Social heuristics and social roles:

Intuition favors altruism for women but not for men

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Are humans intuitively altruistic, or does altruism require self-control? A theory of social heuristics, whereby intuitive responses favor typically successful behaviors, suggests that the answer may depend on who you are. In particular, evidence suggests that women are expected to behave altruistically, and are punished for failing to be altruistic, to a much greater extent than men. Thus, women (but not men) may internalize altruism as their intuitive response. Indeed, a meta-analysis of 13 new experiments and 9 experiments from other groups found that promoting intuition increased giving in a Dictator Game among women, but not among men (Study 1). Furthermore, this effect was shown to be moderated by explicit sex role identification (Study 2, *N*=1,831): the more women described themselves using traditionally masculine attributes (e.g., dominance, independence) relative to traditionally feminine attributes (e.g., warmth, tenderness), the more deliberation reduced their altruism. Our findings shed light on the connection between gender and altruism, and highlight the importance of social heuristics in human prosociality.

Humans often choose to help others. Yet such prosociality typically requires us to expend time, effort and money in order to deliver such help. What makes us willing to do so? Recently, there has been considerable interest in exploring human prosociality using a dual process perspective (for a review, see Zaki and Mitchell (2013)), where decisions are conceptualized as resulting from competition between cognitive processes which are automatic, fast, and intuitive, versus those that are controlled, slow, and deliberative (Kahneman, 2003; Sloman, 1996). Does prosociality require deliberative self-control, or do prosocial impulses get reined in by the calculus of self-interest?

The *Social Heuristics Hypothesis* (SHH) has been proposed as a theoretical framework for answering this question (Peysakhovich & Rand, 2015; Rand et al., 2014). The SHH adds an explicitly dual process lens to theories regarding the adoption of typically advantageous behaviors (e.g. theories based on "spillover" effects (Kiyonari, Tanida, & Yamagishi, 2000), norm internalization (Chudek & Henrich, 2011), and consequences of interdependence in one's social interaction experiences (Van Lange, De Bruin, Otten, & Joireman, 1997)). The SHH posits that social strategies which are typically successful in daily life specifically become automatized as *intuitive* responses. Deliberation can then override these intuitions and adjust one's behavior in light of the details of the specific decision at hand.

In particular, the SHH argues that a key component of deliberation is the consideration of strategic concerns and payoff maximization, which favors self-interested behavior. As a result, deliberation is predicted to sometimes undermine prosocial intuitions, but not to push selfish intuitions toward prosociality. A mathematical model of dual-process agents playing Prisoner's Dilemma games formalizes this prediction (Bear & Rand, 2016): amongst all possible strategies, the dual-process strategies that perform best (and thus are favored by evolution, social learning,

and/or strategic decision-making) use deliberation to switch from cooperation to defection in 1-shot anonymous settings. Conversely, strategies that use deliberation to switch from defection to cooperation (under any circumstances) never perform well, and are always disfavored.

By this account where typically successful strategies are intuitive, intuition should typically favor cooperation: in the context of daily life, most important interactions (e.g., with co-workers, friends and family) are repeated. Thus, because cooperation is non-zero-sum, cooperating can be in one's long-run self-interest: cooperating with others today can induce others to cooperate with you in the future (Rand & Nowak, 2013). Conversely, when interacting in settings where future consequences are *not* enough to incentivize cooperation (e.g. 1-shot anonymous laboratory experiments), it is never in one's self-interest to cooperate; and, therefore, deliberation should favor selfishness. As predicted by this account, experimentally promoting intuition relative to deliberation via time pressure or a conceptual priming exercise has been found to increase cooperation on average in one-shot anonymous interactions (Cone & Rand, 2014; Lotz, 2015; Protzko, Ouimette, & Schooler, 2015; Rand, Greene, & Nowak, 2012; Rand, Newman, & Wurzbacher, 2015); for a meta-analysis, see Rand et al. (2014).

The implications of the SHH for *altruism* (unilaterally giving resources to others), however, remain unclear. On the one hand, a narrow read of the SHH suggests that, like deliberation, intuition should disfavor altruism: transferring money to someone and then having them transfer it back does not make one better off than just keeping the original money, and so altruism (unlike cooperation) is not advantageous even in repeated games. On the other hand, a broader interpretation of the SHH suggests that intuition may favor altruism in a similar way to what has been observed with cooperation. If being selfish in the context of zero-sum interactions is seen negatively by others, it may create reputational costs in the context of other (non-zero-

sum) interactions. If so, then altruism could be payoff maximizing in the long-run. However, it may not be the case that all people are harmed from being seen as selfish, such that moderators may exist for whether altruism is advantageous in daily life (and thus favored by intuition).

A particularly compelling candidate for such moderation is gender. Specifically, we might expect women, but not men, to have altruism as their intuitive social response for two reasons. First, a large body of work suggests that the behavior of men and women is governed by stereotypes concerning their social roles; and in particular that women are expected to be communal and unselfish, whereas men are expected to be agentic and independent (Eagly, 1987). When women behave in ways that are perceived as insufficiently communal, they are not only liked less, but they are also less likely to be helped, hired, promoted, paid fairly, and given status, power and independence in their jobs (Heilman & Okimoto, 2007). Thus, women are subject to much stronger expectations that they will behave altruistically (Heilman & Chen, 2005). Furthermore, recent work has found that women are well aware of these gender stereotype-based behavioral prescriptions, and their concern over encountering backlash effects from violating these stereotypes helps explain, in part, a range of behaviors that systematically vary by gender (Brescoll, 2011). As a result, behaving altruistically in accordance with others' expectations is typically advantageous for women.

