How competitive are female professionals? A tale of identity conflict

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\textbf{ABSTRACT}

We develop and test experimentally the argument that gender/family and/or professional identities, activated through priming, influence preference for competition. We focus on female professionals for whom these identities may conflict and male professionals for whom they may be reinforcing. We primed MBA-student participants by administering questionnaires concerning either gender/family or professional issues. Subsequently, participants undertook a real-effort task and chose between piece-rate and competitive-tournament compensation. For females, professional priming resulted in a significantly greater preference for competition than gender/family priming. Priming had significantly different effects for males. This contrast highlights an identity conflict for female professionals, not present for males.

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1. Introduction

Despite continuous improvements over the past few decades, women are still earning less than men in the US and in many other countries (Blau and Kahn, 2000, 2006 for the US; Drolet, 2001 for Canada; Weichselbaumer and Winter-Ebmer, 2005 present a meta-analysis of 263 wage-gap studies for many different countries). This is true not only for women in general, but also for those who have graduated from top MBA programs, presumably with the aim of pursuing ambitious managerial/professional careers (Babcock and Laschever, 2003; Bertrand et al., 2010; Carter and Silva, 2010). Moreover, female executives and MBA graduates occupy fewer seats in corporate boardrooms and are under-represented in many high-profile jobs compared to men (e.g., Bertrand and Hallock, 2001; Pfeffer, 2010).

An extensive literature spanning economics, management, sociology and psychology seeks to explain these gender-based disparities in pay and promotion (e.g., Polachek, 1981; Wennérås and Wold, 1997; Goldin and Rouse, 2010; Black and Strahan, 2002; Babcock and Laschever, 2003; Bertrand et al., 2010; Carter and Silva, 2010; Pfeffer, 2010). In this study, we build on two recent strands of this literature. One of these strands uses laboratory experiments to demonstrate that male students choose
to participate in highly competitive high-stakes tournaments more frequently than female students in both the United States (Niederle and Vesterlund, 2007) and France (Datta Gupta et al., 2013). Moreover, Gneezy et al. (2009) show that while males choose a competitive tournament more often than females among the patriarchal Maasai of Tanzania, females are more inclined than males to compete among the matrilineal Khasi of India. These contrasting behaviors highlight the importance of nurture and suggest that societal norms such as culture-specific gender roles and stereotypes may be important factors in explaining the differing attitudes of males and females toward competition.

According to gender role theory (Eagly and Karau, 2002) gender stereotypes originate from the social roles that men and women have traditionally occupied in a society. Stereotypes are learned early in life, become part of one’s cultural understanding, and are internalized as implicit beliefs and endorsed values. People extend stereotypes to develop implicit self-concepts, which are evidenced by automatic associations between the self and stereotypical personality traits, abilities and roles (e.g. Devos et al., 2008). Such stereotypes are likely closely related to the differing preferences for competitive tournaments demonstrated by men and women.

The other important strand of the literature focuses on the contrasting effects of marriage, motherhood and fatherhood on pay and career advancement. Weichselbaumer and Winter-Ebmer (2005) demonstrate in their meta-analysis of 263 wage-gap studies that the male-female differential is significantly lower for single than for married employees across many countries and regions. An example of such a study is by Drolet (2001), who shows that in Canada the observed ratio of female to male wages is 0.96 for single, never-married persons, but 0.77 for those who are married. Parenthood is particularly important in this regard. Indeed, a substantial motherhood wage penalty has been documented for the United States (e.g., Waldfogel, 1997, 1998a, 1998b; Lundberg and Rose, 2000; Budig and England, 2001; Anderson et al., 2002, 2003; Edwards, 2005) and many other countries (Joshi et al., 1999; Todd, 2001; Phipps et al., 2001; Harkness and Waldfogel, 2003; Kunze and Ejrnaes, 2004; Sgle-Rushton and Waldfogel, 2007a, 2007b; Molina and Montuenga, 2009). In contrast, a significant fatherhood wage premium has also been observed (e.g., Lundberg and Rose, 2000, 2002; Glauber, 2008; Hodges and Budig, 2010). Moreover, Glass (2004) and Budig (2010) argue that the gender gap among US employees with similar experience, education, training and jobs is actually a parenthood gap caused by the combination of a motherhood penalty and a fatherhood premium. Caranci and Gauthier (2010) make the same argument for Canada.

What are the reasons for such a parenthood gap? Budig and England (2001) show that about one third of the motherhood penalty is explained by differences in job experience between mothers and women without children. They attribute the remaining two thirds to a combination of productivity differences and discrimination. A large number of experimental and survey studies point to discrimination as an important factor (see Benard et al., 2008 for an excellent review of this literature). For example, Correll et al. (2007) show that both student evaluators and real employers discriminate against mothers relative to females without children. In particular, student evaluators, when asked to compare two fictitious job applicants with otherwise equal qualifications, rated the mothers as significantly less competent and less committed to work than the females without children. They also recommended significantly lower salaries for the mothers. In contrast, fathers were considered significantly more committed to work, and raters recommended a significantly higher salary for them than for males without children. Real employers called back job applicants who were mothers significantly less often than females who were not parents. This was not true for males.

A number of models have been used to explain such discrimination (Benard et al., 2008). They have in common the idea that people, including those responsible for hiring and salary decisions, have conflicting notions regarding the characteristics of a good mother versus those of a good employee (e.g., Blair-Loy, 2003). According to this view, a good mother is required to be warm, caring, and committed first to her family, implying less commitment to her job. In contrast, a good employee must be devoted, competent and committed to work. Using questionnaire-based experimental data, Cuddy et al. (2004) argue that when female employees become mothers, others perceive them as warmer but less competent. Males however do not face this trade-off when becoming fathers, gaining perceived warmth, while retaining perceived competence.

In this paper, we argue that such conflicting ideals regarding work and family life for females may affect not only the decisions of potential employers, but also the behavior of female employees themselves. If motherhood blunts a woman’s competitive edge, her behavior not only in the family but also in the workplace may be affected. If so, the effects of motherhood on workplace behavior may be such as to reinforce the very discrimination that such women receive. We focus on women who have chosen to pursue a highly competitive managerial career. Our argument is that such women often experience conflicting role identities: a professional identity that is highly competitive, competent and ambitious and a gender/family identity that is warm, supportive and caring. We demonstrate that when activated by subtle psychological priming, each of these identities can have a significant impact on whether such women will choose to participate in a competitive tournament with high-powered financial incentives. In contrast, for otherwise similar males, we show that identical priming has significantly different effects. Females primed with the gender/family identity are significantly less competitive than those primed with the professional identity, while males primed with the gender/family identity are not. Under some circumstances, males primed with the gender/family identity are in fact significantly more competitive than those primed with the professional identity.

Although such priming effects may be short-term in nature, these results suggest that life-cycle events such as marriage, pregnancy, and parenthood could have very substantial and long-lasting effects on the activation of family identities with their consequent effects on attitudes toward competition. Thus, the decision to avoid or minimize competition made by many
women in professional careers may be driven not by lack of ability but rather by the increased salience of the gender/family identity, based on stereotypical beliefs, attitudes and ideals over time.

2. Experiments on gender and preference for competition

Niederle and Vesterlund (2007) (henceforth NV) examined whether males and females differ in the type of compensation scheme they prefer, while holding the task characteristics constant. Since our experimental design shares some common features with the NV study, we describe it in some detail. NV employed a real-effort task, involving the addition of as many sets of five two-digit numbers as possible in a five-minute time interval. Males and females showed no significant differences in performance, whether working under an imposed piece-rate or imposed tournament compensation scheme. Although participants received feedback on their absolute performance, they received no feedback about their performance relative to the other members of their group. All groups consisted of two men and two women. After the two imposed rounds, the participants were given a choice of compensation scheme for the same task. The results are striking. Despite the similar performance, 73% of males chose to enter the tournament, while only 35% of women chose to do so. NV find that this gender gap in tournament entry was driven both by greater male overconfidence relative to females and by different preferences for competition associated with each gender. In contrast, the experiment provides negligible evidence for either risk or feedback aversion having an impact on such decisions.

In a related study Gneezy and Rustichini (2006) compared self-selection of men and women into a competitive environment using two tasks: shooting baskets, intended to favor males, and solving anagrams, intended to favor females. They found that the proportion of participants choosing the competitive environment was higher for males than for females in both scenarios, but that the difference was smaller in the task that favored women. Datta Gupta et al. (2013), who use a maze-solving task and examine mixed- versus same-sex competition, provide further support for the competitiveness finding. Sutter and Rutzler (2010) show that such a gender gap is present even for three-year olds, indicating that gender differences in competitiveness emerge very early in life. However, Price (2011) was unable to replicate NV’s competitiveness result, using a seemingly identical experimental design.

