Student Assessment), and confirmed that the gender gap in competitiveness is larger in countries with higher levels of gender equality, which are also more economically developed.[4] They highlighted two potential explanations for this gender-equality paradox.[5] The first is the resource hypothesis, which posits that greater material resources allow individuals to express gender-specific preferences more freely (Falk and Hermle, 2018). The second is the gender identity hypothesis, which argues that in postmaterialist societies individuals are encouraged by culture to develop and

[4] Napp and Breda (2022) also found such a gender-equality paradox with the PISA data.
[5] The term 'gender-equality paradox' was coined by Stoet and Geary (2018), whose work focused on the phenomenon that gender differences in the pursuit of STEM degrees increase with country-level gender equality.

enact gendered preferences (Charles and Bradley, 2009). Klinowski and Niederle (2025) showed that the two explanations yield distinct predictions when studying boys and girls separately: if the first hypothesis is correct, boys should increase their competition entry more than girls as resources increase, whereas if the second hypothesis holds, girls should decrease their competition entry in cultures that place stronger emphasis on gender identity while boys should be unaffected by cultural variation. Klinowski and Niederle (2025) found support only for the second, cultural hypothesis. These findings are consistent with evidence from traditional societies, which likewise suggests that lower willingness to compete among girls is shaped by cultural influences.

2.2. Age

Experiments in the field allow researchers not only to study different cultures but also to examine different age groups. We first discuss studies focusing on children and on the influence of their parents or peers, then studies on university students in the field, and finally studies on older populations.

2.2.1. Children, parents, peers

Sutter and Glätzle-Rützler (2015) found that in Austria, gender differences in willingness to compete emerge as early as kindergarten and persist during childhood. Buser et al. (2022) examined Swiss lower-secondary school students at all ability levels and found that the gender gap in willingness to compete was significantly higher among high-ability students than among low-ability students. The increase in the gap occurred both when using a stereotypically male numbers-based task and a stereotypically more female letters-based task, and it emerged because boys' willingness to compete increased along the ability distribution whereas girls' did not. Horn et al. (2022) ran a series of lab-in-the-field experiments in Hungarian high schools and found a modest gender gap in competitiveness. Lénárd et al. (2024) reanalyzed this data and introduced a Guessed-Actual Performance (GAP) metric, which categorized individuals as overconfident, realistic, or underconfident. Lénárd et al. (2024) showed that only among the realistic subgroup was there a gender gap. Their result challenged the idea that overconfident men drive the relationship between confidence and the gender gap in competition; instead, it points to gender differences in preferences within the realistic subgroup as a relevant mechanism.

Do parents matter for competitiveness? The findings vary depending on the specific factor and context under consideration. Khadjavi and Nicklisch (2018) examined preschool children and their parents in Germany and found no gender differences in willingness to compete in a running task, nor any correlation between parents' and children's competitive preferences. However, parents' ambitions for their children's future professional success were positively correlated with children's willingness to compete. Tungodden and Willén (2023) found that Norwegian parents choose more competitive environments for their sons than for their daughters, a bias explained by beliefs about their children's preferences. Importantly, these biased choices predicted the children's later-in-life educational outcomes. Similarly, Chen et al. (2024) found that parents in China exhibit a stronger inclination towards tournament schemes for boys than girls and showed that this gap can be mitigated by providing parents with information on children's past math scores. Findings on socioeconomic status point in opposite directions across studies. Almås et al. (2016) found that among Norwegian adolescents, the gender gap disappears in the low socioeconomic status subsample. However, Boneva et al. (2024) found that among German adolescents the gender gap is largest among those with low socioeconomic status.

Turning to peer influences, several studies focused on single-sex schooling. Two of them - Booth and Nolen (2012) in the UK and Laury et al. (2019) in the US - found that girls educated in single-sex environments are more likely to compete than girls from coed schools, and in fact make choices similar to those of boys. However, a third study from South Korea found that single-sex schooling does not reduce the gender gap in competitiveness (Lee et al. 2014). Given the institutional specificity of single-sex schooling, it is difficult to disentangle whether these differences reflect variation in culture, setting, or empirical approach.

Within the broader literature on peers and competitiveness, Jørgensen et al. (2022) examined the role of friends among Danish children aged 7-16. They found no gender differences in competitiveness in the overall sample, but among high performers who should have competed, girls were less likely to do so. They also found that girls were more likely to compete if their friends competed, while no such pattern emerged for boys. Page et al. (2017) examined whether relative age among peers matters using experiments in Australian high schools where participants were either the oldest or the youngest in their classroom. They found that older students were more competitive, with the effect being concentrated on males.

2.2.2. University students in lab-in-the-field experiments

A small number of studies use university students in lab-in-the-field settings to examine questions around selection, experience and peers. Dariel et al. (2022) asked whether a gender gap in competitiveness exists in the broader population of economics majors, rather than only among those who self-select into laboratory experiments. They found that although a gap is present among economics majors, it is substantially overstated in laboratory settings due to selection. Willinger et al. (2023) investigated self-selection and experience in a different context: they compared non-athletes to athletes and found that athletes were more likely to opt for competition and that there was no gender difference in willingness to compete among athletes. Finally, Delavande et al. (2024) studied peer effects at a UK university by leveraging the quasi-random assignment of student accommodations and found that men living with a higher share of female flatmates exhibit a decline in competitiveness over a one-year period, while no effect is observed for women.

2.2.3. Older populations

Moving on to older populations, Mayr et al. (2012) conducted a lab-in-the-field competition experiment with 25- to 75-year-olds at an indoor shopping mall in the US. They found that willingness to compete increased over the life cycle, peaking around age 50 before declining thereafter. They also found that men chose competition more than women at all ages. In contrast, Flory et al. (2018) found that willingness to compete increases with age only among women, resulting in no gender gap by the age of 50. While their main sample was from rural communities of Malawi, they also studied a smaller urban US sample and found similar patterns.

Flory et al. (2023) examined people aged 12 to 90 in both matrilocal and patrilocal communities in rural Malawi, building on the data from Flory et al. (2018) and on additional experiments. They found a significant gender gap in competition choices only in the patrilocal sample and also replicated the finding from Andersen et al. (2013) that girls become less competitive in patrilineal and patrilocal societies around the age of adolescence. They also went further and divided the female sample into four categories based on age and motherhood: 12-14-year-olds, 15-49-year-olds without a child older than 7, 15-49-year-olds with a child older than 7, and those aged 50+. They found that among patrilocal women, those aged 15-49 without a child over 7 are less competitive than all other categories of women and men and are the only group

less competitive than others. No such pattern is observed in matrilocal communities. The authors propose an inclusive fitness explanation for these findings.

The association between motherhood and willingness to compete was also explored by Dariel and Nikiforakis (2022), who examined samples from the United Arab Emirates, the United States, and the Netherlands. In the UAE, they conducted an experiment with university students, while in the US they did so on MTurk; both experiments showed that mothers aged 18-30 are less likely to choose competition than similar women without children. In the Netherlands they used survey data, which revealed that the negative association between motherhood and competitiveness is present already *before* women become mothers, indicating that it reflects selection into motherhood rather than a causal effect. For men, they found positive selection in the Netherlands, with fathers-to-be being more competitive than non-fathers, while no difference by fatherhood was observed in the US sample.

