Title: Money Affects Theory of Mind Differently by Gender

Short Title: Money Affects Theory of Mind Differently by Gender

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Abstract
Theory of Mind (ToM) — the ability to understand other's thoughts, intentions, and emotions — is important for navigating interpersonal relationships, avoiding conflict, and empathizing. Prior research has identified many factors that affect one's ToM, but no study has examined how different kinds of monetary incentives affect ToM. We ask: Does money affect ToM? If so, how does the affect of money on ToM depend on the structure of monetary incentives? How do the differences depend on the gender of the individuals involved? Drawing from different strands of experimental research on ToM and the impact of money on interpersonal relationships, we hypothesize that money will affect ToM differently by gender: monetary rewards increase males’ motivation to express ToM while simultaneously crowding out females’ motivation. This prediction is confirmed in an experiment that varies the structure of monetary rewards for correct answers in the Reading the Mind in the Eyes Test (RMET) that measures ToM. RMET scores decrease for females and increase for males with individual payments, and this effect is stronger with competitively-structured payments. RMET scores do not significantly change when monetary earnings go to a charity. Whether money improves or hinders ToM, and, hence, success in social interactions, thus depends on the interaction of gender and monetary incentive structure.
Introduction

Compared to our closest primate cousins, we humans are not merely social but are "ultra social" (1, 2). We engage in competition and cooperation, form coalitions, use cultural symbols passed down through generations, and do all of the above within in a rich variety of formal and informal institutional arrangements. To function effectively, a human must develop the skills necessary to traverse this complexity, including the ability to communicate, to learn from others, and to understand other's thoughts, intentions, and emotions (1, 2). This last ability, i.e., the capacity to impute mental and emotional states to others, referred to as "Theory of Mind" (ToM), is crucial in social life. Previous studies have found that ToM allows an individual to navigate interpersonal relationships, avoid destructive conflict, and empathize (3-6), and that impairment of one's TOM is associated with difficulty in maintaining positive relationships (7, 8). ToM is especially important in highly strategic environments in which success depends on the ability to not only understand others' intentions but also predict their behavior (9-11)

Researchers have identified many factors that affect ToM, e.g., having autism hinders one's ToM (7, 8) and reading literary fiction improves it (12). We ask: how does money affect ToM? There is surprisingly little known about how money affects ToM, and this lacuna is striking for two reasons. First, money plays a role in many interpersonal interactions, from buying and selling goods and services in markets to wage bargaining between employee and employer to budgetary decisions made by spouses. Second, a wide array of research establishes that, for better or worse, money can influence interpersonal interaction. Studies by economists show how money incentivizes action and facilitates the trade of goods and services across communities and nations, thus serving as an effective tool for encouraging large-scale economic cooperation (13-15). Psychologists' studies also reveal how money can damage social relationships and lead individuals to pursue goals individually without aid from others, thus hindering success in some domains of life (14, 16-18).

Money could potentially affect ToM via multiple channels. Money is a powerful motivating force that can create a large incentive to understand others' mental or emotional states. That money motivates, with more money inspiring more motivation, is a fundamental premise of experimental economics, so much so that experimental economists typically use monetary payments in their experiments to create a strong incentive to make decisions seriously (19). Experimental psychologists agree that money provides strong extrinsic motivation but also find that money can "crowd out" other intrinsic motivations people might have (20-23) and make individuals more inward-focused (24-26). These findings suggest money might hinder an individual's ability to understand others' mental or emotional states. A review of literature thus reveals that we lack understanding of how money affects ToM.

Gender is an additional complicating factor. Studies have consistently found a female advantage in ToM (38). Moreover, previous experiments have found crowding-out effects on motivation to be larger for females, who, relative to males, appear to have higher intrinsic motivation to manifest empathy (23, 27-30). Competition is also found to affect motivation differently by gender; on average, men seek out competition and women avoid it (31-33). Indeed, these gender differences are believed to have large consequences for life outcomes. The large and persistent wage differentials between women and men have been attributed in part to women sorting into less-competitive career paths (34-35) and less frequently asking for raises (36). The effect of money on ToM is thus likely to differ across genders.
A number of questions remain unanswered: Does the presence of money in an interpersonal interaction affect ToM? If so, how does the affect of money on ToM depend on the structure of the monetary incentives? Do the gender differences in motivation and crowding out found in other settings also reveal themselves with ToM? To what extent do the gender differences depend on the competitiveness of the setting?

