BELIEVED GENDER DIFFERENCES IN SOCIAL PREFERENCES *

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While there is a vast (and mixed) literature on gender differences in social preferences, little is known about believed gender differences in social preferences. Using data from 15 studies and 8,979 individuals, we find that women are believed to be more generous and more equality-oriented than men. This believed gender gap is robust across a wide range of contexts that vary in terms of strategic considerations, selfish motives, fairness concepts, and payoffs. Yet this believed gender gap is largely inaccurate. Consistent with models of associative memory, specifically the role of similarity and interference, the believed gender gap is correlated with recalled prior life experiences from similar contexts and significantly affected by an experience that may interfere with the recall process of prior memories, even though this interfering experience should not affect the beliefs of perfect-memory Bayesians. Application studies further reveal that believed gender differences extend to the household (i.e., beliefs about contributions to the home, family, and upbringing of children), the workplace (i.e., beliefs about equal pay), and policy views (i.e., beliefs about redistribution, equal access to education, healthcare, and affordable housing). *JEL codes:* C91, D64, D91

I. Introduction

There are persistent gender gaps in labor market outcomes, with women earning less money and having lower representation in leadership positions (Goldin 2014; Blau and Kahn 2017). Motivated by these gaps, a rich body of literature investigates gender differences in behavior, providing evidence that

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women negotiate and ask for less (Babcock and Laschever 2003; Small et al. 2007; Hernandez-Arenaz and Iriberri 2019; Recalde and Vesterlund 2023; Roussille 2024), compete less (Gneezy, Niederle, and Rustichini 2003; Niederle and Vesterlund 2007, 2011; Saccardo et al. 2018), speak up less (Coffman 2014), claim less credit (Isaksson 2018), and self-promote less (Exley and Kessler 2022) than men do.

In addition to gender differences in behavior, beliefs about gender differences may contribute to disparate outcomes for men and women.[1] For instance, if women are expected to perform less well than men in certain jobs, women may be less likely to be hired in those jobs. Similarly, if women are expected to be more generous and to care more about equality—that is, to be more "socially oriented"—they may be chosen less often for certain leadership positions, such as those that involve distributing unequal pay and rewards.[2] However, unlike the rich and growing literature on believed gender differences in performance (Bohren, Imas, and Rosenberg 2019; Bordalo et al. 2019; Coffman, Exley, and Niederle 2021; Coffman, Collis, and Kulkarni 2024a, 2024b; Exley and Nielsen 2024), less is known about believed gender differences in the socially oriented behavior of men and women.[3] This is despite the fact that beliefs about gender differences in social preferences may influence decisions such as those relating to which employers they want to work for, which colleagues they want to work with, which politicians they want to vote for, which industries they want to select into given the gender composition

1. Indeed, see review articles on gender discrimination such as Riach and Rich (2002), Blau and Kahn (2017), and Bertrand and Duflo (2017).

2. Prior work (see Croson and Gneezy 2009) has also used the "socially oriented" terminology. For our purposes, we emphasize that by "socially oriented" we mean more than prosocial or generous and intend to include more equality-oriented and cooperative behavior.

3. As further evidence of this, a recent review about misperceptions of others in the field (Bursztyn and Yang 2022) highlights prior work on believed gender differences that relate to (i) female and male leaders' ability, (ii) female and male teachers' ability, (iii) managers' beliefs about females' and males' productivity, and (iv) children's future outcomes depending on gender and caste. Though all of this reviewed prior work (see the "Primary beliefs" column of Appendix Table A.1 in Bursztyn and Yang 2022) broadly relates to believed gender differences in ability, none of it relates to believed gender differences in social preferences. There is also work on believed gender differences in contexts relating to risk (Eckel and Grossman 2002; Ball, Eckel, and Heracleous 2010) and labor force participation and affirmative action (Bursztyn et al. 2023).

of various industries, and which people to praise or scold given their behavior and gender.[4]

The goal of this article is to provide—across a wide range of contexts—an extensive examination of believed gender differences in behavior and attitudes relating to social preferences. Although we find little to no evidence for gender differences in behavior or attitudes relating to social preferences, we find robust evidence for the believed gender gap in social preferences.[5] Across a series of studies, we find that women are believed to be more socially oriented in contexts that vary in numerous dimensions, including the relevance of selfish motives, the extent of strategic considerations, the types of fairness concepts likely involved in the decision, and the size of the payoffs. Focusing on the 3,382 participants in our main economic games studies, we find that relative to men, women are expected to be more likely to choose socially oriented outcomes in (i) a classic dictator game, (ii) a dictator game that introduces a trade-off between equality and efficiency concerns, (iii) a dictator game that introduces a trade-off between equality and performance-based entitlement concerns, (iv) an ultimatum game, (v) a trust game, (vi) a prisoner's dilemma, and (vii) a public goods game. The believed gender gap in social preferences even arises in third-party versions of these games. We find that women are expected to give more across a wide range of stakes in a study that asks participants to make decisions about whether to keep money for themselves or to give to others when giving to others results in the money being multiplied by 0.2, 0.4, 0.6, 0.8, 1, 2, 4, 6, 8, or 10. We find significant evidence for the believed gender gap when examining the beliefs held by men and the beliefs held by women: among

4. Just as gender differences in social preferences may influence which jobs workers prefer (Daymont and Andrisani 1984; Grove, Hussey, and Jetter 2011; Abraham and Burbano 2022; Burbano, Padilla, and Meier forthcoming), beliefs about gender differences in social preferences may influence whether employers view men or women as better fits.

5. These inaccurate beliefs may also relate to prior work on stereotypes relating to a "kernel of truth" (Bordalo et al. 2016) that women are more socially oriented. Although we observe little to no evidence for actual gender differences in the contexts we consider, there is evidence in the broader literature for women being more socially oriented than men in some contexts, such as mothers providing more child care (Aguiar and Hurst 2007) and women being more left-leaning (Bertrand 2011). These inaccurate beliefs could also relate to stereotypes that akin to Eagly and Steffen (1984) and Schwartzstein (2014) may arise from individuals partly neglecting the importance of the context (Ross 1977).

four different subject pools (undergraduate students, online participants, online participants with self-reported managerial and hiring experience, and a representative sample), in a study version that asks about broader beliefs (e.g., about the likelihood of men and women favoring "decisions that achieve equality" rather than whether they favor the (5, 5) split in a dictator game), in study versions with fewer belief questions, in study versions with belief questions framed in different ways, and in a study version that obscures our focus on gender by eliciting beliefs about groups of individuals who are defined by several demographic characteristics rather than just their gender. This last study reveals that the believed gender gap in social preferences is larger than the believed difference between the youngest and oldest age group, and it is larger than the believed differences in increases from one income bracket to the next (see footnote 28).

Prior work points to potential explanations in considering the believed gender gap in social preferences. Given individuals' vast number of experiences pertaining to the extent to which men and women are socially oriented, one explanation relates to prior work that documents the connection between experiences and beliefs (see Malmendier and Nagel 2011 and a review in Malmendier 2021b).[6] In addition, which experiences or memories people recall—and thus the connection between beliefs and memory—may prove particularly important as shown in recent work (Bordalo, Gennaioli, and Shleifer 2020; Bordalo et al. 2021, 2023, forthcoming; Conlon and Patel 2023; Graeber, Roth, and Zimmermann 2024; Enke, Schwerter, and Zimmermann 2024). For instance, as modeled in Bordalo et al. (forthcoming), participants may form their beliefs about many of the novel (i.e., likely unfamiliar) contexts we investigate in our studies by making simulations from similar (but not identical) contexts they encounter outside of our studies.[7]

6. See also Malmendier and Nagel (2016); Schwerter and Zimmermann (2020); Malmendier (2021a); Malmendier and Wellsjo (2024); Malmendier and Wachter (2022); Nagel and Xu (2022); Kibris and Uler (2023); Malmendier and Shen (2024). See also Schwerter and Zimmermann (2020) for causal evidence on how experiences can shape trust in economic games, and see Conlon et al. (2022) for the differential impact of personal over others' experiences in influencing beliefs.

7. A common feature of many of these models relates to the role of similarity and memory. For related work on similarity-based learning, see Ilut and Valchev (2023) and Alsan et al. (2024). See Mullainathan (2002) for an earlier study on

Motivated by the idea that recalled experiences from similar contexts shape beliefs about new contexts, we recruited 799 participants across two studies to examine whether there are correlations between the believed gender gap in social preferences in our study contexts and similar memories from outside of our studies. The first study reveals that the believed gender gap is larger among participants who name a woman when asked to recall someone they think of as being generous. The second study reveals that the believed gender gap is larger among participants who report having spent more of their childhood with female caretakers and larger among participants who report having experienced, over the course of their life, relatively more women who are generous and equality oriented.

In addition to these findings related to similarity, we investigate whether there is evidence for another defining feature of models of associative memory and belief formation: interference. Interference relates to the idea that when a person recalls memories to form beliefs, the ability to recall one memory may be hindered by the recall of another memory. Building off the design in Schwerter and Zimmermann (2020), we investigate the impact of an "interfering" experience that, since it relates to the socially oriented behavior of a man and a woman in similar contexts to the context we ask about in our belief questions, may affect the recall process of participants forming beliefs in our study. Results from two additional studies with 3,198 participants confirm that an interfering experience causally affects the believed gender gap in social preferences. Notably, we document this causal impact of an interfering experience even after we provide and require participants to accurately report back information on the full distribution of socially oriented behavior of men and women in similar contexts, implying that the interfering experience should *not* affect the beliefs of perfect-memory Bayesians.

We recruited 1,600 participants for studies that highlight the potential implications and applications of the believed gender gap in social preferences. First, we show that the believed gender gap in social preferences extends to the household (i.e., women are believed to care more about equal contributions to the home, family, and upbringing of children), the workplace (i.e., women are expected to favor equal pay more often), and policy views (i.e.,

memory and Malmendier and Wachter (2022) for a review of the memory literature.

women are expected to be more supportive of redistribution and equal access to education, health care, and affordable housing). Second, an incentivized worker-employer experiment reinforces some of these findings: relative to men, female employers are expected to favor equal pay over performance pay more often. Third, the incentivized worker-employer experiment also allows us to document how this belief can influence which employers are favored: workers favor female employers more when equal pay is to their benefit (i.e., when the workers are low performers and would benefit from equal pay rather than performance pay). Fourth, we replicate the believed gender gap in social preferences with a sample of "professional" participants with self-reported management and hiring experience and show that the professional participants expect labor market implications to follow from the believed gender gap in social preferences. Specifically, professional participants think the believed gender gap in social preferences will be helpful to women in cooperative workplaces but harmful to women in competitive workplaces. These findings add to prior work that often finds positive relationships between socially oriented behavior and labor market outcomes (see Dohmen et al. 2009; Sauer 2015; Deming 2017), including highlighting how the context of the workplace likely influences the extent to which the believed gender gap in social preferences helps or harms women.[8]

Beyond the novel connections between the believed gender gap in social preferences and the literature on memory and beliefs, this article relates to two sets of literature that specifically address gender and social preferences. The first set of literature asks whether there are gender differences in behavior that relate to social preferences. Early work raised this important question and found evidence for women being more socially oriented in dictator games (Eckel and Grossman 1998) and for women being more equality oriented in modified dictator games (Andreoni and Vesterlund 2001; Dickinson and Tiefenthaler 2002). More recent work adds support to findings in which women give more in classic dictator games (for reviews, see Engel 2011; Bilén, Dreber, and Johannesson 2021) and to findings in which women are more equality oriented in contexts such as those relating to redistribution (see the review in Bertrand 2011). However, when consider-