Taken together, the findings of Flory et al. (2023) and Dariel and Nikiforakis (2022) highlight that the relationship between parenthood and competitiveness is context-dependent, and that both social mechanisms and selection into parenthood are important factors in this area of research.

Rather than focusing on parenthood status, another line of research examined competitiveness across sexual orientations. Buser et al. (2018) conducted an incentivized experiment with a representative sample from the Netherlands and found that gay men are significantly less likely to choose competition than heterosexual men, while lesbians competed at similar rates as heterosexual women. Evidence from a larger sample in the United States by Aksoy and Chadd (2025) points to a broader "sexual minority gap" in competitiveness, with both gay men and lesbian women being less likely to compete than their heterosexual counterparts. Taken together, these findings suggest that sexual orientation constitutes an additional dimension along which competitive behavior varies, further underscoring the role of identity and social norms.

2.3. Tasks and forms of competition

In the previous sections, we have discussed several studies that are informative not only with respect to culture and age but also incorporate variation in the tasks used to elicit competitive behavior. This is not incidental: a prominent line of research explicitly examines the role of

tasks and forms of competition in competitive choices. In this section, we review studies that focus on this question. To avoid repetition, we do not revisit studies already discussed above.

Several studies varied the nature of the task. Dreber et al. (2011) used three different tasks - running, skipping rope, and dancing - among Swedish children aged 7–10. Rather than allowing children to choose between a competitive and a non-competitive scheme, they examined the effect of competition on performance and found no gender differences. Two other studies from Sweden examined older populations and whether there is a gender gap in competition entry in verbal and math tasks. Dreber et al. (2014) studied children aged 16–18, while Boschini et al. (2019) examined a random sample of Swedish adults. Both studies found no gender gap in competition entry in the verbal task, but a gender gap in the math task (although the statistical significance was sensitive to controls). Task variation has also been examined in a relatively isolated hunter-gatherer population. Apicella and Dreber (2015) studied the Hadza in Tanzania using three tasks: a gender-neutral task (skipping rope), a female-centric task (bead collection), and a male-centric strength task. They found that women and girls are significantly less likely to compete in the gender-neutral and male-centric tasks, while the difference was not significant in the female-centric task. Finally, rather than bringing the lab to the field, De Paola et al. (2015) conducted a field experiment with Italian undergraduates to examine whether there are gender differences in competitiveness when the task is familiar and consequential in the education context. Specifically, they invited students to undertake a midterm exam for bonus points under a tournament scheme. They found no gender difference in the willingness to choose this tournament-style midterm. Overall, these studies indicate that patterns of competitiveness vary with the nature of the task.

The difficulty of the task has also been shown to matter. Both Drouvelis and Pearce (2025) and Hoyer et al. (2020) reported that the gender gap in tournament entry is sizable when tasks are relatively easy but shrinks and becomes insignificant when tasks are difficult. The consistency of these findings is particularly noteworthy given the very different settings studied. Drouvelis and Pearce (2025) applied the Niederle-Vesterlund framework in a lab setting at a university in Botswana, while Hoyer et al. (2020) conducted a field experiment at a university in the Netherlands in which students chose whether to solve multiple-choice questions for bonus points under a piece-rate scheme or a tournament grading scheme. Furthermore, John (2017) highlighted that competitions can be made more difficult by assigning stronger competitors. She ran an experiment in Malaysian high schools in which, after the three standard rounds

(piece-rate, tournament, and choice), students participated in a fourth round where they competed either against stronger or weaker opponents. The choice results replicated the standard gender gap in competitiveness. However, boys responded to harder competition with lower performance, while girls' performance did not vary by level of competition.

The standard Niederle-Vesterlund design involves competing against another individual. An interesting variation is to let individuals compete against themselves. Bönte et al. (2018) conducted a lab-in-the-field experiment in a shopping mall in a large German city and found that although women were more reluctant than men to compete against their own past performance, this gap was not significant once they controlled for risk preferences. Lab and online studies by Apicella et al. (2017) and Carpenter et al. (2018) found that the gender gap was entirely absent in self-competition. Overall, the self-competition findings suggest that the gender gap is not a general aversion to competition *per se*, but rather a specific aversion to interpersonal or social competition. Another variation that has been examined in the field is to let people compete in teams. Delfgaauw et al. (2013) ran a field experiment with a Dutch retail chain and designed sales competitions with and without monetary rewards among subsets of their stores. They found that the competition significantly and positively affected sales growth only where the managers and most employees had the same gender. This result was robust irrespective of monetary reward and it highlights the importance of gender composition in team competitions.

3. Willingness to compete and field outcomes

The value of the experimental literature on gender and competition ultimately rests on its ability to predict and explain economic outcomes outside of the lab. Here we review the growing number of studies that link experimental competition choices to field outcomes.

Educational and career choices feature prominently in this literature. Buser et al. (2014) conducted a lab-in-the-field experiment with students in the academic track of Dutch secondary education and found that experimental competition choices correlated strongly with the choice of more prestigious, math-intensive specializations. The competitiveness measure explained a substantial share of the gender difference in these choices. Using two distinct tasks in Switzerland, Buser et al. (2017) found that competition choices predict specialization choices in academic high schools more than one and a half years after the experiment, explaining a significant portion of the gender difference in the choice of math-intensive specializations. The

consistency of findings across different contexts (e.g., country, time horizon, and tasks) suggests that the relationship is not incidental but reflects a robust link between experimentally measured willingness to compete and academic specialization choices. Further studies showed that the external relevance of the experimental measure is even broader. Rather than focusing on the restricted set of academic specializations, Buser et al. (2022) considered the full set of study options in Swiss upper-secondary education and found that willingness to compete predicts the choices of high-ability students across both academic and vocational specializations, and it also predicts whether low-ability boys pursue upper-secondary education upon finishing compulsory schooling. Willingness to compete has also been found to predict binary decisions about pursuing an academic education at the secondary level (Zhang, 2012; Almås et al., 2016).

At later stages of educational and career trajectories, the picture becomes more nuanced. Reuben et al. (2017) found that experimentally measured competitiveness was not related to college major choice among undergraduates at New York University. However, those who were overconfident and overly competitive expected higher earnings across all major categories, and gender differences in overconfidence and competitiveness explained a substantial share of the gender gap in expected earnings. These results are consistent with the idea that competitiveness and overconfidence shape career plans conditional upon major choice. Kamas and Preston (2018) measured willingness to compete and confidence among seniors at two selective US colleges and tracked participants subsequent labor market experiences. They found that choosing to compete coupled with confidence correlated with higher female earnings, while neither confidence nor willingness to compete predicted male earnings. Shifting the focus to early career outcomes at the top, Reuben et al. (2024) asked whether competitiveness is always advantageous and whether it can explain the gender pay gap among MBA graduates from a top US business school. They found that competition preferences could not explain the gender gap in MBAs' income. Moreover, competitiveness is associated with better outcomes only for non-overconfident individuals; MBAs who were overconfident and competitive had lower compensation and income growth, as well as more frequent job interruptions and exits from high-reward industries. A negative association was also found in vocational education: Lüthi and Wolter (2023) reported that vocational education and training (VET) contracts were more likely to be terminated prematurely for competitive women than for non-competitive women, mainly due to conflicts with employers. This pattern is not observed for men, suggesting that demand-side biases constrain female competitive

success in the vocational sector, potentially due to perceived violations of gender norms. Overall, the results highlight that the economic relevance of competitiveness can extend beyond supply-side choices, as employers may impose costs in response to competitive behavior, potentially in gender-specific ways.

