

Women dislike competing against men

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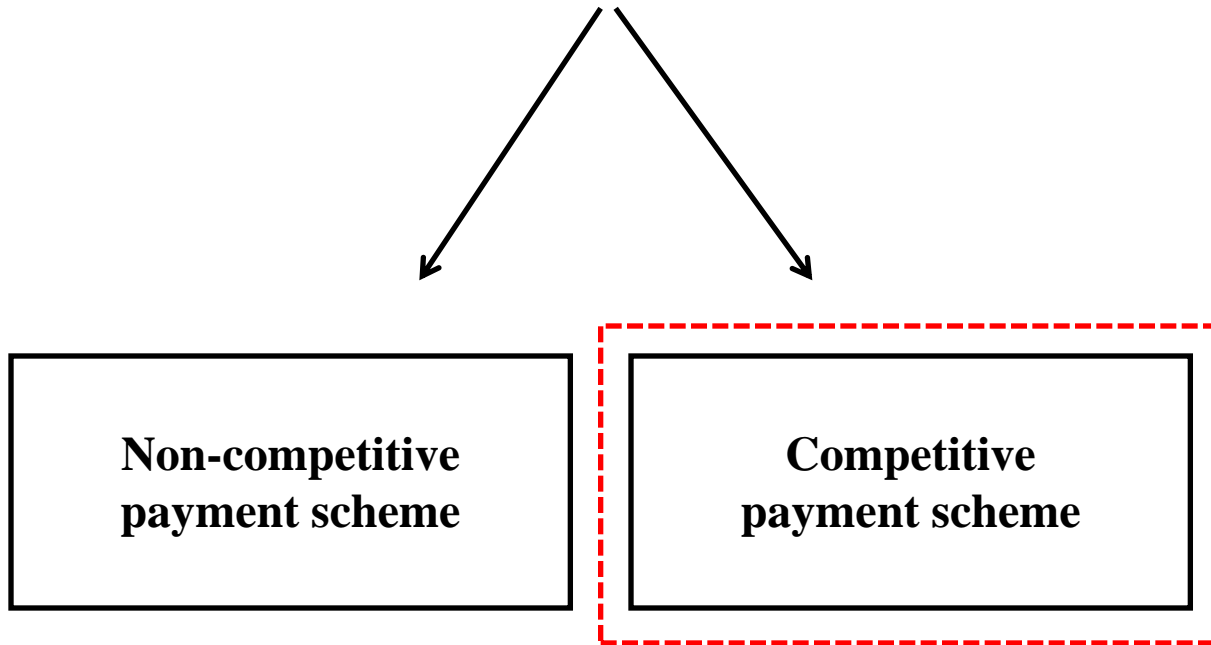
Motivation/Background

- A stylized fact about gender differences is the gap in wages and positions at the workplace (sources: *Eurostat*; *She Figures*)
- Experimental economics studies on men and women self-selection into competitive environments (e.g., Niederle and Vesterlund, *QJE* 2007; Dohmen and Falk, *AER* 2011; Gneezy, Leonard and List, *Econometrica* 2009)

Motivation/Background

Measure of competitive attitude

Choice between two payment alternatives for a subsequent work task performance



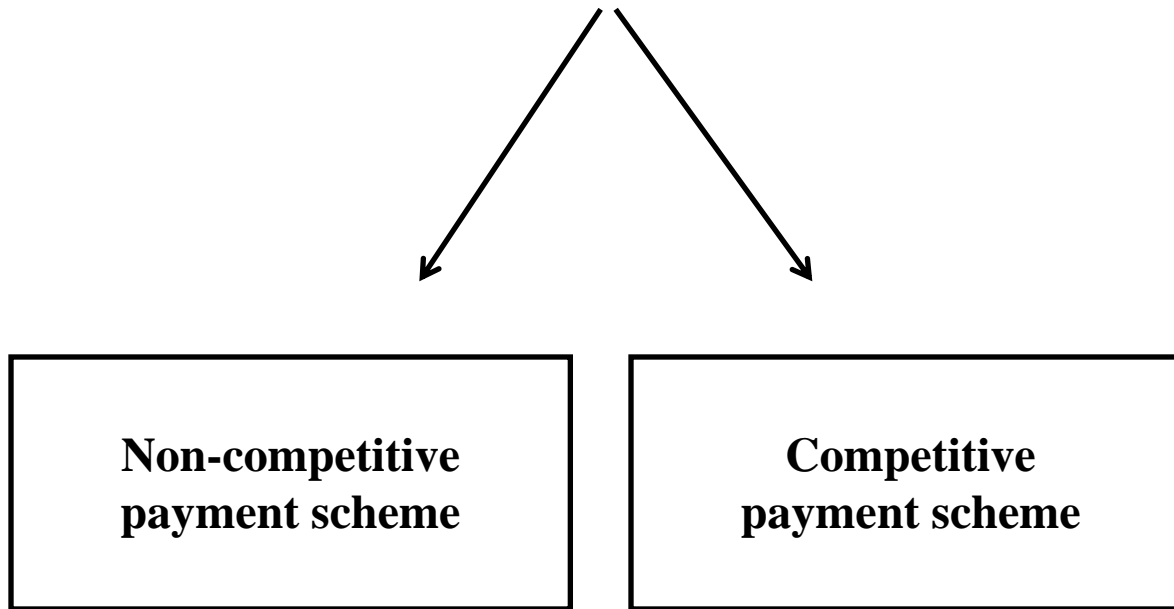
Motivation/Background

- A stylized fact about gender differences is the gap in wages and positions at the workplace (source: *Eurostat* 2009)
- Experimental economics studies on men and women self-selection into competitive environments (e.g., Niederle and Vesterlund, *QJE* 2007; Dohmen and Falk, *AER* 2011; Gneezy, Leonard and List, *Econometrica* 2009)
- Experimental economics studies motivated by the **Affirmative Action policy** debate (e.g., Balafoutas and Sutter, *Science* 2012; Niederle, Segal and Vesterlund, *Management Science* 2013)

Motivation/Background

Measure of competitive attitude with AA Policy

Choice between two payment alternatives for a subsequent work task performance



- Quotas ✓
- Head start ✓
- Repetition of the competition ✗

Possible problem in the literature

- The standard procedure in the literature is to **conduct balanced mixed-sex laboratory sessions without making reference to the gender composition of participants** (e.g., Niederle and Vesterlund, *QJE* 2007; Gneezy, Leonard and List, *Econometrica* 2009; Cason, Masters and Sheremeta, *JPE* 2010; Dohmen and Falk, *AER* 2011)
- **The claim that women shy away from competition per se might be compromised**

Research Question

- Do women have an aversion against competition *per se*? Or, rather, do they shy away from competing against men, at least within a stereotypically male-typed domain?

Approach

- Investigate whether manipulating the perception of the sex of potential competitors alters women's willingness to compete in a male-typed domain

Focus on a Male-typed Domain

■ Why?

Preserve the spirit of the most representative labor markets and educational programs in which the gender gaps are a serious concern (e.g., high-level business positions, STEM fields).

■ How?

Use of a mathematical work task because:

- Stereotype that men are better at mathematics (e.g., Spencer, Steele and Quinn, *J. Experimental Social Psychology* 1999, recent survey using participants of our subject pool)
- There is empirical and theoretical basis to expect women to dislike competing against men in this context (**Stereotype Threat** [e.g., Inzlicht and Schmader, 2013]; **Negative Self-stereotyping** [Bordalo, Gennaioli and Schleifer, 2014])

Hypotheses

- Women are not less competitive than men
- But, at least in a male-typed domain, women dislike facing a male competitor

Experimental Design

Replication Condition

- Choice between a non-competitive and a competitive payment scheme (**2** alternatives)

Choice of Sex Condition

- Choice between a non-competitive and two competitive payment scheme (**3** alternatives)

Chart of the Experiment: Replication Condition

Step 1	Step 2	Step 3	Step 4
<p>Practice Round</p>			
<p>Work task: Calculate as many addition problems as possible (Niederle and Vesterlund, 2007)</p> <p>No payment</p> <p>(2 minutes)</p>			

Work Task (Niederle and Vesterlund, 2007)

$$31 + 53 + 56 + 37 + 58 = ?$$

The sum of the 5 two-digit numbers displayed above is:

Please click OK to confirm your answer.