Other recent studies examine factors that mediate the relationship between gender and preference for competition (e.g., Vandegrift and Yavas, 2009; Gill and Prowse, 2011; Balafoutas et al., 2012) and tasks and environments that mitigate this relationship (e.g., Niederle et al., 2008; Dargnies, 2009; Vandegrift and Yavas, 2009; Balafoutas and Sutter, 2010; Flory et al., 2010; Healy and Pate, 2011; Andersen et al., 2011; Ertac and Szentes, 2011; Müller and Schwieren, 2011). As already noted in the introduction, Gneezy et al. (2009) provide strong evidence that culture-specific gender roles and stereotypes play an important role in determining whether males or females prefer competition. In contrast, Wozniak et al. (2010) suggest that biological factors may matter. They show in a laboratory experiment that females are more likely to avoid competition during the low-hormone phase of their menstrual cycle, while during the high-hormone phase their revealed preference for competition is not significantly different from those of the males in the study. As argued by Datta Gupta et al. (2013), this does not provide conclusive evidence of a biological underpinning to the differing preferences of men and women. It may instead represent a reaction primed by the onset of menstruation, which occurs during the low-hormone phase of the cycle.\(^\text{2}\) None of these papers explicitly examines how conflicting gender/family and professional identities among females pursuing a professional career in a developed, industrialized country may influence self-selection into more or less competitive environments. We use the priming methodology developed in psychology and exploited by both psychologists and economists to study issues of identity to tackle this important issue.

3. Priming of gender/family and professional role identities

Identity theory (e.g., Burke, 1980; Stryker, 1968) focuses on the role positions that people occupy in society and emphasizes the impact of those positions on peoples’ self-concepts. In particular, each role position is linked with a distinct role identity. A role identity encompasses a set of normative expectations, which in turn prescribe role-congruent behavior (Eagly and Karau, 2002). Satisfactory enactment of roles can positively enhance feelings of self-esteem and self-evaluation (Stryker and Serpe, 1982). Together, a person’s multiple role identities define and give meaning to the self. The likelihood that a particular role identity will affect one’s behavior in a given situation is called identity salience (Stryker, 1987). Exposure to a priming stimulus can make one identity more salient than others, thereby affecting a person’s subsequent behavior. The power of identity priming in influencing behavior was first demonstrated in social psychology. For example, Shih et al. (1999) showed that Asian-American women performed better/worse on a mathematics test when their ethnic/gender identity was activated than a control group. They activated Asian/gender identity and the identity-related stereotype that Asians/women

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\(^2\) A related literature shows that on some tasks males perform no better than females under non-competitive circumstances, but do significantly better in a competitive context (e.g., Gneezy et al., 2003; Gneezy and Rustichini, 2004; Datta Gupta et al., 2013). Guenther et al. (2010) suggest that such a result is moderated by the nature of the task. In particular, they demonstrate that while this result holds for stereotypically male tasks, it is reversed for stereotypically female tasks. Another related study is Price (2012), which demonstrates that in a laboratory experiment, males assigned the role of manager and, given information about worker ability, choose a tournament pay scheme for females less often than for males playing the worker role. This is not true when no information about worker ability is provided.
are better/worse at math by administering a questionnaire concerning ethnic heritage/gender to one group of subjects immediately prior to the math test. Such a priming effect can occur automatically and without conscious awareness (Kawakami et al., 2002).

Economists have also become increasingly interested in the notion of identity, applying identity models to various aspects of economic decision-making (e.g., Akerlof and Kranton, 2000, 2002, 2005, 2008; Basu, 2005, 2010; Chen and Li, 2009; Bénabou and Tirole, 2011; Chen and Chen, 2011). In recent years a number of economics experiments have successfully used priming to study the effects of race and ethnicity (Benjamin et al., 2010; Chen et al., 2010), urban status (Afridi et al., 2011) and religion (Benjamin et al., 2012) on various aspects of economic behavior. Benjamin et al. (2010) provide a nice model of the relationship between priming and identity, which demonstrates how priming can reveal the marginal effect of increasing the salience of a particular identity.

We use the idea that role identity has the potential to drive an individual’s behavior, and conjecture that women’s entry decisions into high-powered tournaments may be influenced by their professional (competitive) and family (care-giving and non-competitive) roles, which may be in conflict with each other. To test our conjectures, we expose our participants to a priming stimulus that can make one identity more salient than the other and thus create exogenous variation in the saliency of gender/family versus professional role identities. Our focal hypothesis is that professionally oriented females and males who receive professional priming will demonstrate no difference in their propensities to select into a competitive tournament. However, exposure to gender/family priming will have different effects on the females relative to the males, opening up a gender gap in preference for competition. In particular, under such priming, we predict that females will show a lower propensity to select into a competitive pay scheme relative to their choices under professional priming. While gender/family priming may cause males to become more competitive, as suggested by some of the explanations for the fatherhood premium, professional priming is also likely to promote competition. Thus, we make no prediction about the direction of the priming effect on males, but rather hypothesize that the probability of a female making a competitive choice will decrease (increase) significantly more than the comparable male probability when participants receive gender/family (professional) rather than professional (gender/family) priming. The testing of this prediction, embodied in Hypothesis 4 below, is central to the identity issues examined in this study. It is rooted in the idea that while many female professionals face a strong identity conflict between their gender/family and professional identities, many male professionals experience little such identity conflict. We also examine beliefs about whether one has ranked first in a previously played tournament as a potential mediating variable to determine the extent to which identity priming works by affecting such beliefs, which may be linked to the relative salience of gender/family versus professional identity. Moreover, we examine whether behavioral over- or under-confidence are affected by the type of identity priming to which one is exposed. Finally, we look at whether identity priming has similar effects on the selection of a risky gamble, the outcome of which is completely random, and on submission of a previous performance to a tournament-based compensation scheme. Our main hypotheses are as follows:

**H1.** Males are more likely than females to enter a competition under gender/family priming.

**H2.** Males and females are equally likely to enter a competition under professional priming.

**H3.** Females under professional priming are significantly more likely to enter a competition than females under gender/family priming.

**H4.** Gender moderates the relationship between priming and preference for competition. In particular, the effect of receiving professional versus gender/family priming on increasing the probability of a competitive choice is lower for males than for females.\(^4\)

**H5.** The relationship between priming, gender, and preference for competition is mediated by confidence in one’s ability to win a tournament as expressed in beliefs about whether one has previously finished first in such a competition.

### 4. Methods

**4.1. Participants, experimental site and task**

We conducted our experiment at the Rotman School of Management at the University of Toronto. Rotman is widely regarded as one of the world’s most prestigious and elite business schools according to many global rankings. We recruited participants from the population of full-time MBA students at Rotman. These students all had several years of managerial experience prior to entering the MBA program, and by entering the program had put themselves on a highly competitive career track. We focused on this population because we were seeking to examine the hypothesized conflict between professional and gender/family identities among highly talented, ambitious and career-oriented women in comparison with similarly talented and ambitious men. Applying laboratory methods to a particular population that has a special relevance to

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\(^3\) A mediating model hypothesizes that the independent variable affects the mediating variable, which in turn affects the dependent variable. Mediation may be either partial or complete. In the former case, there is both a direct and an indirect effect of the independent variable on the dependent variable. In the latter case, the independent variable affects the dependent variable only indirectly through the mediator (Mackinnon, 2008).

\(^4\) A moderating variable statistically interacts with another independent variable in affecting the dependent variable (Cohen et al., 2003).
the purpose of a study has been termed an artifactual field experiment (Harrison and List, 2004). Such an approach occupies an important middle ground between a laboratory experiment and naturally occurring field data.

Potential participants were recruited by means of an email solicitation through the MBA program listserv. They were told that they would be participating in a study about workplace issues and that they would be paid. They were not given any other details prior to the experiment. One hundred and thirty-two full-time MBA students participated in the initial study (66 men and 66 women) with an average age of 28 years and a standard deviation of 2.91 years. A real-effort task previously used in the literature to examine similar issues was employed in this study (e.g., Niederle and Vesterlund, 2007). It is an arithmetic task involving the addition of as many sets of five two-digit numbers as possible in a set time frame. This arithmetic task was selected because several recent meta-analytical papers have shown that there is no gender difference in performance on such a simple arithmetic task (e.g., Else-Quest et al., 2010; Hyde et al., 1990). This differs from more complex mathematical tasks such as those from the Canadian Math Competition used by Shih et al. (1999), in which males perform better on average than females. The numbers for the arithmetic task were randomly generated on the computer. However, the experiment itself was done using paper-and-pencil.