The predictive power of competitiveness extends also to a broader range of educational and labor market outcomes. Buser et al. (2026) assessed the predictive power of both an incentivized experimental measure and a survey question on competitiveness using a large, representative survey panel. They found that both measures were strong predictors of a person's level of education, occupation and income. Moreover, given the debate on whether competitiveness can simply be captured by risk preferences and confidence (Gillen et al., 2019; van Veldhuizen, 2022), they showed that competitiveness predicts outcomes independently of risk preferences and confidence, and that risk attitude is not a consistent predictor of the same outcomes but it predicts other outcomes such as investing in stocks or smoking.[6] They also demonstrated that competitiveness has more predictive power than other established personality traits such as the Big Five. Their study is a powerful validation of the research program, as it shows that competitiveness is a distinct predictor of several economically meaningful field outcomes. Another contribution comes from Buser and Sangi (2025), who distinguished between general competitiveness and a willingness to engage in competition that involves 'dirty' acts such as sabotage (Chowdhury and Gürtler, 2015) or cheating. This behavioral trait is distinct from 'clean' competitiveness, and there is a gender gap in this trait itself. Their online experiment found that this specific type of competitive preference is a strong predictor of holding a management or supervisory position and of working in the private sector.

Another strand of the literature uses field experiments to examine the link between competitiveness and labor market decisions. Flory et al. (2015) conducted a natural field experiment in which job seekers are randomized into different compensation regimes. The findings showed that women disproportionately shy away from competitive work settings. Similarly, in a field experiment on the impact of compensation schemes on willingness to apply for a job, Samek (2019) found that competitive schemes that depend on relative performance disproportionately deter women from applying. Because these studies are based on randomized

[6] Relatedly, an experiment by Choe et al. (2022) indicates that gender differences in risk preferences play no significant role in tournament versus piece-rate job choices and in the resulting gender wage gaps.

treatment variations, they demonstrate a causal link between preferences for competition and job entry behavior.

Overall, the evidence from the studies reviewed in this section delivers a clear message: competitiveness is not just an interesting academic phenomenon, but a behavioral trait with strong predictive power for educational and labor market outcomes. Importantly, it also has a causal impact on real-world behavior, as demonstrated by field experiments on job entry decisions.

4. Interventions to mitigate the gap

A central and increasingly important question in the literature is whether and how gender gaps in competitiveness and related outcomes can be mitigated. A large number of experimental studies address this question, ranging from laboratory to field settings. Given the scope of this chapter, we focus on studies that provide evidence from the field, including both lab-in-the-field and field experiments.[7] Beyond these scope considerations, such studies are particularly valuable because they allow researchers to test interventions in more diverse population or more natural environments than standard lab experiments.

Information provision is a popular intervention that has been tested in the field in various formats. Kessel et al. (2021) found that informing participants about the gender gap in competitiveness and its potential earnings implications reduced the gap both in a standard lab experiment and in a lab-in-the-field experiment with high school students. However, the authors also highlighted that the intervention had heterogeneous effects on earnings, with some participants benefiting while others losing out. Using a large-scale incentivized field experiment, Pink et al. (2025) investigated whether informing women about the gender gap in competition entry increased their willingness to compete for leadership roles on an executive job search platform (AboveBoard). They found that informing qualified women about the gender gap in competition (i.e., telling them that women are less likely to apply for high-status roles) increased their application rates substantially. The authors argue that this provides a counter-narrative to the 'stereotype threat' literature, which suggests that highlighting gender differences holds women back.

7 Some of the studies reviewed in this section naturally overlap with the broader policy intervention literature surveyed in Balafoutas and Peter (2026). However, the focus here is specifically on competitiveness and related outcomes and on evidence from field and lab-in-the-field experiments, while Balafoutas and Peter (2026) examined a broader set of labor market outcomes and includes evidence from lab experiments.

Rather than providing general information about gender differences, an alternative intervention is to inform participants about their own rank. This has the potential to mitigate gender gaps as confidence influences competition entry and women have been found to be less confident across a wide range of settings (Exley and Kessler, 2022). Hakimov et al. (2023) implemented such a rank information intervention among college applicants in France. They found that explicit rank information closed 72% of the gender gap in admissions to elite college programs among top students. While these results are impressive, a limitation of this intervention is that the policymaker would need to know the precise qualifications of the individuals in the pool.

A more easily implementable approach is to describe more clearly the required qualifications to pass a bar, such that individuals can form more accurate beliefs about their chances. However, evidence of such interventions is mixed. Coffman et al. (2024) implemented such an intervention in a field experiment on the online labor market platform Upwork. They focused on a male-typed domain where qualified women were significantly less likely to apply for jobs than qualified men and found that clarifying the bar made women more likely to apply while having no effect on men. In a subsequent Prolific study, they found that qualified individuals of both genders were more likely to apply, so the gender gap was reduced in the original field study but not in the subsequent replication. Similarly, Abraham et al. (2024) randomized 60,000 viewers across different job ad versions for over 600 corporate positions at Uber, where the treatment removed optional and superfluous qualifications. They found that overall applications increased similarly among men and women, but the composition differed by gender: among women, highly skilled women applied less while less skilled women applied more, whereas among men the treatment attracted men from across the skill distribution.

Information interventions have also been used in the context of choosing economics majors, typically such that information was shared about the major, often also combined with encouragement to choose the major. The results of this strand show that such interventions are typically not effective in reducing the gender gap in specializations (Bayer et al., 2019; Bedard et al., 2021, Pugatch and Schroeder, 2021).

In contrast to the findings on economics majors, Del Carpio and Guadalupe (2022) reported encouraging results from the tech sector. Their field experiments investigated applications to a software-coding bootcamp which was offered exclusively to low-income women. Their study had three intervention components: information provision about women's success in the industry, information provision about the program's network of women, and highlighting the

story of a successful recent graduate from the program. The authors found that an intervention that combines the three elements increases applications, and that omitting any of the elements reduces applications.

Role model interventions were found to be successful also in other contexts. Porter and Serra (2020) showed that talks by successful female alumni significantly increased female students' likelihood to major in economics. Patnaik et al. (2023) included alumni of both genders and found that in both cases a significant positive effect emerges for students who have the same gender as the speaker. Palffy et al. (2023) tried to attract more girls (boys) to STEM (health and care) apprenticeships in Switzerland by presenting a female (male) role model and a counter-stereotypically framed short text to applicants. They found that the counter-stereotypical STEM intervention was effective for girls, but the counter-stereotypical health and care intervention was not effective for boys.

Training and mentoring programs are more intensive interventions, based on the premise that competitiveness is malleable. Several studies provide evidence in support of this idea. Alan and Ertac (2019) introduced an educational program in Turkish elementary schools that focuses on fostering grit and found that it eliminated the gender gap in willingness to compete and improved efficiency. Boneva et al. (2022) implemented a mentoring intervention in German elementary schools in which children met weekly with mentors to foster the acquisition of new skills and ideas. Mentors were typically university students, matched by gender for girls but not for boys. Boneva et al. (2022) found a positive effect on girls' willingness to compete, resulting in a smaller gender gap in competitiveness and in earnings expectations. Among women in Vietnam, Treurniet et al. (2024) implemented a psychosocial and personal finance training in two versions, emphasizing either independent or interdependent models of agency. They found that women randomly assigned to the independent agency version were more willing to compete than those who participated in the interdependent version. Almås et al. (2020) provided an entrepreneurship training in Tanzania that aimed to empower young women with practical knowledge and non-cognitive business skills. The authors found that their intervention led to adverse selection into competition: low-ability, but not high-ability, girls became more willing to compete. This resulted in lower earnings for the low-performing group. This study highlights that increasing competitiveness without accounting for heterogeneity in ability can have unintended negative consequences.

