Gender differences in the effect of subjective feedback (and competition)

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Agenda

- Pilot experiment
  - The effect of subjective feedback on performance
  - Summary of the results and project status
- Next experiment(s):
  - Interaction of competitive environment and subjective feedback
  - Topic, design, main questions

Motivation: Gender, non-cognitive traits, and institutional environment

- **Gender differences in *non-cognitive traits*** – may affect labor market outcomes
  - Attitudes towards competition and risk aversion, altruism, cooperation, self-confidence *(Eckel and Grossman 2008, Croson and Gneezy 2009, Niederle 2016)*

- Elements of the ***institutional design may favor certain traits*** ➔ gender gaps in performance

- „**Fix institutions**" *(Niederle 2016):* adjust institutional design so it does not favor psychological traits that are unequally distributed by gender

➔ Achieve outcomes that more closely reflect underlying preferences and abilities

Motivation: Gender, non-cognitive traits, and institutional environment

- Previous economic studies: **objective performance feedback can decrease gender gaps** in the choice to compete and performance in competitive setting (*Bandiera et al 2012, Azmat & Iriberri 2010, Hannan et al 2008*)

- Psychology literature: subjective feedback impacts motivation and performance, effects differ by personality and gender
- HR management & education: encouragement key element

- Our experiments: the role of the subjective **content of supervisory communication**
  - Positive subjective content (pilot): praise and encouragement
  - Competitive elements (relative performance feedback, performance-dependent stakes, publicity) & subjective feedback

Pilot experiment: the effect of subjective feedback

- Is the subjective content of feedback an institutional element that may contribute to gender gaps in performance?
- Is task-related confidence the mediator of any difference in the effect?
  - Differences in response by confidence & differences in confidence by gender
- How do encouragement and praise differ in effect?
  - Praise: performance-dependent
  - Encouragement: performance-independent, effort-dependent

➔ Online game with randomized treatment:

- No subjective feedback (control)
- Receives subjective feedback (treatment)

Contribution

- Subjective feedback content not previously studied as source of gender differences in the labor market
- Praise, encouragement, and objective feedback not studied in relation

- Online game - sort of „Lab in the field" *(Gneezy et al 2017)*
  - Laboratory method – experimental control
  - Naturalistic setting – play in own home, but not in job setting
    - Real life behavior when facing a new challenging task – important determinant of educational and labor market outcomes *(Lloyd et al. 2005, Dweck 2006)*
  - Relevant population – young educated adults, early labor market

- Results quantify real-life differences in behavior that have a significant impact on performance

➔ More individualized subjective content in supervisory communication can improve the performance of those with low confidence, and decrease gender differences in performance

Theoretical framework: Individual performance in a task

Performance: determined by *effort* (E) and *productivity* (MP)

1. Effort: decision of individual – utility maximization
   - Depends on expected net benefits
     - Performance-independent: time, effort, joy from playing, learning
     - Performance-dependent: sense of achievement, any rewards, increased confidence, public pride
   - Preferences: vary by individual, may differ by personality/gender
   - Expected performance: info about game, previous experience, task-related confidence

➔ May be affected by subjective content, due to (a) direct utility *(Ariely 2016)* or (b) belief updating of performance expectations *(Möbius et al 2014)*

2. Productivity: not decision in the short-run
   - Depends on: ability, previous experience, environmental factors
   - Performance under stress (*Ariely 2009, Baumeister 1984, Azmat et al 2015*)

   ➔May be affected by subjective content, e.g. encoruagement sets players at ease so they focus/click better