Second, the fact that women also disproportionately occupy roles that either mandate self-sacrificing and altruistic behavior (e.g., mother) or, at the very least, require a great deal of other-oriented, communal behavior (e.g., nurse) (Eagly, 1987), may cause women to habituate to being altruistic. And even women who do not explicitly occupy such family or work roles may acquire altruistic intuitive social responses because female peer groups are markedly more communal and egalitarian than male peer groups, and thus make self-sacrificing, unselfish

behavior socially adaptive (Maccoby, 1998). Taken together, consideration of both the expectations of others and the behaviors one engages in regularly point to intuition favoring altruism for women more so than men.

In this paper, we experimentally investigated the role of intuition and deliberation in altruism, and the potential moderating role of gender. In Study 1, a meta-analysis of 22 giving studies where cognitive processing was manipulated revealed the predicted interaction between cognitive processing mode and gender: promoting intuition increased altruism in women but had no significant effect in men. Study 2 then investigated the mechanism behind this effect by examining whether identification with gender norms moderated the sex differences found in Study 1.

Study 1

Method

In Study 1, we conducted a meta-analysis (N = 4,366) of new and existing studies looking at the effects of experimentally manipulating the use of intuition versus deliberation on giving in the Dictator Game (DG). In the DG, participants unilaterally decide how to divide actual money between themselves and an anonymous recipient. Across studies, we used the percentage of the endowment given to the recipient as our measure of altruism.

To minimize file-drawer effects, we began by including all data each of the authors of the present study had ever collected where cognitive processing was manipulated in a zero-sum dictator game (including failed pilots, experiments with problematic design features, etc). We had 13 such experiments (all previously unpublished), each of which manipulated cognitive processing using either time constraints or conceptual priming. Reducing the amount of time

subjects have to decide shortens the window of opportunity for deliberation to rein in intuition, leading to more intuitive decisions (Wright, 1974). Therefore, in the time constraint experiments, reliance on intuition was increased by asking subjects to make their giving decision in less than a specified number of seconds (time pressure); and was reduced by asking subjects to wait and think for at least a specified number of seconds before deciding (time delay). The conceptual priming conditions, on the other hand, used a writing exercise at the outset of the experiment to induce more or less intuitive decision-making (Shenhav, Rand, & Greene, 2012). Reliance on intuition was increased by asking subjects to write about a time in their life where following their intuition worked out well, or where carefully reasoning through a problem worked out poorly. Reliance on intuition was decreased by asking subjects to write about a time in their life where following their intuition worked out poorly, or where carefully reasoning through a problem worked out well.

We also included data from other labs by doing a comprehensive database search and requesting raw data (including gender) for experiments in which cognitive processing was manipulated in dictator games with the standard setup of (i) a single anonymous recipient, and (ii) a decision space ranging from completely selfish to completely altruistic. For cognitive process manipulations, in addition to time pressure and conceptual priming, we also included experiments that used cognitive load (where participants had to engage in a more or less cognitively demanding task, such as holding a 7-digit versus 3-digit number in working memory, while completing the DG).[1]

[1] We did not include ego depletion, based both on evidence that ego depletion may not function in same way as other cognitive process manipulations (Inzlicht & Schmeichel, 2012), and the fact that we were only able to obtain data from one depletion study with a total of 54 participants (Halali, Bereby-Meyer, & Ockenfels, 2013); including these data does not qualitatively alter our key results.

In total, we received datasets for nine additional experiments (Benjamin, Brown, & Shapiro, 2013; Cornelissen, Dewitte, & Warlop, 2011; Evans, 2014; Hauge, Brekke, Johansson, Johansson-Stenman, & Svedsäter, 2014; Kinnunen & Windmann, 2013). Thus, Study 1 aggregated data from 22 experiments, for a total of 4,366 participants (52.7% female, M_{age}=29.8). Supplemental Materials Table S1 provides details for each experiment.

Results and Discussion

As predicted, random-effects meta-analysis of DG giving found a significant interaction between gender and cognitive processing mode, effect size 5.5 percentage points, 95% CI [2.6, 8.5], Z=3.66, p=.0001 (Figure 1). There was no evidence of publication bias (Egger's test, t=-.28, p=.79; Begg's test, z=-.31, p=.76), or of heterogeneity in the true size of this interaction across studies, $chi^2(21)=16.04$, p=.77. Furthermore, meta-regression found no significant difference in interaction effect between studies run online versus in the physical laboratory, t=.22, p=.83 (interaction effect: 6.1 percentage points in lab, 5.4 percentage points online); and no significant differences in interaction effect size across methods of manipulating cognitive processing, F(2,19)=.4, p=.68 (interaction effect: cognitive load, 6.4 percentage points; conceptual priming, 6.1 percentage points with; time constraints, 2.7 percentage points).