Priming treatments have also been tested in the field. Boudreau and Kaushik (2020) conducted a large platform-based field experiment in which the description of a tech-related product development activity emphasized either competitive or collaborative interactions with other participants. They found that the competition treatment led to relatively lower participation for females in non-STEM fields, but not in STEM fields. A possible explanation for the diverging results is that self-selection into STEM fields results in more similarity between men and women in this subsample. Preece and Stoddard (2015) ran a field experiment to investigate the lack of female representation in political competition. They found that priming individuals to consider the competitive nature of politics significantly reduces women's interest to hold political office whereas it does not influence men. This is true for both subjects from an online labor market and for politically motivated individuals, and results in a gender gap in political leadership.

Similar to priming, a light-touch intervention is to manipulate the language of job advertisements. The evidence on the effectiveness of such interventions is mixed. He and Kang (2025) conducted both lab and field studies and found that when job advertisements were 'debiased' by replacing masculine language with gender-neutral language, women (as well as men whose self-identities are less aligned with masculinity) were more likely to apply. Díaz et al. (2023) conducted an online study with demographically diverse samples in Latin America via the Ipsos Interactive Services Panel. They found that both diversity statements and gender-inclusive language in job adverts increased women's stated preferences for a given job. However, Castilla and Rho (2023) found little effect of gendering of job-postings, using both an observational study and a field experiment. Relatedly, a field experiment by Flory et al. (2021) found that diversity statements are not effective in increasing gender diversity. Finally, a field experiment by Del Carpio and Fujiwara (2023) found that gender-inclusive language in adverts did not increase women's application rates generally; positive effects emerged only in sectors that were not too male-dominated.

An emerging and promising area of intervention involves the use of artificial intelligence (AI) in hiring. Avery et al. (2024) conducted two field experiments in the male-dominated technology sector to study the impact of AI on gender diversity. The findings show that the use of AI in recruitment increased gender diversity. This improvement was driven by effects on both the supply and demand side. On the supply side, the gender gap in application rates was reduced, with complementary survey evidence suggesting that female job seekers believed

there was less bias when assessed by AI. On the demand side, providing human evaluators with applicants' AI scores closed the gender gap in assessments that otherwise disadvantaged women. Awad et al. (2023) examined not only the effect of AI evaluators but also the role of debiasing. They found that the use of AI does not change the quality and gender diversity of applicants, but debiasing (both human and AI) increases gender diversity without reducing the number of high-quality applicants. In the same line, Ip (2025) showed in a mock job application experiment that algorithms that prioritize equal representation of males and females attract the most female applications but are not considered the fairest by either gender, whereas gender-blind algorithms have similar effects in increasing female applications and are considered the fairest by both genders.

The use of quotas and other affirmative action (AA) measures (Chowdhury et al., 2023) has been a subject of intense debate and research. Balafoutas and Sutter (2012) and Niederle et al. (2013) were the first to examine gender quotas in Niederle-Vesterlund type competition experiments, and both studies found that gender quotas attract women to competitions without lowering the quality of the winners. However, these and most subsequent experiments are conducted in the laboratory. One exception is Ibañez and Riener (2018), who reported results from field experiments on job advertisements. Ibañez and Riener (2018) investigated the effect of informing subjects of a gender quota before applying versus after applying. They found that announcing the quota in advance eliminates the gender gap in application rates, without reducing the quality of the top 15th percentile of the applicant pool. A further exception is a lab-in-the-field experiment on children by Sutter et al. (2016), which demonstrated that quotas and preferential treatment close the gender gap in competition already at an early age. Consistent with previous studies, the authors found that the interventions do not lead to efficiency losses. Furthermore, Sutter et al. (2016) also examined whether affirmative action policies have downstream effects on a post-competition team production task and found no effect on team production. While these results are reassuring, evidence from laboratory and online experiments suggests a more nuanced picture of potential downstream effects. For example, Avery (2023) showed that while quotas increased the number of women who entered and succeeded in an initial competitive stage, in a second stage employers were significantly less likely to hire women who had succeeded under the AA scheme. This decrease was attributed to employer beliefs about the ability of these women. Relatedly, Peter (2026) showed that the impact of quotas on competence expectations depends on information provision. Quotas lower competence expectations when subjects are not provided with a rationale for

introducing a quota. However, when subjects are informed about the attraction effect of quotas on high-ability women, they expect "quota-women" to be more talented. Thus, while people do not intuitively recognize that quotas attract high-ability women, they adjust their expectations in response to such information. Taken together, these findings suggest that quotas can be an effective policy tool, but their success depends on accompanying information and the beliefs they generate among decision-makers.

Interventions that focus on incentives have also been examined. Feld et al. (2023) ran a field experiment offering financial incentives to complete job application assessments to a treatment group of job applicants. However, they found that financial incentives did not encourage women to complete these assessments compared to the control group. Rather than trying to increase competition entry with financial incentives, the literature suggests that a more promising avenue is to consider non-monetary competition prizes. In particular, work by Cassar et al (2016) and Cassar and Zhang (2022) showed that the gender gap closes when cash prizes are switched to rewards intended to benefit the participant's child or to gender-stereotypical goods.

Other interventions that change rules include nudges (Thaler and Sustein, 2008) and co-leadership. He et al. (2021) provided causal evidence that shifting the default from "opt-in" to "opt-out" for competitive tasks significantly reduces the gender gap in willingness to compete. Their results are based on several studies, including a field experiment on the online labor market Upwork, and are in line with results from experiments by Erkal et al. (2022). These findings suggest that the gender gap may reflect an aversion to the act of entering a competition through a status quo bias that can be overcome with a change in institutional framing.

Finally, while most of the literature focuses on one-shot settings, two papers examine settings with repeated interaction. Cotton et al. (2013) ran a field experiment with elementary school children where they conducted a series of math contests. They found that while there is an initial gender gap in performance, it is eliminated, and girls even perform better than boys over time. Hence, experience and training could eliminate the initial gender gap. Lovász et al. (2023) used an online game with randomized treatments to study how a leaderboard display and subjective feedback affect players. They found that the leaderboard increased persistence for both genders while it increased performance only for male players. When the leaderboard was combined with supportive feedback, female players also increased their performance.

Overall, the collective evidence from these studies shows that the gender gap is highly malleable. This confirms the lesson from Section 2 that willingness to compete is not a fixed biological characteristic but a learned behavior that is shaped by the social, cultural, and institutional context in which individuals develop and operate. These findings provide important insights for the design of policies and interventions aimed at reducing gender gaps in education and labor markets.

5. Discussion

The literature on gender differences in competition has evolved from documenting the robustness of a stylized fact to a sophisticated and heterogenous field of study. Field experiments contributed significantly to this area of research. The main finding - that men are more willing to compete than women - is now understood as a context-dependent phenomenon, and as a product of complex social, cultural, and institutional forces rather than an irreversible biological preference. The most compelling evidence for this conclusion comes from the progression of the research itself: from replications that revealed the gap's sensitivity to task and environment, to cross-cultural studies that completely eliminated the finding, to longitudinal analyses that traced its development from childhood, and finally to causal interventions that successfully manipulated it in real-world settings. This review summarizes these developments, as well as the evidence that competitiveness predicts and causally influences important field outcomes and provides a bird's-eye view of this evolving field.