8. Related, for evidence showing that human resource managers do make inferences about one's prosociality from their resume, see also Heinz and Schumacher (2017).

ing the results across many contexts, evidence for gender differences in social preferences is mixed: Croson and Gneezy (2009, 448) conclude that "women are neither more nor less socially oriented, but their social preferences are more malleable." Niederle (2016, 72) similarly concludes that "the message about gender differences in altruism and cooperation is much more mixed than one might have expected."[9] Our results add support to the growing consensus that—despite gender differences in socially oriented behavior arising in some contexts—we do not observe robust evidence across contexts for a gender gap in social preferences.[10]

The second set of literature jointly examines gender differences in social preferences and beliefs about gender differences in social preferences. Unlike the first set of literature that focuses on behavior that has been reviewed in survey papers and meta-analyses, this literature is nascent. We are aware of only four papers that directly examine gender differences in behavior relating to social preferences and beliefs about gender differences in that behavior.[11] These studies find that women are expected

9. Prior work finds that gender differences in socially oriented behavior can depend on the cost of giving (Andreoni and Vesterlund 2001), the type of charity involved (Andreoni, Brown, and Rischall 2003), the age of individuals (List 2004), the information provided about others (Meier 2007), the risk involved as noted in the review article by Eckel and Grossman (2008) (see also Gauriot, Heger, and Slonim 2020, 2022) for results on the need to carefully and jointly consider both risk and altruism preferences), the ability to avoid being asked to give (DellaVigna et al. 2013), social framing (Ellingsen et al. 2013), whether gender is primed (Boschini et al. 2018), whether the game is a trust game or gift exchange game (Van Den Akker et al. 2020), whether inequity results from merit or luck (Buser et al. 2020), and the country and the relationship between the givers and recipients (Doñate-Buendía, García-Gallego, and Petrović 2022). More broadly, the relevant gender norms across situations are likely to influence the extent of gender differences (Eagly 2009; Babcock, Bowles, and Bear 2012).

10. There is also mixed evidence on gender differences in socially oriented behavior in developing countries when it comes to spending habits. Some papers find evidence in support of women being more inclined toward socially oriented expenditures (Duflo 2003; Armand et al. 2020), whereas others have not found a gender effect (Benhassine et al. 2015; Haushofer and Shapiro 2016).

11. As discussed in footnote 3, much of the literature on gender differences in behavior and beliefs about gender differences in that behavior has centered on believed gender differences in ability. Prior work related to perceptions about gender differences in social preferences has also focused mostly on beliefs about broader traits rather than eliciting beliefs about specific behavior and observing specific behavior associated with those beliefs (Spence, Helmreich, and Stapp 1975; Eagly and Steffen 1984; Williams and Best 1990; Diekman and Eagly 2000; Fiske et al.

to be more socially oriented in a context in which they observe more socially oriented behavior, specifically in dictator games (Mayo 2017; Brañas-Garza, Capraro, and Rascón-Ramírez 2018), a low-promotability volunteer task (Babcock et al. 2017), and a coordination game (Cason, Gangadharan, and Grossman 2022). Demonstrating how this finding generalizes to other contexts, we find that women are expected to be more socially oriented even in contexts in which women are not more socially oriented than men are, in contexts without selfish motives, in contexts with various payoffs and design parameters, in contexts that span a rather extensive set of economic games, in contexts involving different subject pools, and in contexts that pertain to applied domains ranging from the workplace to the household to policy views.

The rest of the article is organized as follows. In Section II, we investigate beliefs about the socially oriented behavior of men and women. Specifically, we examine whether there exists a believed gender gap in socially oriented behavior, Δ, which we define as follows:

$$\Delta \equiv B(F) - B(M) \equiv \text{believed gender gap in socially oriented behavior}$$

$$B(F) \equiv \text{beliefs about the socially oriented behavior of women}$$

$$B(M) \equiv \text{beliefs about the socially oriented behavior of men.}$$

We measure socially oriented behavior using binary choices between a socially oriented outcome and a non–socially oriented outcome in a range of contexts. We measure beliefs as the believed percent of men and women who chose the socially oriented outcome in a given context.

After observing evidence for a belief that women are more socially oriented than men are, that is, $\hat{\Delta} > 0$, we investigate the potential drivers, applications, and implications of this believed gender gap in the remaining sections.

Section III examines potential drivers of the believed gender gap in socially oriented behavior. Motivated by prior literature on the connection between beliefs and experiences—specifically the connection between beliefs and the recall of those experiences—Section III tests whether there is evidence for beliefs being driven

2002; Bandiera et al. 2022). We also differ from this prior work in many of the applications we focus on (e.g., beliefs about equal redistribution) and given findings related to associative memory.

by two defining features of memory models: similarity and interference. Following Bordalo et al. (forthcoming), we assume that participants in our experiments estimate the proportions of men and women who chose the socially oriented option in a given context by (i) recalling experiences that are similar to that context and (ii) using these recalled experiences to simulate behavior in that context. This results in the following hypothesis.

> *Similarity Hypothesis*: The believed gender gap in socially oriented behavior, Δ, is increasing in prior experiences with socially oriented women and decreasing in prior experiences with socially oriented men.

We further assume that experiences compete for retrieval when participants try to recall them, resulting in the following hypothesis.

> *Interference Hypothesis*: An experience that should not affect the beliefs of perfect-memory Bayesians may affect the believed gender gap in socially oriented behavior, Δ, if it interferes with the recall process of prior memories about the socially oriented behavior of men and women.

Section IV investigates the potential applications and implications of the believed gender gap in socially oriented behavior in relation to the household, the workplace, and policy views.

Section V concludes and highlights avenues for future work.

II. Documenting the Believed Gender Gap in Social Preferences

To investigate whether there is a believed gender gap in social preferences, we designed a series of Economic Games studies. Specifically, motivated by prior literature relating to social preferences, the economic games in these studies are based off classic dictator games (Kahneman, Knetsch, and Thaler 1986; Forsythe et al. 1994; Eckel and Grossman 1998; Dickinson and Tiefenthaler 2002), dictator games with efficiency concerns (Andreoni and Vesterlund 2001; Andreoni and Miller 2002; Charness and Rabin 2002), dictator games with entitlement concerns (Cherry, Frykblom, and Shogren 2002; Dickinson and Tiefenthaler 2002; Almås, Cappelen, and Sørensen 2021; Almås, Cappelen, and Tungodden 2020), ultimatum games (Güth, Schmittberger, and Schwarze 1982; Eckel and Grossman 2001;

Solnick 2001; Bereby-Meyer and Niederle 2005; Guth, Schmidt, and Sutter 2007), trust games (Camerer and Weigelt 1988; Berg, Dickhaut, and McCabe 1995; Croson and Buchan 1999; Buchan, Croson, and Solnick 2008; Garbarino and Slonim 2009), prisoner's dilemma games (Dal Bó and Fréchette 2011, 2018; Capraro 2018), and public goods games (Marwell and Ames 1981; Andreoni 1988). Sections II.A–II.C describe the experimental design and results of our main studies, and Section II.D overviews the design and results of our robustness studies.

II.A. Experimental Design of the Main Economic Games Studies

This section describes the design for the two main Economic Games studies: the Economic Games (Undergraduate Students) study and the Economic Games (Online Participants) study.

1. *Scenarios.* There are 14 scenarios, and three types of players: Player 1 (P1), Player 2 (P2), and the Neutral Player (NP). In each, the decisions made by a subset of these players determine the points given to P1 and P2. Each scenario is built off a common experimental game to measure social preferences in which one or two players make a binary decision. We use binary decisions to facilitate belief elicitation.[12] Given the beliefs we later elicit, we refer to the decision maker as P1 in scenarios 1–7 and as the NP in scenarios 8–14 (although P2 also makes decisions in some of these scenarios). Online Appendix Table A.4 shows the points for P1 and P2 that result from the decisions made in each game, which are labeled as scenarios 1–14.

The decision maker in each scenario chooses between D1 (the non–socially oriented outcome) and D2 (the socially oriented outcome).[13] This terminology is meant for clarity given the focus of our article and does not imply that social preferences cannot be relevant in choosing D1. The socially oriented outcome results when the decision maker (i) acts more generously and equality-oriented in "first-party scenarios," in which their decisions in-

12. By restricting to binary decisions, we can elicit participants' beliefs about the percentage of other participants who make one decision in a scenario, and these beliefs then immediately imply their beliefs about the percentage of participants who make the other decision in that scenario.

13. We focus on the decisions made by the main decision maker since we only elicit beliefs about those decisions. But in some games, two participants make decisions and we note that P2 is always the non–main decision maker.

fluence their own payoffs; or (ii) acts more equality-oriented in "third-party scenarios," in which their decisions only influence the payoffs of others.[14]

Scenarios 1–7 are first-party scenarios because P1 chooses between D1 and D2, which influences how many points are given to themselves and how many points are given to P2. Specifically, (P1's points, P2's points) are as follows:

- *Scenario 1* involves a dictator game (DG). While D2 yields (5, 5), D1 yields an unequal split of (10, 0).
- *Scenario 2* involves a dictator game with efficiency concerns (DG-EFF). While D2 yields (5, 5), D1 yields an unequal—but more efficient—split of (15, 0).
- *Scenario 3* involves a dictator game with entitlement concerns (DG-ENT). While D2 yields (5, 5), D1 yields a higher amount for P1 when P1 is "entitled" to it. Specifically, D1 yields (10, 0) when P1 outperforms P2 on a math task (shown in Online Appendix Figure C.25) but (5, 5) otherwise.[15]
- *Scenario 4* involves an ultimatum game (UG). While D2 yields (5, 5), D1 yields the unequal split of (9, 1) if it is accepted by P2 but (0, 0) if it is rejected by P2.[16]
- *Scenario 5* involves a trust game (TG). If P1 distrusts P2 by choosing D1, then (10, 0) is guaranteed. If P1 trusts P2 by choosing D2, the amount of points is doubled and the

14. In some games, the more equality-oriented outcome is obvious (e.g., in the dictator games). In other games (e.g., a prisoner's dilemma game where equal outcomes can result from both participants cooperating or both participants defecting), the more equality-oriented outcome is less obvious. If we define the more equality-oriented outcome as one that either guarantees the equal outcome or makes the payoff-maximizing equal outcome more likely, the more socially oriented outcome is always the more equality-oriented outcome. In addition, the more socially oriented behavior aligns with other social preferences—for example, the outcome in which participants trust more in the trust game, contribute more in the public goods game, and cooperate more in the prisoner's dilemma game.

15. To narrow in on entitlement concerns—and given the well-documented gender gap in competition (Niederle and Vesterlund 2011)—note that P1 cannot be made worse off by choosing the entitlement payoff even if they performed "worse" than P2.