OK

Chart of the Experiment: Replication Condition

Step 1	Step 2	Step 3	Step 4
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Chart of the Experiment: Replication Condition

Step 1	Step 2	Step 3	Step 4
Practice Round	Elicitation of subjects' productivity		
Work task: Calculate as many addition problems as possible (Niederle and Vesterlund, 2007) No payment (2 minutes)	Piece-rate incentive scheme: € 0.5 per correct answer (5 minutes)		

Chart of the Experiment: Replication Condition

Step 1	Step 2	Step 3	Step 4
<p>Practice Round</p>	<p>Elicitation of subjects' productivity</p>	<p>Choice of payment scheme for the subsequent 5 minutes performance</p>	
<p>Work task: Calculate as many addition problems as possible (Niederle and Vesterlund, 2007)</p> <p>No payment</p> <p>(2 minutes)</p>	<p>Piece-rate incentive scheme € 0.5 per correct answer</p> <p>(5 minutes)</p>	<p>Option 1</p> <p>Random Pay incentive scheme</p> <p>A participant earns € 1 per correct problem with a 50% chance</p>	

Chart of the Experiment: Replication Condition

Step 1	Step 2	Step 3	Step 4
<p>Practice Round</p>	<p>Elicitation of subjects' productivity</p>	<p>Choice of payment scheme for the subsequent 5 minutes performance</p>	
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Replication Condition Results

**Piece-rate baseline
performance**

Replication Condition: Ability difference?

Piece-rate baseline performance (in average number of correct answers)

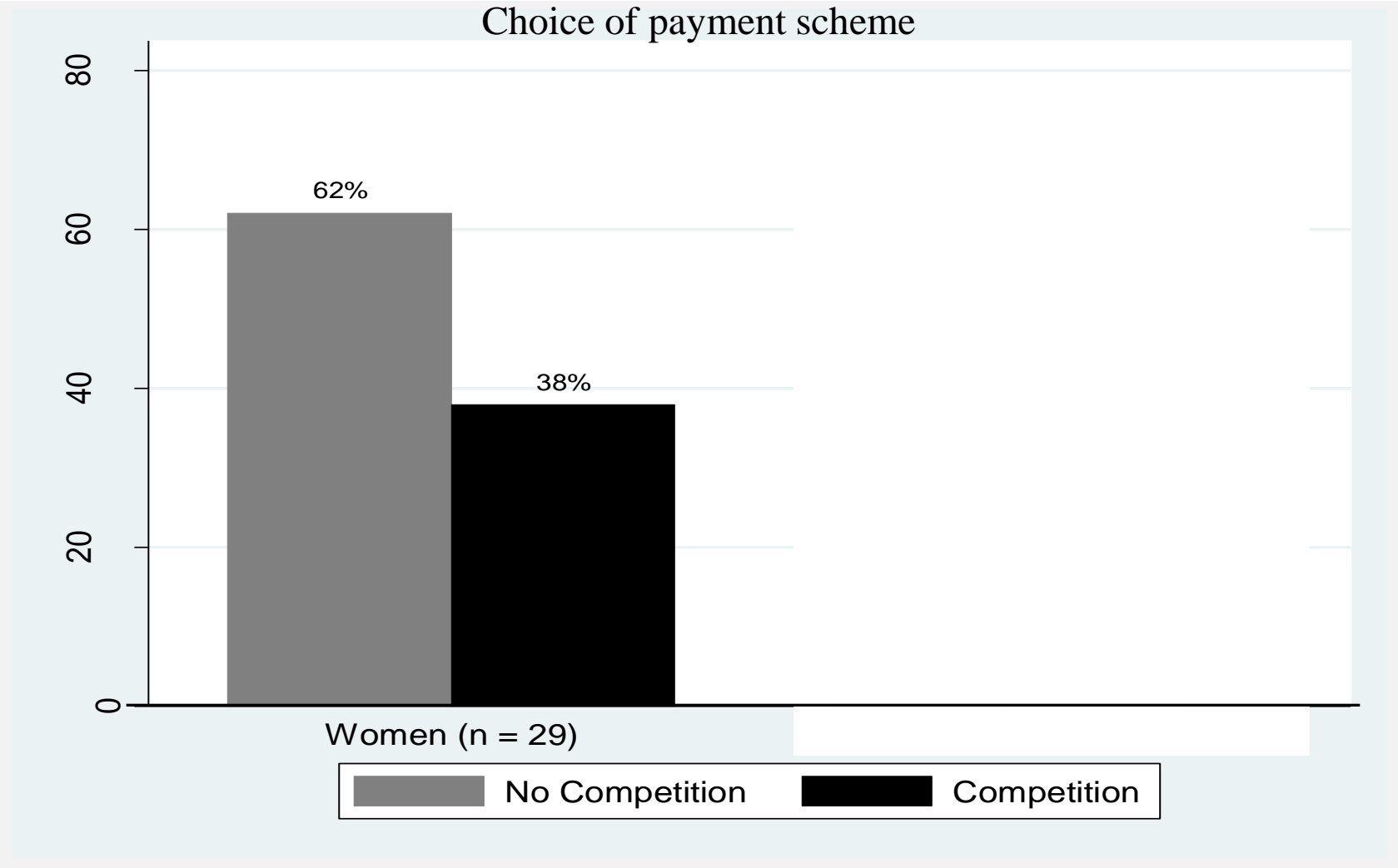
MEN	WOMEN	MW test
10.31	10.28	$p = 0.919$