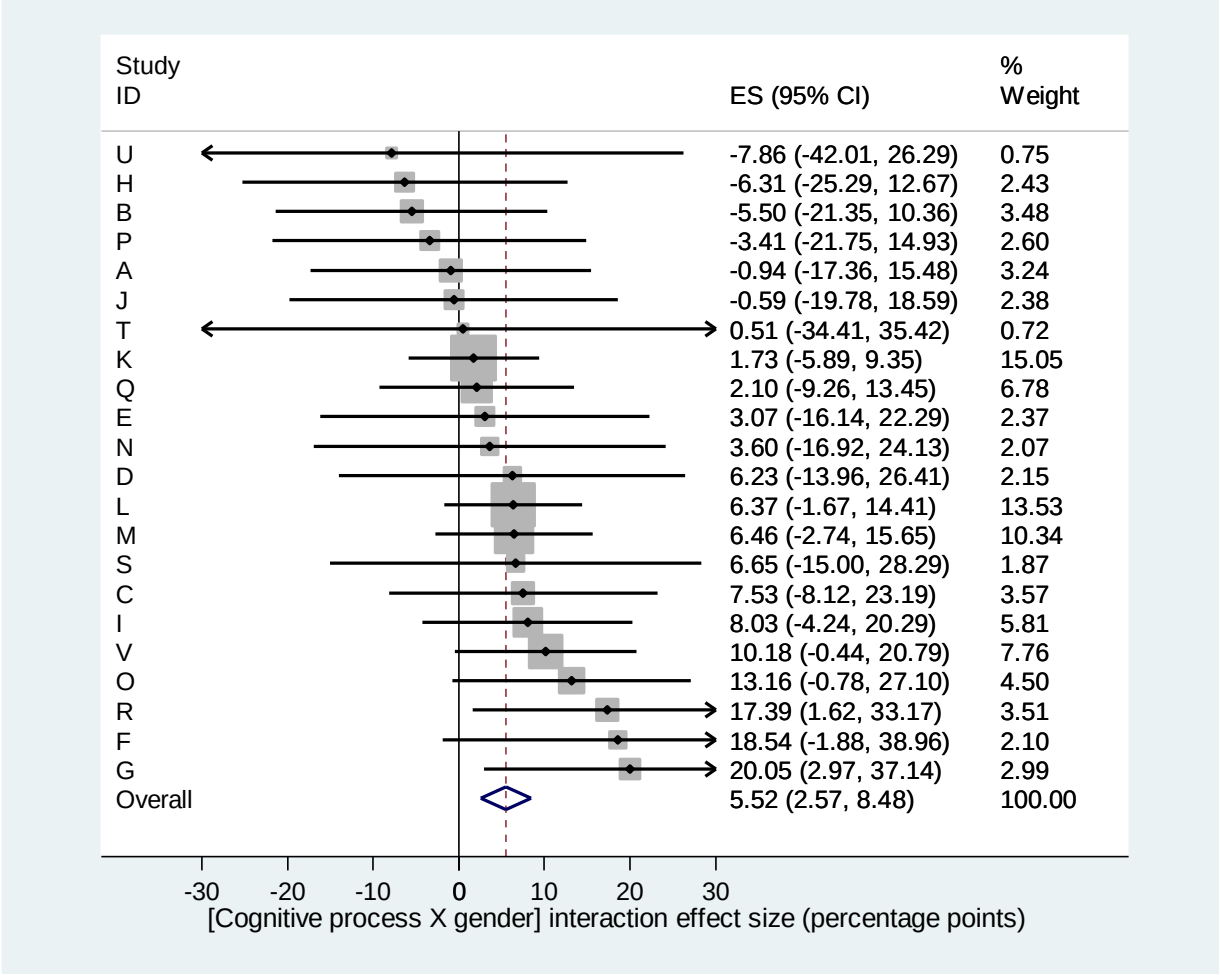

Figure 1. Effect size for interaction between gender and cognitive processing mode for each experiment in Study 1 – 13 new experiments plus 9 previously published experiments. See Supplemental Materials Table S1 for key. Error bars indicate 95% confidence intervals. Gray squares indicate weight placed on each study.

Examining simple effects showed a significant positive effect of promoting intuition among women (Figure 2), effect size 3.8 percentage points, 95% CI [1.9, 5.7], Z=3.87, p<.0001; resulting in on average 10.8% more giving in the high intuition condition relative to the low intuition condition. Conversely, there was no significant effect among men (Figure 3), effect size

-2.0 percentage points, 95% CI [-4.2, .001], Z=1.87, p=.062. Again, there was no evidence of heterogeneity in effect size across studies (women, $chi^2(21)=13.1$, p=.91; men, $chi^2(21)=16.4$, p=.75).