16. To ensure that P2 only faces a binary decision in this scenario and to ensure P2 receives a higher number of points from a choice of D2, P2 is only given the opportunity to reject or accept the unequal split of (9, 1). If P1 chooses D2, the equal split of (5, 5) is definitely implemented.

distribution of points equals (10, 10) if P2 chooses to reward that trust or (0, 20) if P2 chooses to punish that trust.[17]

- *Scenario 6* involves a prisoner's dilemma (PD). If P1 defects by choosing D1, then (15, 0) results if P2 cooperates, but (5, 5) results if P2 also defects. If P1 cooperates by choosing D2, then (10, 10) results if P2 also cooperates, but (0, 15) results if P2 defects.
- *Scenario 7* involves a public goods game (PGG). If P1 does not contribute by choosing D1, then (18, 8) results if P2 contributes, but (10, 10) results if P2 also does not contribute. If P1 contributes by choosing D2, then (16, 16) results if P2 also contributes, but (8, 18) results if P2 does not contribute.[18]

We refer to scenarios 8–14 as the third-party scenarios because the NP chooses between D1 and D2, which influences how many points are given to the two other participants (P1 and P2). Relative to the first-party scenarios, the only difference in the third-party scenarios is that the NP—rather than P1—chooses between D1 and D2. Thus, while results from scenarios 1–7 allow us to explore beliefs about gender differences in social preferences when being socially oriented can be financially costly (indeed, D1 can be classified as the "selfish" choice in all of these scenarios), results from scenarios 8–14 allow us to consider beliefs about gender differences in social preferences when selfish motives are not relevant.[19]

2. *Beliefs.* In the beliefs part of the study, described in Online Appendix Table A.5, participants are asked two belief

17. Aksoy et al. (2018) finds that the behavior in an incentivized trust game is correlated with a survey measure of trust (when both players are endowed but not when only the first mover is endowed). We find believed gender differences with the incentivized trust game noted here and with broader measures of trust in several of our additional studies (the Broader Beliefs (Online Participants) study, the Broader Beliefs (Representative Sample) study, and the Broader Beliefs (Equality Attitudes) study).

18. Note that this is equivalent to a PGG where both participants start off with 10 points, they can choose to contribute their 10 points to the public good or not, the number of points in the public good is multiplied by 1.6, and the number of points in the public good is redistributed equally between P1 and P2.

19. D1 can be classified as the selfish choice because of the following: P2 always receives (expected) higher payoffs from D2, but P1 receives (expected) higher payoffs from D1 with only one possible exception (i.e., the expected payoffs from D1 in scenario 4 could be lower if the rejection rates of D1 are high in the UG).

questions in each of the 14 scenarios for a total of 28 beliefs. In each first-party scenario (scenarios 1–7), the two belief questions ask participants to predict the percentage of female P1s who choose D1 and the percentage of male P1s who choose D1 in that scenario. In each third-party scenario (scenarios 8–14), the two belief questions ask participants to predict the percentage of female NPs who choose D1 and the percentage of male NPs who choose D1 in that scenario. Answers to each belief question are provided with sliders that allow participants to select a range that covers 7 percentage points from 0% to 100%. Beliefs are incentivized for accuracy: participants are allocated £10 or $2 (when run with undergraduate students and online participants, respectively) if they select a range on the slider that includes the true percentage.[20] On the screen where participants provide beliefs, information about the payoffs that result from D1 and D2 is always presented quantitatively and qualitatively to facilitate comprehension and in a manner that is consistent with how it is presented in the decisions part (see Online Appendix Figures C.23 and C.6 for screenshots of how first-party decisions and beliefs about those decisions are elicited).

3. *Decisions.* In the decisions part of the study, participants are informed that they will be randomly assigned to a group with two other participants who complete this study and each member of their group will be randomly assigned to be P1, P2, or the NP. Participants are then asked to make the relevant decisions in each scenario in the event that they are assigned to be P1, P2, or the NP. As described in Online Appendix Table A.6, this results in 14 decisions that correspond to the beliefs we elicit: 7 decisions as P1 in the first-party scenarios and 7 decisions as the NP in the third-party scenarios. This also results in eight additional decisions as P2 in scenarios 4–7 and 11–14, although these decisions are not the focus of our analyses since we do not elicit beliefs about them. Decisions are incentivized: each point is equal to £1 or $0.10 (when run with undergraduate students and online participants, respectively).

20. We seek to follow the recommendation in Danz, Vesterlund, and Wilson (2022) to provide simple incentives for accurate beliefs; indeed, we implement their proposal of simply rewarding participants "if the true outcome falls within some bounds around their guess."

4. *Implementation Details.* All participants face the same set of decisions and belief questions. All that varies is that the order in which they make these decisions and provide these beliefs is randomly determined at the participant level.[21] After completing the decisions and the beliefs parts, participants answer a short follow-up survey. To determine their payments, one part—decisions or beliefs—is randomly selected as the part that counts. If the beliefs part is the part that counts, participants receive the amount they are allocated in one randomly selected belief question. If the decisions part is the part that counts, participants receive the cash equivalent of the points allocated to them in one randomly selected scenario.[22] Participants receive detailed instructions—including on the payment procedure—and must correctly answer understanding questions at various points in the study. No participants are excluded for having answered understanding questions incorrectly. Instead, participants are given as many attempts as needed to answer these questions correctly.

We recruited two sets of participants to complete the Economic Games studies. In the Economic Games (Undergraduate Students) study, to assess these beliefs among a traditional subject pool, we recruited 382 undergraduate students through the Finance and Economics Experimental Laboratory at the University of Exeter.[23] In the Economic Games (Online Participants)

21. Participants are randomly assigned to complete either the decisions part or the beliefs part first. In the beliefs part, participants face two blocks (beliefs relating to scenarios 1–7 or scenarios 8–14) in a random order, and the scenarios in those blocks are in a random order. Whether the belief question about men always precedes the belief question about women, or vice versa, is randomized at the level of the participant. in the decisions part, participants face four blocks (pertaining to P1's decisions in scenarios 1–7, the NP's decisions on behalf of P1 in scenarios 8–14, P2 interacting with P1 in scenarios 4–7, and P2 interacting with the NP in scenarios 11–14) in a random order, and the order of scenarios in those blocks is random.

22. Specifically, if the decisions part is the part that counts, recall that participants are randomly assigned to a group with two other participants, and each group member is randomly assigned P1, P2, or the NP. Thus, participants are given the number of points in the randomly selected scenario that corresponds with (i) whether they are assigned to P1, P2, or the NP; and (ii) the decision made by the participant assigned to be P1 if P1 made a decision in that scenario, the decision made by the participant assigned to be NP if NP made a decision in that scenario, and/or the decision made by the participant assigned to be P2 if P2 made a decision in that scenario.

23. Although we sought to only recruit undergraduate students, 13 graduate students completed our study. They are dropped from our analyses, although

study, to assess the robustness of these beliefs in a more diverse subject pool, we recruited 400 online participants from Prolific.[24] (See Online Appendix Table A.1 for full implementation details and Online Appendices C.1 and C.2 for full instructions).

II.B. Decisions in the Main Economic Games Studies

In this section, we present results on the decisions made by men versus the decisions made by women. Specifically, for each scenario, Table I shows how the rate at which the socially oriented outcome depends on whether the decision maker is a man or woman. D(F) shows the rate among female decision makers, D(M) shows the rate among male decision makers, and Δ shows the difference in these rates. Standard errors are shown in parentheses. Each scenario is defined according to the game involved (noted in the column) and whether it involves first-party decisions (Panels A and B) or third-party decisions (Panels C and D). The results are also presented separately for each study population: for the undergraduate students (Panels A and C) and for the online participants (Panels B and D).

The main result from Table I is that while some gender differences in decisions emerge, there are no robust gender differences in decisions across contexts. For example, consider the results in Panel A, column (1). When undergraduate students make first-party DG decisions, approximately 32% of men and 32% of women choose the socially oriented outcome of (5, 5), which implies a Δ that is nearly zero (although not exactly zero due to rounding). More generally, in 24 out of the 28 contexts—defined by the scenario and by the study population—we fail to reject that $\Delta = 0$. When considering the four times that Δ is statistically significant, this evidence never replicates in both of our study populations. At most, gender differences in these decisions are sensitive to both the study population and the payoffs involved.

Despite the limited evidence for gender differences in decisions, the pattern of results in Table I shows that decision

our results are entirely robust to including them. Also, when examining our decisions data from this study—given our focus on decisions made by men versus women and since we are underpowered to consider more gender diverse groups of students—we exclude one student who identified as neither a man nor a woman. We include data from this participant when we turn to our beliefs data. We hope future work also investigates more inclusive and diverse measures of gender.

24. For more on Prolific, see Palan and Schitter (2018) and Peer et al. (2022).

TABLE I

RATE OF CHOOSING THE SOCIALLY ORIENTED OUTCOME IN THE ECONOMIC GAMES STUDIES

Game	DG (1)	DG-EFF (2)	DG-ENT (3)	UG (4)	TG (5)	PD (6)	PGG (7)
Panel A: Undergraduate students, first-party scenarios							
D(F)	0.32	0.16	0.15	0.70	0.25	0.27	0.36
D(M)	0.32	0.13	0.18	0.74	0.24	0.36	0.43
Δ	0.01	0.03	−0.03	−0.04	0.00	−0.09*	−0.07
	(0.05)	(0.04)	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)
N	381	381	381	381	381	381	381
Panel B: Online participants, first-party scenarios							
D(F)	0.60	0.46	0.38	0.76	0.43	0.47	0.56
D(M)	0.46	0.36	0.37	0.77	0.44	0.47	0.52
Δ	0.14***	0.10**	0.01	−0.01	−0.01	−0.00	0.04
	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)
N	396	396	396	396	396	396	396
Panel C: Undergraduate students, third-party scenarios							
D(F)	0.74	0.65	0.46	0.83	0.61	0.61	0.57
D(M)	0.72	0.57	0.44	0.87	0.66	0.67	0.73
Δ	0.02	0.08	0.02	−0.05	−0.05	−0.05	−0.16***
	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)
N	381	381	381	381	381	381	381
Panel D: Online participants, third-party scenarios							
D(F)	0.82	0.72	0.61	0.83	0.74	0.68	0.75
D(M)	0.81	0.71	0.61	0.86	0.69	0.69	0.76
Δ	0.02	0.01	0.01	−0.03	0.05	−0.01	−0.01
	(0.04)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.04)
N	396	396	396	396	396	396	396

Notes. D(F) and D(M) show the rates at which female and male decision makers choose the socially oriented outcome in a scenario, Δ shows the difference in these rates. Standard errors are shown in parentheses. Columns (1)–(7) correspond to decisions made by female and male decision makers in the following games (see Online Appendix Table A.4 for more details): the dictator game (DG), the dictator game with efficiency concerns (DG-EFF), the dictator game with entitlement concerns (DG-ENT), the ultimatum game (UG), the trust game (TG), the prisoner's dilemma (PD), and the public goods game (PGG). Panels A and B correspond to the decisions made in the first-party versions of the noted game, and Panels C and D to the third-party versions of the noted game. The data are from the Economic Games studies run with undergraduate students (excluding one student who did not select male or female as their gender) in Panels A and C and with online participants (excluding four participants who did not select male or female as their gender) in Panels B and D. * $p < .10$, ** $p < .05$, *** $p < .01$.

makers pay attention to and respond to how incentives vary across the scenarios. Consistent with prior work on how distributional decisions often reflect selfish motives (see Konow 2000), both men and women are less likely to choose the socially oriented outcome in first-party scenarios (see Panels A and B) than in third-party scenarios, in which selfish motives are not relevant (see Panels C and D). In addition, relative to the DG scenarios

(see column (1)), the rate of choosing the socially oriented outcome is lower when choosing the non–socially oriented outcome aligns with efficiency concerns (in the DG-EFF scenarios, see column (2)), is lower when the non–socially oriented outcome aligns with entitlement concerns (in the DG-ENT scenarios, see column (3)), and is higher when the non–socially oriented outcome may be rejected (in the UG scenarios, see column (4)).

II.C. Beliefs in the Main Economic Games Studies

In this section, we present results on the beliefs about men versus the beliefs about women. For clarity, we emphasize that this is different than beliefs held by men versus beliefs held by women, although we note that Section II.D.3 shows that our results are robust to the beliefs held by either gender.