Despite significant progress, several important puzzles remain unresolved. While the literature has shown that interventions can reduce the gap, there is limited understanding of the long-term effects and potential for unintended consequences of interventions. For example, in the case of affirmative action, it would be warranted to study backlash (Deschamps, 2024), sabotage (Brown and Chowdhury, 2017, Leibbrandt et al. 2018) and competence expectations (Avery, 2023; Peter, 2026) with the help of field experiments. There should also be more studies on different types of interventions. For example, Fornwagner et al. (2023) and Ifcher and Zarghamee (2024), showed in laboratory experiments that the gender gap in competition entry disappears when the decision is made by someone else (e.g., principal for agent). In these settings, more women are 'made to compete' by third parties, often because the third-party decision-maker (the principal) does not evaluate the female agent's performance any differently than the male's. This may, in turn, have massive implications for how corporate

promotions are structured (i.e., moving from an application-based to a nomination-based system). Such novel design should be tested in the field.

It would be also important to investigate intersectionality and other demographic effects. Both Avery et al. (2024) and Pink et al. (2025) showed that interventions have heterogeneous effects across racial groups. Pink et al. (2025) specifically found that 'stereotype reactance' interventions are more effective for Black and Hispanic women than for White women. This suggests that the double-jeopardy of race and gender stereotypes may make women of color more responsive to messages that encourage them to defy expectations. Further studies on such intersectionality would help us understand this issue better. The use of new technologies, particularly AI, as a tool for both analysis and intervention, also warrant further investigation. Future research should continue to explore how AI can be leveraged to create more equitable and efficient competitive environments.

Intervention through affirmative action highlights a broader methodological point regarding distributional inference. As noted by DellaVigna et al. (2012) regarding the 'importance of being marginal,' it is critical to evaluate whether interventions shift the behavior of those at the margin of participation. For instance, while some interventions may close the average gender gap, they may do so by attracting lower-ability individuals into competition (as seen in the 'adverse selection' results of Almås et al., 2020), rather than correcting the 'shying away' of high-ability women. Future research should prioritize this type of distributional analysis to ensure that competitive incentives and quotas attract the most qualified candidates.

Also, more long-term longitudinal studies are needed to track the formation and evolution of competitive preferences over lifecycles. This would allow for a better understanding of the causal pathways through which parental choices, education, and peer groups shape these preferences. For example, while laboratory experiments showed an inverted-U shaped relationship between endowment and competition (Chowdhury and Moffatt, 2017), there is no study from field focusing on gender.

Finally, an important but often neglected aspect of gender differences in competition is its endogenous effect on men and women and their non-pecuniary welfare. Many studies, including field experiments mainly focus on the areas and scope of engaging women more in competitive situations as that improves monetary rewards. However, the effects of competition on non-monetary aspects are often ignored. Schwieren and Weichselbaumer (2010) showed in

a laboratory experiment that competitive pressure often makes women cheat more. In a similar line, Chowdhury et al. (2021) found that females behave more dishonestly in a repeated setting when they can pre-plan doing so. Müller and Schwieren (2012), on the other hand, showed that women who are unwilling to compete are also more prone to neuroticism – which is negatively related to performance in competition. They mention that women who do not choose competitive incentives "know" that they should not. These studies indicate that paternalistic policies designed to make females compete more might have unintended consequences in terms of non-pecuniary welfare of females. Investigating this with field experiments would be a promising area of research.

In conclusion, the overall evidence suggests that the 'Gender and Competition' literature is entering a third phase of research. Phase 1 was about documenting the gap and Phase 2 was about exploring its cultural, demographic and contextual heterogeneity. Phase 3 focuses more on the 'Endogeneity of the Competitive Environment.' This means that we no longer see gaps as emerging from fixed attributes that women have, but as a 'response' to the costs of competition and to societal and institutional factors. We also anticipate further research that will focus on overall welfare of women (and men) instead of 'fixing' female behavior or competition. This shift in perspective – from 'fixing the women' to 'fixing the competition' to 'focusing on welfare' – captures an important direction in the evolution of the literature.

References

Abraham, L., Hallermeier, J. & Stein, A. (2024). Words matter: Experimental evidence from job applications, *Journal of Economic Behavior & Organization*, 225, 348-391.

Aksoy, B. & Chadd, I. (2025). Competitiveness at the intersection of gender and sexual orientation, *Journal of Economic Behavior & Organization*, 233, 106987.

Alan, S. & Ertac, S. (2019). Mitigating the gender gap in the willingness to compete: Evidence from a randomized field experiment. *Journal of the European Economic Association*, 17(4), 1147-1185.

Almås, I., Berge, L.I.O., Bjorvatn, K., Somville, V., & Tungodden, B. (2020). *Adverse selection into competition: Evidence from a large-scale field experiment in Tanzania*. NHH Dept. of Economics Discussion Paper No. 19/2020.

Almås, I., Cappelen, A.W., Salvanes, K.G., Sørensen, E.Ø., & Tungodden, B. (2016). Willingness to Compete: Family Matters. *Management Science*, 62(8), 2149–2162.

Almås, I., Cappelen, A.W., Salvanes, K.G., Sørensen, E.Ø., & Tungodden, B. (2016). What explains the gender gap in college track dropout? Experimental and administrative evidence. *American Economic Review,* 106(5), 296–302.

Andersen, S., Ertac, S., Gneezy, U., List, J.A., & Maximiano, S. (2013). Gender, competitiveness, and socialization at a young age: Evidence from a matrilineal and a patriarchal society. *Review of Economics and Statistics*, 95(4), 1438-1443.

Apicella, C.L. & Dreber, A. (2015). Sex Differences in Competitiveness: Hunter-Gatherer Women and Girls Compete Less in Gender-Neutral and Male-Centric Tasks. *Adaptive Human Behavior and Physiology*, 1, 247–269.

Apicella, C.L., Demiral, E.E., & Mollerstrom, J. (2017). No gender difference in willingness to compete when competing against self. *American Economic Review*, 107(5), 136-140.

Avery, M. (2023). *The self-limiting dynamics of affirmative action*. SSRN Working paper No. 4458610.

Avery, M., Leibbrandt, A., & Vecci, J. (2024). *Does Artificial Intelligence Help or Hurt Gender Diversity? Evidence from Two Field Experiments on Recruitment in Tech,* CESifo Working paper No. 10996.

Awad, E., Balafoutas, L., Chen, L., Ip, E. & Vecci, J. (2023). *Artificial Intelligence and Debiasing in Hiring: Impact on Applicant Quality and Gender Diversity*, SSRN Working paper No. 4626059.

Balafoutas, L. & Peter, N. (2026). *Experiments on policies that aim to close gender gaps in labor markets*. In: Handbook of Gender and Experimental Economics, Eds.: Cubel, M., Schwieren, C., Edward Elgar Publishing.

Balafoutas, L., & Sutter, M. (2012). Affirmative action policies promote women and do not harm efficiency in the laboratory. *Science*, 335(6068): 579-582.