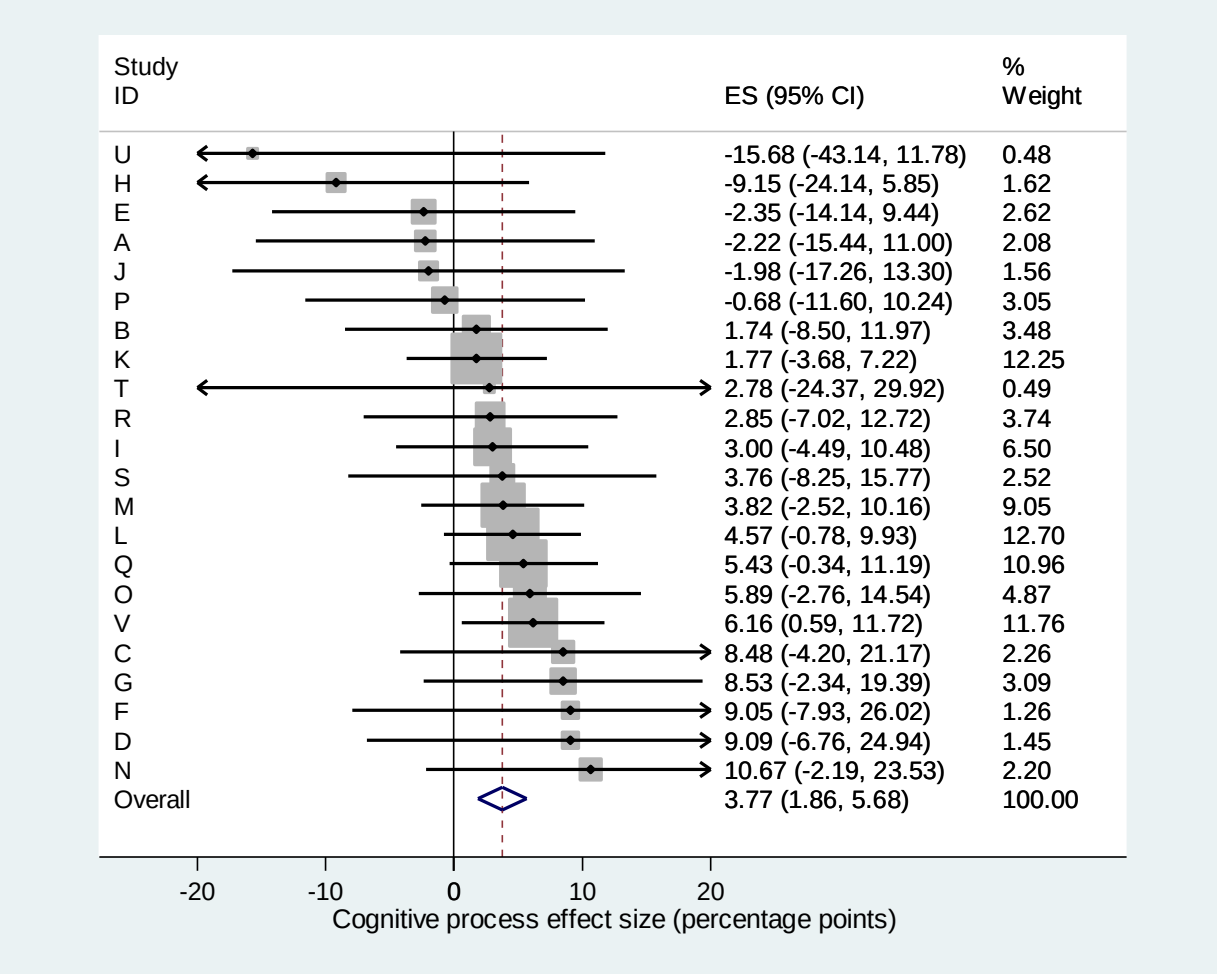

Figure 2. Effect size for simple effect of promoting intuition among women for each experiment in Study 1. Error bars indicate 95% confidence intervals. Gray squares indicate weight placed on each study.