Following a similar structure as Table I, Table II presents results on beliefs about male versus female decision makers. B(F) indicates the average believed percent of female decision makers who choose the socially oriented outcome, B(M) indicates the average believed percent of male decision makers who choose the socially oriented outcome, and Δ shows the difference in these beliefs and whether this difference is statistically significant (when standard errors are clustered at the participant level).

Before considering believed gender differences, we note that—like the results on decisions shown in Table I—several patterns in the results in Table II are reassuring in terms of participants paying attention to and responding to how incentives vary across the scenarios. Consistent with the role of selfish motives, in all contexts, participants believe that men and women are less likely to choose the socially oriented outcome in first-party scenarios (see Panels A and B) than in third-party scenarios (see Panels C and D). In addition, relative to the DG scenarios (see column (1)), participants believe that the percent of decision makers choosing the socially oriented outcome is lower when choosing the non–socially oriented outcome aligns with efficiency concerns (in the DG-EFF scenarios, see column (2)), is lower when the non–socially oriented outcome aligns with entitlement concerns (in the DG-ENT scenarios, see column (3)), and is higher when the non–socially oriented outcome may be rejected (in the UG scenarios, see column (4)).

Turning to our main result of interest, Table II reveals clear evidence for the believed gender gap in social preferences: women

TABLE II

BELIEFS ABOUT THE PERCENT OF DECISION MAKERS CHOOSING THE SOCIALLY ORIENTED OUTCOME IN THE ECONOMIC GAMES STUDIES

Game	DG (1)	DG-EFF (2)	DG-ENT (3)	UG (4)	TG (5)	PD (6)	PGG (7)
Panel A: Undergraduate students, beliefs about first-party scenarios							
B(F)	32.33	28.79	27.91	51.41	31.20	36.27	38.98
B(M)	23.13	20.19	19.48	42.36	23.40	27.24	30.77
Δ	9.20***	8.60***	8.43***	9.04***	7.80***	9.03***	8.21***
	(0.73)	(0.66)	(0.62)	(0.71)	(0.69)	(0.61)	(0.71)
N	764	764	764	764	764	764	764
Panel B: Online participants, beliefs about first-party scenarios							
B(F)	43.42	40.66	38.49	53.49	44.02	45.45	46.27
B(M)	30.43	27.82	27.52	42.14	32.26	32.58	35.25
Δ	12.98***	12.84***	10.97***	11.35***	11.77***	12.87***	11.02***
	(0.96)	(0.93)	(0.93)	(0.94)	(1.00)	(0.95)	(0.95)
N	800	800	800	800	800	800	800
Panel C: Undergraduate students, beliefs about third-party scenarios							
B(F)	52.63	46.71	39.45	59.25	45.99	50.48	52.07
B(M)	43.21	37.64	30.95	49.95	36.85	41.21	43.53
Δ	9.41***	9.07***	8.49***	9.30***	9.14***	9.26***	8.54***
	(0.81)	(0.87)	(0.71)	(0.72)	(0.76)	(0.74)	(0.71)
N	764	764	764	764	764	764	764
Panel D: Online participants, beliefs about third-party scenarios							
B(F)	54.10	50.04	44.18	55.55	51.56	50.22	51.25
B(M)	41.71	38.11	34.17	45.69	40.42	40.48	41.29
Δ	12.39***	11.93***	10.01***	9.87***	11.14***	9.74***	9.96***
	(1.00)	(0.96)	(0.92)	(0.93)	(1.05)	(0.93)	(0.91)
N	800	800	800	800	800	800	800

Notes. B(F) and B(M) show the average believed percent of female and male decision makers who choose the socially oriented outcome in a scenario, Δ shows the difference in these percentages. Standard errors are shown in parentheses and clustered at the participant level. Columns (1)–(7) correspond to beliefs about decisions made by female and male decision makers in the following games (see Online Appendix Table A.4 for more details): the dictator game (DG), the dictator game with efficiency concerns (DG-EFF), the dictator game with entitlement concerns (DG-ENT), the ultimatum game (UG), the trust game (TG), the prisoner's dilemma (PD), and the public goods game (PGG). Panels A and B correspond to the beliefs about decisions made in the first-party versions of the noted game, and Panels C and D to the third-party versions of the noted game. The data are from the Economic Games studies run with undergraduate students in Panels A and C and with online participants in Panels B and D. * $p < .10$, ** $p < .05$, *** $p < .01$.

are expected to choose the socially oriented outcome more often than men are. The believed gender gap in social preferences arises in all contexts: in 28 out of 28 contexts, Δ is statistically significantly positive. The believed gender gap in social preferences is also substantial: women are expected to choose the socially oriented outcome anywhere from 8 to 13 percentage

points more often than men are across these 28 contexts. (Footnote 28 further reveals, via an additional study, how the magnitude of the believed gender differences is larger than the believed differences between the youngest and oldest age group and larger than the believed differences in increases from one income bracket to the next.)

Given that the believed gender gap in social preferences persists across all contexts, what does this imply for believed gender differences? Let us first consider beliefs about first-party scenarios. These results reveal that women are believed to be more likely (i) to choose an equal split rather than an unequal split that favors themselves in a classic dictator game (see Panels A and B, column (1)), (ii) to choose an equal split rather than an unequal split that favors themselves and is more efficient in a dictator game with efficiency concerns (see Panels A and B, column (2)), (iii) to choose an equal split rather than an unequal split that favors themselves if they outperformed P2 in a dictator game with entitlement concerns (see Panels A and B, column (3)), (iv) to propose an equal split rather than the smallest nonzero amount possible in an ultimatum game (see Panels A and B, column (4)), (v) to trust by sending money to the second mover in a trust game (see Panels A and B, column (5)), (vi) to cooperate in a prisoner's dilemma game (see Panels A and B, column (6)), and (vii) to contribute in a public goods game (see Panels A and B, column (7)).

While one broad interpretation of the beliefs relating to the first-party scenarios could be that women are expected to be more prosocial or generous, beliefs from the third-party scenarios show that the believed gender gap in social preferences extends beyond believed gender differences in prosocial behavior or generosity. In particular, Table II, Panels C and D show that the believed gender gap in social preferences also arises when considering beliefs about third-party scenarios in all contexts. That is, even when men and women make decisions that do not influence their own financial payoffs in third-party scenarios, women are believed to be more likely to choose equal outcomes in dictator and ultimatum games, trust more by sending more in trust games, cooperate more in prisoner's dilemma games, and contribute more in public goods games.

Despite the robustness of the believed gender gap in social preferences across contexts, however, the believed gender gap in social preferences is largely inaccurate. Online Appendix Table

A.19 presents results related to the accuracy of beliefs. Although the extent to which women are believed to choose the socially oriented outcome is sometimes overestimated and other times underestimated (see B(F) − Truth(F)), the extent to which men are believed to choose the socially oriented outcome is almost always underestimated (see B(M) − Truth(M)). This results in the believed gender gap in social preferences being significantly overestimated in 26 out of the 28 contexts (see Δ).

To summarize, across contexts, we observe a robust believed gender gap in social preferences. Women are believed to choose the socially oriented outcome more often when selfish motives are and are not relevant (i.e., in first-party and third-party scenarios), when strategic considerations are and are not relevant (e.g., in the DG and UG scenarios), and when various fairness concepts are relevant (e.g., across the DG, DG-EFF, and DG-ENT scenarios). Across contexts, there are little to no gender differences in these decisions.

II.D. Additional Results in Main Economic Games Studies and Robustness Studies

After we present additional results from our main studies in Sections II.D.1–II.D.5, we present results from "robustness studies": the Economic Games (Beliefs Only) study in Sections II.D.6–II.D.7, the Economic Games (Additional Demographics) study in Section II.D.8, the Economic Games (Stakes Vary) study in Section II.D.9, the Broader Beliefs (Online Participants) study in Section II.D.10, and the Broader Beliefs (Representative Sample) study in Section II.D.11. Online Appendix Table A.1 provides an overview of these robustness studies—including references to the full experimental instructions, implementation details that relate to randomization of questions and payment, and tables that explicitly detail the main questions.

1. *Does the Believed Gender Gap Persist Across Several Robustness Checks?* To facilitate several robustness checks, Online Appendix Table A.17 presents results on the average believed difference when pooling across all first-party scenarios in Panels 1 and 2 and when pooling across all third-party scenarios in Panels 3 and 4. The believed gender gap in social preferences is robust to: including scenario fixed effects and clustering standard errors at the participant level (column (1)), controlling for

demographics (column (2)), restricting to the 95% of undergraduate students or 99% of online participants who pass an unincentivized attention check at the end of the survey (column (3)),[25] the order in which the belief versus decision part occurs (see columns (4) and (5)), and whether we restrict to beliefs that are elicited relatively earlier or later in the study (see columns (6) and (7)).

The believed gender gap in social preferences is also robust to considering the full distribution of beliefs. Figure I shows the distributions of: beliefs about first-party scenarios provided by undergraduate students (see Figure I, Panel A), beliefs about first-party scenarios provided by online participants (see Figure I, Panel B), beliefs about third-party scenarios provided by undergraduate students (see Figure I, Panel C), and beliefs about third-party scenarios provided by online participants (see Figure I, Panel D). In each panel, the distribution of the beliefs about female decision makers first-order stochastically dominates the distribution of beliefs about male decision makers and these distributions are statistically different (Kolmogorov-Smirnov test, $p < .01$). Online Appendix Figures B.1, B.2, B.3 and B.4 further show that similar results follow when comparing these distributions in each of the 28 contexts (for each comparison: Kolmogorov-Smirnov test, $p < .01$).

2. *Is the Believed Gender Gap Evident with Participant-Level Data?* One may wonder whether the believed gender gap in social preferences extends beyond average differences in beliefs. The answer is yes. Online Appendix Table A.18 collapses participants' belief data to determine whether, in each context, a participant believes (i) women are more likely to be socially oriented, (ii) men are more likely to be socially oriented, or (iii) men and women are equally likely to be socially oriented. These results reveal strong evidence for the believed gender gap in social preferences. For instance, undergraduate students believe that women are more likely than men to choose the socially oriented outcome

25. In our follow-up survey, participants are asked to select the option on the left that corresponds with "strongly disagree" in one question and the option on the right that corresponds with "strongly agree" in another question. They only pass our attention check if they correctly answer both questions. When completing our follow-up survey, participants know that their answers cannot influence their payments from the study. The high rate of passing this attention check that is unincentivized and asked when participants may be most fatigued at the end of the study is also reassuring.