The focus of the experiment is to examine whether gender/family identity and/or professional identity, both of which are activated through priming, might have differing impacts on preference for competition between female and male MBA students. Some previous studies examining the differing impacts of priming two types of identity or decision-making styles compare both types to a control group that was not primed (e.g., Shih et al., 1999). Others compare the differing impacts resulting from the two primes to each other so that each acts as a control for the other (e.g., Zhong, 2011). The nature of our research question calls for a focus on the latter approach. People all have identities, which influence the way they think and act. It is not possible either in the lab or in the field to have an identity-free situation. Thus, a treatment with no priming of any specific identity creates a situation where researchers have no way of identifying whether or to what extent an identity or multiple identities may be influencing people’s behavior. The potentially differing impacts of gender/family and professional identity on preference for competition among male versus female MBA students can be most directly compared by contrasting each priming treatment with the other rather than by comparing each to a no priming alternative in which the impact of different possible identities is neither observed nor controlled. While initially concentrating on a comparison of behavior under the two forms of identity priming with each other, we subsequently present the results of a no-priming treatment for comparison with behavior under each of the primed identities. This permits an examination of the strength of each identity in the absence of controlled priming by the researchers.

Priming was implemented by administering a questionnaire at the very beginning of an experimental session prior to giving participants any instructions about the task or the experimental procedures. About half of the participants (30 men and 30 women) received a questionnaire on gender- and family-related concerns at that time, while the rest (36 men and 36 women) received a questionnaire concerning their MBA program and professional career planning issues. After completing the experimental task, the questionnaire not completed prior to the task was administered. Sample items included “what is your gender?” and “do you have children?” for the former questionnaire and “what is your GMAT score?” and “What is your salary expectation upon the completion of your degree?” for the latter one. Preference for competition was measured through the type of compensation scheme selected by a participant while holding the task characteristics constant.

4.2. Experimental procedure

We ensured that in every session, there were equal numbers of men and women. Following NV, participants were then divided randomly into groups of four with two men and two women in each group. Gender was never explicitly mentioned, but participants could see each other and thus observe the gender composition of their own group. Four sessions were conducted. Two sessions started with the gender/family-priming questionnaire, while the other two began with the professional-priming questionnaire.

After completing the questionnaire, each participant received instructions about the arithmetic task. The experimental instructions were read aloud to the participants while they followed along on their own copies. The instructions informed the participants that they would begin by playing a two-minute warm-up round and subsequently play several five-minute experimental rounds. The warm-up round was designed to familiarize participants with the experimental procedure and the real-effort task. They were not told exactly how many rounds they would play, but they were told that only one of the experimental rounds would be selected at random at the end of the session for payment. This design feature was implemented so that money earned in one round would not affect behavior in a subsequent round, and so that each round would be considered independent and equally important. Lastly, participants were informed that they would receive a $10 show-up fee above and beyond their earnings from the task.

Each participant was provided with a prepared workbook. For each round, the first page in the workbook explained which compensation scheme conditional would apply to the upcoming round. Participants were not permitted to look ahead to future pages or to go back to previous pages. They were only allowed to tear off one page and look at the next when instructed to do so by the experimenter. After each round, each participant’s workbook page was collected by the experimenters and taken

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5 The full questionnaires are available from the authors upon request.
6 The instructions are available from the authors upon request.
to another room where the number of correct answers was calculated. Participants received feedback after each round on the absolute number of questions they had answered correctly, but not on their ranking relative to the other participants in their group. The compensation schemes available for each experimental round were as follows:

**Round 1 – First self-selection of piece-rate or tournament pay (SS1)**

Participants were asked to decide which one of the two following compensation methods they would like to use for calculating their earnings for Round 1.

**Method A:** Participants would earn $4.00\(^7\) for each problem solved correctly. Thus, total earnings for the round would be: $4.00 \times \text{the number of problems solved correctly.}$ Since pay depended only on one’s own performance, there was no competition with others.

**Method B:** One’s payment would depend on one’s performance relative to that of the other three participants who were sitting in the same row. If one solved more problems than the other three persons, one would earn $16.00 for each correctly solved problem. Thus, total earnings for the round would be: $16.00 \times \text{the number of problems solved correctly.}$ However, if one’s performance were ranked second, third, or fourth among the participants in the row, one would earn $0$ regardless of the number of problems solved. If there were ties, the winner would be determined randomly from among those who were tied for the best performance. Since a participant received a very high rate of compensation, but only if ranked first out of the four participants, this pay scheme was highly competitive. Notice that a person choosing this scheme must do better than the other three participants to receive compensation regardless of which scheme was chosen by those participants.\(^8\)

**Round 2 – Imposed piece-rate pay**

Participants were informed that Method A would be used for calculating earnings for Round 2. This gave all participants experience with the piece-rate compensation scheme, and allowed us to compare the performance of males and females under this pay scheme.

**Round 3 – Imposed tournament pay**

Participants were informed that Method B would be used for calculating earnings for Round 3. This gave all participants experience with the tournament compensation scheme, and allowed us to compare the performance of males and females under this pay scheme. For half of the participants, Rounds 2 and 3 were administered in reverse order to control for order effects from learning or other factors.

**Round 4 – second self-selection of piece-rate or tournament pay (SS2)**

Participants received the same instructions as in Round 1 (SS1). This second self-selection (SS2) was designed to determine whether choices changed or remained the same after experience under both pay schemes. Cadsby et al. (2007) showed that participants in a real-effort experiment became better at choosing the most beneficial pay scheme for themselves after experiencing each of the pay schemes even in the absence of feedback on their performance. In this study, we give each player feedback on their absolute, but not on their relative performance. Comparing choices under SS2 with those under SS1 allows us to examine whether the differing effects of gender/family versus professional priming on self-selection are attenuated through experience of the two pay schemes.

**Round 5 – Self-selection of piece-rate or chance pay (SSC)**

Tournaments not only involve competition. They also involve financial uncertainty or risk. In our study, the selection of a tournament involved greater financial uncertainty than the selection of piece-rate compensation. In order to identify the role played by risk-aversion, we employed a self-selection round of chance pay. Specifically, participants were asked

\(^7\) All dollar amounts are in Canadian dollars, which were roughly at par with US dollars at the time the study was conducted.

\(^8\) A potential problem with this approach might arise if participants were to perform systematically better under one scheme than under the other. In that case, one’s self-selection into a tournament or piece-rate scheme might depend in part on one’s beliefs about how many other people in one’s group would choose each scheme. However, there was no such systematic difference. Neither males nor females in either treatment or in aggregate showed any significant differences in performance between the imposed tournament and imposed piece-rate schemes discussed below.

\(^9\) Another potential concern is that participants who choose a tournament in round 1 might as a result of their experience with the tournament perform better in later rounds. To explore this possibility, we ran regressions using performance in the assigned rounds as dependent variables. Controlling for performance in round 1, gender, priming treatment, interaction between gender and priming treatment and GMAT score, we find that a dummy variable indicating whether a tournament was selected in round 1 is not significant. Thus, there is no evidence of such path dependence.
to decide which one of the following two compensation methods they would like to use for calculating their earnings for Round 5.

Method A: Participants would earn $4.00 for each problem solved correctly. Thus, total earnings for the round would be: $4.00 \times \text{the number of problems solved correctly}.

Method C: There would be a 25% chance of earning $16.00 for each problem solved correctly. There would be a 75% chance of earning $0 regardless of the number of problems solved correctly.

Since the expected earnings from Method A and Method C are identical, a risk-averse person would choose Method A to avoid all risk, while a risk-loving person would choose Method C. A risk-neutral person would be indifferent between the two choices. Method C is identical to Method B under the assumption that each participant has a 25% chance of ranking first. Thus, it allowed us to separate attitudes toward financial risk or uncertainty from confidence in one’s ability and attitudes toward competing with others. By isolating the risk characteristics of a tournament, we are able to examine whether identity priming affects such risk attitudes.

Round 6 – Self-selection of piece-rate or tournament pay based on past piece-rate performance (PSS)

Participants were told that they did not need to perform in Round 6. Rather if this round were randomly selected for payment, their earnings would depend on the number of correct answers they provided in Round 2, i.e. the imposed piece-rate pay round. Each participant was asked to decide whether s/he would like Method A or Method B applied to her/his past piece-rate performance to determine her/his earnings. NV employed such a condition to separate the various factors that might affect the choice between tournament and piece-rate compensation (e.g. risk attitude, feedback aversion, and overconfidence) from a preference for the act of competing itself. Our focus was to examine the extent to which identity priming affects selection into such a “near tournament” that did not involve actually having to compete since it was based solely on past performance in a non-competitive setting.

Round 7 – Self-selection of piece-rate or tournament pay based on past tournament performance (TSS)

Participants were told that they did not need to perform in Round 7. Rather if this round were randomly selected for payment, their earnings would depend on the number of correct answers they provided in Round 3, i.e. the imposed tournament pay round. Each participant was asked to decide whether s/he would like Method A or Method B applied to her/his past tournament performance to determine her/his earnings. This provides an alternative measure of the extent to which identity priming affects the choice between tournament and piece-rate compensation in a near tournament that does not involve competing in the future. It may, however, differ from the Round-6 (PSS) measure if participants felt differently about their past performance relative to others under an imposed tournament than they did about their past performance relative to others under an imposed piece rate. Note that for those participants for whom Rounds 2 and 3 were administered in reverse order, Rounds 6 and 7 were administered in reverse order as well.