Note: MW test stands for Mann-Whitney test

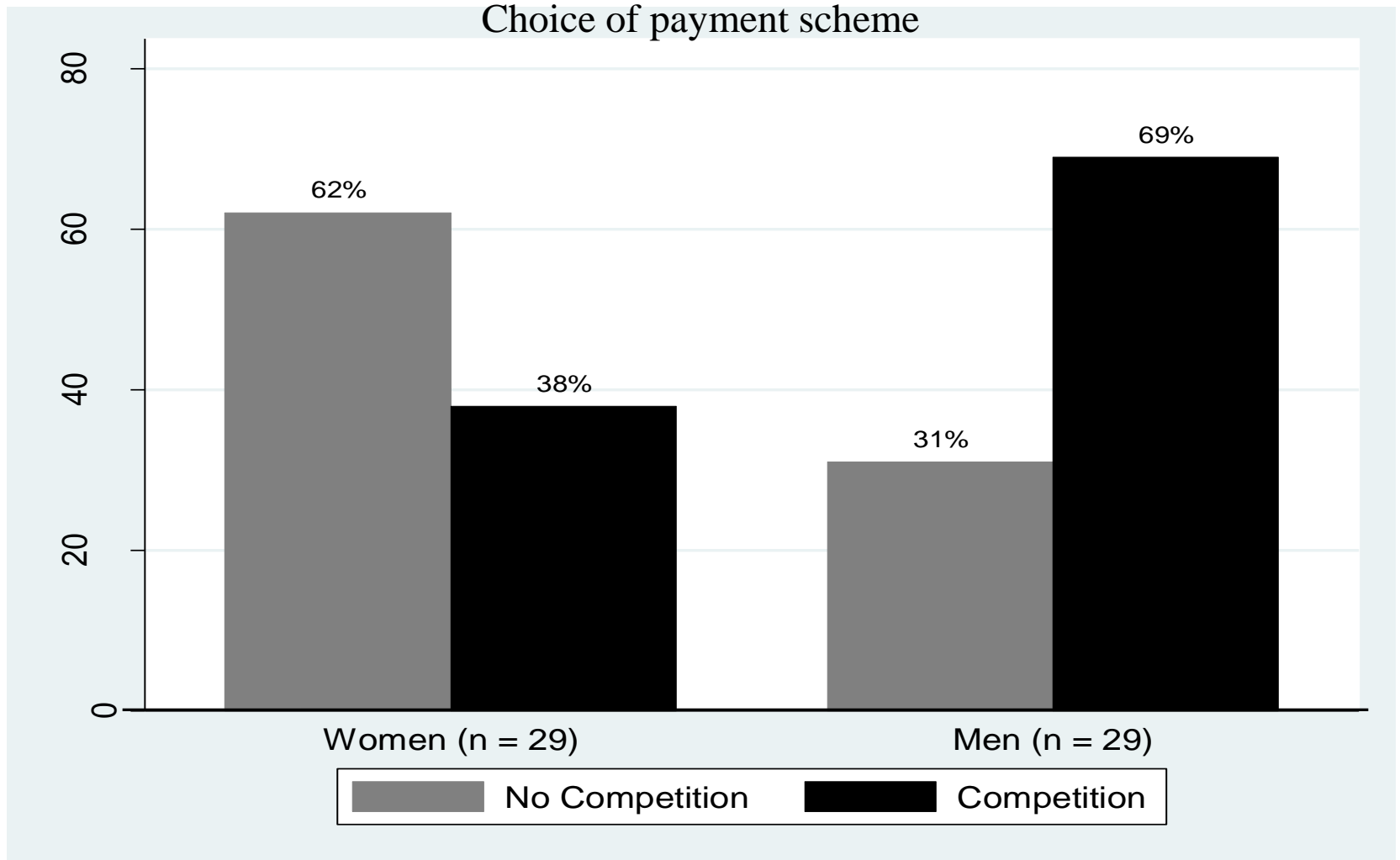
Replication Condition Results

Choice of payment scheme

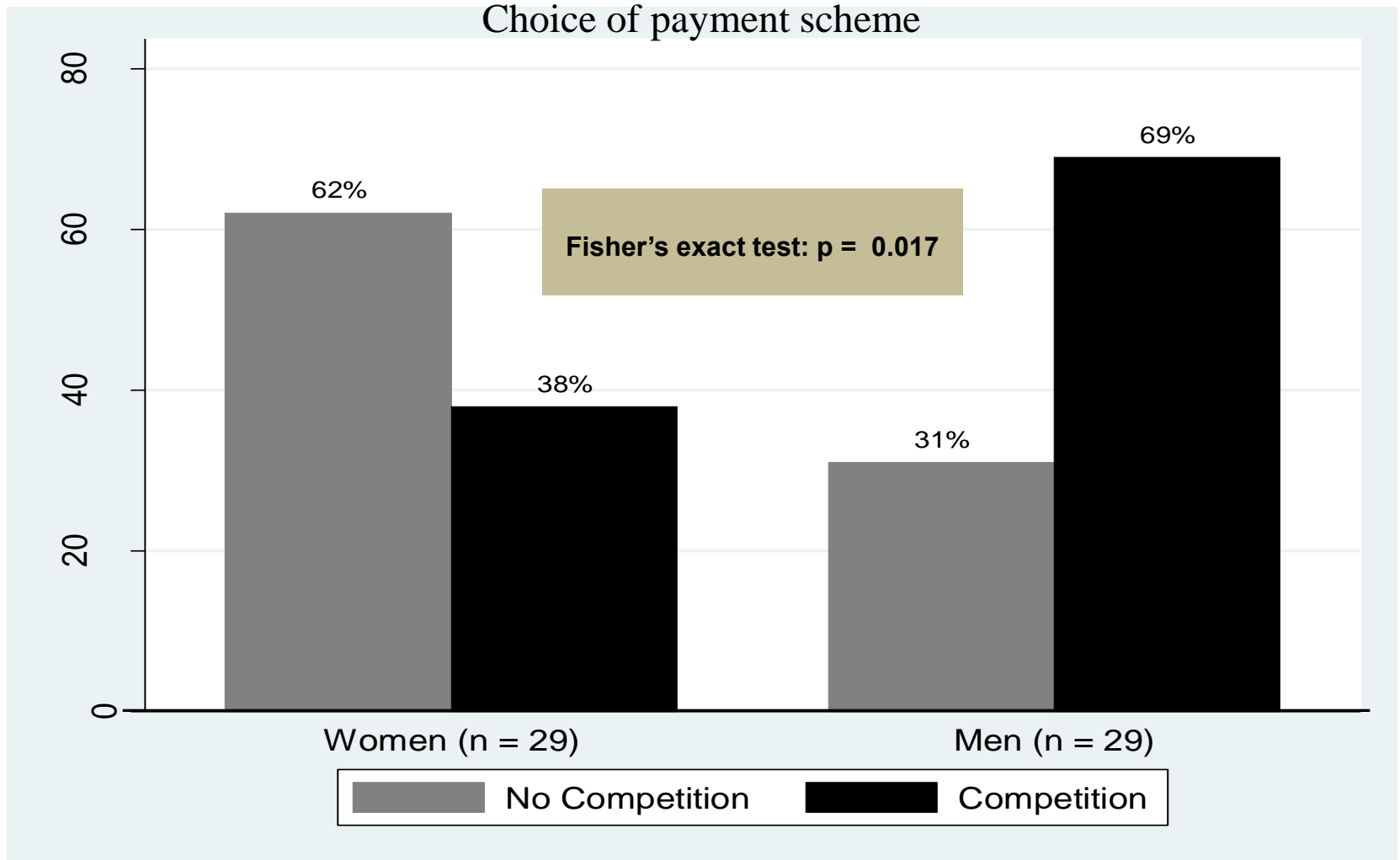
Replication Condition Results: 38 percent of women choose competition



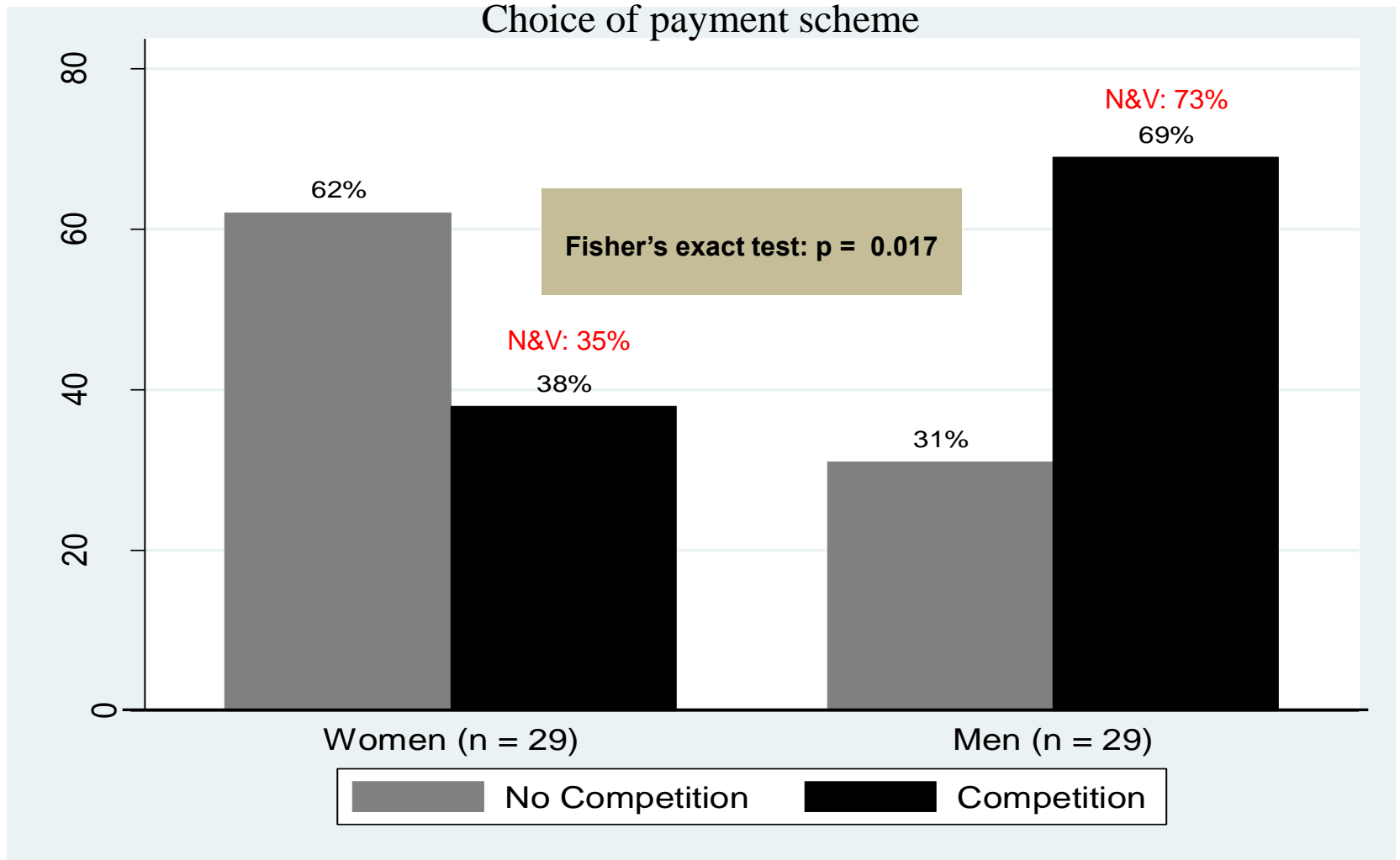
Replication Condition: 69 percent of men choose competition