Bayer, A., Bhanot, S. P., & Lozano, F. (2019). Does Simple Information Provision Lead to More Diverse Classrooms? Evidence from a Field Experiment on Undergraduate Economics. *AEA Papers and Proceedings*, 109, 110–114

Bedard, K., Dodd, J. & Lundberg, S. (2021). Can Positive Feedback Encourage Female and Minority Undergraduates into Economics? *AEA Papers and Proceedings*, 111, 128-32.

Bertrand, M. (2011). *New Perspectives on Gender*. In: Handbook of Labor Economics, Eds.: O. Ashenfelter, Card, D. vol. 4B, Elsevier, Amsterdam, 1543–1590.

Bjorvatn, K., Falch, R., & Hernæs, U. (2016). Gender, context and competition: Experimental evidence from rural and urban Uganda. *Journal of Behavioral and Experimental Economics*, 61, 31-37.

Blau, F.D., & Kahn, L.M. (2017). The gender wage gap: Extent, trends, and explanations. *Journal of Economic Literature*, 55(3), 789-865.

Boneva, T., Buser, T., Falk, A., & Kosse, F. (2024). *The Origins of Gender Differences in Competitiveness and Earnings Expectations: Causal Evidence from a Mentoring Intervention*. ECONtribute Discussion Paper No. 301.

Bönte, W., & Piegeler, M. (2013). Gender gap in latent and nascent entrepreneurship: driven by competitiveness. *Small Business Economics*, 41(4), 961-987.

Bönte, W., Procher, V., & Urbig, D. (2018). Gender differences in selection into self-competition. *Applied Economics Letters*, 25(8), 539–543.

Booth, A., & Nolen., P. (2012). Choosing to Compete: How Different Are Girls and Boys? *Journal of Economic Behavior & Organization*, 81(2), 542–55.

Booth, A., Fan, E., Meng, X., & Zhang, D. (2019). Gender Differences in Willingness to Compete: The Role of Culture and Institutions, *Economic Journal*, 129(618), 734–764.

Boschini, A., Dreber, A. von Essen, E., Muren, A. & Ranehill, E. (2019). Gender, risk preferences and willingness to compete in a random sample of the Swedish population. *Journal of Behavioral and Experimental Economics*, 83, 101467.

Boudreau, K., & Kaushik, N. (2020). *The Gender Gap in Tech & Competitive Work Environments? Field Experimental Evidence from an Internet-of-Things Product Development Platform*. NBER Working paper No. w27154.

Brown, A., & Chowdhury, S.M. (2017). The hidden perils of affirmative action: Sabotage in handicap contests. *Journal of Economic Behavior & Organization*, 133, 273-284.

Buser, T., & Sangi, S. (2025). *Willingness to Compete in Dirty Competitions*. IZA Discussion Paper No. 17676.

Buser, T., Geijtenbeek, L., & Plug, E. (2018). Sexual orientation, competitiveness and income, *Journal of Economic Behavior & Organization*, 151, 191-198.

Buser, T., Niederle, M., & Oosterbeek, H. (2014). Gender, competitiveness, and career choices. *Quarterly Journal of Economics*, 129(3), 1409-1447.

Buser, T., Niederle, M., & Oosterbeek, H. (2026). Can competitiveness predict education and labor market outcomes? Evidence from incentivized choice and survey measures. *Review of Economics and Statistics*, 1-19.

Buser, T., Peter, N., & Wolter, S.C. (2017). Gender, Competitiveness, and Study Choices in High School: Evidence from Switzerland. *American Economic Review*, 107(5), 125-130.

Buser, T., Peter, N., & Wolter, S.C. (2022). Willingness to compete, gender and career choices along the whole ability distribution. *Experimental Economics*, 25, 1299–1326.

Cárdenas, J.C., Dreber, A., von Essen, E. & Ranehill, E. (2012). Gender differences in competitiveness and risk taking: Comparing children in Colombia and Sweden. *Journal of Economic Behavior & Organization,* 83 (1), 11-24

Carlsson, F., Lampi, E., Martinsson, P., & Yang, X. (2020). Replication: Do women shy away from competition? Experimental evidence from China. *Journal of Economic Psychology*, 81, 102312.

Carpenter, J., Frank, R., & Huet-Vaughn, E. (2018). Gender differences in interpersonal and intrapersonal competitive behavior. *Journal of Behavioral and Experimental Economics*, *77*, 170-176.

Cassar, A., Wordofa, F. & Zhang, Y.J. (2016). Competing for the benefit of offspring eliminates the gender gap in competitiveness, *Proceedings of the National Academy of Sciences*. 113 (19) 5201-5205.

Cassar, A. & Zhang, Y.J. (2022): The competitive woman: Evolutionary insights and cross-cultural evidence into finding the Femina Economica, *Journal of Economic Behavior & Organization, 197*, 447-471.

Castilla, E.J., & Rho, H.J. (2023). The gendering of job postings in the online recruitment process. *Management Science*, 69(11), 6912-6939.

Charles, M., & Bradley, K. (2009). Indulging our gendered selves? Sex segregation by field of study in 44 countries. *American Journal of Sociology*, 114(4), 924-976.

Chen, Y., Yang, W., Luo, G., & Luo, J. (2024). Choosing tournament for children: Parenting style and information intervention. *China Economic Review*, 85, 102164.

Choe, C., Jung, S., & Oaxaca, R. (2022). *What's the Risk from Competing? Competition Aversion and the Gender Wage Gap*. IZA Working Paper No. 15048.

Chowdhury, S.M., & Gürtler, O. (2015). Sabotage in contests: a survey. *Public Choice*, 164(1), 135-155.

Chowdhury, S.M., Esteve-González, P., & Mukherjee, A. (2023). Heterogeneity, leveling the playing field, and affirmative action in contests. *Southern Economic Journal*, 89(3), 924-974.

Chowdhury, S.M., Jeon, J.Y., Kim, C., & Kim, S.H. (2021). Gender differences in repeated dishonest behavior: experimental evidence. *Games*, 12(2), 44.

Chowdhury, S. M., & Moffatt, P. G. (2017). Overbidding and heterogeneous behavior in contest experiments: A comment on the endowment effect. *Journal of Economic Surveys*, 31(2), 572-576.

Coffman, K.B., Collis, M.R., & Kulkarni, L. (2024). Whether to apply. *Management Science*, 70(7), 4649-4669.

Cotton, C., McIntyre, F., & Price, J. (2013). Gender differences in repeated competition: Evidence from school math contests. *Journal of Economic Behavior & Organization*, 86, 52-66.

Dariel, A., & Nikiforakis, N. (2022). *Is there a motherhood gap in the willingness to compete for pay?: Evidence from the Netherlands, the UAE and the USA*. NYUAD Working Paper No. 20220079.

Dariel, A., Kephart, C., Nikiforakis, N., & Zenker, C. (2017). Emirati women do not shy away from competition: evidence from a patriarchal society in transition. *Journal of the Economic Science Association*, 3(2), 121-136.

Dariel, A., Nikiforakis, N., & Stoop, J. (2022). *Competition, Selection Bias and Gender Differences Among Economics Majors*. NYUAD Working Paper No. 20220074.

De Paola, M., Gioia, F., & Scoppa, V. (2015). Are females scared of competing with males? Results from a field experiment. *Economics of Education Review*, 48, 117-128.

Del Carpio, L., & Fujiwara, T. (2023). *Do Gender-Neutral Job Ads Promote Diversity? Experimental Evidence from Latin America's Tech Sector*. NBER Working Paper No. w31314.