Rounds 2, 3, 4 and 6 are similar in design to NV. However, NV did not examine identity priming. Moreover, in NV’s self-selection treatment, participants choosing the tournament competed against the other participants’ performances in the imposed tournament round rather than against their contemporaneous performances. We chose to use contemporaneous performances for all participants because of the possibility of performance improvement through learning over time.

4.3. Post-experiment questionnaires

After participants completed the experimental task, they filled out a questionnaire in which they responded to a number of demographic questions. Neither GMAT score nor any of the demographic characteristics (i.e., marital status, managerial experience, target salary, age, or having children) was significantly different between those participants randomly assigned to the gender/family priming treatment and those randomly assigned to the professional priming treatment. We also included belief-assessment questions, which asked participants to guess their ranking relative to the other participants in their group in the first four rounds. Each participant was asked to pick a rank between one and four, and was paid $4 for a correct guess if that round was selected for payment.

At the end of the experiment, a number from one to seven was drawn to determine which of the seven rounds was utilized to pay participants. The experiment lasted about an hour and participants earned on average $73, inclusive of a $10 show-up fee. All participants were paid privately. The relatively high level of compensation was an important feature of the experimental design. The MBA students who participated in our sessions pay a very high tuition for their education and have high expected earnings. The high-powered financial incentives we provided were meant to ensure that they were highly motivated. In fact, participants appeared focused and enthusiastic, and worked diligently throughout the experimental session.
Table 1
Data overview.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Gender/family priming treatment</th>
<th>Professional priming treatment</th>
<th>No priming treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men (n = 30)</td>
<td>Women (n = 30)</td>
<td>Men (n = 36)</td>
</tr>
<tr>
<td>Round 1: self-selection 1 (SS1)</td>
<td>0.37</td>
<td>0.07</td>
<td>0.25</td>
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<tr>
<td>Round 2/3: imposed tournament round performance</td>
<td>15.83</td>
<td>12.40</td>
<td>15.47</td>
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<td>Round 4: self-selection 2 (SS2)</td>
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<td>0.10</td>
<td>0.17</td>
</tr>
<tr>
<td>Round 5: self-selection of chance pay (SSC)</td>
<td>0.13</td>
<td>0.00</td>
<td>0.03</td>
</tr>
<tr>
<td>Round 6/7: self-selection for piece-rate round (PSS)</td>
<td>0.43</td>
<td>0.20</td>
<td>0.28</td>
</tr>
<tr>
<td>Round 6/7: self-selection for tournament round (TSS)</td>
<td>0.37</td>
<td>0.10</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Table 2
Means, standard deviations and correlations.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. dev.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Male</td>
<td>0.50</td>
<td>0.047</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Married</td>
<td>0.22</td>
<td>0.039</td>
<td>0.14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Have Children</td>
<td>0.05</td>
<td>0.021</td>
<td>0.14*</td>
<td>0.441***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. GMAT Score</td>
<td>660</td>
<td>51.21</td>
<td>0.313***</td>
<td>0.107</td>
<td>0.005</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Managerial Experience</td>
<td>4.71</td>
<td>0.213</td>
<td>0.173**</td>
<td>0.344***</td>
<td>0.324</td>
<td>0.067</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Target Salary</td>
<td>90,820</td>
<td>1710</td>
<td>0.365***</td>
<td>0.119</td>
<td>0.149*</td>
<td>0.266**</td>
<td>0.266**</td>
<td>0.205**</td>
</tr>
<tr>
<td>7. Age</td>
<td>27.56</td>
<td>2.91</td>
<td>0.173**</td>
<td>0.442***</td>
<td>0.442***</td>
<td>−0.080</td>
<td>0.763***</td>
<td>0.205**</td>
</tr>
</tbody>
</table>

Note: n = 132, *; ** and *** denote p < 0.05, 0.01, 0.001 respectively.

5. Results

5.1. Data overview and task performance

The first two columns of Table 1 provide a summary of the results by priming treatment and gender. The nature of priming appears to have a dramatic influence on self-selection into a competitive tournament. Under gender/family priming, 37% of males and just 7% of females selected into the tournament in Round 1 (SS1) prior to any experience or feedback on absolute performance. In contrast, under professional priming, 25% of both male and female participants chose the tournament. In Round 4 (SS2), after experiencing both the imposed piece-rate and imposed tournament payment schemes, the comparable numbers are 37% of males compared to 10% of females under gender/family priming and 17% of males versus 31% of females under professional priming. The results are similar for Rounds 6 and 7 (PSS and TSS). Fewer people selected into chance pay in Round 5 (SSC), but the impact of priming appears similar to its effect in the tournament and near-tournament rounds.

Surprisingly, males performed better than females regardless of payment scheme or priming treatment. This contrasts with NV, who found no differences in performance under either compensation scheme between male and female undergraduates. Table 2, which shows the means and correlations between the demographic variables, sheds some light on this issue.10 In this sample of MBA students, maleness is correlated with higher GMAT scores, more managerial experience, higher salary expectations, being older and having children. This is due to a combination of applicant pool demographics and the admission policies of the MBA program, which are intended to ensure a substantial number of female students. The relative paucity of qualified female applicants may of course reflect the general tendency of many women to avoid competitive situations, documented in NV and Datta Gupta et al. (2013).

These factors, particularly the higher average GMAT scores for men, suggest that the men in our sample from this particularly competitive managerially oriented population, may on average have greater ability at performing the experimental task than the females. Table 3 reports the results from two regressions using imposed tournament and piece-rate performance respectively as the dependent variable. In each case, Model 1 contains three independent variables: a gender dummy that is 0 for females and 1 for males, a treatment dummy that is 0 for the gender/family priming treatment and 1 for the professional priming treatment, and an interaction between the two. Under both compensation schemes, only the coefficient on male is significant (p = 0.013 and 0.051 respectively). This both confirms the impression from the data summary that males performed better than females, and indicates that the priming treatment made no significant difference in this

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10 As noted in the text above, t tests available from the authors upon request indicate that there is no significant difference for any of these demographic variables between treatment groups. Thus, women share similar demographic characteristics across treatments, and so do men.
respect. Model 2 adds GMAT score to the other independent variables.\(^\text{11}\) The GMAT score is highly significant in both cases ($p = 0.015$ and $0.021$ respectively). Moreover, once we control for GMAT score as a proxy for ability, the coefficient on the male dummy is no longer significant in either case.

### 5.2. Preference for competition and its determinants in Rounds 1 and 4

We begin to investigate self-selection into a competitive tournament using the first self-selection in Round 1 (SS1) as the dependent variable. Since this is a binary categorical variable, we estimate a logit regression model.\(^\text{12}\) The results are reported in Table 4. For Model 1, the independent variables are the male dummy, the professional-priming dummy and their interaction, coded as in Table 3. Model 2 controls for individual ability by adding GMAT score. We also estimated a similar model using actual performance in the imposed tournament round as a proxy for ability. The results, while not identical, were qualitatively similar for this and for the subsequent models using GMAT as an ability proxy.\(^\text{13}\)

In most cases, our hypotheses are unidirectional as indicated in the discussion and hypotheses that conclude Section 3. In those cases, we use one-tailed hypothesis tests and report one-tailed $p$-values. All such tests are indicated by a 1 superscript.\(^\text{14}\) In H1, we predicted that males would be more competitive than females under gender/family priming. This is corroborated by significant coefficients for the male dummy in both Models 1 and 2 ($p = 0.005$ and 0.035 respectively). For ease of interpretation, we also report marginal effects. The marginal effect for the gender/family treatment is highlighted by a superscript G. For binary categorical variables, the marginal effect is just the difference between the probability of entering the tournament when the dummy variable equals 1, indicating a male, and the probability of entering when the dummy variable equals 0, indicating a female. For example, in Model 1 the number 0.30 indicates that the probability of a male entering the tournament exceeds the probability of a female entering the tournament by 0.30 ($0.37-0.07$). The $p$-value indicates that this difference is significant ($p = 0.001$), again supporting H1. The analogous number for the professional priming treatment is highlighted by a superscript P. In this case, we use a two-tailed test because H2 predicted no difference between males and females in this case. All such two-sided tests are indicated by a 2 superscript. The marginal effect is 0 since

---

\(^\text{11}\) Of the 122 participants in the study, 16 did not answer the question concerning their GMAT scores. Thus, the number of observations falls from 132 to 116 when GMAT score is included as an independent variable. We also reestimated Model 1 using data from only these 116 participants. The results were qualitatively the same as when all 132 observations were used to estimate Model 1. This is also true for all of the subsequent statistical analysis reported in this paper.

\(^\text{12}\) Alternatively, we could use a Probit model. Probit gives almost identical results for all of the logit estimations reported in the paper.

\(^\text{13}\) There is considerable controversy about the appropriate use of one-tailed tests. We use one-tailed tests only for our explicitly unidirectional hypotheses.