We here argue and present experimental evidence that money affects ToM and that it does so differently by gender. Monetary incentives provide higher extrinsic motivation for males than for females but also crowd out females' intrinsic motivation more than males'. These gender differences are in motivation but not social orientation, thus gender differences should not be observed when changing orientation. Our experiment places subjects into different conditions that mimic the different ways that monetary incentives might arise in social interactions. This design enables us to identify how different monetary incentives affect the ToM of males and females.

Theory of Mind and Gender

Given the prior literature mentioned above, the following conceptual framework will prove useful in understanding how money can affect ToM and in generating testable predictions. The ToM that an individual manifests in a setting can be represented by this simplified equation:

\[ \text{expressedToM}_{i gs} = \text{innate}_{ig} + \text{engagement}_{igs}, \]

where \( \text{expressedToM}_{i gs} \) is the ToM expressed or realized by individual \( i \) of gender \( g \) in a particular setting \( s \), \( \text{innate}_{ig} \) is the individual's innate ToM ability, and \( \text{engagement}_{igs} \) is the degree to which the individual is socially engaged to express ToM in a given setting. Having autism can be viewed as reducing one’s innate ability (7, 8), while reading a passage of literary fiction temporarily increases one's engagement (12).

We conjecture that money affects one's engagement rather than innate ability and does so through three separate channels: intrinsic motivation, extrinsic motivation, and social orientation. A simple representation of engagement can be written as:

\[ \text{engagement}_{igs} = \text{intrinsic}_{igs} + \text{extrinsic}_{igs} + \text{orientation}_{igs}, \]

where \( \text{intrinsic}_{igs} \) and \( \text{extrinsic}_{igs} \) are the intrinsic and extrinsic motivation of an individual \( i \) of gender \( g \) in a given setting \( s \) and \( \text{orientation}_{igs} \) represents the degree to which the individual is outwardly or socially-oriented in the setting.

As stated earlier, prior studies establish that both intrinsic and extrinsic motivation are important components in an individual’s desire to engage in a given social situation (20, 27, 28, 31), and a monetary incentive may actually lower overall motivation in some settings if it decreases (i.e., "crowds out") intrinsic motivation more than it increases extrinsic motivation (20-23). This crowding out effect is stronger for females (23, 29), who, relative to males, appear to have higher intrinsic motivation to manifest empathy (27, 28, 30). As a result of motivational crowding out, females' overall expressed ToM may actually decrease when given monetary incentives. Conversely, because intrinsic motivation in males is relatively low, their crowding out may be too small to offset the increase in extrinsic motivation. Moreover, given the evidence that men seek out competition and women avoid it (31-33), competitively-structured monetary rewards should have an additional positive effect on males' extrinsic motivation leading to an
even stronger, positive effect on males' engagement and expressed ToM. The effect of competition would be the opposite for females, further driving down their engagement and expressed ToM.

The direction of one's social orientation—whether inward towards oneself or outward towards others—also affects behavior (24-26) and, potentially, one’s ToM. Merely priming subjects with the concept of money has been found to reduce the likelihood that they ask others for help and to reduce the degree in which they assist others who ask for help, effectively inducing an inward orientation (17, 18). Recent evidence finds higher expressed ToM from individuals who are naturally more socially oriented or primed to be socially oriented (24-26). These effects appear to be similar across gender, suggesting that the introduction of money may negatively affect TOM for both males and females by shifting orientation inward. Gender differences in the effect of money on ToM should thus largely arise from differential effects on motivation rather than orientation.

**Experiment Design**

We test the above claims by placing subjects into one of four experimental conditions. To measure expressed ToM, subjects complete the Reading the Mind in the Eyes Test (RMET) in which they are asked to identify thirty-six facially-expressed emotions (8). We chose the RMET for multiple reasons. It has been used widely as a measure of what we call expressed ToM (8, 12, 26, 37-40). Moreover, the RMET measures affective ToM, and we believe that affective ToM rather than cognitive or strategic ToM is particularly important for the personal interactions between family members, friends, and coworkers. We note, however, that the RMET is highly correlated with other measures of ToM, so it provides an overall good measure of ToM. Finally, unlike some other ToM measures, the RMET test typically generates a distribution of scores that is conducive to standard statistical procedures.