Replication Condition: This observed gender gap in competition entry is both substantial and significant



Replication Condition: This observed gender gap in competition entry is both substantial and significant



Choice of Sex Condition

Experimental Design

Chart of the Experiment: Choice of Sex Condition

Step 1	Step 2	Step 3	Step 4
<p>Practice Round</p>	<p>Elicitation of subjects' productivity</p>	<p>Choice of payment scheme for the subsequent 5 minutes performance</p>	<p>Performance under the chosen payment scheme</p> <p>(5 minutes)</p>
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Chart of the Experiment: Choice of Sex Condition

Step 1	Step 2	Step 3	Step 4
<p>Practice Round</p>	<p>Elicitation of subjects' productivity</p>	<p>Choice of payment scheme for the subsequent 5 minutes performance</p>	<p>Performance under the chosen payment scheme</p> <p>(5 minutes)</p>
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		<p>Option 2</p> <p>Winner-take-all tournament against a man</p> <p>Pairwise competition against a randomly chosen man who <i>also</i> selects to <i>compete</i>.</p>	

Chart of the Experiment: Choice of Sex Condition

Step 1	Step 2	Step 3	Step 4
<p>Practice Round</p>	<p>Elicitation of subjects' productivity</p>	<p>Choice of payment scheme for the subsequent 5 minutes performance</p>	
<p>Work task: Calculate as many addition problems as possible (Niederle and Vesterlund, 2007)</p> <p>No payment</p> <p>(2 minutes)</p>	<p>Piece-rate incentive scheme: € 0.5 per correct answer</p> <p>(5 minutes)</p>	<p>Option 1</p> <p>Random Pay incentive scheme</p> <hr/> <p>Option 2</p> <p>Winner-take-all tournament against a man</p> <p>Pairwise competition against a randomly chosen man who <i>also</i> selects to <i>compete</i>.</p> <hr/> <p>Option 3</p> <p>Winner-take-all tournament against a woman</p> <p>Pairwise competition against a randomly chosen woman who <i>also</i> selects to <i>compete</i>.</p>	<p>Performance under the chosen payment scheme</p> <p>(5 minutes)</p>

Choice of Sex Condition Results

**Piece-rate baseline
performance**

Choice of Sex Condition: Ability difference?

Piece-rate baseline performance (in average number of correct answers)

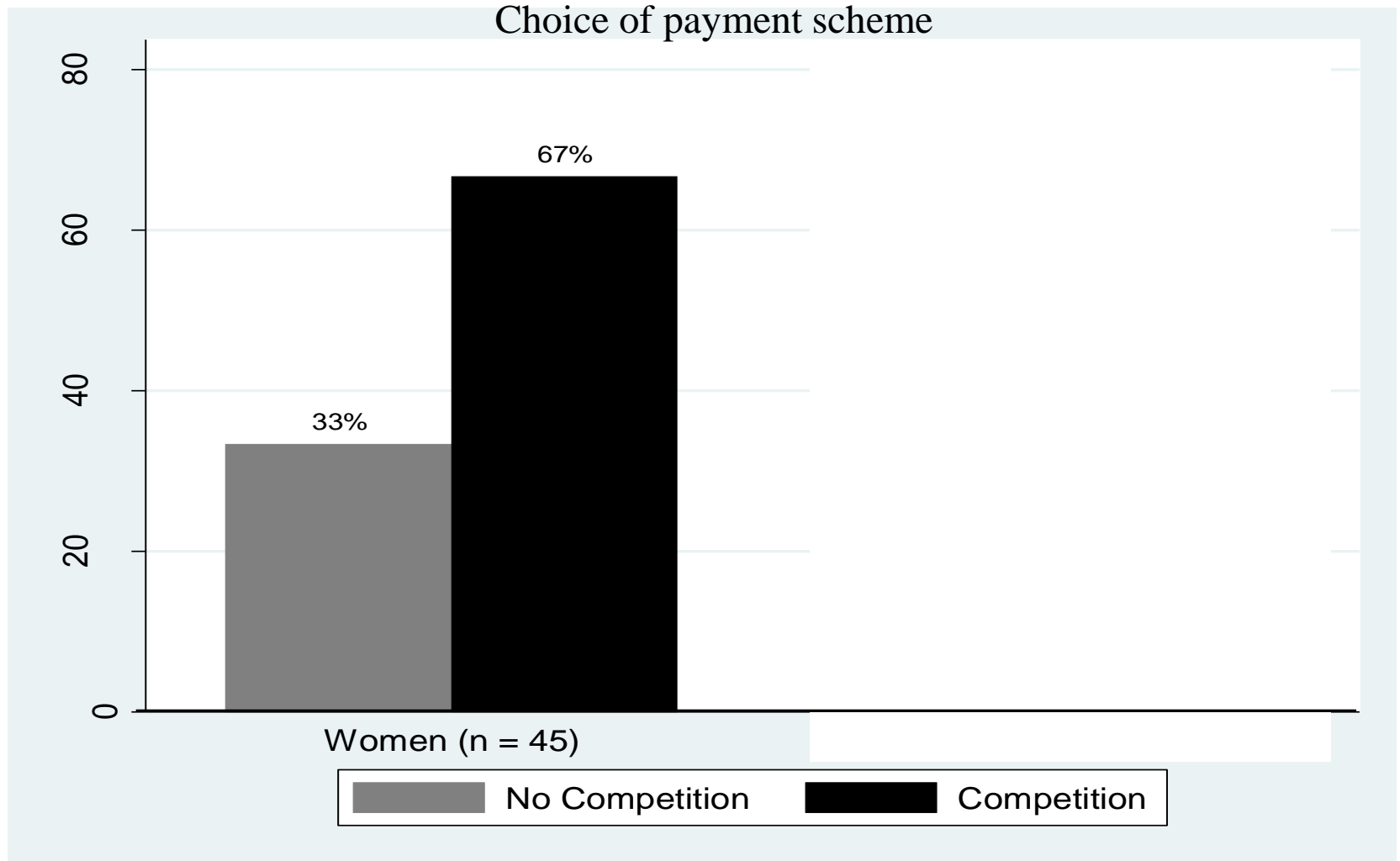
MEN	WOMEN	MW test
10.29	10.38	$p = 0.418$