\(^\text{14}\) The results using performance in the imposed tournament as a proxy for ability are available from the authors upon request. Using performance rather than GMAT score as a proxy for ability is however potentially problematic. Performance in the imposed tournament occurred after SS1 and therefore could be affected by the SS1 choice. For example, a person choosing the tournament in SS1 would experience a tournament prior to the imposed tournament round whereas a person choosing the piece rate in SS1 would not. These different experiences could potentially influence performance in the imposed tournament round, obscuring the hypothesized causal relationship between ability and one's choice of compensation scheme. In contrast to performance in the imposed tournament, GMAT score is clearly an exogenous variable relative to selection of payment scheme.

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**Table 3**

Determinants of imposed piece-rate/tournament round performance (OLS regressions with two-tailed $p$-values in parentheses).

<table>
<thead>
<tr>
<th></th>
<th>Imposed tournament round</th>
<th>Imposed piece-rate round</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1 ($n = 132$)</td>
<td>Model 2 ($n = 116$)</td>
</tr>
<tr>
<td>Gender (male = 1)</td>
<td>3.43 (0.013)</td>
<td>1.63 (0.278)</td>
</tr>
<tr>
<td>Priming (professional)</td>
<td>0.961 (0.463)</td>
<td>−0.500 (0.728)</td>
</tr>
<tr>
<td>Interaction</td>
<td>−1.32 (0.475)</td>
<td>0.526 (0.786)</td>
</tr>
<tr>
<td>GMAT</td>
<td></td>
<td>0.023 (0.015)</td>
</tr>
<tr>
<td>Constant</td>
<td>12.4 (0.000)</td>
<td>−1.70 (0.786)</td>
</tr>
</tbody>
</table>

**Table 4**

Determinants of SS1 (logit regressions with $p$-values in parentheses).

<table>
<thead>
<tr>
<th></th>
<th>Model 1 ($n = 132$)</th>
<th>Model 2 ($n = 116$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef. ($p$-value)</td>
<td>Marginal ($p$-value)</td>
</tr>
<tr>
<td>Gender (male = 1)</td>
<td>2.09 (0.005)(^1)</td>
<td>0.30(^2) (0.001)(^1)</td>
</tr>
<tr>
<td>Priming (professional)</td>
<td>1.54 (0.031)(^1)</td>
<td>0.18(^4) (0.016)(^1)</td>
</tr>
<tr>
<td>Interaction</td>
<td>−2.09 (0.017)(^1)</td>
<td>−0.30 (0.017)(^1)</td>
</tr>
<tr>
<td>GMAT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>−2.64 (0.000)(^2)</td>
<td></td>
</tr>
</tbody>
</table>

*Note: 1 and 2 denote one-tailed and two-tailed $p$-values respectively. G, P, M and F denote marginal effects estimated at the average GMAT level for the gender/family-priming treatment, professional-priming treatment, males and females respectively. The marginal effect for GMAT score is calculated at the average GMAT score using a weighted average of the marginal effects evaluated for males and females in each treatment.*
the probability of entry is 0.25 for both males and females, supporting H2. After controlling for ability by use of GMAT scores in Model 2, a significant difference in marginal effect between males and females in the gender/family priming treatment remains (p = 0.020), while the difference in the professional priming treatment continues to be insignificant. Marginal effects are calculated for the average GMAT score, which was 660.

H3 predicted that females would be significantly more competitive under professional than under gender/family priming. It is corroborated by the significant coefficients and marginal effects for females in both Models 1 and 2 (p = 0.031 and 0.048 respectively for the coefficients and p = 0.016 and 0.029 respectively for the marginal effects). The female marginal effects are on top and highlighted by an F superscript. We made no directional prediction for the effect of priming on males. The two-tailed hypothesis test indicates that the marginal effect of priming for males, highlighted by an M superscript, was not significant in either model.

H4 predicted that the marginal effect of the interaction between gender and priming would be significantly negative. The significantly negative coefficients indicate that the negative interaction effect significantly improves the goodness of fit of both Models 1 and 2 (p = 0.017 and 0.037 respectively). The marginal effect is a test of whether the difference between the priming effect for males and the priming effect for females (or equivalently the difference between males and females in the professional priming treatment minus the difference between them in the gender/family treatment) is significantly negative as predicted. In Model 1, this number is −0.30. It is significant as is the comparable number for Model 2 (p = 0.017 and 0.038 respectively), which is evaluated at the average GMAT score, corroborating the H4 prediction that gender would moderate the priming effect. The marginal effect of GMAT score is marginally significant using a one-tailed test (p = 0.070). The marginal effect for GMAT score is calculated at the average GMAT score using a weighted average of the marginal effects evaluated for males and females in each treatment.

During Rounds 2 and 3, all participants experienced both the piece-rate and tournament compensation schemes. In Rounds 1, 2, and 3, each participant received feedback on the number of arithmetic questions s/he solved, but not on her/his relative ranking. We conjectured that such experience might weaken the effects of identity priming. However, it did not.

Table 5 reports the logit results for the second self-selection in Round 4 (SS2). Models 1 and 2 are specified exactly as for SS1 in Table 4, and the interpretation of the coefficients and marginal effects is the same. The Model 1 SS2 results are qualitatively similar to the results for SS1 with one interesting exception. For SS2, the marginal effect of professional priming

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**Table 5**

Determinants of SS2 (logit regressions with p-values in parentheses).

<table>
<thead>
<tr>
<th>Coef. (p-value)</th>
<th>Marginal (p-value)</th>
<th>Coef. (p-value)</th>
<th>Marginal (p-value)</th>
<th>Coef. (p-value)</th>
<th>Marginal (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (male = 1)</td>
<td>1.65 (0.010)</td>
<td>0.27 (0.005)</td>
<td>0.93 (0.110)</td>
<td>0.14 (0.098)</td>
<td>0.15 (0.432)</td>
</tr>
<tr>
<td>Priming (professional priming = 1)</td>
<td>1.38 (0.026)</td>
<td>0.21 (0.014)</td>
<td>1.37 (0.033)</td>
<td>0.24 (0.020)</td>
<td>1.08 (0.099)</td>
</tr>
<tr>
<td>Interaction</td>
<td>−2.44 (0.004)</td>
<td>−0.41 (0.023)</td>
<td>−2.26 (0.004)</td>
<td>−0.38 (0.006)</td>
<td>−2.18 (0.023)</td>
</tr>
<tr>
<td>GMAT</td>
<td>0.012 (0.010)</td>
<td>0.002 (0.006)</td>
<td>0.009 (0.068)</td>
<td>0.001 (0.063)</td>
<td>0.011 (0.000)</td>
</tr>
<tr>
<td>Belief as mediator</td>
<td>−2.20 (0.000)</td>
<td>−9.79 (0.005)</td>
<td>−8.19 (0.037)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

***Note:*** 1 and 2 denote one- and two-tailed p-values. G, P, M and F denote marginal effects estimated at the average GMAT level for the gender/family- and professional-priming treatments, males and females respectively. The marginal effect for GMAT score is calculated at the average GMAT score using a weighted average of the marginal effects evaluated for males and females in each treatment. The marginal effect for Belief is calculated using a weighted average of the marginal effects evaluated for males and females in each treatment at the average GMAT score. Belief = 1 indicates a reported belief that one ranked first in the imposed tournament, while Belief = 0 indicates a reported belief that one did not rank first.

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15 Marginal effects for interactions in non-linear models must be calculated and interpreted with great care. See Ai and Norton (2003), Ai et al. (2004) and Karaca-Mandic et al. (2012) for a clear and insightful discussion of this issue.

16 When added to the logit regression, none of the demographic variables (i.e., marital status, managerial experience, target salary, age, or having children) presented in Table 2 other than gender and GMAT score was significantly related to the selection of the competitive compensation scheme.
Table 6
Determinants of belief of whether or not one ranked first in the imposed tournament round (logit regressions with p-values in parentheses).