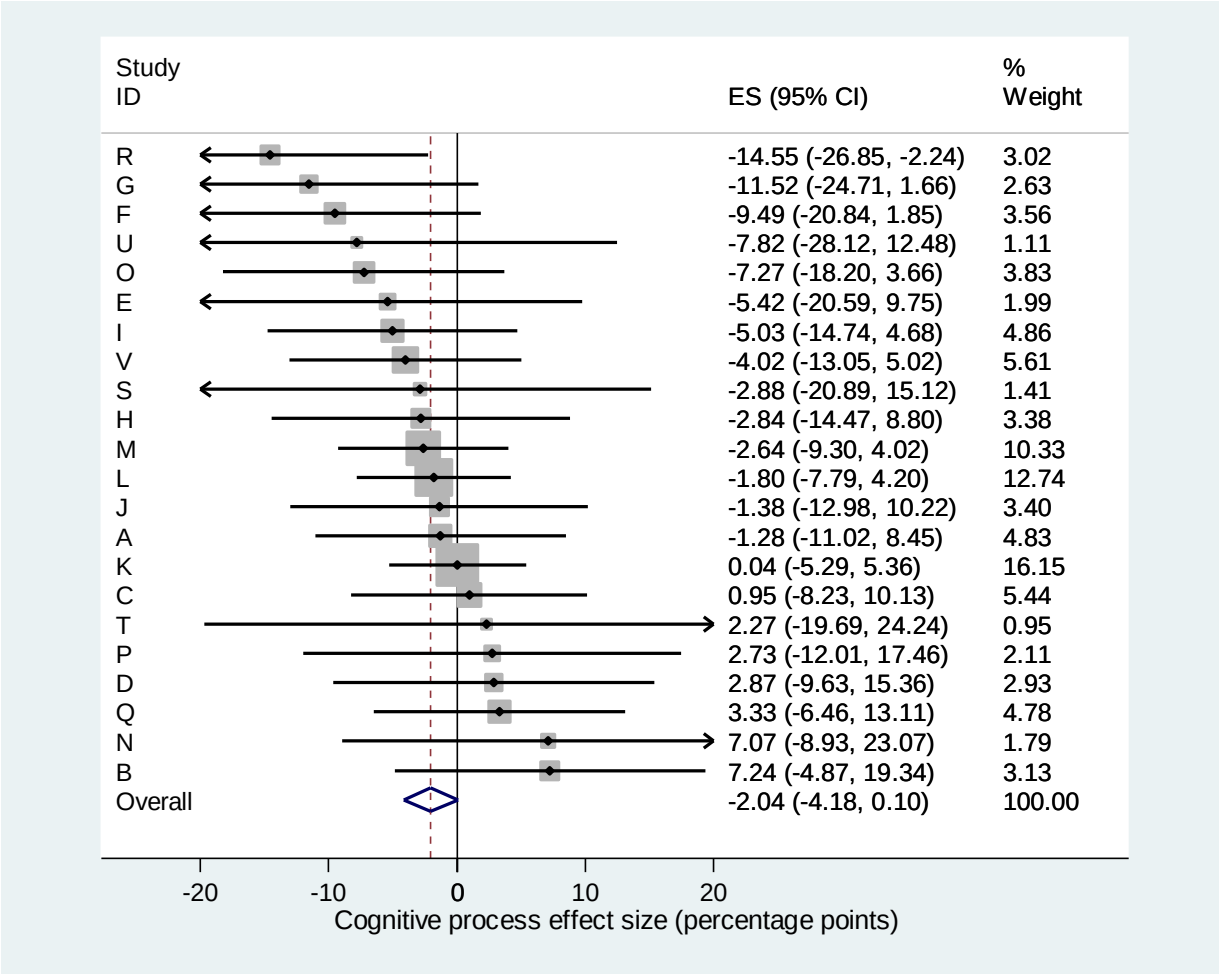

Figure 3. Effect size for simple effect of promoting intuition among men for each experiment in Study 1. Error bars indicate 95% confidence intervals. Gray squares indicate weight placed on each study.

Study 2

Study 1 showed an interaction between gender and intuitive processing: intuition favored unilaterally helping others for women, but not for men. Although this effect was consistent with our predictions based on the SHH and the differential value of altruism for women versus men, the goal of Study 2 was to provide more direct evidence for social norms as the proposed

mechanism. Specifically, if sex differences in the relationship between intuition, deliberation and altruism are driven by social norms associated with men and women's social roles, then individual differences in the extent to which people adopt such sex role norms should moderate this relationship. Thus, for women, explicit self-identification with traditionally masculine attributes was predicted to influence deliberative responses but not intuitive responses

Women who identify with masculine attributes are still perceived by the world as women, and thus are subject to the altruistic expectations placed upon women (making altruism typically advantageous for them). Since intuitive responses are not within one's conscious control, but instead implement typically advantageous behaviors, the intuitive responses of even women who explicitly adopt masculine attributes should be as altruistic as women who explicitly identify with feminine attributes; and women's intuitive responses should be more altruistic than men's, regardless of whether women identify more with masculine versus feminine attributes.

When deliberating, however, explicit gender role identification *was* predicted to influence women's altruism: women who identified more with masculine attributes were predicted to shift in the direction of men (i.e. to become less altruistic), because altruism is disfavored by both (i) masculine gender roles (which involve power, dominance, and independent self-interest) and (ii) deliberation's general tendency to make people consider strategic self-interest.

Women who explicitly identify with feminine attributes, on the other hand, embrace traits that are consistent with altruism, and are in conflict with the self-interested effects of strategic deliberation. Thus, deliberation should not affect their behavior in the DG. For the same reason, men who explicitly identify with feminine attributes should also not override their selfish intuitions to become more altruistic when deliberating. Finally, for men who identify with masculine attributes, their intuitive and deliberative responses are in alignment, both favoring

relative selfishness, which again leads to no predicted effect of deliberating. Study 2 directly tested these hypotheses.

Study 2 also explored a second potential moderator, how strongly participants felt that gender norms were enforced in their lives, which was unsuccessful for reasons that we believe were practical, rather than theoretically informative, in nature; see Supplemental Materials Section 2 for details.

Method

Study 2 took advantage of the fact that three of our experiments from Study 1 (K, L, and M), in which participants completed the conceptual priming manipulation described in Study 1 and made a single dictator game decision (total N = 1,831; 51.5% female, M_{age}=35.0 years), also included questions about self-identification with male and female sex roles (the short-form of the Bem Sex-Role Inventory, BSRI, (Bem, 1977)).[2] Participants indicated the extent to which each of 20 attributes (10 traditionally masculine, 10 traditionally feminine) described them (from 1="*Never or almost never true*" to 7="*Always or almost always true*"). [3] We then classified participants' gender role identification as masculine vs feminine using a median split on the sum of all masculine items minus the sum of all feminine items (Hoffman & Borders, 2001).

Results and Discussion

[2] Whether the moderator questions came before or after the conceptual priming task and DG was randomized. Our analyses collapsed over order, rather than analyzing the effect of order, because a substantial difference in attrition rates between the orders prevented valid causal inference about order effects.