Condition 1 (n=64) is our Baseline condition which replicates the (unincentivized) RMET task as typically done in other studies. Upon arrival at the laboratory at the start time of the experiment, each subject was randomly assigned to one of the computer terminals. Each subject is shown a picture of eyes and is given a list of four possible emotions. The subject then selects which of the emotions best matches the eyes in the image. After making a selection, the subject then is shown the next pair of eyes and given another list from which to select, and so on until a selection has been made for all thirty-six images. Feedback on performance is not given until the end of the task, at which time the subject is told how many of the thirty-six were correctly answered and is asked to complete a questionnaire. As part of the questionnaire, the subject undertakes the Cognitive Reflection Test (41), which has been shown to be strongly correlated with other measures of intelligence (40).

Condition 2 (n=58) provides an Individual incentive. This condition is identical to the Baseline except the subject is paid $0.40 for each correct selection in the RMET. The instructions in this treatment only differ from the baseline by the addition of one sentence that reads "For each correct choice you will receive $0.40." This text constitutes a minimally-primed monetary incentive as no other attempt is made to prime the notion of money. Payment earnings were distributed privately one at a time to each subject at the end of the experiment session.

Condition 3 (n=64) is the Winner-take-all condition. This condition is identical to the Baseline except the subjects are randomly and anonymously placed into groups of four via the
computer and then told that the subject within the group that performs best on the RMET will receive $40 and all others in that group receive $0 (a random draw determines winner in case of tie). The $40 was chosen to roughly equalize the monetary earnings across conditions 2-4; average earnings were approximately $10 per person in the Individual condition, thus making a prize of $40 akin to the winner receiving the earnings for everyone in the group.

Condition 4 (n=52) is the Charity condition. Before doing the RMET, the subject is told that he or she would undertake a task for a charity of her choice, with the amount donated anonymously on the subject's behalf to the charity based on his or her performance on the task. The subject is then given a list of four charities (Amnesty International, UNICEF, Doctors without Borders, and American Cancer Society) and provided with a paragraph about that organization's mission and a picture of an example of a beneficiary of that organization. The text and pictures serve two purposes: they enable the subject to make an informed choice when deciding the charity to receive the earnings, and they prime an outward, other-regarding orientation. The subject next selects which charity will receive his or her earnings and completes the RMET with $0.40 per correct question donated to the selected charity. All other aspects of this condition are the same as in the Baseline. Payment earnings were distributed to the selected charities after the completion of the experiment.

Table 1 provides a summary of our predictions for each condition relative to the Baseline. The '+' and '-' in the table indicate our predicted directional effect, with more symbols indicating a larger effect. An unclear effect is indicated by '+/-'. The monetary incentive in the Individual condition should: decrease intrinsic motivation for females but have little to no effect on males (column A); increase both males' and females' extrinsic motivation (column B), with the effect larger for males; and reduce social orientation leading individuals to be more self-oriented (column C). Aggregating these channels, the Individual condition will have an overall negative effect for females and an overall positive effect for males (column D). We predict similar effects in the Winner-take-all condition, albeit stronger due to the different responses to competition. In the Charity condition, the negative impact of money on orientation should be offset by the outward orientation of doing the RMET task for others. The overall effect on orientation is unclear with no difference by gender. Gender differences should still be observed in motivation, so we predict no difference in females' RMET score in Charity relative to Baseline, but males may express slightly higher ToM. We emphasize that disaggregating by gender is vital: the apparently minimal changes with males and females combined (column E) mask large and significant gender differences (column D).
Table 1: Predicted treatment effect on RMET score relative to baseline condition.
Columns 1-3 separate the different channels by which money is predicted to affect overall engagement. Symbols indicate the direction and magnitude direction of predicted effect: "++" indicates large positive effect, "+" indicates small positive effect, "0" indicates little to no effect, "+/−" indicates an unclear or no effect, "-" indicates a small negative effect, "--" indicates a large negative, and "---" indicates a very large negative effect. Gender-specific treatment effects are predicted in motivation but not orientation. Large gender differences in the Individual and Winner-take-all conditions (column 4) are obscured when males and females are combined (column 5).