<table>
<thead>
<tr>
<th></th>
<th>Model 1 (n = 132)</th>
<th></th>
<th>Model 2 (n = 116)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef. (p-value)</td>
<td>Marginal (p-value)</td>
<td>Coef. (p-value)</td>
<td>Marginal (p-value)</td>
</tr>
<tr>
<td>Gender (Male = 1)</td>
<td>2.01 (0.001)</td>
<td>0.406</td>
<td>1.68 (0.012)</td>
<td>0.316</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.000)</td>
<td></td>
<td>(0.005)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.196</td>
<td></td>
<td>0.099</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.082)</td>
<td></td>
<td>(0.577)</td>
</tr>
<tr>
<td>Priming (professional priming = 1)</td>
<td>0.92 (0.000)</td>
<td>1.22 (0.053)</td>
<td>0.20 (0.039)</td>
<td>-0.04 (0.774)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.068)</td>
<td></td>
<td>(0.620)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.064</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.24)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction</td>
<td>-1.16 (0.000)</td>
<td>-0.21 (0.095)</td>
<td>1.37 (0.068)</td>
<td>-0.24 (0.082)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.078)</td>
<td></td>
<td>(0.003)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.013</td>
<td></td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.003)</td>
<td></td>
<td>(0.000)</td>
</tr>
<tr>
<td>GMAT</td>
<td>-1.87 (0.000)</td>
<td>-10.44 (0.001)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.000)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: 1 and 2 denote one- and two-tailed p-values respectively. G, P, M and F denote marginal effects estimated at the average GMAT level for the gender/family-priming treatment, professional-priming treatment, males and females respectively. The marginal effect for GMAT score is calculated at the average GMAT score using a weighted average of the marginal effects evaluated for males and females in each treatment.

for males is negative and marginally significant ($p = 0.063$). Thus, there is some suggestive evidence that gender/family priming representing male identity in the family has a greater effect on the competitiveness of males than professional priming. This is consistent with the literature on the fatherhood wage premium (e.g. Glauber, 2008; Hodges and Budig, 2010; Lundberg and Rose, 2000, 2002) as discussed above.

When GMAT score is added to the model, its coefficient and marginal effect are now both unambiguously significant ($p = 0.010$ and 0.006 respectively) and it has double the marginal impact relative to its impact on SS1, implying a greater influence of ability on sorting by experienced participants. The marginal effect of the male dummy in the gender/family treatment is now only on the margin of significance ($p = 0.098$), giving weak support to H1. However, the marginal effect of male in the professional priming treatment is now significant and negative using a two-tailed test ($p = 0.035$), rejecting H2 in an interesting direction. After some experience, women primed to activate their professional identity actually exhibit a significantly higher probability of choosing the competitive tournament than do similarly primed men, controlling for ability with GMAT scores. Thus, it is the males, who compared to females with the same GMAT scores, shy away from competition. This was a surprising and unexpected result. We can only conjecture that among this select population of females and males who had selected and were accepted into a highly competitive MBA program, the females, when primed with professional identity, felt a special need or desire to demonstrate that despite gender stereotypes, they were indeed competitive. In contrast, no such need to demonstrate that they did not conform to stereotype existed for males. As with SS1, the marginal effect of priming on females remains significant ($p = 0.020$), again supporting H3. The priming effect on males is no longer significant when we control for GMAT score. However, the marginal effect of the interaction continues to be significant ($p = 0.006$), again supporting H4.17

5.3. Mediated moderation analysis

Prior to the SS2 decision in Round 4, each participant was exposed to an imposed tournament. As described in the methods section, we gathered data on each participant’s belief regarding her/his ranking in that tournament relative to her/his designated competitors. Of 47 people who believed they ranked first, 24 chose the tournament in SS2, while of 85 who believed they ranked second, third, or fourth, only 7 chose the tournament. All of those 7 believed they ranked second. This suggests that beliefs about one’s previous performance in the imposed tournament influenced the SS2 choice. H5 predicts that such beliefs may mediate the moderated effect of priming on SS2.18

Having established that priming moderated by gender affects SS2, we examine whether it also affects the proposed mediator, beliefs about whether one ranked first or not in the imposed tournament, a binary categorical variable. 19, 20 The results are presented in Table 6. Concentrating on Model 2, which controls for GMAT score, the marginal effect of gender is

17 See footnote 16.
18 Note that in contrast to SS2, SS1 occurs prior to the imposed tournament. Thus, beliefs about one’s performance in the imposed tournament cannot mediate one’s SS1 choice.
19 We follow the procedures outlined in Baron and Kenny (1986).
20 As a robustness check, we also did the analysis using beliefs defined as a four-level categorical variable. The results were qualitatively similar, though there was some loss of statistical power because of fewer degrees of freedom.
significant in the gender/family priming treatment \( (p = 0.005) \), but not in the professional treatment, indicating that males were significantly more likely than females to believe they finished first, but only under gender/family priming. Moreover, exposure to professional as opposed to gender/family priming increases significantly the probability that women believe they finished first in the imposed tournament \( (p = 0.039) \), but does not significantly affect men. The marginal effect of the interaction, evaluated at the average GMAT score, is negative albeit with marginal significance \( (p = 0.082) \). In summary, priming moderated by gender does affect beliefs.

Adding the proposed mediator, beliefs, to the SS2 regression in Model 3 of Table 5, we find that its coefficient and its marginal effect are both significant \( (p = 0.000 \text{ for both}) \). All of the other coefficients are lower in absolute value than in Model 2, though the effect on the interaction coefficient is rather small. However, the marginal effects of gender, reported both for those who believed they ranked first and for those who did not, are still significant for the professional priming treatment \( (p = 0.038 \text{ and } 0.002 \text{ respectively}) \). Thus, even after we control for beliefs, males continue to choose the tournament significantly less often than females under professional priming. The marginal effect of professional priming on females becomes only marginally significant when controlling for beliefs \( (p = 0.102 \text{ and } 0.095 \text{ for those believing they ranked first and those not respectively}) \), while the interaction term \( (p = 0.023) \) and its marginal effects remain significant \( (p = 0.021 \text{ and } 0.046 \text{ for those believing they ranked first and those not respectively}) \). This suggests that beliefs about one’s ranking in the imposed tournament only partially mediate the moderated effect of priming on SS2, partially corroborating H5. Thus, the moderated effect of identity priming on preference for competition seems to work both indirectly through its effect on how optimistic one feels about one’s ranking in the previously played imposed tournament as well as directly on the SS2 selection decision itself, controlling for ranking beliefs.\(^{21}\)

5.4. Over-confidence, under-confidence, and earnings

Since identity priming affects ranking beliefs, which in turn affect selection decisions, it may also affect the propensity of participants to make selection decisions that turn out to be overconfident. We define an overconfident decision as the selection of a tournament by a participant who does not end up ranking first in his/her group of four.\(^{22}\) Table 7 presents the proportion of participants who made such decisions organized by gender and identity prime relative to the total number of participants who did not rank first for SS1 and SS2.\(^{23}\) These proportions suggest that females (males) exhibit a higher (lower) propensity to make overconfident decisions under professional than under gender/family priming. The logit regressions reported in Table 8 show these effects to be significant in SS2 \( (p = 0.074 \text{ for females}, \ p = 0.046 \text{ for males}) \), but not in SS1.\(^{24}\) While in SS1 males exhibit significantly more overconfidence than females under both gender/family \( (p = 0.000) \) and professional \( (p = 0.010) \) priming, in SS2 males exhibit more overconfidence than females under family/gender priming \( (p = 0.000) \) but less under professional priming \( (p = 0.002) \). The interaction between identity priming and gender is also significant \( (p = 0.027) \) in SS2.

Table 7 also presents analogous proportions for under-confident selection decisions, i.e. the proportion of those finishing first who did not select the tournament. These proportions suggest that females make fewer under-confident decisions

\(^{21}\) Adding interactions between priming and beliefs as well as gender and beliefs to see whether the mediator is itself moderated by either priming or gender indicates that none of these interactions is significant. These results are omitted to save space. However, they are available from the authors upon request.

\(^{22}\) We use this ex-post definition of over-confidence because we do not have data on the probability distribution of each participant’s beliefs on ranking first or not prior to the selection decision.

\(^{23}\) Note that a person who finishes first cannot exhibit over-confidence.

\(^{24}\) Since GMAT score was not significant, it was dropped from the regressions.
under professional than under gender/family priming. However, an analysis analogous to the one on over-confidence shows this effect to be significant only in SS1 ($p = 0.033$).\footnote{It is only possible for a selection decision to be classified as under-confident if the participant finishes first. Since the number of people finishing first and thus eligible to display under-confidence is just slightly more (because of ties) than 25% of all participants, the statistical power of the under-confidence estimation is limited. The detailed results are not included here to save space, but are available from the authors upon request.}

Actual earnings in the SS1 and SS2 rounds depend on both the number of problems correctly solved and on the selection decision. Selecting into the tournament (piece rate) but losing (winning) involves a loss of $\$4.00 ($12.00) per correctly solved problem relative to the amount one could have earned if the piece rate (tournament) had been selected. However, a regression of SS1 and SS2 earnings on gender, identity prime and their interaction, controlling for GMAT score, reveals that none of these are significant for SS2, while only GMAT score is significant ($p = 0.007$) and identity priming marginally significant for females ($p = 0.105$) in SS1.\footnote{The detailed results are available from the authors upon request.}

### 5.5. Gender, priming, risk attitude and near tournaments

Initially, we planned to consider risk attitude as an additional potential mediator. The idea was that in addition to affecting beliefs about one’s ranking in a tournament, priming might have analogous effects on risk attitude moderated by gender. This in turn might provide an additional indirect pathway affecting the decision to select into a competitive tournament since the tournament is also financially riskier than piece-rate compensation. The risk characteristics of a tournament were isolated from performance ranking by giving participants the choice of either chance pay or a piece rate in Round 5 (SSC). Those selecting chance pay revealed themselves to be risk-loving or risk-neutral, while those selecting into the piece rate revealed themselves to be risk-averse or risk-neutral.