[3] Traditionally masculine attributes: Willing to take a stand; Defends own beliefs; Independent; Has leadership abilities; Strong personality; Forceful; Dominant; Aggressive; Assertive; Willing to take risks. Traditionally feminine attributes: Affectionate; Warm; Compassionate; Gentle; Tender; Sympathetic; Sensitive to needs of others; Soothe hurt feelings; Understanding; Loves children.

Study 2 reproduced the pattern observed in the meta-analysis: an ANOVA predicting DG giving based on cognitive processing mode, gender, and study demonstrated an interaction between cognitive processing mode and gender, $F(1, 1819)=3.85$, $p=.050$, effect size 4.4 percentage points, such that dictator giving was significantly greater among women when intuition was promoted (M=.40, SD=.23) relative to deliberation (M=.37, SD=.24), t(941)=2.08, p=.038; but cognitive process did not significantly affect giving among men (intuition: M=.32, SD=.27; deliberation: M=.33, SD=.27), t(886)=.58, p=.55. No other terms were significant (p>.15 for all), except for a significant main effect of gender, $F(1,1819)=29.5$, $p<.001$, effect size 6.3 percentage points, such that women (M=.39, SD=.24) gave more than men (M=.33, SD=.27). In particular, because the 3-way interaction between gender, cognitive processing mode, and study was not significant, F(2, 1819)=.46, p=.63, we collapsed across study in our subsequent analyses.

To test for moderation, we conducted an ANOVA predicting DG giving using gender, cognitive processing mode, and sex role self-identification (0=feminine, 1=masculine).[4] In addition to significant main effects of gender F(1,1823)=18.53, p<.0001, such that women were more altruistic than men, and sex role self-identification F(1,1823)=13.57, p=.0002, such that feminine participants were more altruistic than masculine participants, we observed the predicted significant three-way interaction between gender, cognitive processing mode, and sex role self-identification, $F(1, 1823)=5.23$, $p=.022$, effect size 11.1 percentage points.[5] This three-way interaction was such that there was a significant two-way interaction between cognitive processing mode and self-identification among women, $F(1, 939)=5.52$, $p=.019$, effect size 7.4

[4] Our results are qualitatively equivalent when using a continuous measure of sex role self-identification.
[5] Note that this result is robust to Bonferroni correcting for also having tested a second moderator (described in the Supplemental Materials), given that $p<0.025$.

percentage points, but not among men, $F(1, 884)=1.00$, $p=.32$, effect size -3.8 percentage points. Decomposing the significant two-way interaction among women, we found a significant negative effect of promoting deliberation for women who self-identified as masculine, t(371)=3.19, p=.002, effect size 7.8 percentage points; and no significant effect of promoting deliberation for women who self-identified as feminine, t(570)=.19, p=.85, effect size .00 percentage points.

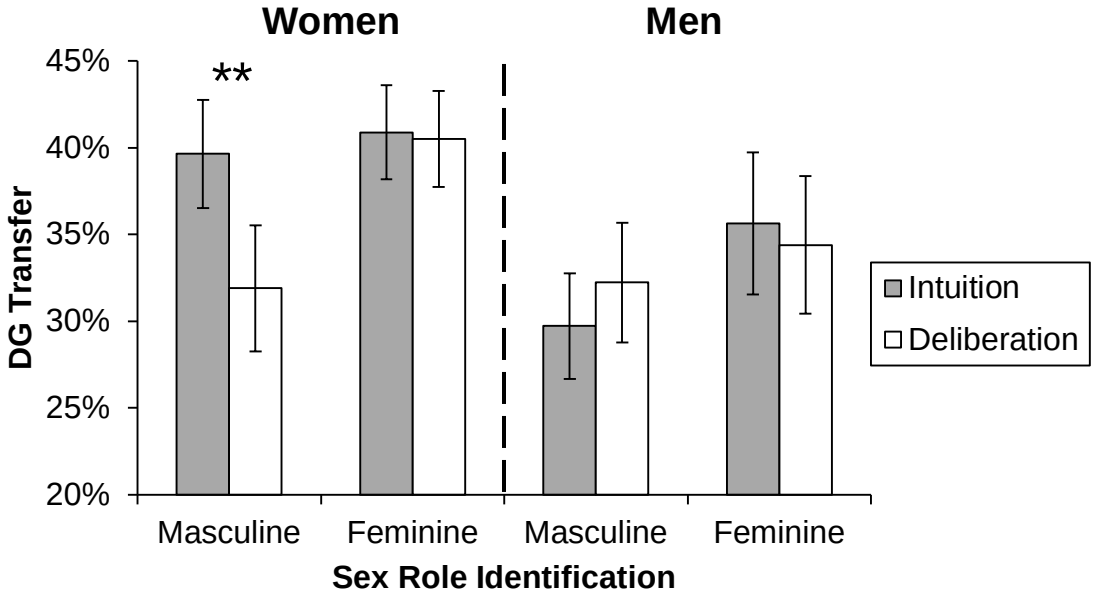

Figure 4. Average dictator game giving in Study 2 by gender, cognitive processing mode, and sex role self-identification. Error bars indicate 95% confidence intervals. **p<0.01.