<table>
<thead>
<tr>
<th></th>
<th>Intrinsic Motivation</th>
<th>Extrinsic Motivation</th>
<th>Social Orientation</th>
<th>Overall gender-specific effect</th>
<th>Overall combined effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual</td>
<td>Female</td>
<td>--</td>
<td>+</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>0</td>
<td>++</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>(2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winner-take-all</td>
<td>Female</td>
<td>--</td>
<td>+/-</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>0</td>
<td>++</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>(3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charity</td>
<td>Female</td>
<td>-</td>
<td>+</td>
<td>+/-</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>0</td>
<td>+</td>
<td>+/-</td>
<td></td>
</tr>
</tbody>
</table>

Results

A total of 238 students participated in our experiment that took place at a computer laboratory. Subjects were recruited from a large and diverse subject pool. Prior to each experimental session, a randomly-selected group of subjects were each sent an email informing them about the upcoming experiment. Students then registered for the experiment via the subject pool website. There were no exclusion restrictions other than that the subject must be 18 years of age or older, must be currently enrolled as student at the university, and cannot participate in more than one experiment session. All subjects received a show-up payment of $7, plus additional earnings based on their choices and the treatment condition.

This project was approved by the University of California–Irvine Institutional Review Board under protocol HS#2011-8378. Individuals provided informed consent via a four-step process. First, to enlist in the subject pool, individuals must read a consent document and then provide consent to register by clicking on a box on the registration page. This acknowledgement is recorded electronically. Second, once in the subject pool, the individual receives email notifications that provide information about location and expected duration of upcoming experiment sessions. Third, upon receipt of an email notification, the individual consents to participate by signing-up for a particular session by clicking on a link in the email. Finally, upon arrival at the laboratory for the experiment, the subject is verbally reminded that participation is voluntary, that she is free to go at any time without penalty, and that continuing to participate indicates that she has given consent to participate. This consent process was approved by the...
Institutional Review Board. Written consent was waived because this process was deemed sufficient to obtain informed consent.

As seen in Figure 1A, there are only small differences in average RMET scores across the treatments when pooling males and females, and these differences are not statistically meaningful (see Supporting Information). This finding could be used as *prima facie* evidence that money does not affect ToM, however, these combined averages mask significant gender differences revealed in Figure 1B that align with the predictions from Table 1. Figure 2 provides additional evidence that the effect of the treatment conditions differs by gender. The distribution of females' RMET scores appears to shift downward, while the distribution of males' RMET scores shifts upwards as we move from the Baseline to the Individual and Winner-take-all conditions. The variance in scores is similar across genders in the Baseline and Individual conditions, but the females' variance is larger in the Winner-take-all and smaller in the Charity conditions.

[Fig. 2 about here]

**Fig. 1. Unadjusted average RMET score by treatment.** (A) Plots the average RMET score with males and females combined. (B) plots the average RMET score by gender. Combined averages move in the directions predicted in Table 1 but do not significantly differ across conditions. Gender-specific averages manifest much larger, often statistically significant, differences across conditions.

[Fig. 2 about here]

**Fig. 2. Histogram of unadjusted RMET scores by treatment.** For a given RMET score, taller bars indicate a larger density of individuals with that score. Female and male distributions are represented with shaded bars and empty bars, respectively.

These figures provide cursory yet imprecise substantiation of our predictions in part because the unadjusted averages do not account for other subject-level characteristics found in prior studies to affect RMET scores (24, 37-40). To obtain sharper estimates of the treatment effects, we conduct regression analyses that control for a fixed gender effect, whether English is the subject's first language, the number of years the subject has lived in the U.S, and cognitive ability as measured by the Cognitive Reflection Test (41). We also calculate standard errors clustered at the subject level. As found in prior studies, being female, having English as the first language, spending more years in the U.S., and cognitive ability are all positively correlated with higher RMET score and statistically significant at standard confidence levels (typically p values less than 0.01).

When not separating by gender, our ordinary least-squares estimates find little-to-no difference in overall average RMET scores across sessions (Table 2 column A). Consistent with our predictions, however, we find different effects of money on ToM by gender (column B). Relative to the Baseline, the Individual monetary incentive has a positive but statistically insignificant effect on males' RMET scores ($\beta=0.95$, $p = 0.36$, 95% CI= -1.10 to 3.00), but a statistically meaningful negative effect on females' RMET scores ($\beta=-1.42$, $p = 0.03$, 95% CI= -2.72 to -0.12). Females' RMET scores are on average higher than males’ scores by about 2.9
(β=2.87, p <0.01, 95% CI= 1.24 to 4.50). The crowding-out effect of the monetary incentive reduces overall engagement, but not enough to eliminate the females' overall advantage. Despite this, the male and female RMET scores in the Individual condition are not statistically different from each other (F-test, F(1,226)=0.28, p=0.60).