Figure 1: Determinants of individual performance in a game

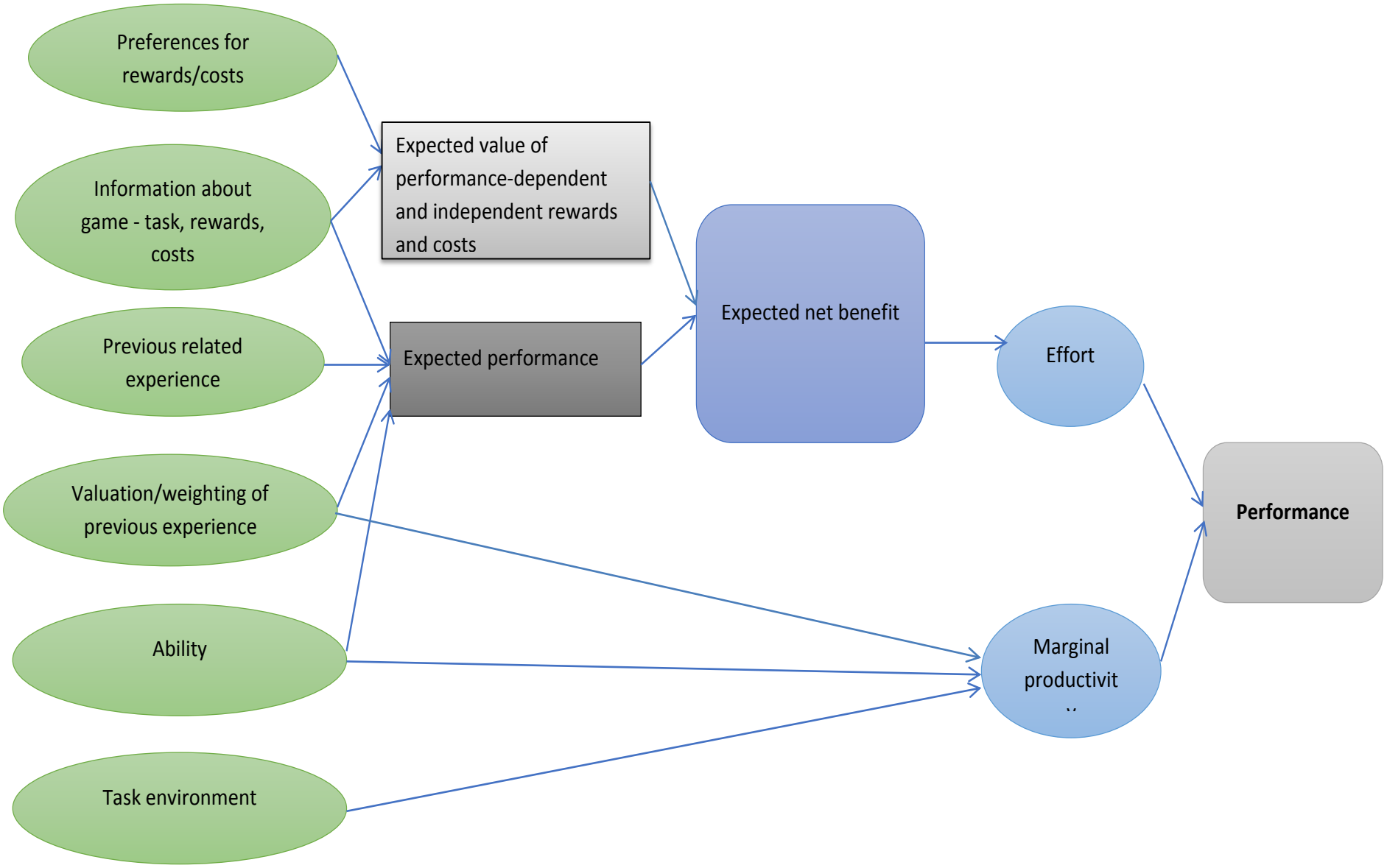
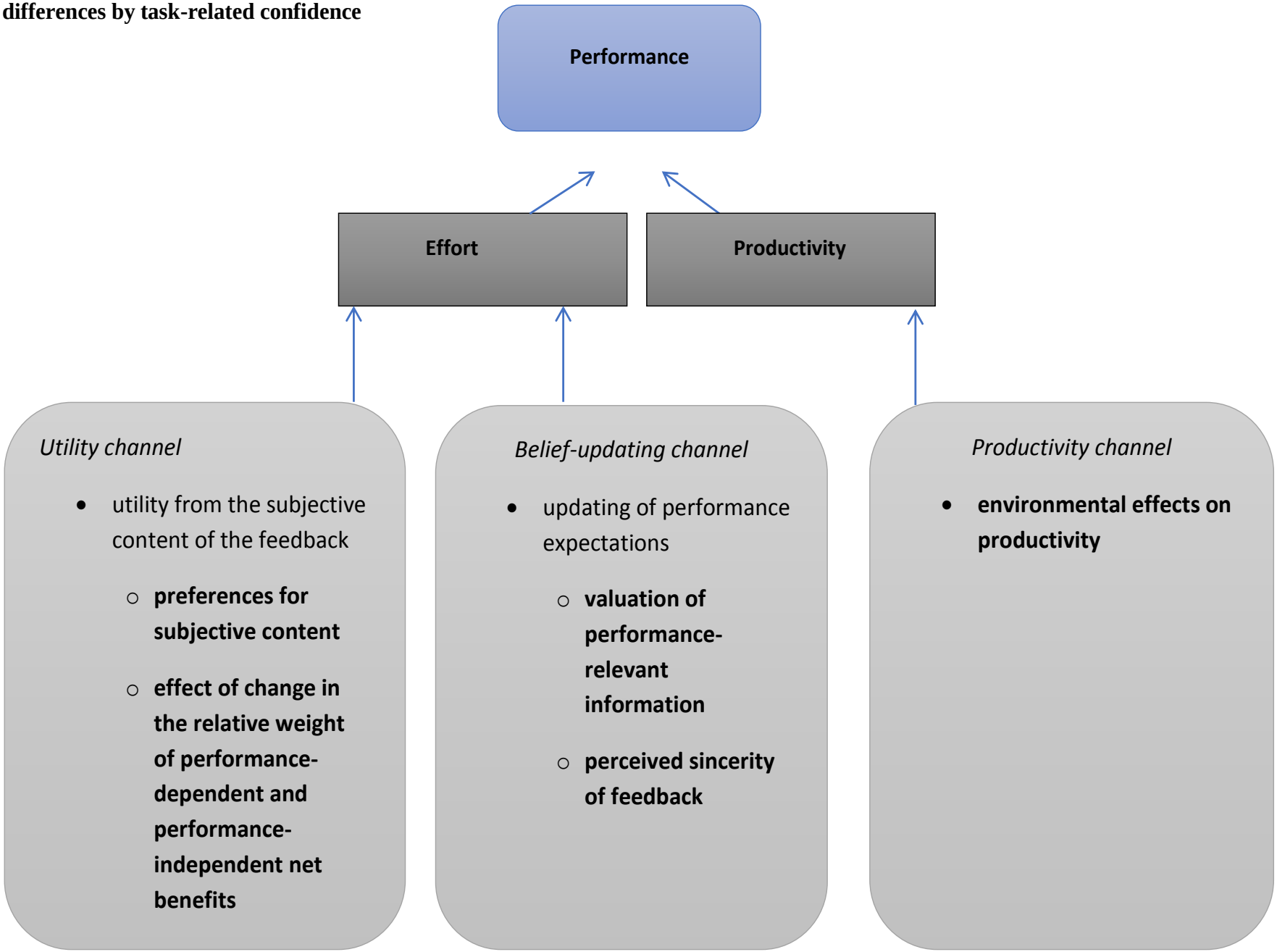