Note: MW test stands for Mann-Whitney test

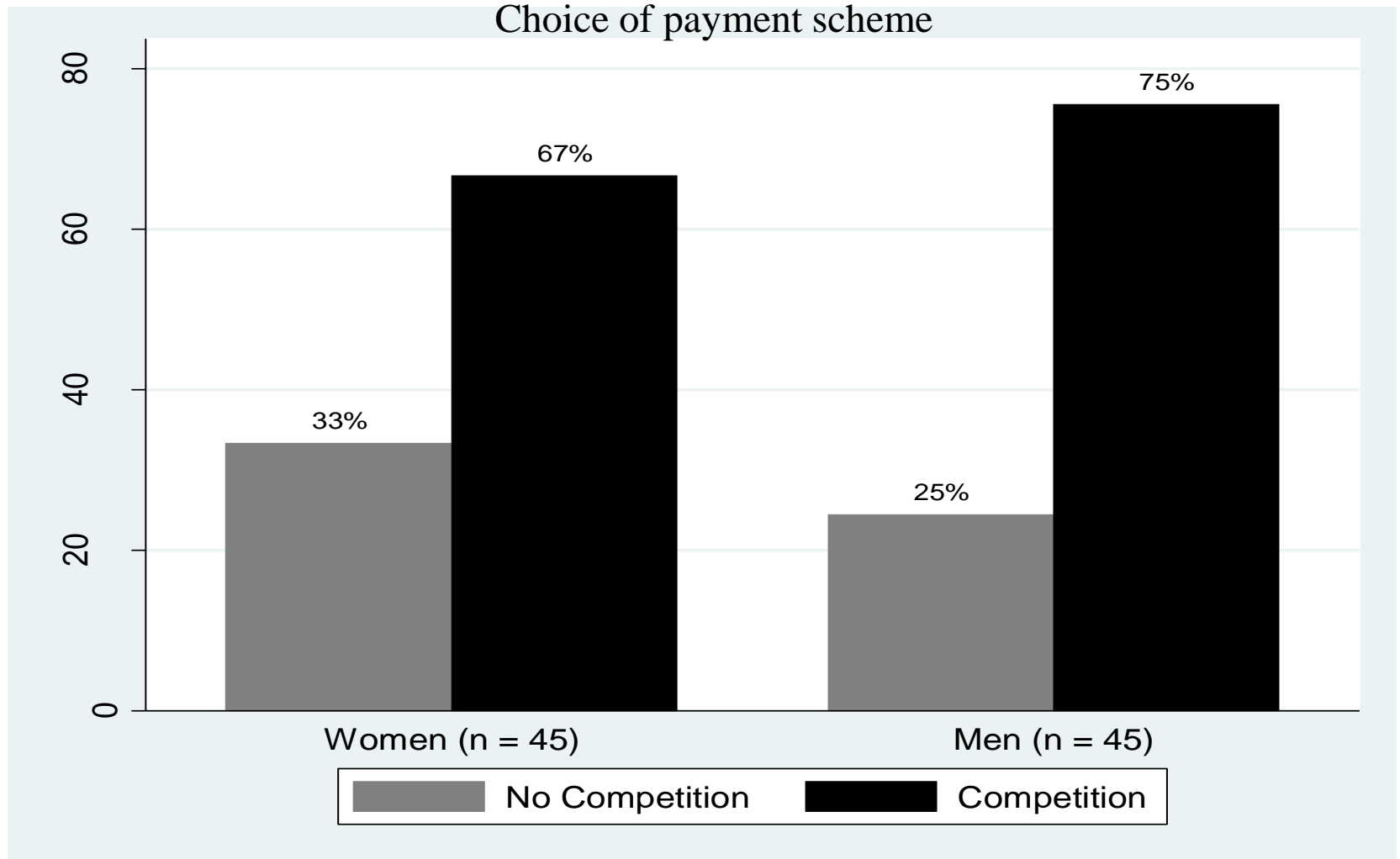
Choice of Sex Condition Results

Choice of payment scheme

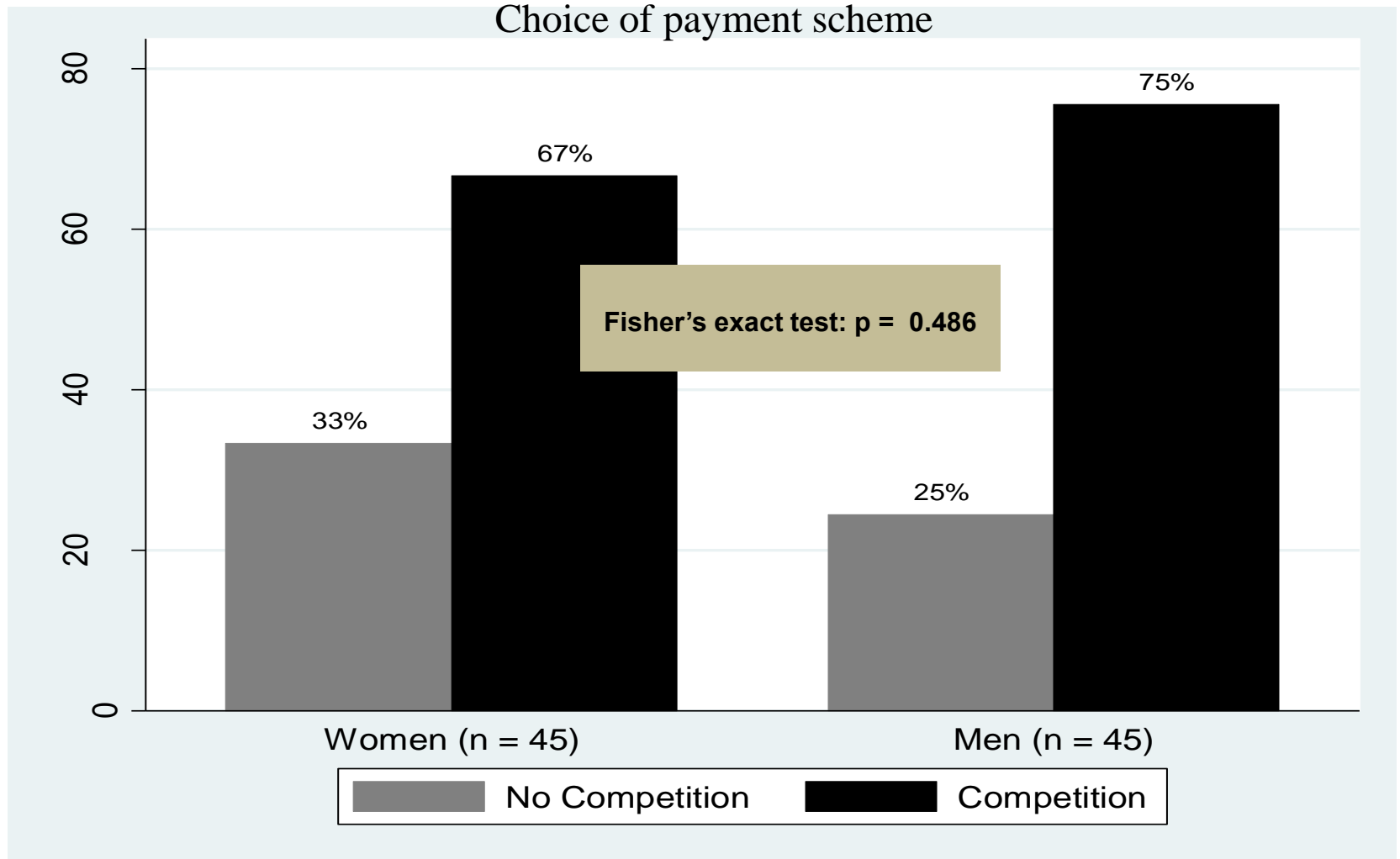
Choice of Sex Condition Results: 67 percent of women choose competition



Choice of Sex Condition Results: 75 percent of men choose competition



Choice of Sex Condition Results: men and women competition entry is not significantly different



In a nutshell

- When given the possibility to choose the sex of the competitor, men and women similarly self-select into a competitive environment
- The narrowing of the gender gap in competition entry is due to a significant increase of women who choose to compete:

	Replication Condition	Choice of Sex Condition	Fisher's exact test
WOMEN	38%	67%	0.014