Table 2. Ordinary least squares and random-effects probit regressions. Controls include Average Question Time, Cognitive Reflection Test Score, Number of Years Living in U.S., and Native English Speaker. Columns 1 and 2 report results from ordinary least-squares regressions on subjects overall RMET score. Clustered standard errors at the subject level are reported in parentheses. Columns 3 and 4 report the change in predicted probability that a subject gives a correct answer in the RMET using random effects probit regressions that include subject and question fixed effects. Standard errors are calculated using the delta method and are reported in parentheses. Significance is denoted as * p <0.10, ** p < 0.05, *** p < 0.01. See the Supporting Information for the probit regression coefficients from which estimates in columns 3-4 are calculated.

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Ordinary least-squares coefficients</th>
<th>Random-effects probit predicted changes in answering correctly</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RMET score</td>
<td>Correct answer</td>
</tr>
<tr>
<td></td>
<td>(A)</td>
<td>(B)</td>
</tr>
<tr>
<td>Individual</td>
<td>-0.41</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>(0.57)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Winner-take-all</td>
<td>-0.11</td>
<td>-0.02</td>
</tr>
<tr>
<td></td>
<td>(0.61)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Charity</td>
<td>0.68</td>
<td>-0.00</td>
</tr>
<tr>
<td></td>
<td>(0.59)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Individual x female</td>
<td>-1.42**</td>
<td>-0.04**</td>
</tr>
<tr>
<td></td>
<td>(0.66)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Winner-take-all x female</td>
<td>-1.62**</td>
<td>-0.04**</td>
</tr>
<tr>
<td></td>
<td>(0.82)</td>
<td>(0.02)</td>
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<tr>
<td>Charity x female</td>
<td>0.33</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>(0.66)</td>
<td>(0.02)</td>
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<tr>
<td>Individual x male</td>
<td>0.95</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>(1.04)</td>
<td>(0.03)</td>
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<tr>
<td>Winner-take-all x male</td>
<td>2.03</td>
<td>0.06**</td>
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<tr>
<td></td>
<td>(0.91)</td>
<td>(0.02)</td>
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<tr>
<td>Charity x male</td>
<td>1.48</td>
<td>0.04**</td>
</tr>
<tr>
<td></td>
<td>(0.95)</td>
<td>(0.02)</td>
</tr>
<tr>
<td>Female</td>
<td>0.99**</td>
<td>2.87**</td>
</tr>
<tr>
<td></td>
<td>(0.45)</td>
<td>(0.83)</td>
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<td>Question fixed effects</td>
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<tr>
<td>N</td>
<td>238</td>
<td>238</td>
</tr>
<tr>
<td>R²</td>
<td>0.197</td>
<td>0.248</td>
</tr>
<tr>
<td>ρ</td>
<td>0.04</td>
<td>0.04</td>
</tr>
<tr>
<td>χ²</td>
<td>745.21</td>
<td>754.90</td>
</tr>
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The competitive incentive significantly reduces RMET scores for females by about 1.6 ($\beta=-1.62, p =0.05, 95\% CI= -3.22$ to $-0.12$) and increases males' average RMET scores by about 2.0 ($\beta=2.03, p =0.03, 95\% CI= 0.24$ to $3.8$). While this change is large enough for men to perform better on average than women in the Winner-take-all setting despite the general female advantage, the difference is not statistically significant (F-test, F(1,226)=0.73, p=0.39).

The Charity condition has a positive but statistically insignificant effect on RMET scores for males ($\beta=1.48, p =0.12, 95\% CI= -0.40$ to $3.36$) and females ($\beta=0.33, p =0.62, 95\% CI= -0.98$ to $1.64$). Average female scores on the RMET are higher than males in the Charity condition (F-test, F(1,226)=4.44, p=0.04). Even if the very presence of money primes an inward orientation as found in other studies (5, 6), having the money donated to charity primes a countering outward orientation. The former works to hinder ToM, while the latter enhances it, with a small net effect.