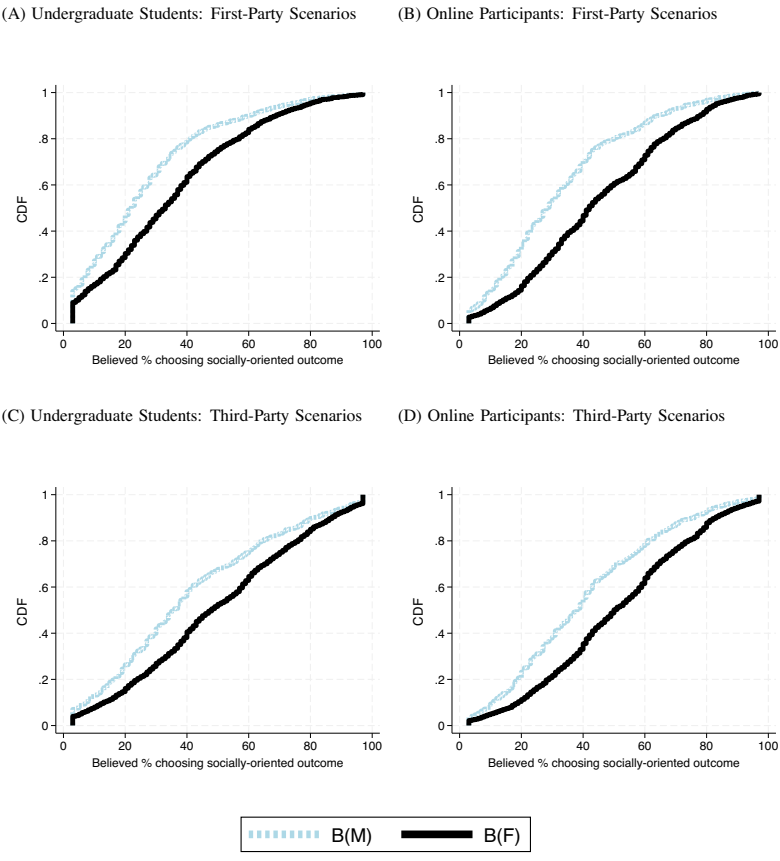

FIGURE I

Distributions of Incentivized Beliefs When Pooling Across All Games

Graphs show CDFs for the believed percent of male and female decision makers who choose the socially oriented outcome (denoted by B(M) and B(F), respectively). The graphs show the beliefs across all games (see Online Appendix Table A.4 for more details): the dictator game (DG), the dictator game with efficiency concerns (DG-EFF), the dictator game with entitlement concerns (DG-ENT), the ultimatum game (UG), the trust game (TG), the prisoner's dilemma (PD), and the public goods game (PGG). Panels A and B correspond to the beliefs about decisions made in the first-party versions of the noted game, and Panels C and D to the third-party versions of the noted game. The data are from the Economic Games studies run with undergraduate students in Panels A and C and with online participants in Panels B and D.

in first-party scenarios 73% of the time, believe the opposite 11% of the time, and believe there is no gender difference 16% of the time.

In addition, as shown in Online Appendix Figure B.5, the distribution of the number of times each participant believes female decision makers are more socially oriented is skewed toward the right. The modal participant believes female decision makers are more socially oriented in all 14 contexts, and almost no participants believe the opposite.

3. *Is the Believed Gender Gap Held by Men and Women?* As shown in Online Appendix Tables A.26–A.29, the believed gender gap is statistically significant for women (see column (1)) and men (see column (2)). That said, the gender gap in social preferences is larger among women than men, significantly so among the undergraduate students and directionally so among the online participants (see column (3)). That both men and women expect gender differences in social preferences adds to prior work that shows how men and women expect gender differences in performance outcomes (Bordalo et al. 2019; Card et al. 2020; Exley and Nielsen 2024) and that the believed gender gap in social preferences is, if anything, larger among women also adds to prior work on in-group beliefs (Tajfel and Turner 2004; Chen and Li 2009; Chen and Chen 2011; Ioannou, Qi, and Rustichini 2015; Carlsson and Eriksson 2019; Coffman, Exley, and Niederle 2021).

4. *Does the Believed Gender Gap Differ by Own Behavior?* As shown in columns (4) and (5) of Online Appendix Tables A.26–A.29, the believed gender gap is statistically significant both when participants make non–socially oriented decisions (see the coefficient estimates on Δ) and when participants make socially oriented decisions (see the sum of the coefficient estimates on Δ and $\Delta\times$ Socially Oriented). If anything, the believed gap is larger when participants make socially oriented decisions—particularly among female participants (and hence why we present the results separately for men and women in columns (4) and (5)). In addition, as one may expect, participants making more socially oriented decisions in a context are more likely to believe that others will make socially oriented decisions in that context, too (see the coefficient estimates on Socially Oriented).

5. *Is the Believed Gender Gap More Likely Among Certain "Types" of Individuals?* The prior subsections show how beliefs vary by gender and own behavior. To further investigate if there are certain types of individuals who are more inclined to exhibit the believed gender gap in social preferences across the contexts in our study, we elicited participants' "broader beliefs" in our follow-up surveys.

In the study with undergraduate students, the follow-up survey asked participants to select either men or women in response to three questions on who, in general, they think is (i) nicer, (ii) more selfish, and (iii) fairer. In Online Appendix Tables A.26 and A.27, the believed gender gap in social preferences among undergraduate students is significantly larger among (i) the 90% of participants who indicate that women are nicer in general (see column (6)), (ii) the 88% of participants who indicate that men are more selfish in general (see column (7)), and (iii) the 84% of participants who indicate that women are fairer in general (see column (8)).

In the study with online participants, the follow-up survey asked participants to indicate the extent to which on a 0 (completely unwilling) to 10 (completely willing) scale they think women and men are willing to be (i) altruistic, (ii) charitable, and (iii) fair. These questions built off Falk et al. (2023).[26] Online Appendix Tables A.28 and A.29 add a variable that captures the believed differences in willingness between women and men and an interaction of that variable with the believed gender gap. These results show that the believed gender gap in social preferences among online participants is significantly larger among participants who believe women are relatively more

26. We changed to these more continuous measures of broader beliefs because of the little variation in beliefs among the binary follow-up questions among undergraduate students and to document the robustness to other ways to elicit broader beliefs. All three questions build off of the "in general" and 11-point scale structure in Falk et al. (2023), and the charitable question builds off that paper directly (see notes of Online Appendix Tables A.28 and A.29 for exact wording). We also asked three more follow-up questions (and find the same significant patterns of results with these questions) about whether participants believe women are more relatively willing (iv) to be cooperative, (v) to be trustworthy, and (vi) to indicate that luck that creates inequity is unfair. For (vi), we build off of prior papers such as Cappelen et al. (2022a).

willing (i) to be altruistic (see column (6)), (ii) to be charitable (see column (7)), and (iii) to be fair (see column (8)).[27]

6. *Does the Believed Gender Gap Persist When Only Asked to Provide Beliefs?* As discussed already, our main study results are robust to restricting to the set of beliefs that are elicited before decisions are made, which may help mitigate potential consistency motives. To further investigate if our results persist when we only ask participants to provide beliefs, we recruited 399 online participants to complete the Economic Games (Beliefs Only) study. In this study, participants are asked the same set of belief questions as in the main studies (see Online Appendix Table A.5), but they are not asked to make any decisions. Each page only elicits the beliefs about men or the beliefs about women. As shown in Online Appendix Table A.25, the believed gender gap in social preferences is statistically significant in 14 out of the 14 contexts.

7. *Does the Believed Gender Gap Persist When We Ask Fewer Belief Questions?* As discussed, our main study results are robust to examining beliefs that are elicited earlier and later in the study, which helps mitigate order effect or subject fatigue–related concerns. That we replicate the believed gender gap in social preferences when we only elicit beliefs in the Economic Games (Beliefs Only) study, as just discussed, further addresses these concerns. In addition, we replicate the gender gap in social preferences in four additional studies that only ask participants to provide two beliefs (one about women and one about men) about one economic game (see Section IV).

8. *Does the Believed Gender Gap Persist If We Obscure Our Focus on Gender?* To investigate whether the believed gender gap in social preferences persists when we obscure the focus on gender, we recruited 400 online participants to complete the Economic Games (Additional Demographics) study. While the main Economic Games studies elicit beliefs about groups that are only defined by gender, the Economic Games (Additional Demographics) study elicits 40 beliefs about the decisions made by 40 groups that are defined by their gender, age, and

27. On a scale of 0 to 10, women are believed to be on average 1.64 more altruistic, 2.14 more charitable, and 1.46 fairer.

income. Specifically, each of the belief questions (i) asks about decisions made in the first-party dictator game, (ii) is shown on a separate page and, (iii) as detailed in Online Appendix Table A.7, includes three pieces of information about participants in the group: their gender (women, men), income (less than $25,000; between $25,000 and $49,999; between $50,000 and $74,999; between $75,000 and $99,999; $100,000 or above), and age (aged 18–24, aged 25–34, aged 35–44, aged 45 or over).

Online Appendix Table A.20 shows that the believed gender gap in social preferences is statistically significant without any fixed effects (column (1)) and when including fixed effects for each age and income group (column (2)). These results also reveal that the 8.17 percentage point believed gender gap is sizable relative to believed other changes. It is larger than the believed difference between the youngest and oldest age group, and it is larger than the believed differences in increases from one income bracket to the next income bracket.[28] In addition, by collapsing groups in a way that allows us to compare men and women in the same age-income subgroup, Online Appendix Table A.21 shows that the believed gender gap in social preferences is statistically significant for each of the 20 age-income subgroups.

9. *Does the Believed Gender Gap Persist across Various Stakes?* Results from our main studies show that the believed gender gap in social preference persists across various stakes (e.g., compare the stakes in the DG to those in the PGG and the stakes for the decision maker in the first-party versus third-party scenarios). One may further wonder if the believed gender gap in social preferences persists when we hold constant the payoff structure and only vary the payoff parameters. To investigate

28. As shown in Online Appendix Table A.20, column (2), the believed gender gap is 8.17 percentage points. This is larger than the believed gaps by age or by movements in one income bracket. Specifically, the believed gap is 1.64 percentage points when going from the youngest to the oldest age group. Also the believed gap is (i) 5.78 percentage points when going from the income bracket of $< \$25{,}000$ to the income bracket of $25,000 to $49,999, (ii) 7.25 percentage points when going from the income bracket of $25,000 to $49,999 to the income bracket of $50,000 to $74,999, (iii) 2.06 percentage points when going from the income bracket of $50,000 to $74,999 to the income bracket of $75,000 to $99,999, and (iv) 3.36 when going from the income bracket of $75,000 to $99,999 to the income bracket of $\geq \$100{,}000$.

this, we vary the payoff parameters in a manner similar to many altruism studies by recruiting 400 online participants to complete the Economic Games (Stakes Vary) study. Specifically, as shown in Online Appendix Table A.8, this study involves 10 scenarios in which the decision maker chooses to either keep 10 for themselves or give 2, 4, 6, 8, 10, 20, 40, 60, 80, or 100 to their "partner," or equivalently, scenarios in which the decision maker chooses whether to give when the donation multiplier is 0.2, 0.4, 0.6, 0.8, 1, 2, 4, 6, 8, or 10. Each participant in this study makes decisions in all 10 scenarios and provides beliefs about how often men and women give in each scenario.

As shown in Online Appendix Table A.22, there is little to no evidence for gender differences in giving decisions. While the giving rates clearly respond to the payoff amounts—for example, participants give approximately one-fifth of the time when choosing between 10 for themselves and 2 for others but give more than half of the time when choosing between 10 for themselves and 100 for others—there are no significant gender differences in giving rates in 8 out of the 10 scenarios. The two scenarios with (marginally) statistically significant gender differences also suggest opposite gender effects, with men giving more in one case and women giving more in the other.

Nonetheless, as shown in Online Appendix Table A.23, the believed gender gap is statistically significant in 10 out of the 10 scenarios. Regardless as to whether the benefits of being socially oriented are very low or very high, participants always expect women to give more than men.