In a nutshell

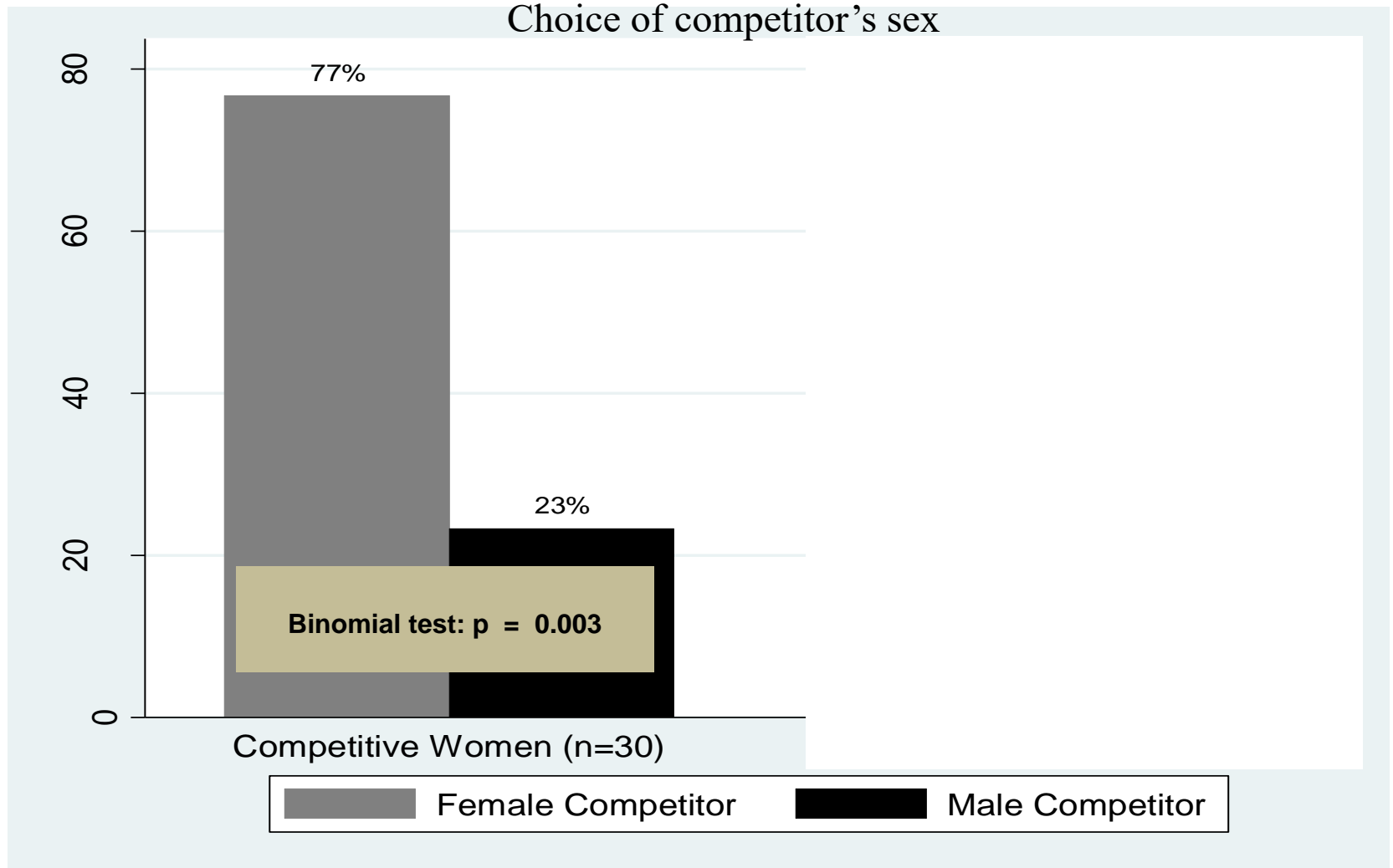
- When given the possibility to choose the sex of the competitor, men and women similarly self-select into a competitive environment
- The narrowing of the gender gap in competition entry is due to a significant increase of women who choose to compete:

	Replication Condition	Choice of Sex Condition	Fisher's exact test
WOMEN	38%	67%	0.014
MEN	69%	75%	0.597

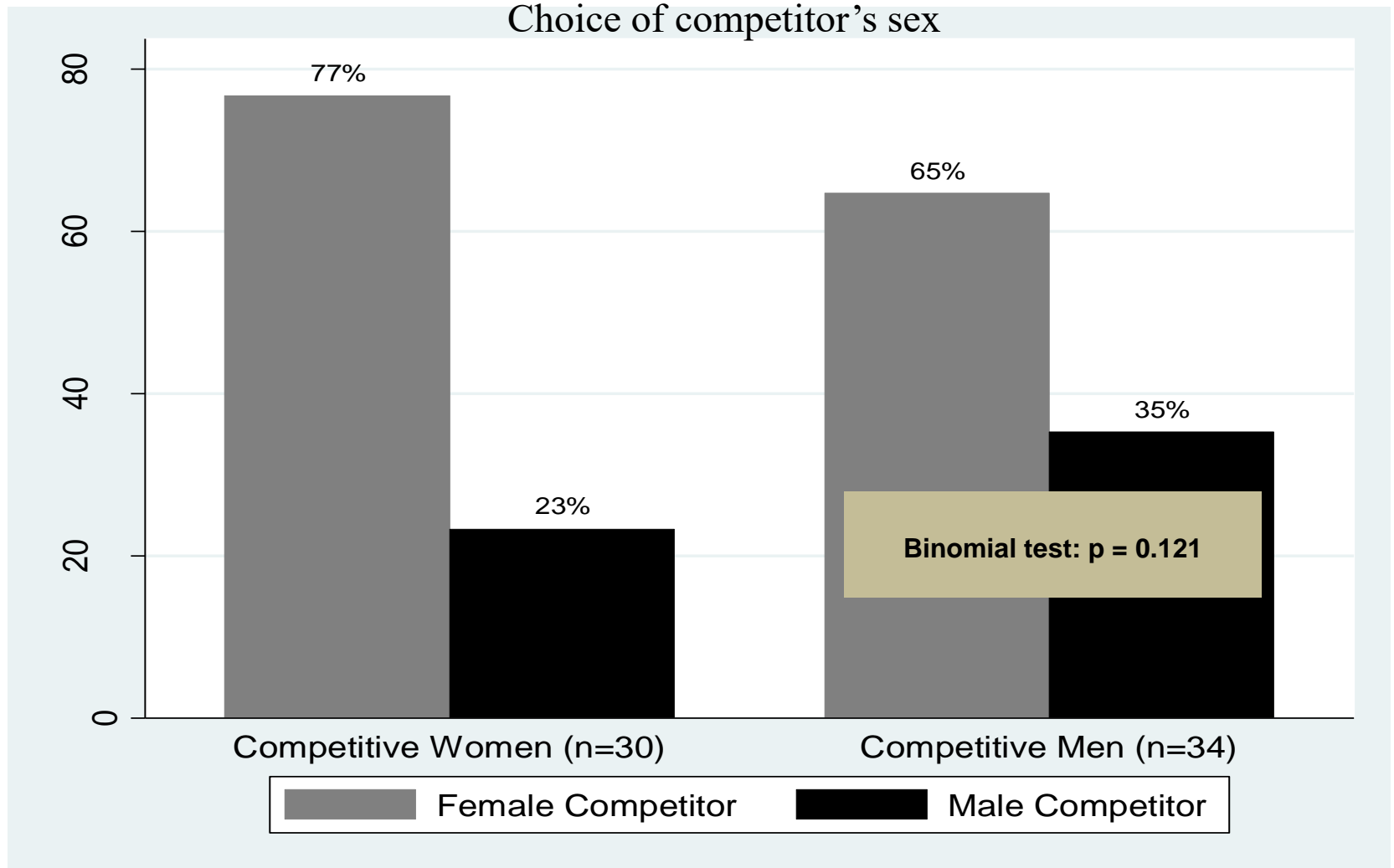
Choice of Sex Condition Results

**Choice of the
competitor's sex**

Choice of Sex Condition Results: Women choose significantly more a female competitor



Choice of Sex Condition Results: Men also choose more a female competitor, but this inclination is not significant



A further condition

- These results are consistent with the hypothesis that the sex of potential competitors importantly affects women's decision to enter into competition
- A further condition...