We examine the impact of priming moderated by gender on selection into chance pay in Table 9.\footnote{It was not possible to estimate a logit model using selection into chance pay as the dependent variable because no females selected chance pay under gender/family priming. This leads to the statistical problem of quasi-complete separation, which implies that maximum likelihood estimates of the coefficients of the logit model do not exist (Albert and Anderson, 1984). As suggested by Heinz and Schepmer (2002), we instead use the penalized logistic regression procedure originally developed by Firth (1993). We implemented this procedure using Firthlog, a module developed for use with Stata by Coveyey (2008). Heinz and Schepmer (2002) also show that in cases of separation such as occur in our data, the penalized likelihood function is highly asymmetric, making Wald tests and confidence intervals unsuitable. Thus, following Heinz and Schepmer (2002), we employ two-tailed likelihood ratio tests.}

<table>
<thead>
<tr>
<th>Coef. (p-value)</th>
<th>Marginal (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (male = 1)</td>
<td>2.17 (0.013)$^2$</td>
</tr>
<tr>
<td>Professional priming</td>
<td>0.69 (0.448)$^2$</td>
</tr>
<tr>
<td>Interaction</td>
<td>−1.60 (0.162)$^2$</td>
</tr>
<tr>
<td>Constant</td>
<td>−2.48 (0.001)$^2$</td>
</tr>
</tbody>
</table>

**Table 8**

Over-confidence in SS1 and SS2 (logit regressions with p-values in parentheses).

Note: 1 and 2 denote one- and two-tailed p-values respectively. G, P, M and F denote marginal effects estimated for the gender/family-priming treatment, professional-priming treatment, males and females respectively.
first in the imposed tournament. Thus, it appears that for some participants the same forces that drove them to believe they ranked first in the imposed tournament also gave them confidence that luck would go their way in a completely random game of chance. As indicated by the results in Table 9, these forces encompass identity priming moderated by gender. Thus, while risk attitude does not appear to represent a mediating variable in the relationship between moderated priming and selection into a tournament, it seems to be part of the same identity package and thus influenced by the same factors.

Finally, we analyze selection into two near tournaments: PSS and TSS. While PSS is based on an imposed piece-rate performance for which participants have little financial reason to focus on ranking first, in TSS, based on an imposed tournament performance, there is such a motivation. We find that: (1) for PSS, the moderated identity priming effect is present but attenuated relative to that on selection into a real tournament, and beliefs about one’s ranking in the imposed piece rate do not mediate moderated priming; however (2) for TSS, the results are similar to those for SS2. Thus, results are consistent between near and actual tournaments as long as the prior performance for which a pay scheme is being selected was actually played as a competitive tournament.

5.6. No-priming treatment

Having demonstrated that professional versus gender/family identity priming moderated by gender significantly affects preference for competition provokes the question of whether one of these identities is more dominant than the other in the absence of controlled priming. To investigate this question, we ran a session with no explicit identity priming using 44 subjects (22 men and 22 women) from a later cohort of MBA students from the same program. In this treatment, the pre-experiment questionnaire was identity neutral (e.g., Benjamin et al., 2010; Chen et al., 2010). Subjects were asked to answer questions about their leisure activities such as whether they subscribed to cable television and how often they ate out. The rest of the control treatment was conducted in an identical manner to the two identity priming treatments to allow for direct comparability.

The data are summarized in the third column of Table 1. Comparing these data with those from the gender/family and professional priming treatments in the first and second columns of the table respectively, it is immediately apparent that they closely resemble the data from the gender/family priming treatment. Redoing our entire analysis, comparing the gender/family data with the no identity priming data, we find no significant differences. In contrast, comparing the

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29 These results are omitted to save space. However, they are available from the authors upon request.
30 We thank an anonymous referee for suggesting this no-priming treatment.
31 We drew our sample from a small elite MBA program. We used almost all of the women and most of the men enrolled in that program in our identity priming treatments. To conduct a treatment with no identity priming using students from the same cohort, we would have had to reduce the number of participants in the identity priming treatments, jeopardizing the statistical power of our comparison of gender/family priming with professional priming. For this reason, we decided not to do so. Thus, to conduct the no-identity-priming treatment, we drew upon a subsequent cohort of students enrolled in the same program. Since these students were not enrolled in the MBA program at the time of the initial study, they were unlikely to have heard about the study from the earlier participants. An administrator assured us that there had been no changes in admission standards. The demographic data we gathered, available from the authors upon request, showed no significant differences between subjects from the two cohorts as indicated by appropriate t tests. Nonetheless possible cohort effects must be kept in mind when interpreting the results.
### Table 10
Determinants of SS1 and SS2 (logit regressions with p-values in parentheses) no-priming treatment vs. professional priming and gender/family priming treatments.

<table>
<thead>
<tr>
<th></th>
<th>SS1</th>
<th>SS2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1 Coef. (p-value)</td>
<td>Model 1 Marginal (p-value)</td>
</tr>
<tr>
<td>Gender (male = 1)</td>
<td>1.74 (0.044)²</td>
<td>0.27N (0.022)²</td>
</tr>
<tr>
<td></td>
<td>0.28C (0.020)²</td>
<td>0.23C (0.013)²</td>
</tr>
<tr>
<td>Professional priming</td>
<td>1.20 (0.150)²</td>
<td>0.16N (0.092)²</td>
</tr>
<tr>
<td></td>
<td>-0.11M (0.365)²</td>
<td>-0.11M (0.364)²</td>
</tr>
<tr>
<td>Gender/family priming</td>
<td>-0.34 (0.747)²</td>
<td>-0.02N (0.722)²</td>
</tr>
<tr>
<td></td>
<td>-0.01M (0.951)²</td>
<td>-0.05M (0.952)²</td>
</tr>
<tr>
<td>Prof. priming × male</td>
<td>-1.74 (0.088)²</td>
<td>-0.27 (0.104)²</td>
</tr>
<tr>
<td></td>
<td>-2.33 (0.026)²</td>
<td>-2.00 (0.025)²</td>
</tr>
<tr>
<td>Gen. priming × male</td>
<td>0.35 (0.770)²</td>
<td>0.01 (0.807)²</td>
</tr>
<tr>
<td></td>
<td>0.11 (0.922)²</td>
<td>-0.04 (0.880)²</td>
</tr>
<tr>
<td>GMAT</td>
<td>0.008 (0.009)³</td>
<td>0.001 (0.009)³</td>
</tr>
<tr>
<td>Constant</td>
<td>2.30 (0.002)²</td>
<td>2.30 (0.002)²</td>
</tr>
</tbody>
</table>

Note: 1 and 2 denote one-tailed and two-tailed p-values respectively. N, G, P, M and F denote marginal effects estimated at the average GMAT level for neutral, gender family-, professional-priming treatments, males and females respectively. The marginal effect for GMAT score is calculated at the average GMAT score using a weighted average of the marginal effects evaluated for males and females in each treatment.
professional priming data with the no identity priming data yields results that qualitatively resemble the comparison of the professional priming data with the family/gender priming data. Table 10 presents an analysis of the SS1 and SS2 selection decisions both with and without the control for GMAT score. Neither gender/family priming nor the interaction between such priming and gender is significant for either selection decision. With the GMAT-score control, professional priming is significantly positive for females (marginal at p = 0.088 for SS1, p = 0.014 for SS2) and the interaction of professional priming with gender is also significant (marginal at p = 0.091 for SS1, p = 0.011 for SS2) for both SS1 and SS2 similar to the comparison of professional with family/gender priming presented earlier.

6. Discussion and conclusions

In this paper, we focus on a very special population, namely people who have successfully gained admission and are currently participating in a highly selective and competitive MBA program. We chose to examine this population because we are interested in studying a conflict of professional and gender/family identities that may coexist within the minds of many highly competitive female professionals, and in comparing its behavioral impact with that of the reinforcing identities that drive many competitive male professionals. We show that for such women identity priming significantly affects willingness to participate in competitive tournaments, to take risky gambles and to select into a tournament pay scheme based on an earlier imposed tournament performance. A similar but weaker effect occurs when participants decide whether to submit their former piece-rate performance to a piece-rate or tournament compensation scheme. Such priming has significantly different effects on males from the same population. This contrast suggests an identity conflict for the female professionals in our study that was absent for the males.

Within this specific population, one particularly surprising result emerged. Initially, for SS1, females under gender/family priming were less likely than males to select into a tournament, whether or not we controlled for ability using GMAT score as a proxy, while under professional priming there was no such difference between males and females. After gaining experience with both a piece rate and a tournament however, behavior changed. For SS2, the higher probability of a male selecting into a competitive tournament under gender/family priming became only marginally significant with the GMAT score control. Moreover, under professional priming females exhibited a significantly higher likelihood than males of selecting into a competitive tournament. Within this selected population of ambitious future managers, a male was more likely to shy away from competition than was his female counterpart with an identical GMAT score under professional priming.