10. *Does the Believed Gender Gap Persist with Simpler Questions and in Relation to Broader Contexts?* Our main studies ask participants about economic games with binary outcomes. This structure is useful for eliciting beliefs because it allows us to incentivize participants to accurately predict the percent of men and women who choose the socially oriented outcome over the non–socially oriented outcome. One may wonder, however, if our results extend to contexts that are not binary in nature, and perhaps even more so to broader contexts that motivate the classic economic games. In addition, one may wonder whether our results arise when we ask simpler questions that are possible when not tying the beliefs to specific economic games. To investigate this, we recruited 400 online participants to provide "broader beliefs"

by completing the Broader Beliefs (Online Participants) study.[29] As shown in Online Appendix Table A.9, participants are asked about 14 scenarios that broadly correspond with the 14 scenarios in our main study; for example, they are asked questions about whether men and women favor "decisions that achieve equality" rather than whether men and women choose (5, 5) over (10, 0) in a dictator game.[30]

As shown in Online Appendix Table A.24, Panels 1 and 3, the believed gender gap in preferences is statistically significant in all 14 of the 14 broader contexts. See also the results detailed in Section IV which show that the believed gap persists in a wide range of applied contexts that relate to the household, the workplace, and various other policy-relevant scenarios.

11. *Does the Believed Gender Gap Persist with a Representative Sample?* The results from our main studies confirm that the believed gender gap in social preferences arises among a traditional sample of undergraduate students and online participants. To investigate if our results also persist with a representative sample, following Snowberg and Yariv (2021), we partnered with Dynata to form a nationally representative sample (in terms of age, gender, and income) and recruited 1,001 participants to complete the Broader Beliefs (Representative Sample) study.[31] The design for this study follows the design for the Broader Beliefs

29. For other work that elicits broader beliefs relating to social preferences and finds evidence for believed gender differences, see Andreoni and Petrie (2008) and Slonim and Guillen (2010).

30. The scenarios are written such that the belief questions asked in the Broader Beliefs study scenarios 1–14 loosely capture the key features of the games involved in the Economic Games studies scenarios 1–14. We refer to scenarios 1–7 as "first-party" scenarios and scenarios 8–14 as "third-party" scenarios. All contextual information about a scenario is detailed in the text of each belief question. Answers are not incentivized, but participants are asked to answer the questions carefully and honestly.

31. Our approach follows Snowberg and Yariv (2021): they recruited a representative sample of $N = 1{,}000$ U.S. survey respondents via Dynata (previously named Survey Sampling International before merging with Research Now) who are representative of the U.S. population across age, gender and income. For details on this procedure and a table showing that our sample in the Broader Beliefs (Representative Sample) study is nationally representative along gender, age, and income, see Online Appendix Table A.42. For work on how differences may arise across subject pools, see Aksoy et al. (2024).

(Online Participants) study, so see Online Appendix Table A.9 for the list of the belief questions.

As shown in Online Appendix Table A.24, Panels 2 and 4, the believed gender gap in preferences is statistically significant in all 14 of the 14 contexts. Our results also persist among "professional participants" with self-reported hiring and management experience.

III. The Believed Gender Gap in Social Preferences and Connections with the Associative Memory Literature

Given the robustness of the believed gender gap in social preferences—and the potential implications of this believed gender gap (further discussed in Sections IV and V)—it is important to understand what factors contribute to these beliefs. Motivated by prior literature on beliefs and memory, particularly since individuals likely have many prior memories related to the extent to which men and women are socially oriented, this section presents a series of results across four studies.

Motivated by the possibility that, as modeled in Bordalo et al. (forthcoming), individuals may form beliefs about the novel contexts in our study by making simulations from prior similar memories, the first two studies examine evidence related to the similarity hypothesis (see Section I). Evidence from the Recalled Person study (see Section III.A) reveals a correlation between the believed gender gap in social preferences and whether participants name a woman when asked to recall someone who they think of as generous. Evidence from the Recalled Experience study (see Section III.B) further reveals that the believed gender gap in social preferences is correlated with (i) participants having spent more of their childhood with female caretakers; (ii) participants reporting that they have experienced, over the course of their life, relatively more women who are generous; and (iii) participants reporting that they have experienced, over the course of their life, relatively more women who are equality oriented.[32]

32. For other work related to prior experiences shaping beliefs relating to trust and other notions of morality—although not related to believed gender differences—see Schwerter and Zimmermann (2020) and Mastroianni and Gilbert (2023), respectively. For the importance of early childhood experiences on memory, see Wachter and Kahana (2024).

Motivated by another feature of models of associative memory and belief formation, the last two studies in this section relate to the interference hypothesis (see Section I). Specifically, to investigate the effect of an "interfering" experience—which shares some similarities with the belief questions we ask participants but could dampen the recall of prior memories—we ran the Interfering Experience study and the Interfering Experience (Robustness) study (see Section III.C). Both studies reveal that an interfering experience causally affects the believed gender gap in social preferences, even though the interfering experience should not affect the beliefs of perfect-memory Bayesians.

Online Appendix Table A.2 provides an overview of these four studies, including references to the full experimental instructions and implementation details.

III.A. The Recalled Person Study

We recruited 399 online participants to complete the Recalled Person study. In this study, we only ask participants to provide two beliefs: one belief about how likely men are to give in the first-party version of the dictator game and one belief about how likely women are to give in the first-party version of the dictator game. In the follow-up survey, we ask participants to recall a person whom they personally know and think of as being "likely to give to others."

Online Appendix Table A.30 presents results on the believed gender gap in social preferences, and specifically the believed gender gap in dictator-game giving. While columns (1) and (2) reveal that the believed gender gap in giving arises both among participants who do and do not recall a woman when asked to recall someone who is likely to give (it is 10.45 and 16.08 percentage points, respectively), column (3) confirms that the believed gender gap in giving is significantly larger among participants who recall a woman by 5.62 percentage points or by more than 50%.

Follow-up survey questions are consistent with a connection between associative memory and the believed gender gap in giving; 83% of participants who recall a woman said the recalled person or others like the recalled person influenced their beliefs about the believed gender gap in giving, but only 45% of participants who recall a man said similarly. In addition, 81% of participants report that experiences in contexts that are broadly

similar to the novel study context influenced their beliefs about how likely men and women are to give.[33] Finally, to help guide our next investigation about the relevant types of recalled memories, we note that the most commonly recalled person was a participant's mother (occurring 33% of the time for the 66% of participants who recall a woman).[34]

III.B. The Recalled Experience Study

We recruited 400 online participants to complete the Recalled Experience study. We only ask participants to provide two beliefs: one belief about how likely men are to give in the first-party version of the dictator game and one belief about how likely women are to give in the first-party version of the dictator game. In the follow-up survey, we ask participants about their recalled life experiences that relate to how socially oriented men and women are. Motivated by our prior finding of the modal recall being one's mother and the socially oriented nature of caretaking, we also ask about life experiences that are specific to childhood caretaking experiences.

Online Appendix Table A.31 presents results on the believed gender gap in social preferences according to whether participants report having spent more time growing up with male caretakers (column (1)), approximately an equal amount of time with male and female caretakers (column (2)), or more time with female caretakers (column (3)). Despite the notably small sample size when restricting to the set of participants who spent more time growing up with male caretakers, the believed gender gap in giving persists across all of these three groups. That said, as is evident in column (4), the believed gender gap is significantly

33. Meanwhile, in another question, 43% of participants report that experiences in contexts that are very similar or identical to the dictator game have influenced their beliefs about gender differences in the dictator game.

34. On the first page of the follow-up survey (see Online Appendix Figure C.93), we ask this question by eliciting a free response to ensure participants' answers are not primed. On the second page of the follow-up survey (see Online Appendix Figure C.94), we ask participants to select from a list of alternatives of how that person is related to them. We confirm that participants' answers across these pages are consistent; in the case of inconsistencies, we correct their reported relationship. Nearly all inconsistencies arose from participants selecting how they were related to the person of interest rather than selecting how the person of interest is related to them (e.g., a daughter may have selected "daughter" instead of "mother").

larger among those who report having spent more time growing up with female caretakers.[35]

Online Appendix Table A.32 presents results on the believed gender gap in social preferences according to questions—built off those in Bordalo et al. (forthcoming)—about participants' experiences over the course of their lives. These results, like Bordalo et al. (forthcoming), reveal a strong correlation between prior similar lifetime experiences and beliefs. Specifically, the believed gender gap in giving is larger among participants who report having experienced (i) women being more generous than men over the course of their life (see Panel 1) and (ii) women caring more about equality than men over the course their life (see Panel 2).

III.C. The Interfering Experience Studies

To investigate the causal impact of an "interfering" experience that may affect the recall process of participants forming beliefs in our study, we recruited 1,600 online participants for the Interfering Experience study and 1,598 online participants for the Interfering Experience (Robustness) study. These studies build off the experimental paradigm in Schwerter and Zimmermann (2020) and involve four conditions that are summarized in Online Appendix Table A.10: (i) the Baseline condition, (ii) the Information Only condition, (iii) the Information + Interfering Experience of a Socially Oriented Man condition, and (iv) the Information + Interfering Experience of a Socially Oriented Woman condition. We first describe the design and results for the Interfering Experience study and then examine the robustness of these results in the Interfering Experience (Robustness) study.

In all conditions, belief questions ask participants about how likely prior male and female decision makers in the Economic Games (Undergraduate Students) study are to choose the socially oriented outcome in the first-party dictator game (DG). In each belief question, as in our prior studies, participants earn an allocation depending on the accuracy of their answer and provide answers via sliders. In the three conditions with information,

35. Similar results follow when we instead rely on questions about whether participants recall that women were expected to act in ways consistent with the believed gender gap in social preferences, specifically by doing more child care, household chores or being more nurturing and caring.

participants are provided with information on the socially oriented behavior of these same participants. However, rather than pertaining to the socially oriented behavior of participants in the context that we ask participants about in our belief questions (i.e., the DG), the information conveys the full distribution of socially oriented behavior for male and female decisions makers in two similar contexts: in the first-party dictator game with entitlement concerns (DG-EFF) and in the ultimatum game (UG). In the two conditions with an interfering experience, participants are allocated money according to decisions made in the similar contexts by one of their partners who are also from this prior study. The interfering experience always follows participants receiving the information on the full distribution of behavior in the similar contexts, implying that the interfering experience should not affect the beliefs of perfect-memory Bayesians.

More specifically, in the Baseline condition, participants read a summary of the prior study and then answer the two belief questions about how likely men and women are to choose the socially oriented option in the DG.

The Information Only condition proceeds in the same manner as the Baseline condition except that before providing their beliefs in the DG, participants receive accurate information about the full distribution of socially oriented behavior of men and women in the similar contexts, that is, in the DG-EFF and UG. This distributional information accurately conveys that (i) 13% of men and 16% of women choose the socially oriented outcome in the DG-EFF and (ii) 74% of men of and 70% of women choose the socially oriented outcome in the UG. To ensure attentiveness to this distributional information, participants are required to correctly report back these four percentages. We also note that this distributional information—with women only being slightly more socially oriented in the DG-EFF and men only being slightly more socially oriented in the UG—aligns with our overall finding of little to no robust gender differences in socially oriented behavior.

The Information + Interfering Experience of a Socially Oriented Man and Information + Interfering Experience of a Socially Oriented Woman conditions proceed in the same manner as the Information Only condition except that after receiving the accurate information about the full distribution of behavior of men and women in the UG and DG-EFF, participants encounter an experience that may interfere with their recall process when answering the subsequent belief questions about the DG.