As can be seen in Figure 4, men gave comparatively smaller amount regardless of cognitive processing mode or identification with masculine versus feminine attributes, whereas women gave a larger amount unless they *both* identified as masculine and were induced to deliberate. We also note that these results were not driven entirely by the feminine sex role items, many of which were directly related to prosociality/altruism: a median split on just the 10 masculine items also reveals a significant negative effect of deliberation among more masculine

women t(429)=2.35, p=.019, effect size 5.4 percentage points, and no significant effect of deliberation among less masculine women t(514)=.67, p=.50, effect size 1.4 percentage points.

Thus, Study 2 found that although intuition favored altruism among women, those women who explicitly saw themselves as occupying traditionally masculine sex roles became more selfish when deliberating. Conversely, men's comparatively selfish intuitive response was unaffected by deliberation.

General Discussion

What roles do intuition and deliberation play in altruism? Here we have explored this question using economic games, and found that the answer depends on who you are. Study 1 meta-analyzed 22 Dictator Game studies and revealed an interaction whereby promoting intuition made women significantly more likely to give, but had no significant effect on giving among men. Study 2 then demonstrated moderation by sex role identification, such that deliberation specifically undermined the altruistic intuitions of women who saw themselves as masculine.

Our results tie together two distinct lines of theory: one regarding gender differences in altruism, and another regarding social heuristics and the basis of intuition. Women disproportionately occupy social roles that require communal and even self-sacrificing behavior: thus, failing to behave communally results in negative consequences for women more so than men. The SHH therefore predicts that men and women would develop different intuitions regarding altruism. And indeed, this is what our data show. This supports a core tenant of the SHH — that intuitive responses implement social behavior which is typically optimal. Furthermore, in contrast to the current work on altruism, the SHH predicts that *cooperation* will

be intuitive regardless of one's gender: cooperating inherently has the possibility to be long-run payoff-maximizing because it is non-zero-sum, and thus does not rely on expectations related to social roles. Consistent with this prediction, a follow-up inspired by the current study found no gender moderation of the relationship between intuition and cooperation, which was positive for both women and men (Rand, 2016).

The fact that deliberation only works *against* altruism in our data, rather than sometimes making men *more* altruistic by overriding their selfish intuitions, is also consistent with the SHH. The SHH posits that a key component of deliberation is the consideration of what choice is payoff maximizing, which is always selfishness in our experiments (because they involve one-shot anonymous interactions) – and such payoff-maximizing considerations work against any deliberative motivations to give (such as having a conscious desire to be communal).

Although we explicitly rely on social norms in our theorizing about the gender difference in intuitive altruism, the *ultimate* origins of the distribution of men and women into different social roles could be biological in nature (Preston, 2013). Specifically, women's capacity for reproduction and men's greater physical size and strength (Wood & Eagly, 2002) along with the evolutionary advantages to women of occupying roles that require a longer-term investment in caring for offspring (Buss, 1995) may explain why women end up occupying roles that require communal and self-sacrificing behavior in the first place and thus why altruism may become the intuitive social response for women.

The *size* of the effects we observed was determined not only by the actual magnitude of the influence that intuition and deliberation have on altruism, but also by the effectiveness of the cognitive processing manipulations used. These manipulations were at best only partially successful in making participants rely more heavily on intuition versus deliberation – those in the

"intuition-promoting" conditions were undoubtedly still able to engage in substantial degrees of deliberation, despite the experimental manipulation. As a result, our overall estimates of the observed effects are likely underestimates of the effect size of intuitive processing on altruism one might observe with more powerful manipulations, or in more strongly-valenced real world interactions. Thus, we argue that the size of the observed effects is less important that their *direction*.

Relatedly, it is unclear the extent to which these manipulations acted by reducing deliberation versus amplifying intuition. Thus, future research should use different manipulations to better understand the nature of participants' baseline responses, as well as including baseline responses (i.e., no manipulation). Furthermore, future research should examine whether the gender differences in intuitive altruism we observed in the context of interpersonal giving extend to other forms of altruistic behavior, such as charitable giving (Small, Loewenstein, & Slovic, 2007) and "extreme" altruism (Rand & Epstein, 2014), and to intergroup contexts (given evidence that tribal instincts for parochial altruism are stronger in men (van Vugt, de Cremer, & Janssen, 2007)).

In sum, we provide evidence that promoting intuition relative to deliberation increases altruistic giving in women but not men. These findings extend our understanding of gender and prosociality, and advance a model of intuitive decision-making based on social heuristics.

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Supplemental Materials

Social heuristics and social roles: Intuition favors altruism for women but not for men

by D. G. Rand et al.

1. Details of the experiments included in the meta-analysis of Study 1

Table S1. Details of the experiments analyzed in Study 1. Gender data from Oberholzer-Gee and Eichenberger (2008) were unavailable, and so this study was not included in the meta-analysis.The indicated sample size includes only participants for whom gender data was available.