The effect of identity priming, moderated by gender, on the second selection into a competitive tournament (SS2) worked via two pathways. The first was through its effect on beliefs about one’s ranking under the previously played imposed tournament. The second was a direct effect on selection into a competitive tournament, controlling for such beliefs. The same can be said for the gender-moderated effect of priming on the decision to submit a previously played tournament performance to a tournament rather than a piece-rate pay scheme.

When a no-identity priming treatment was administered on a subsequent cohort of students from the same MBA program, the results closely resembled those from the family/gender priming treatment. Thus, while professional identity priming differentially affects revealed preference for competition between female and male professionals, family/gender identity priming does not. As pointed out by Benjamin et al. (2010, p. 1915), while priming a particular social category “reveals the marginal behavioral effect” of increasing identification with that category and is thus “a useful experimental procedure for studying how identity affects steady-state preferences”, it is not necessarily the case that individuals identifying more strongly with a category will have a stronger reaction to such an identity prime. Indeed it is possible that a person can be so “saturated” with a category that identity priming has no behavioral effect at all. Thus, it is possible that in the absence of explicit professional priming, the strength of family/gender identification was so dominant that explicit family/gender priming could have no further impact on preference for competition among the male and female professionals in the sampled population. Benjamin et al. (2012, p. 21) suggest another possible explanation. A choice situation itself may act as an identity prime. Benjamin et al. (2012, p. 21) use the example of a Jew who keeps kosher experiencing a Jewish identity prime whenever faced with the choice of eating pork. If the professionals in our sample were highly conscious of gender norms, stereotypes or expectations regarding preference for competition, they may have experienced a gender prime even in the absence of explicit priming when faced with such a choice. Both of these explanations suggest that family/gender identity norms are likely to dominate behavioral preference for competition in the absence of explicit professional priming even among this select professionally oriented population.

6.1. Theoretical contributions

The gender-moderated effect of identity priming on preference for competition demonstrated in this experiment is important for two reasons. First, following Benjamin et al. (2010), it is an indicator of the marginal impact of two conflicting identities that may have an important influence on the extent to which female professionals choose to compete. For such women, gender/family and professional identities may often be at cross-purposes, with the former tending to dominate the latter in the absence of explicit priming. However, for male professionals, the two identities may often be reinforcing. Our results thus link identity theory with the observation that women often choose to compete less than men. Second, outside the lab managerial professionals are frequently exposed to priming through life’s important events. These can activate and thus strengthen the impact of gender/family and/or professional identities on behavior. Marriage, pregnancy and parenthood
may all bring out gender/family identity. Whatever professional priming is received in the workplace, the cry of one’s small child is likely to have a strong offsetting impact for many female professionals. The effect on many male professionals might be equally strong, but not necessarily at odds with their professional identity.

This study also contributes to the literature on the motherhood and gender wage gaps. In particular, it suggests that while employer discrimination against mothers or in favor of males or fathers may exist, many mothers may find themselves tugged by their identity as women/mothers away from full and committed participation in the competitive environment of the corporate world, while many males/fathers may not face this conflict. While the focus of this study is the impact of conflicting identities on female professionals, it also suggests that the impact of gender/family identity may be even stronger in general for women who have chosen not to pursue managerial or professional careers. Thus, the motherhood and gender wage gaps may in part be explained by such choices. The study thus sheds light on how social norms reflected in identities may explain previous findings about gender differences in preference toward competition (e.g., Niederle and Vesterlund, 2007; Gneezy et al., 2009; Datta Gupta et al., 2013).

Finally, this study has a peripheral relationship to the vast literature concerning the effect of stereotypes on behavior (e.g. Steele and Aronson, 1995; Kray et al., 2001). Stereotype threat theory and its corroborating empirical studies demonstrate the impact of negative stereotypes on the performance of a task (e.g. Steele and Aronson, 1995; Stone et al., 1999). In our study, stereotypes play a different role. First, they are neither objectively negative nor objectively positive, but rather embody ideals or norms associated with different gender/family or professional identities. Second, priming those identities, while evoking the related ideals, did not affect performance on the arithmetic task employed in the study. Rather, it affected the competitiveness attached to the payment scheme chosen by the subjects. Whereas the mechanisms proposed for the impact of stereotype threat on performance are akin to those involved in choking under stress (e.g. Steele, 1997; Steele et al., 2002), the behavioral response of our subjects to identity priming appears to work both indirectly through affecting beliefs regarding relative ability and directly though altering preference for competition. Thus, we show that identity priming may have powerful effects not only by positively or negatively affecting task performance through invoking identity-based stereotypes as in Shih et al. (1999), but also by affecting preferences and choices regarding whether or not one wants to perform in competition with others.

6.2. Limitations and cautionary notes

There are two selection issues in this paper, which limit its generalizability. The first was an intentional and central component of the experimental design. We recruited our participants from an elite and competitive MBA program. The reason for this is that our goal was to investigate the impact of professional versus family/gender identity among males and females with a competitive, professional orientation. Our hypothesis that many female professionals would face an identity conflict while many male professionals would possess reinforcing identities affecting their revealed preference toward competition was specific to this professionally oriented population. We are not putting forward such a hypothesis for the general population or for the student population in general. Thus, it would have been inappropriate to draw our subjects from such a population. We conjecture that far fewer people in the general population would possess a strong attachment to professional norms and values. Many of them are drawn toward completely different lifestyles associated with different identities, norms and values. Thus, we conjecture that a similar priming exercise using a sample drawn from the general population would show a far weaker association between professional priming and competitive behavior because many people would not affiliate themselves with a professional identity. In contrast, family/gender identity is more universal and would likely have an important impact on behavior. We conjecture that non-professional subjects would, like the professionals in our study, act similarly under family/gender priming as they would if not primed at all. Thus, we conjecture that their behavior would resemble the behavior in NV regardless of priming treatment. However, this is only speculation. We did not do such an experiment, and our results using male and female professionals cannot be generalized to people not voluntarily engaged in competitive professional pursuits.

The second selection issue was not intentional. It turned out that in this population of MBA students, the females had on average lower GMAT scores than the males. This was reflected in our sample for which the average GMAT score for females was 640 while the average GMAT score for males was 675. After we conducted the experiment, an administrator of the program explained to us that though there was no pre-ordained affirmative action program, there were typically fewer strong female applicants to the program. In order to admit a reasonable number of females into the program, it would often turn out that among the accepted students, females had on average a lower GMAT score than males. This could of course affect the selections of females and males into the competitive tournament.32 For this reason, we controlled for GMAT score in examining these selections. Thus, we compare the competitive choices of female versus male professionals with identical GMAT scores.

If the students were aware that average GMAT scores differed between males and females, such a control might not have been sufficient. Following and for comparison with NV, each group was composed of two males and two females. Thus, a male would be competing with two females and one male, while a female would be competing with two males and one female.

32 We do not know whether this is also true in other North American MBA programs or in the population of professional managers generally. We were able to speak to an administrator at one prominent US Business School who verified that a similar policy existed at that school.
If participants assumed that males would have higher GMAT scores than females and that this was associated with ability to add two-digit integers quickly and accurately, a female with the same GMAT score as a male might believe she would be competing with two higher and one lower ability persons, while the male might believe he would be competing with one higher and two lower ability persons. They might thus make different choices. The program administrator assured us that the students did not know that here were any differences in average GMAT scores based on gender. Moreover, even if contrary to the assurances of the administrator some students did suspect this was true, it would not invalidate the comparison between the professional and family/gender identity priming treatments that is the focus of our study. Furthermore, it is inconsistent with the fact that the males in our study did not choose competitive tournaments more frequently than females under professional identity priming.

6.3. Implications for managerial practice, policy making and future research

Our study begins to answer a critical question: is it possible to alter how women perceive and experience competition, thereby altering their behavioral choices? We show that it is possible in the lab. Does this imply that priming techniques could be used to “socially engineer” preferences for competition in everyday life? Might the use of priming to activate professional identities in the workplace help reduce the motherhood wage penalty and the gender wage gap? Would this be beneficial for women? Whether this is possible in the real world is an open question that requires further study. Whether it is desirable is an even more challenging question that requires study from a variety of methodological perspectives. This study emphasizes the importance of identity by manipulating it in the laboratory through priming. However, the fact that it is important does not necessarily imply that it should be manipulated. For example, any policy meant to manipulate the salience of professional identity versus gender/family identity in the real world must take into account not only its effect on men and women at work, but also its effect on men, women and children within the family. Moreover, any proposal for one group of people to use priming techniques to manipulate the identity of others, no matter how well intentioned, must confront difficult ethical issues of power and control that extend well beyond the scope of this study.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.jebo.2013.05.009.

References