Specifically, during the interfering experience, participants are (i) matched with two participants from the prior study (a "female partner" and a "male partner"), (ii) allocated the amount of money their female partner previously allocated to Player 2 in the DG-EFF or the UG and the amount of money their male partner previously allocated to Player 2 in the UG or the DG-EFF, and (iii) asked how they feel (i.e.,"unhappy," "neutral," or "happy") about their allocations from their male and female partners.[36]

In the Information + Interfering Experience of a Socially Oriented Man condition, the interfering experience involves allocations from a socially oriented male partner and a non–socially oriented female partner in the similar contexts. In the Information + Interfering Experience of a Socially Oriented Woman condition, the interfering experience involves allocations from a socially oriented female partner and a non–socially oriented male partner in the similar contexts. By always focusing on interfering experiences with one socially oriented partner and one non–socially oriented partner, we hold constant the allocation amount that results from the interfering experience.[37] By always focusing on interfering experiences pertaining to the similar contexts—even after participants are provided with the full distributional information about men and women in the similar contexts—we are further able to examine the effect of an interfering experience even when the interfering experience should not affect the beliefs

36. When the socially oriented and non–socially oriented options in each of these games is described to participants, we simply inform participants of the corresponding dollar payoffs, rather than introducing the concepts of points. See Online Appendix Table A.4 for a reminder as to the payoffs involved in the socially oriented versus non–socially oriented decisions in these games. We note that each point corresponded to £1 for the U.K. undergraduate students involved in the Economic Games (Undergraduate Students) study. Using the conversion rate of approximately £1 = $1.20, the corresponding dollar payoffs for (Player 1, Player 2) from choosing the socially oriented outcome versus the non–socially oriented outcome are as follows: (i) ($6, $6) versus ($12, $0) in the DG, (ii) ($6, $6) versus ($18, $0) in the DG-EFF, and (iii) ($6, $6) versus ($10.80, $1.20) or ($0, $0) depending on whether Player 2 accepts or rejects this choice in the UG, respectively.

37. See the Player 2 payoffs in Online Appendix Table A.4 in the UG and the DG-EFF, since those are the allocations that can result from the interfering experience. When a decision maker chooses the socially oriented option in either of these games, Player 2 always receives five. When a decision maker chooses the non–socially oriented option in either of these games, Player 2 receives zero in the DG-EFF and zero in the UG if Player 2 rejects the unequal split (which was indeed the case for the Player 2s who were matched to the decision makers selected to be partners in this study).

TABLE III

REGRESSIONS OF THE BELIEVED PERCENT OF DECISION MAKERS CHOOSING THE SOCIALLY ORIENTED OUTCOME IN THE FIRST-PARTY DICTATOR GAME OF THE INTERFERING EXPERIENCE STUDY BY CONDITION

			Information + Interfering Experience of	
	Baseline (1)	Information Only (2)	Socially Oriented Man (3)	Socially Oriented Woman (4)
B(F)	54.76	40.16	39.21	44.36
B(M)	42.89	36.47	40.39	35.90
Δ	11.87***	3.69***	−1.18	8.46***
	(0.91)	(0.45)	(0.79)	(0.80)
N	800	798	798	804

Notes. B(F) and B(M) show the average believed percent of female and male decision makers who choose the socially oriented outcome in the DG. Δ shows the difference in these percentages. Standard errors are shown in parentheses and are clustered at the participant level. Columns (1)–(4) correspond to the beliefs in the Baseline condition, Information Only condition, Information + Interfering Experience of a Socially Oriented Man condition, and Information + Interfering Experience of a Socially Oriented Woman condition, respectively. The data are from the Interfering Experience study. * $p < .10$, ** $p < .05$, *** $p < .01$.

of perfect-memory Bayesians because it conveys no new information about the similar contexts.

Table III presents results on beliefs across the four conditions about how socially oriented men and women are in the DG. Replicating prior results that show how women are believed to be more socially oriented in the dictator game, column (1) reveals that the believed gender gap in the DG is 11.87 percentage points in the Baseline condition. Column (2) shows that the believed gender gap in the DG remains but is substantially smaller—equal to 3.69 percentage points—when participants in the Information Only condition accurately learn that there are little to no differences in the similar contexts (i.e., in the DG-EFF and in the UG). This reduction in the magnitude of the believed gender gap is indeed statistically significant ($p < .01$).

That participants are less likely to expect a gender gap in the DG—after they are provided with the distributional information conveying that there are little to no gender gaps in the similar contexts—shows that participants pay attention to this distributional information. Nonetheless, even after participants are provided with this distributional information on the similar contexts, we observe a significant impact of the interfering experience. In particular, there is a notable difference between the believed gender gap in the Information + Interfering

Experience of a Socially Oriented Man condition (see column (3)) and the believed gender gap in the Information + Interfering Experience of a Socially Oriented Woman condition (see column (4)). While we do not observe any evidence for the believed gender gap when participants encounter an interfering experience with a socially oriented man and a non–socially oriented woman, we again observe the believed gender gap in the DG of 8.46 percentage points when participants encounter an interfering experience with a socially oriented woman and a non–socially oriented man. In addition, the size of the believed gender gap is significantly larger in this latter interfering experience ($p < .01$). While comparing across these interfering experience conditions is attractive because it allows us to hold constant the amount that participants are allocated as well as the overall structure of the study, we note that the believed gender gap in the DG is also significantly different ($p < .01$) when comparing either interfering experience condition to the Information Only condition.

As shown in Online Appendix Table A.33, we replicate these results with 1,598 new participants with an additional study, the Interfering Experience (Robustness) study. Participants are reminded of the distributional information in the interfering experience stage (and no longer asked about how they feel about their experienced allocations). The persistence of our results in this robustness study highlights how an interfering experience affects beliefs even when we reduce the scope for recency effects.

IV. The Believed Gender Gap in Social Preferences and Connections with the Household, the Workplace, and Policy Views

There are many potential connections between the believed gender gap in social preferences and beliefs about men and women in the household, in the workplace, and in relation to their policy views (Fong 2001; Aguiar and Hurst 2007; Eckel, de Oliveira, and Grossman 2008; Alesina and Giuliano 2011; Durante, Putterman, and van der Weele 2014; Fisman, Jakiela, and Kariv 2014; Gärtner, Mollerstrom, and Seim 2017; Capraro 2020; Doepke and Kindermann 2019; Cappelen et al. 2022b; Stantcheva 2020, 2021, 2023; Cappelen et al. 2022a; Ranehill and Weber 2022). We indeed find that women are believed to be more equality oriented in scenarios relating to the household

(i.e., relating to the beliefs about contributions to the home, family, and upbringing of children), to the workplace (i.e., relating to beliefs about equal pay), and in policy views (i.e., relating to beliefs about redistribution, equal access to education, health care, and affordable housing). We explore the beliefs about equal pay further and document that female employers (in an incentivized experiment) are believed to favor equal pay over performance pay more often than men are. Then, as evidence of a potential implication of this belief, we show that workers favor female employers more when equal pay is to the workers' benefit.[38] Finally, we confirm the robustness of the believed gender gap in social preferences to a sample of "professional" participants who self-report hiring and management experience and provide data on what they believe are the related labor market implications.

To establish these results, we ran four more studies: the Equality Attitudes & Employer study, the Broader Beliefs (Equality Attitudes) study, the Worker study, and the Professional Participants study. Online Appendix Table A.3 provides an overview of these studies, including references to the full experimental instructions, implementation details that relate to randomization of questions and payments, and additional design tables. The following subsections provide a high-level design overview of these studies along with references to the main results.

IV.A. Are Women Believed to Be More Equality Oriented in the Workplace, in the Household, and in Their Policy Views?

To investigate whether women are believed to be more equality oriented in the workplace, in the household, and in their policy views, we recruited 400 online participants to complete the Equality Attitudes & Employer study. Participants are asked whether they mostly agree with eight equality statements and are incentivized to accurately provide beliefs about the percent of men and women who agree with these equality statements. These equality statements are shown in Online Appendix Table A.11 and were inspired by questionnaires of the International Social Survey Programme and prior work (Kuhn 2011; Luttmer and Singhal 2011; Almås, Cappelen, and Tungodden 2020).

38. This adds to prior work showing that individuals are more likely to select women to be decision makers in ultimatum games, trust games, and dictator games (Holm and Engseld 2005; Slonim and Garbarino 2008; Aguiar et al. 2009).

Online Appendix Table A.34 indicates that in response to seven out of the eight equality statements, there is not a significant gender difference in equality attitudes.[39] Nonetheless, Online Appendix Table A.35 reveals a robust believed gender gap in equality attitudes: women are believed to be significantly more likely—by 8 to 21 percentage points—to favor (i) society trying to equalize incomes, (ii) the government taking steps to reduce income inequality, (iii) equal pay, (iv) equal household contributions, (v) equal parental involvement in children's lives, (vi) equal access to health care, (vii) equal access to education, and (viii) equal access to affordable housing. Additional results reveal similar patterns and robustness as observed in the Economic Games studies.[40]

As shown in Online Appendix Table A.46, the Broader Beliefs (Equality Attitudes) study confirms the robustness of these results to eliciting beliefs about broader equality attitudes rather than stated broader equality attitudes.

IV.B. Are Female Employers Believed to Choose Equal Pay More Often?

To further examine beliefs about equal pay, participants in the Equality Attitudes & Employer study also make an incentivized decision as an "employer"—inspired by the design in Almås, Cappelen, and Tungodden (2020)—and provide incentivized beliefs about how likely male and female employers are to choose equal pay in that decision. Specifically, employers are asked to choose between implementing equal pay and performance pay for pairs of workers. If an employer chooses equal pay for a pair of workers, both workers in a pair are

39. The only significant difference is that women are more likely to indicate agreement with the first equality statement, which says "Society should aim to equalize incomes."

40. Online Appendix Table A.36 shows that the believed gender gap is robust to several restrictions on our data. Online Appendix Figure B.6 shows that the distribution of the beliefs about women first-order stochastically dominates the distribution of beliefs about men and these distributions are statistically different (Kolmogorov-Smirnov test, $p < .01$). Online Appendix Table A.37 shows that the vast majority of participants believe that the percent of women favoring equality is higher than the percent of men favoring equality. Online Appendix Table A.38 reveals similar heterogeneity as before (i.e., women believe the gender gap is larger and individuals who favor equality are more likely to believe that others favor equality). Finally, Online Appendix Table A.39 shows that the believed gender gap in equality attitudes is inaccurate.

allocated $3. If an employer chooses performance pay for a pair of workers, the "high-performing" worker is allocated $6 while the "low-performing" worker is allocated $0. In each pair, the high-performing worker is the worker who answers more questions correctly on a math and science test with 10 questions (or the worker who is randomly selected in the event of them answering the same number of questions correctly).[41]

Male and female employers both favor equal pay: male employers choose equal pay 68% of the time and female employers choose equal pay 71% of the time. This difference is not statistically significant ($p = .64$).

Female employers are expected to choose equal pay more often: on average, 72% of female employers are expected to choose equal pay, while only 52% of male employers are expected to choose equal pay. This 20 percentage point difference is statistically significant ($p < .01$). Additional results reveal similar patterns and robustness as observed in the Economic Games studies.[42]

41. We follow much of the baseline condition in Almås, Cappelen, and Tungodden (2020). Like them, participants are matched in groups of three, two of whom are workers completing a performance task and one whose task is to choose to allocate ($3, $3) or ($6, $0) to the workers. Employers are not allocated any money in this part, which allows us to narrow in on beliefs about equality per se.