Exp	Subject pool	Manipulation	*N*	Other notes
A	MTurk	Time constraint (<5s vs >30s). Delay was enforced on the instructions page rather than the decision page.	154	$0.10 stake.
B			158	$0.10 stake.
C			192	$0.40 stake.
D	MTurk	Conceptual prime: Write about a time in your life where [following your intuition worked out well or carefully reasoning through a problem worked out poorly] vs [following your intuition worked out poorly or carefully reasoning through a problem worked out well].	125	$0.10 stake.
E			114	$0.10 stake.
F			134	$0.40 stake.
G	MTurk	Conceptual prime: Please write a paragraph (approximately 8-10 sentences) describing a time [your intuition/first instinct] vs [carefully reasoning through a situation] led you in the right direction and resulted in a good outcome.	225	$0.30 stake. "Intuition good" prime was implemented incorrectly, so this study was more like "Reason good" vs baseline. Also, decision options were given in 5 cent increments, but the $0.05 option was accidentally omitted.
H			189	
I	eLab	Time constraint (<10s vs >10s)	340	$10 stake. 1/10 chance of decision actually being implemented.
J	MTurk		104	$1 stake.
K	MTurk	Conceptual prime: Write about a time in your life where [following your intuition worked out well or carefully reasoning through a problem worked out poorly] or [following your intuition worked out poorly or carefully reasoning through a problem worked out well].	715	$0.30 stake. Also analyzed in Study 2.
L			619	
M			439	
N	Physical lab	Conceptual prime: instructed to decide according to their first impulse, their gut-feeling and intuition; or to deliberate and take their time before deciding	48	20€ stake. Kinnunen and Windmann (2013).
O	Physical lab	Cognitive load (memorize random vs sequential 8-digit number)	150	1€ stake, no equal split option. Cornelissen, Dewitte, and Warlop (2011) Study 1.
P			102	1.10€ stake, no equal split option. Cornelissen et al. (2011) Study 2b.
Q			171	1.10€ stake, no equal split option. Cornelissen et al. (2011) Study 3.
R	Physical lab	Cognitive load (memorize random vs easy 9 digits of letters & numbers)	60	NOK 300 stake. Subjects played 2 DGs, first with take frame than with give frame; we average fraction given over the 2 DGs. Hauge, Brekke, Johansson, Johansson-Stenman, and Svedsäter (2014) Study 2.
S		Cognitive load (memorize random vs easy 7 digits of letters & numbers)	74	SEK 160 stake. Hauge et al. (2014) Study 3.
T	Physical lab	Cognitive load (memorize 7 digit number vs nothing)	37	300 peso stake. Benjamin, Brown, and Shapiro (2013) Study 3.
U		Cognitive load (remember # of times a sequence of musical tones was played)	60	$1.00 stake. Benjamin et al. (2013) Pilot Study.
V	Snowball sampling via email and Facebook	Conceptual prime: Write 100-150 words about a time intuition or reflection lead to a positive outcome	156	Played 8 DGs with stakes between 5€ and 44€. 1/10 chance of one DG being randomly selected for payment; we average fraction given over the 8 DGs. Evans (2014).

2. Second moderator in Study 2

In addition to the BSRI, the moderator questionnaire in Study 2 included five questions about the extent to which participants reported internalizing societal gender norms in their daily lives, which we loosely adapted from Devine, Monteith, Zuwerink, and Elliot (1991) and Brescoll (2012): "In your everyday life, how important is for to you to behave in ways that are considered socially appropriate for your gender?"; "How committed are you to behaving in ways that are considered socially appropriate for your gender?"; "How central to your self-concept (i.e., your view of your self) is behaving in ways that are considered socially appropriate for your gender?"; "Would you be concerned that you might be disliked for behaving in ways that are considered socially inappropriate for your gender?"; "Would you be concerned that people would judge you for behaving in ways that are considered socially inappropriate for your gender?"

These items were intended to capture the extent to which gender norms were enforced in participants' lives, which affects the strategies that were typically adaptive – and therefore was predicted to affect intuitive responses: greater importance (and internalization) of gender norms was predicted to amplify sex differences, leading women to be more intuitively altruistic and men to be more intuitively selfish.

We averaged responses to these 5 items to form an aggregate measure (α=.89). Unlike the BSRI results reported in the main text, there was no significant 3-way interaction between gender, cognitive processing mode, and internalization of gender norms $F(1, 1823)=1.95$, $p=.16$; and no other terms involving internalization of gender norms were significant, $p>.10$ for all.

We believe that this null result was most likely explained by limitations of the (not previously validated) explicit self-report measure we used, rather than indicating a theoretically meaningful lack of moderation. This is especially true given that in addition to not observing the

predicted three-way interaction with gender and cognitive processing mode, we also found no significant effects of the measure whatsoever.

Unlike the BSRI, which directly asked participants about how they identified with specific traits, our second measure asked more abstract questions about the influence of gender roles; and it seems likely that people may not have been able to accurately assess the extent to which they were influenced by societal gender norms (i.e. may lack consciously awareness of this influence; particularly because we predicted an impact on *intuitive* responses). It may be also the case that people were not motivated to report that they are subject to, and care deeply about, societal gender norms. Being unwilling and unmotivated to admit being influenced by such norms is analogous to the way that people are reluctant to admit that they *personally* are influenced by the media or advertising, though the data clearly show that individuals are powerfully influenced by such forces. To help clarify these issues, future work should investigate whether *implicit* attitudes regarding the internalization of gender norms moderation the relationship between intuition, deliberation, and altruism for women.

3. Supplemental Materials References

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