All Women Condition

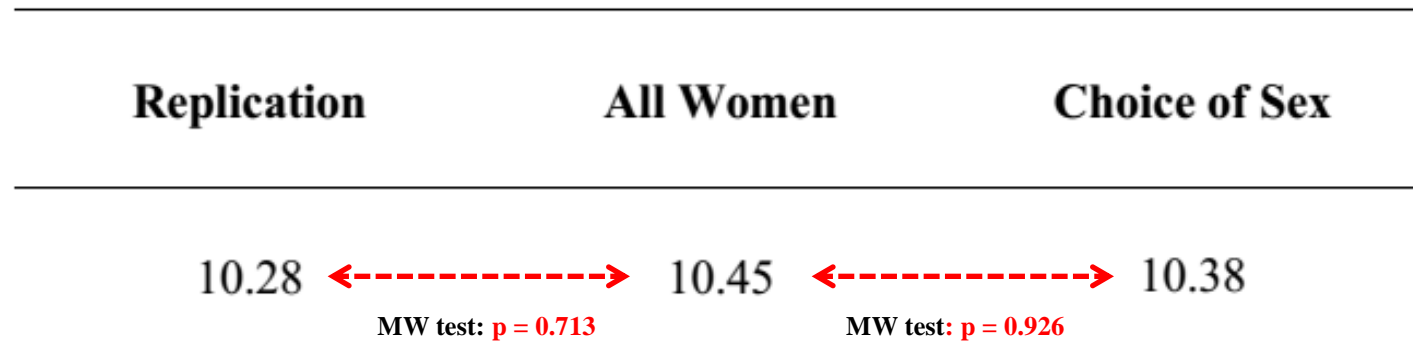
- Same design of the replication condition (2 payment alternatives)
- *Only women* participate

All Women Condition Results

**Piece-rate baseline
performance**

All Women Condition: Ability difference?

Women's piece-rate baseline performance across conditions (in average number of correct answers)

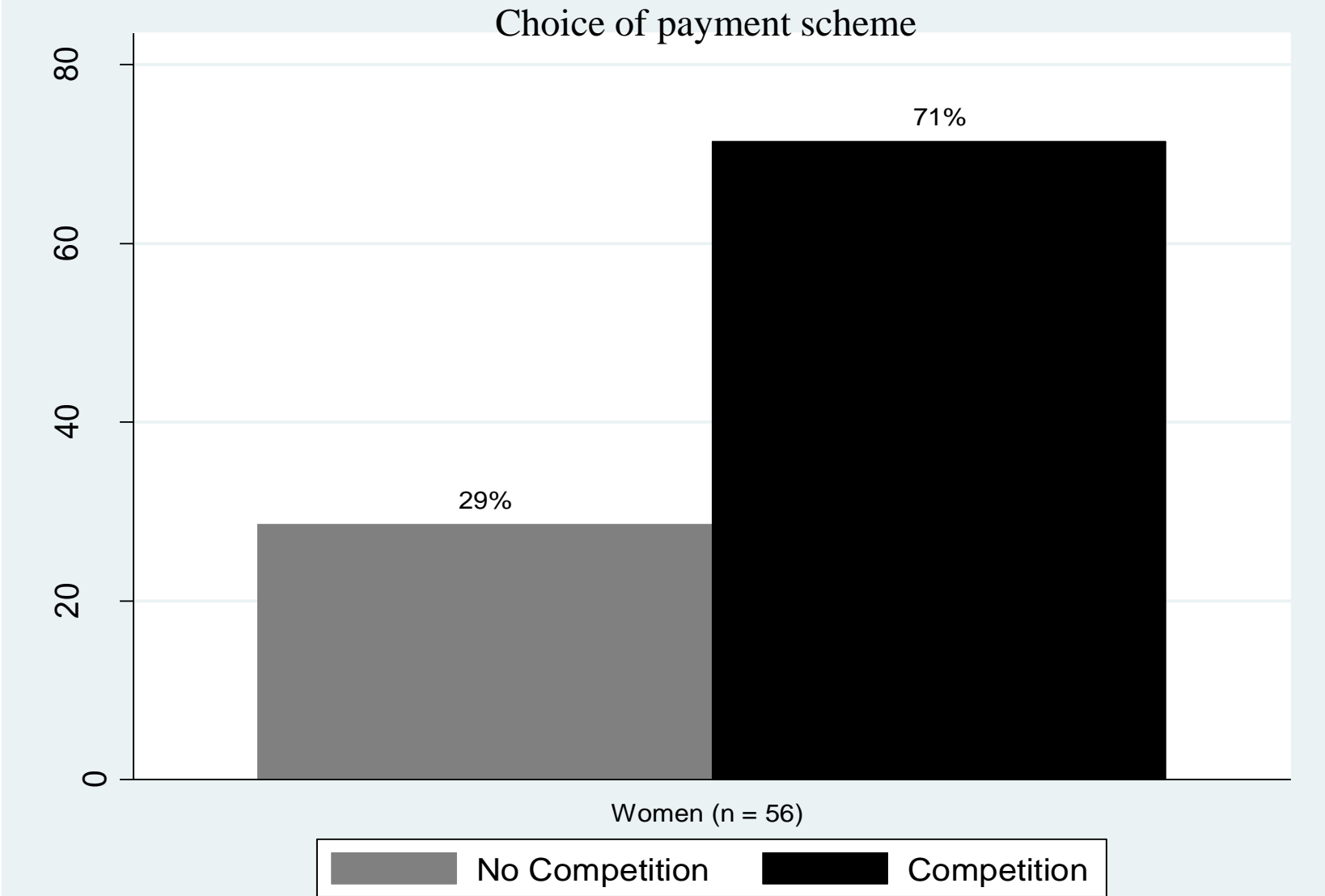


Note: MW test stands for Mann-Whitney test

All Women Condition Results

Choice of payment scheme

All Women Condition Results: 71 percent of women choose competition



DISCUSSION

- Is there evidence to establish a connection between the stereotype that men are better at mathematics and women's choice of payment scheme?

Preference-based connection: Stereotype Threat
“shapes” women's preference to compete

and/or

Confidence level connection: Negative self-stereotyping
bias women's confidence level to compete

DISCUSSION

Stereotype-based beliefs

Stereotype-based beliefs: Elicitation

Step 1	Step 2	Step 3	Step 4
<p>Practice Round</p>	<p>Elicitation of subjects' productivity</p>	<p>Choice of payment scheme for the subsequent 5 minutes performance</p>	<p>Performance under the chosen payment scheme</p> <p>(5 minutes)</p>
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Note: Elicitation is monetarily incentivized

Stereotype-based beliefs: Results

Participants' estimate of the gender gap in performance (in number of correct answers)

	Replication	Choice of Sex	All Women
Men	1.1***	0.8***	n.a.
Women	2.1***	1.7***	1.6***

Note: *** significant at 1% refers to Wilcoxon signed-rank tests.

→ Accommodates a preference-based explanation grounded on Stereotype Threat. Yet...

DISCUSSION

- Is there evidence to establish a connection between the stereotype that men are better at mathematics and the choice of payment scheme?

Preference-based connection: Stereotype Threat
“shapes” women’s preference to compete

and/or

Confidence level connection: negative self stereotyping
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DISCUSSION

Winning beliefs

Winning beliefs: Elicitation

Step 1	Step 2	Step 3	Step 4
<p>Practice Round</p>	<p>Elicitation of subjects' productivity</p>	<p>Choice of payment scheme for the subsequent 5 minutes performance</p>	
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Note: Elicitation is monetarily incentivized

Winning beliefs: Results

Winning beliefs (in average percentage)

	Replication	Choice of Sex	All Women
Men	44.5%	44%	n.a.
Women	41.5%	44.9%	44.6%

- Confidence level is not significantly different between the sexes nor across conditions (Mann-Whitney test, $p > 0.264$ for any of the comparisons)

Winning beliefs: Results

Probit models of payment choice

Dependent variable: 1 if payment choice is a winner-take-all tournament

	Panel A			Panel B		
	Replication (1)	Choice of Sex (2)	All Women (3)	Replication (4)	Choice of Sex (5)	All Women (6)
<i>1 if female</i>	-0.32*** [0.123]	-0.11 [0.089]	n.a.	-0.28*** [0.106]	-0.11 [0.084]	n.a.
<i>Baseline performance</i>	0.05*** [0.016]	0.04*** [0.010]	0.04*** [0.010]	0.03* [0.017]	0.02* [0.012]	0.02 [0.013]
<i>Risk score</i>	-0.007 [0.028]	0.016 [0.017]	0.022 [0.025]	-0.004 [0.023]	0.017 [0.017]	0.024 [0.023]
<i>Winning belief</i>				0.009*** [0.002]	0.006*** [0.002]	0.005** [0.002]
Observations	58	90	56	58	90	56
Pseudo R ²	0.169	0.120	0.133	0.388	0.197	0.190

Note: The table reports marginal effects. Robust standard errors in brackets. ***, ** and * significant at 1%, 5% and 10%, respectively.