42. Online Appendix Table A.40 shows that the believed gender gap in equal pay is robust to several restrictions on our data. Online Appendix Figure B.7 shows that the distribution of the beliefs about female employers first-order stochastically dominates the distribution of beliefs about male employers and these distributions are statistically different (Kolmogorov-Smirnov test, $p < .01$). The results persist at the participant level: 91% of participants believe the percent of female employers favoring equal pay is higher than the percent of male employers favoring equal pay, 5% of participants believe the reverse, and 4% of participants believe there is no gender difference. Online Appendix Table A.41 reveals similar heterogeneity as before (i.e., women believe the gender gap is directionally larger and individuals who choose equal pay when they are employers are directionally more likely to believe other employers favor equality). Given that women only choose equal pay 2 percentage points more often but are believed to choose equal pay 20 percentage points more often, the believed gender gap in equality attitudes is significantly inaccurate ($p < .01$)

IV.C. *Are Female Employers Favored More when Equal Pay Is Beneficial?*

Because female employers are expected to favor equal pay, one may wonder if it follows that workers are more likely to favor female employers when they are low performers (who benefit from equal pay) rather than high performers (who benefit from performance pay).[43]

To investigate this, we recruited 400 online participants to complete the Worker study, who are the "workers" discussed in the previous subsection. After they are incentivized to answer as many questions correctly as they can on a 10-question math and science test and then provide accurate beliefs about their performance on that test, they make two main decisions—a strategy-method decision and a direct decision—about whether they would prefer to work for a male or female employer.

In the strategy-method decision, workers indicate whether they would prefer to choose a male or female employer (i) in the event that they are a high performer who would benefit from performance pay, and (ii) in the event that they are a low performer who would benefit from equal pay. Consistent with workers favoring female employers more when it is to their benefit because they are low performers, workers are 39 percentage points ($p < .01$) more likely to choose a female employer when making decisions as a low performer (in which case they choose a female employer 85% of the time) compared with when making decisions as a high performer (in which case they choose a female employer 47% of the time).[44]

43. Here, we purposefully narrow in on the financial benefit in a simple one-employment decision setting. More broadly considering how equal pay is defined and what factors may be to one's benefit (e.g., including the role of image concerns) are some of the many important avenues for future work.

44. This behavior also aligns with the belief that low performers are more likely to benefit from female employers because female employers are more likely to choose equal pay. In addition to documenting this belief with incentivized belief data from employers (recall from Section IV.B), this belief is confirmed with additional unincentivized belief data from the workers. For each state of the world in the strategy-method decision, workers were asked whether they expect to earn more from male employers, to earn more from female employers, or to earn the same from both. When asked about the state in which they are the high performer, 44% of workers expect to earn more from male employers, while only 11% of workers expect to earn more from female employers. By contrast, when asked

In the direct decision, participants are only asked to make one choice as to whether they prefer a male or female employer, so they cannot make different choices according to whether they are a low or high performer. When we condition their choice according to whether they believe they are a high performer, similar results follow.[45] Workers are 35 percentage points ($p < .01$) more likely to favor female employers if they believe they are a low performer (in which case they choose female employers 84% of the time) compared with when they believe they are a high performer (in which case they choose female employers 49% of the time).

IV.D. What Are Professional Participants' Beliefs about Women and the Related Labor Market Consequences?

To examine the beliefs of individuals with employment-related experience (Della Vigna and Pope 2018a, 2018b), we recruited 400 "professional participants" from Prolific who had self-reported experience with management and hiring.[46] These participants provide three sets of beliefs.

First, in response to belief questions about equality attitudes (shown in Online Appendix Table A.43) professional participants believe that women are significantly more likely to think that (i) society should aim to equalize incomes; (ii) the government should take measures to reduce differences in income levels; (iii) all people should be paid equally, rather than according to their performance, for the same job; (iv) spouses should take equal responsibility for the home and family; (v) both parents should be equally involved in the upbringing of a child; (vi) all people should have equal access to health care; (vii) all people should have equal

about the state in which they are the low performer, only 4% expect to earn more from male employers, while 54% expect to earn more from female employers. The rest of the subjects expect no difference.

45. Thirty-eight percent of participants believe they are a high performer, and 62% of participants believe they are a low performer.

46. Specifically participants needed to answer "yes" in a prescreening questionnaire to the following two questions, "Do you have any experience being in a management position?" and "Do you have any experience in making hiring decisions (i.e. have you been responsible for hiring job candidates)?" similar to other recent studies (Huber and Huber 2020; Saccardo and Serra-Garcia 2023). In addition, participants needed to have an approval rating of 95% or greater from at least 100 prior submissions and to choose the United States when asked for their nationality.

access to education; and (viii) all people should have equal access to suitable and affordable housing.[47]

Second, as shown in Online Appendix Table A.44, professional participants also think women are in general more likely to (i) make generous decisions, (ii) make decisions that achieve equality, and (iii) favor equal pay over performance pay.

Third, professional participants expect these believed gender differences in social preferences to have labor market consequences. As shown in Online Appendix Table A.45, when professional participants are asked about whether these believed gender differences are likely to be helpful or harmful to a woman's chance of succeeding as a leader and to a woman's chance of being hired, professional participants predict that these beliefs are (i) at least two times more likely to be harmful than helpful to women in workplaces that are highly competitive, but instead (ii) at least three times more likely to be helpful than harmful to women in workplaces that are more cooperative and rely on social skills. Interesting questions for future work relate to whether such expected consequences of the believed gender gap in social preferences influence women's willingness to select into competitive workplaces or positions and the extent to which these expected consequences are accurate.[48]

V. Conclusion

Despite finding little to no gender differences in observed behavior or attitudes relating to social preferences, this article documents robust believed gender differences. Across a wide range of contexts involving 8,979 subjects and 15 studies, women are believed to be substantially and significantly more socially oriented, that is, more generous and more equality oriented. The believed gender gap in social preferences arises across contexts with and without strategic considerations, across contexts with various payoffs in relation to selfishness and the benefits to others, and across contexts with differing and sometimes competing notions of fairness (e.g., in first- and third-party versions of

47. Encouragingly, the fact that such beliefs may arise with professional participants also echoes one of the prior (undiscussed) results in Table 6 of Heinz and Schumacher (2017).

48. For examples of related work, see Buser, Niederle, and Oosterbeek (2014) and Flory, Leibbrandt, and List (2015).

dictator games, dictator games that involve efficiency concerns, dictator games that involve entitlement concerns, ultimatum games, trust games, prisoner's dilemma games, and public goods games). The believed gender gap in social preferences is robust to four different subject pools (undergraduate students, online participants, professional participants, and a representative sample) and various types of participants (including the beliefs held by men and women). The believed gender gap in social preferences is also robust to various study versions that offer participants donation multipliers that are as high as 10 when they are asked to give; elicit broader beliefs, such as those relating to whether women favor "decisions that achieve equality"; obscure our focus on gender; and ask fewer or differently framed belief questions.

The believed gender gap in social preferences extends to beliefs about the household (i.e., beliefs about contributions to the home, family, and upbringing of children), the workplace (i.e., beliefs about equal pay), and policy views (i.e., beliefs about redistribution and equal access to education, health care, and affordable housing). As further evidence of the potential connection between important economic outcomes and the believed gender gap in social preferences, we highlight a few specific connections with data from an incentivized worker-employer experiment and from professional participants who are asked about expected labor market consequences. With the former, we show that being a high performer who benefits from performance pay (rather than equal pay) decreases the extent to which workers favor female employers. With the latter, we show that professional participants think the believed gender gap in social preferences will be helpful to women in cooperative workplaces but harmful to women in competitive workplaces.

Finally, when considering potential explanations for the believed gender gap in social preferences, we turn to prior theoretical work—and prior empirical work in domains other than those related to gender and social preferences—that highlights the connection between associative memory and belief formation. In doing so, we find support for two of the defining features of associative memory models: similarity and inference. Two correlational studies reveal that the believed gender gap is larger (i) among participants who name a woman when asked to recall someone they think of as being generous, (ii) among participants who report having spent more of their childhood with female caretakers, and (iii) among participants who report having experienced

relatively more women who are generous and equality oriented. Two large studies show that an interfering experience causally affects the believed gender gap in social preferences, even though we examine a setting where the interfering experience should have no effect if participants are perfect-memory Bayesians.

Our results suggest several avenues for future work, four of which we highlight here. A first is to explore ways to provide information that accurately affects the believed gender gap in social preferences, particularly given the potential for interfering experiences to counteract the effectiveness of this information. In our Interfering Experience study, the believed gender gap in social preferences was significantly and accurately reduced when participants were provided with distributional information about the socially oriented behavior of men and women and when there were no interfering experiences. In addition to the clear challenges that may arise in finding such comprehensive information and encouraging attention to such information outside of controlled laboratory settings, another challenge likely relates to interfering experiences being unavoidable on a long-run basis.

A second avenue for future work is to further investigate how the believed gender gap in social preferences connects with labor market outcomes. Building off our results around when female employers are favored given beliefs about employer pay tendencies, a natural question for future work is whether and how these types of preferences contribute to differential outcomes for male and female employers. Future work may also investigate the extent to which—as predicted by professional participants—the believed gender gap in social preferences is helpful to women in cooperative workplaces but harmful to women in competitive workplaces, particularly when considering differential success in certain tasks, jobs, and industries.

A third avenue for future work is to explore if there are domains in which the believed gender gap is particularly strong or perhaps even reverses. While we find robust evidence across a wide range of contexts—including more abstract contexts as well as contexts related to the household and workplace—one could imagine that the extent of the believed gender gap could depend on domain and related stereotypes (Günther et al. 2010; Shurchkov 2012; Coffman 2014; Dreber et al. 2014; Bordalo et al. 2019; Coffman, Flikkema, and Shurchkov 2021; Saygin and Atwater 2021; Exley and Kessler 2022; Coffman, Collis, and Kulkarni 2024a; Aksoy, Exley, and Kessler 2024). Future work

may first investigate which types of socially oriented behaviors are considered male-stereotyped versus female-stereotyped and then examine whether the believed gender gap in social preferences differs in a predictable way in these behaviors.[49]

A fourth area for future work is to investigate whether the believed gender gap in social preferences results in women being rewarded less when they are socially oriented and punished more when they are not socially oriented.[50] Indeed, one interpretation of the believed gender gap in social preferences is that individuals seem to hold lower "standards" for men when it comes to how socially oriented they are, and future work may naturally investigate how this connects to gender-specific backlash and lower assessments of women in negotiations, leadership roles, or the workplace more generally (Riach and Rich 2002; Bowles, Babcock, and Lai 2007; Rudman and Phelan 2008; Grossman et al. 2019). For instance, if women pursue their own financial interests too little, they may forgo financially favorable opportunities. But if women pursue their own financial interests too much, they may experience backlash due to not being as socially oriented as women are expected to be.[51]

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49. On this, we note that Musick and Wilson (2008) discusses how men appear to volunteer more in domains related to public safety and emergency services while women appear to volunteer more in domains related to education and human services. Chandar et al. (2019) find that tips given to Uber drivers are on average higher among men than women.

50. Examining how individuals are rewarded (or punished) for socially oriented behavior (or the lack thereof) is a particularly important question given the rich literature on how observability influences socially oriented behavior (see Andreoni and Petrie 2004; Andreoni and Bernheim 2009; Ariely, Bracha, and Meier 2009; Lacetera and Macis 2010; Exley 2018; Bolton, Dimant, and Schmidt 2021).

51. Nuances like these make clear why caution is warranted with blanket recommendations to "lean in" (Exley, Niederle, and Vesterlund 2020). The complexity of this situation, in our view, lends further support to carefully investigate "change the system" approaches. For examples of "change the system" approaches, see Bohnet (2016), Bohnet, van Geen, and Bazerman (2016), Apicella, Demiral, and Mollerstrom (2017), He, Kang, and Lacetera (2021), and Kessel, Mollerstrom, and van Veldhuizen (2021).

Supplementary Material

An Online Appendix for this article can be found at *The Quarterly Journal of Economics* online.

Data Availability

The data underlying this article are available in the Harvard Dataverse, https://doi.org/10.7910/DVN/NDKGAH (Exley et al. 2024).

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