We assess the robustness of our results in various ways. First, we conducted additional regression analysis. Estimating random-effects probit regressions at the level of the question enables us to leverage the longitudinal data structure to control for individual subject and question effects. Estimated changes in the probability of getting an answer correct, as derived from the regressions, are reported in columns C-D of Table 2. The results are similar to the ordinary least-squares estimates except that the change in predicted probability for males in the Charity condition relative to the Baseline is now significant at the 10% level ($p=0.08, 95\% CI= -0.01$ to $0.09$). Multiplying these predicted probability changes by 36 gives very similar predicted changes in overall RMET score similar to the OLS estimates. Additional regressions that vary control variables and assumptions about the standard errors were also estimated. Again, the estimates and their interpretation do not meaningfully change. Second, we checked if answers to specific questions RMET questions varied systematically across the conditions. They did not; the correct RMET answer was the modal selection by the subjects, the single exception being one question in the Baseline. It is the general ability to read emotions that appears to be affected by the monetary incentives. Finally, the average amount of time spent by the subjects in answering questions was the same across the Baseline, Individual, and Winner-take-all conditions but was slightly higher in the Charity condition. This difference in the Charity condition was solely due to women taking longer in that Condition. Again, it appears to be a general ability to read emotions that is affected by the incentives, an ability that is generally one that is not mediated through the amount of time spent.

**Discussion**

Scholars have long distinguished between impersonal trade in large markets that is facilitated by money from the small-scale and interpersonal interactions between family members, friends, and neighbors that depend more on social preferences and norms rather than money (42-44). We suspect that ToM is less important in the former, and thus any negative effect of money on ToM has a relatively small impact on the functioning of large-scale markets. ToM is, however, extremely important in small-scale economic and personal interactions. Experimental evidence has consistently shown that emotions are significant in explaining behavior in a number of situations including bargaining (45), pricing decisions (46), tax evasion (47), and charitable giving (48). The ability to recognize the emotions of others may have a profound effect on individual decision making (49). For example, in wage bargaining an employer that has a high degree of ToM may be able to better anticipate how an offer may affect the emotions of their employee, this anticipation may reduce potential conflict leading to better negotiation outcomes. Our study shows that the effect of money on ToM will depend in part on...
the structure of the monetary incentives in such settings. As our Charity condition reveals, it is not the presence of money per se but how monetary incentives are structured that matters for ToM.

Our study also provides new insights into gender differences in behavior and life outcomes. For example, wage differentials between women and men have been attributed in part to women less frequently asking for raises (34), and sorting into less-competitive career paths (34, 35). When bargaining face to face, one experiment found that women were more likely to accept lower offers relative to men (50). Women may be less likely to enter wage negotiations and more likely to accept unfair offers because they may recognize, as found in our study, that their ToM is inhibited in that setting. This behavioral response to hindered ToM may contribute to lower wages for women. However, when women negotiate salaries for others, they seek higher compensation compared to when they negotiate for themselves (36, 51), a finding that is consistent with our findings as women’s TOM was not reduced in the Charity condition. For career choice, the type of occupation can differ greatly on the level of competitiveness. Our findings suggest that women may avoid competitive settings in part because they assess that their ToM is impaired in such environments. Conversely, men may feel enhanced ToM in such environments and thus seek them out. The differential effect of money on ToM may thus contribute to gender differences in wages and career choice.

We also note a methodological implication of our study for future research on ToM. That women generally score higher on some ToM measures such as the RMET is partly a function of the common practice of not incentivizing the RMET task with money. Males can perform similarly to women, despite the females' general advantage, under some incentive schemes. Whether future researchers should or should not use monetary incentives when measuring ToM thus depends on the type of setting being studied. ToM in competitive environments, for example, may be more appropriately studied using an incentivized measure of ToM. Failing to account for these setting-specific factors can lead to inaccurate conclusions about gender-specific abilities in those settings.

Although our study has found gender differences in how monetary incentives affect ToM, we acknowledge that our study cannot identify the source of those gender differences found. Whether the differences are due to genes, culture, or a combination of both is unclear. A more appropriately-designed research design will be necessary to identify the biological and cultural factors behind the gender differences in ToM that we report.

Acknowledgments

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**Supporting Information**

Figure S1: Experiment Instructions—Welcome Screen for all Conditions.
Figure S2: Experiment Instructions—Baseline Condition.
Figure S3: Experiment Instructions—Individual Condition.
Figure S4: Experiment Instructions—Winner-take-all Condition.
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Table S3: Predicting RMET Score Pure Gender Effect by Treatment and Demographics.
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Table S7: Change in Predicted Probability of Correct Answer in RMET Relative to Baseline References (52-54).