DISCUSSION

Belief in the sex of potential competitors

Belief in the sex of potential competitors

- Participants are not informed about the gender composition in the lab before the choice of payment scheme, but...
- A participant's belief in the sex of potential competitors depends upon how a participant:
 - i. Perceives the gender composition of participants present in the lab**
 - ii. Belief in the likelihood of each sex to enter into competition**

Belief in the sex of potential competitors

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- A participant's belief in the sex of potential competitors depends upon how a participant:
 - i. Perceives the gender composition of participants present in the lab**
 - **Almost every woman correctly perceive the actual gender composition**
 - ii. Belief in the likelihood of each sex to enter into competition**

Belief in the sex of potential competitors

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 - i. **Perceives the gender composition of participants present in the lab**
 - Almost every woman correctly perceive the actual gender composition
 - ii. **Belief in the likelihood of each sex to enter into competition**

Belief in the sex of potential competitors: Elicitation ii.

Step 1	Step 2	Step 3	Step 4
<p>Practice Round</p>	<p>Elicitation of subjects' productivity</p>	<p>Choice of payment scheme for the subsequent 5 minutes performance</p>	<p>Performance under the chosen payment scheme</p> <p>(5 minutes)</p>
<p>Work task: Calculate as many addition problems as possible (Niederle and Vesterlund, 2007)</p> <p>No payment</p> <p>(2 minutes)</p>	<p>Piece-rate incentive scheme: € 0.5 per correct answer</p> <p>(5 minutes)</p>	<p>Option 1</p> <p>Random Pay incentive scheme</p> <p>A participant earns € 1 per correct problem with a 50% chance</p>	
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Note: Elicitation is monetarily incentivized

Belief in the sex of potential competitors: Results ii.

Women's belief in the likelihood of each sex to enter into competition (in percentage)

	Replication	Choice of Sex	All Women
Probability men enter	70.6%	72%	n.a.
Probability women enter	51.5%	64.4%	65.4%

Belief in the sex of potential competitors: Results ii.

Women's belief in the likelihood of each sex to enter into competition (in percentage)

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Probability men enter	70.6%	72%	n.a.
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Belief in the sex of potential competitors: Results ii.

Women's belief in the likelihood of each sex to enter into competition (in percentage)

	Replication	Choice of Sex	All Women
Probability men enter	70.6%	72%	n.a.
Probability women enter	51.5%	64.4%	65.4%

➔ In the replication condition, in which women cannot avoid the possibility of a mixed-sex competition in case they compete, women's belief in other women's willingness to compete is significantly lower (MW test, $p < 0.01$ for the two comparisons)

Belief in the sex of potential competitors: Results ii.

Probit models of payment choice (only women)

Dependent variable: 1 if payment choice is a winner-take-all tournament

	Replication (1)	Choice of sex (2)
<i>Baseline performance</i>	0.03 [0.040]	0.02 [0.021]
<i>Risk score</i>	-0.02 [0.043]	0.01 [0.026]
<i>Winning belief</i>	0.010*** [0.002]	0.005** [0.002]
<i>Belief percentage men among competitors</i>	-0.024** [0.012]	-0.014 [0.009]
Observations	29	45
Pseudo R ²	0.468	0.191

Note: The table reports marginal effects. Robust standard errors in brackets. *** and ** significant at 1% and 5%, respectively.

Belief in the sex of potential competitors: Results ii.

Probit models of payment choice (only women)

Dependent variable: 1 if payment choice is a winner-take-all tournament

	Panel A			Panel B		
	Replication (1)	Choice of Sex (2)	All Women (3)	Replication (4)	Choice of Sex (5)	All Women (6)
<i>Baseline performance</i>	0.03 [0.033]	0.03 [0.021]	0.02 [0.013]	0.03 [0.038]	0.03 [0.016]	0.01 [0.011]
<i>Risk score</i>	0.01 [0.035]	0.01 [0.026]	0.02 [0.023]	-0.01 [0.041]	-0.03 [0.025]	0.01 [0.024]
<i>Winning belief</i>	0.010*** [0.002]	0.005** [0.003]	0.005** [0.002]	0.010*** [0.002]	0.005** [0.002]	0.005** [0.002]
<i>Belief probability men enter</i>				-0.008 [0.007]	0.005 [0.004]	n.a.
<i>Belief probability women enter</i>				0.011** [0.005]	0.014*** [0.003]	0.010*** [0.003]
Observations	29	45	56	29	45	56
Pseudo R ²	0.340	0.166	0.190	0.492	0.366	0.322

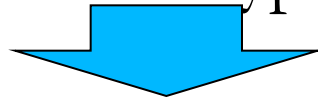
Note: The table reports marginal effects. Robust standard errors in brackets. *** and ** significant at 1% and 5%, respectively.

Conclusions: Behaviour

- Women are not less competitive than men
- Women “just” dislike competing against men
- **Importantly, in each condition, the more women believe other women compete, the more likely they are to enter into competition**

Conclusions: Policy implications

- **Affirmative Action policy** (e.g., Balafoutas and Sutter, *Science* 2012; Niederle et al., *Management Science* 2013)
 - Quotas or a head start for women boosts women's competition entry...**but also significantly decrease men's competition entry.**
- My study suggests an alternative, and likely less controversial, course of action to encourage women to enter into competitive male-typed domains



Highlight women who do enter or seek to enter into these domains, rather than highlighting women's underrepresentation (e.g., Academic Economics Job Market)

THANK YOU!

Conclusions: Words of caution

- This study only considers the supply-side...
- Analysis and discussion was directed to understand how to promote women to compete more in a mixed-sex context. However, there are circumstances in which encouraging competitive behavior might not be desirable (e.g., joint work in mixed-sex teams)
- From this perspective, the results indicate that the relevant question to be studied would be how to promote men to compete less rather than women to compete more...

Belief in the sex of potential competitors: Elicitation i.

Step 1	Step 2	Step 3	Step 4
<p>Practice Round</p>	<p>Elicitation of subjects' productivity</p>	<p>Choice of payment scheme for the subsequent 5 minutes performance</p>	<p>Performance under the chosen payment scheme</p> <p>(5 minutes)</p>
<p>Work task: Calculate as many addition problems as possible (Niederle and Vesterlund, 2007)</p> <p>No payment</p> <p>(2 minutes)</p>	<p>Piece-rate incentive scheme: € 0.5 per correct answer</p> <p>(5 minutes)</p>	<p>Option 1</p> <p>Random Pay incentive scheme</p> <p>A participant earns € 1 per correct problem with a 50% chance</p>	
		<p>Option 2</p> <p>Winner-take-all tournament</p> <p>Pairwise competition against a randomly chosen participant who <i>also</i> selects to <u>compete</u>. Winner earns € 1 per correct problem</p>	

Belief in the sex of potential competitors: Elicitation i.

How do you perceive the gender composition of participants in this experimental session? Please choose the option that better describes your perception:

- I did not notice the gender composition of participants
- Only female participants
- Mainly female participants
- Balanced composition
- Mainly male participants
- Only male participants

Note: Elicitation is NOT monetarily incentivized

Belief in the sex of potential competitors: Results i.

Unawareness of the gender composition

(in percentage)

	Replication	Choice of Sex	All Women
Men	45%	53%	n.a.
Women	14%	13%	16%

Note: The percentage refers to the men (women) who chose the alternative “I did not notice the gender composition of participants in this experimental session”.

- ➔ The overwhelmingly majority of women report that they did notice the gender composition, whereas for men this aspect has not distinctively attracted their attention

Belief in the sex of potential competitors: Results i.

Women's perception of the gender composition (in percentage)

	Only female	Mainly female	Balanced composition	Mainly male	Only male
Replication	0%	4%	88%	8%	0%
Choice of Sex	0%	8%	90%	2%	0%
All Women	87%	11%	0%	2%	0%

➔ Almost every woman correctly perceives the actual gender composition of participants present in the lab