Del Carpio, L., & Guadalupe, M. (2022). More women in tech? Evidence from a field experiment addressing social identity. *Management Science*, 68(5), 3196-3218.

Delavande, A., Del Bono, E., Holford, A., & Nolen, P.J. (2024). *Less Macho, More Mellow: The Malleability of Competitiveness*. SSRN Working paper No. 4833785.

Delfgaauw, J., Dur, R., Sol, J., & Verbeke, W. (2013). Tournament incentives in the field: Gender differences in the workplace. *Journal of Labor Economics*, 31(2), 305-326.

DellaVigna, S., List, J. A., & Malmendier, U. (2012). Testing for altruism and social pressure in charitable giving. *Quarterly Journal of Economics*, 127(1), 1-56.

Deschamps, P. (2024). Gender quotas in hiring committees: A boon or a bane for women?. *Management Science*, 70(11), 7486-7505.

Díaz Escobar, A.M., Salas, L.M., Piras, C., & Suaya, A. (2023). *What job would you apply to? Findings on the impact of language on job searches*. IDB Working Paper Series No. IDB-WP-01417.

Dreber, A., von Essen, E. & Ranehill, E. (2014). Gender and competition in adolescence: task matters. *Experimental Economics* 17, 154–172

Dreber, A., Von Essen, E., & Ranehill, E. (2011). Outrunning the gender gap-boys and girls compete equally. *Experimental Economics*, 14(4), 567-582.

Drouvelis, M., & Pearce, G. (2025). Task difficulty and gender differences in competitiveness: Evidence from Botswana. *Oxford Bulletin of Economics and Statistics*, 87(4), 735-750.

Erkal, N., Gangadharan, L., & Xiao, E. (2022). Leadership selection: Can changing the default break the glass ceiling?. *The Leadership Quarterly*, *33*(2), 101563.

Exley, C.L., & Kessler, J.B. (2022). The gender gap in self-promotion. *The Quarterly Journal of Economics*, *137*(3), 1345-1381.

Falk, A., & Hermle, J., (2018). Relationship of gender differences in preferences to economic development and gender equality. *Science*, 362.6412: eaaas9899.

Feld, J., Ip, E., Leibbrandt, A., & Vecci, J. (2023). Do Financial Incentives Encourage Women to Apply for a Tech Job? Evidence from a Natural Field Experiment. *AEA Papers and Proceedings*, 113, 432-435.

Fletschner, D., Anderson, C.L., & Cullen, A. (2010). Are Women as Likely to Take Risks and Compete? Behavioural Findings from Central Vietnam. *Journal of Development Studies*, 46(8), 1459–1479.

Flory, J.A., Gneezy, U., Leonard, K.L., List, J.A. (2018). Gender, age, and competition: A disappearing gap?, *Journal of Economic Behavior & Organization*, 150, 256-276.

Flory, J.A., Leibbrandt, A., & List, J.A. (2015). Do competitive workplaces deter female workers? A large-scale natural field experiment on job entry decisions. *Review of Economic Studies*, 82(1), 122-155.

Flory, J.A., Leibbrandt, A., Rott, C. and Stoddard, O. (2021). Increasing workplace diversity: Evidence from a recruiting experiment at a Fortune 500 company. *Journal of Human Resources*, 56 (1) 73-92.

Flory, J.A., Leonard, K.L., Tsaneva, M., Vasilaky, K. (2023). How social structure shapes female competition throughout her lifetime. *Journal of Economic Behavior & Organization*, 216, 433-456.

Fornwagner, H., Pompeo, M., & Serdarevic, N. (2023). Choosing competition on behalf of someone else. *Management Science*, 69(3), 1555-1574.

Gillen, B., Snowberg, E. and Yariv, L. (2019). Experimenting with measurement error: Techniques with applications to the caltech cohort study. *Journal of Political Economy*, 127(4), 1826–1863.

Global Gender Gap Report (2025). *The World Economic Forum*. Available at: https://www.weforum.org/publications/global-gender-gap-report-2025/

Gneezy, U. & Niederle, M. & Rustichini, A. (2003). Performance In Competitive Environments: Gender Differences, *Quarterly Journal of Economics*, 118, 1049–1074.

Gneezy, U., & Rustichini, A. (2004). Gender and competition at a young age. *American Economic Review*, 94(2), 377-381.

Gneezy, U., Leonard, K.L., & List, J.A. (2009). Gender differences in competition: Evidence from a matrilineal and a patriarchal society. *Econometrica*, 77(5), 1637-1664.

Hakimov, R., Schmacker, R., & Terrier, C. (2023). *Confidence and college applications: Evidence from a randomized intervention.* Technical report, WZB Discussion Paper No. 962.

Harrison, G. W., & List, J. A. (2004). Field experiments. *Journal of Economic literature*, 42(4), 1009-1055.

Hauge, K.E., Kotsadam, A., & Riege, A. (2023). Culture and Gender Differences in Willingness to Compete, *Economic Journal*, 133(654), 2403–2426.

He, J.C., & Kang, S.K. (2025). Debiasing job ads by replacing masculine language increases gender diversity of applicant pools. *Proceedings of the National Academy of Sciences*, 122(7), e2409854122.

He, J.C., Kang, S.K., & Lacetera, N. (2021). Opt-out choice framing attenuates gender differences in the decision to compete in the laboratory and in the field. *Proceedings of the National Academy of Sciences*, 118(42), e2108337118.

Horn, D., Kiss, H.J. & Lénárd, T. (2022). Gender differences in preferences of adolescents: Evidence from a large-scale classroom experiment, *Journal of Economic Behavior & Organization,* 194, 478-522.

Hoyer, B., van Huizen, T., Keijzer, L., Rezaei, S., Rosenkranz, S. & Westbrock, B. (2020). Gender, competitiveness, and task difficulty: Evidence from the field, *Labour Economics,* 64, 101815.

Ibañez, M., & Riener, G. (2018). Sorting through affirmative action: Three field experiments in Colombia. *Journal of Labor Economics*, 36(2), 437-478.

Ifcher, J., & Zarghamee, H. (2024). Does Decision Making for Others Close the Gender Gap in Competition? *Management Science*, 70(7), 4165–4184.

Ip, E. (2025). Fair AI in hiring: Experimental evidence on how biased hiring algorithms and different debiasing methods affect the quality and diversity of applicants. *Behavioral Science & Policy*, 11(1), 44-54.

John, J.P. (2017). Gender differences and the effect of facing harder competition, *Journal of Economic Behavior & Organization*, 143, 201-222.

Jørgensen, L.K., Piovesan, M., & Willadsen, H. (2022). Gender differences in competitiveness: Friends matter, *Journal of Behavioral and Experimental Economics*, 101, 101955.

Kamas, L. & Preston, A. (2018): Competing with confidence: The ticket to labor market success for college-educated women, *Journal of Economic Behavior & Organization*, 155, 231-252.

Kessel, D., Mollerstrom, J., & Van Veldhuizen, R. (2021). Can simple advice eliminate the gender gap in willingness to compete?. *European Economic Review*, 138, 103777.

Khachatryan, K., Dreber, A., von Essen, E., & Ranehill, E. (2015). Gender and preferences at a young age: Evidence from Armenia, *Journal of Economic Behavior & Organization*, 118, 318-332.

Khadjavi, M., & Nicklisch, A. (2018). Parents' ambitions and children's competitiveness. *Journal of Economic Psychology*, 67, 87–102.

Khadjavi, M., Sipangule, K. & Thiele, R. (2024). Exposure to large-scale farms increases smallholders' competitive behavior and closes the gender gap, *World Development*, 176, 106519.

Klege, R.A., Visser, M., & Clarke, R.P. (2021). Competition and gender in the lab vs field: Experiments from off-grid renewable energy entrepreneurs in rural Rwanda. *Journal of Behavioral and Experimental Economics*, 91, 101662.

Klinowski, D. & Niederle, M. (2025). *Gender-equality paradox in competitiveness: Evidence and explanations*. Mimeo.

Klonner, S., Pal, S., & Schwieren, C. (2021). *Equality of the Sexes and Gender Differences in Competitiveness: Experimental Evidence from a Traditional Society with Gender-Balanced Norms*. SSRN Working paper No. 3940199.

Laury, S.K., Lee, D.J., & Schnier, K.E. (2019). Will Girls Be Girls? Risk Taking and Competition in An All-Girls' School. *Economic Inquiry*, 57, 1408-1420.

Lee, S., Niederle, M. & Kang, N. (2014). Do single-sex schools make girls more competitive?, *Economics Letters*, 124(3), 474-477.

Leibbrandt, A., Wang, L.C., & Foo, C. (2018). Gender quotas, competitions, and peer review: Experimental evidence on the backlash against women. *Management Science*, 64(8), 3501-3516.

Lénárd, T., Horn, D., & Kiss, H.J. (2024). Competition, confidence and gender: Shifting the focus from the overconfident to the realistic. *Journal of Economic Psychology*, *104*, 102746.

Lovász, A., Bat-Erdene, B., Cukrowska-Torzewska, E., Rigó, M., Szabó-Morvai, Á. (2023). Competition, subjective feedback, and gender gaps in performance, *Journal of Behavioral and Experimental Economics*, 102, 101954.

Lowes, S. (2021). Kinship structure, stress, and the gender gap in competition, *Journal of Economic Behavior & Organization*, 192, 36-57.

Lüthi, S., & Wolter, S.C. (2023). Is being competitive always an advantage? Competitiveness, gender, and labour market success. *Labour Economics*, 85, 102457.

Markowsky, E., & Beblo, M. (2022). When do we observe a gender gap in competition entry? A meta-analysis of the experimental literature. *Journal of Economic Behavior & Organization*, 198, 139-163.

Mayr, U., Wozniak, D., Davidson, C., Kuhns, D. & Harbaugh, W.T. (2012). Competitiveness across the life span: the feisty fifties. *Psychology and Aging*, 27(2), 278.

Müller, J., & Schwieren, C. (2012). Can personality explain what is underlying women's unwillingness to compete?. *Journal of Economic Psychology*, 33(3), 448-460.

Napp, C., & Breda, T., (2022). The stereotype that girls lack talent: A worldwide investigation. *Science Advances*, 8.10: eabm3689.

Niederle, M. & Vesterlund, L. (2011). Gender and Competition. *Annual Review of Economics*, 3, 601-630.

Niederle, M., & Vesterlund, L. (2007). Do women shy away from competition? Do men compete too much? *Quarterly Journal of Economics*, *122*(3), 1067-1101.

Niederle, M., Segal, C., & Vesterlund, L. (2013). How costly is diversity? Affirmative action in light of gender differences in competitiveness. *Management Science*, 59(1), 1-16.

Page, L., Sarkar, D. & Silva-Goncalves, J. (2017). The older the bolder: Does relative age among peers influence children's preference for competition?, *Journal of Economic Psychology*, 63, 43-81.

Palacios-Huerta, I. (2022). Competitiveness among Nandi female husbands. *Proceedings of the National Academy of Sciences*, 119(17), e2117454119.

Palffy, P., Lehnert, P., & Backes-Gellner, U. (2023). *Countering Gender-Typicality in Occupational Choices: An Information Intervention Targeted at Adolescents*. Swiss Leading House Economics of Education Working Paper No. 207.

Patnaik, A., Pauley, G.C., Venator, J., & Wiswall, M.J. (2023). *The Impacts of Same and Opposite Gender Alumni Speakers on Interest in Economics*. NBER Working Paper No. 30983.

Peter, N. (2026). *Women at the top, quotas, and competence expectations: evidence from an information experiment*. Mimeo.

Pink, S.L., Cervantez, J., Kirgios, E.L., Chang, E.H., & Milkman, K.L. (2025). Can stereotype reactance prompt women to compete? A field experiment. *Organization Science*, 36(5), 1643-2059.

Porter, C., & Serra, D. (2020). Gender differences in the choice of major: The importance of female role models. *American Economic Journal: Applied Economics*, 12(3), 226-254.

Preece, J., & Stoddard, O. (2015). Why women don't run: Experimental evidence on gender differences in political competition aversion. *Journal of Economic Behavior & Organization*, 117, 296-308.

Pugatch, T., & Schroeder, E. (2021). Promoting female interest in Economics: Limits to nudges. *AEA Papers and Proceedings*, 111, 123-127.

Reuben, E., Sapienza, P., & Zingales, L. (2024). Overconfidence and preferences for competition. *Journal of Finance*, 79(2), 1087-1121.

Reuben, E., Wiswall, M., & Zafar, B. (2017). Preferences and biases in educational choices and labor market expectations: Shrinking the black box of gender. *Economic Journal,* 127(604), 2153–2186.

Samek, A. (2019). Gender Differences in Job Entry Decisions: A University-Wide Field Experiment. *Management Science*, 65(7), 3272-3281.

Schwieren, C., & Weichselbaumer, D. (2010). Does competition enhance performance or cheating? A laboratory experiment. *Journal of Economic Psychology*, 31(3), 241-253.

Stoet, G., & Geary, D.C. (2018). The Gender-Equality Paradox in Science, Technology, Engineering, and Mathematics Education. *Psychological Science*, 29(4), 581-593.

Sutter, M. & Glätzle-Rützler, D. (2015). Gender Differences in the Willingness to Compete Emerge Early in Life and Persist. *Management Science*, 61(10), 2339-2354.

Thaler, R.T., & Sunstein, C.R. (2008). *Nudge: Improving Decisions about Health, Wealth, and Happiness*. Yale University Press, New Haven.

Treurniet, M., Stein, C., Lensink, R., & Lybbert, T.J. (2024). *Culture, agency and the willingness to compete: Evidence from a randomized field experiment*. Mimeo.

Tungodden, J., & Willén, A. (2023). When parents decide: Gender differences in competitiveness. *Journal of Political Economy*, 131(3), 751-801.

van Veldhuizen, R. (2022). Gender differences in tournament choices: Risk preferences, overconfidence, or competitiveness? *Journal of the European Economic Association*, 20(4), 1595–1618

Willinger, M., Dubois, D., & Bravaccini, S. (2023). Participation in Competitive Sports Closes Gender Gaps in Competition and in Risk Taking. *Journal of Sports Economics*, 24(1), 97-133.

Zhang, Y.J. (2012). *Can experimental economics explain competitive behavior outside the lab?* SSRN Working paper No 2292929.

Zhang, Y.J. (2019). Culture, Institutions and the Gender Gap in Competitive Inclination: Evidence from the Communist Experiment in China, *Economic Journal*, 129(617), 509–552.