Figure 2: Channels through which supervisory feedback content affects performance, and sources of differences by task-related confidence



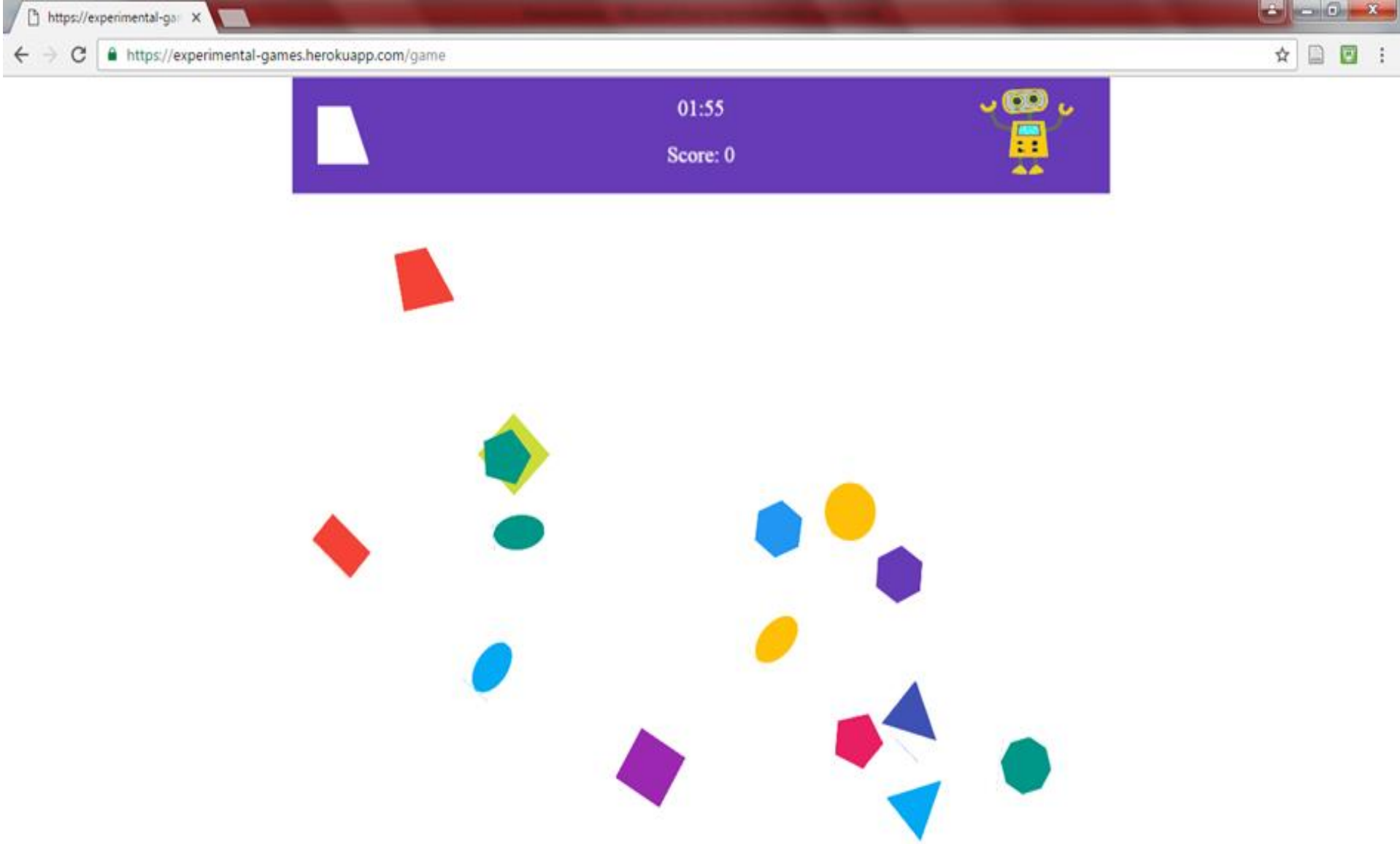
Hypotheses

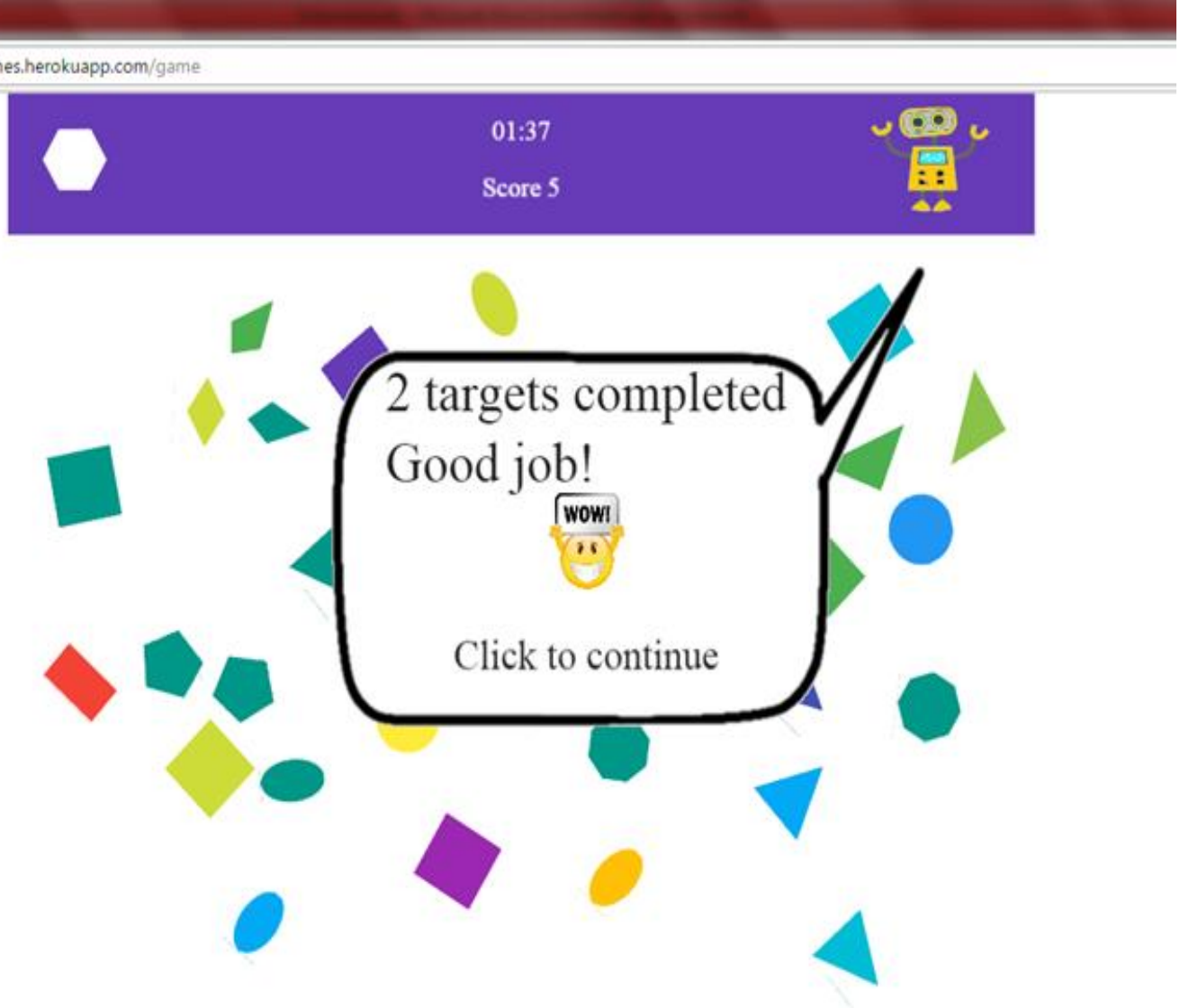
- Lower-confidence individuals respond more to subjective content
- The effect of praise is more strongly correlated with confidence compared to encouragement
- Effect of encouragement is more positive than praise among those with lower confidence

- Due to the lower confidence of women, SFB affects them more, and encouragement affects them more positively than praise

Methodology

- Online computer game, randomized treatment:
  - Control 1: Shapes completed (timing same as praise)
  - Control 2: Score (timing same as enc.)
  - Treatment 1: Shapes completed + Praise
  - Treatment 2: Score + Encouragement
- Treatment: simple text + emoticons in text boxes


https://experimental-ga
https://experimental-games.herokuapp.com/game
01:55
Score: 0


https://experimental-ga
https://experimental-games.herokuapp.com/game
01:37
Score 5
2 targets completed
Good job!
WOW!
Click to continue

Feedback Specifications

Control (Praise)	
Trigger	**text**
start screen	Are you ready? "Click"
after 2nd, 5th, 10th, 15th, 20th... shape change	"X targets conpleted"
END	Score: XX Play again!

Control (Encour.)	
Trigger	**text**
start screen	Are you ready? "Click"
30/60/90 seconds	Score: X
END	Score: XX Play again!

Praise		
Trigger	**Picture**	**text**
start screen	x	Are you ready? "Click"
after 2nd, 5th, 10th, 15th, 20th... shape change		"X targets completed" + 3 texts alternate: "Good job!" or "Well done!" or "You're great!"
END		Congratulations! Score: XX Play again!

Encouragement		
Trigger	**Picture**	**text**
start screen		Are you ready? "Good luck!" "Click"
30		Score: X + "You can do it!"
60		Score: X + "Keep it up!"
90		Score: X + "Almost there!"
END		Score: XX + Play again!

Data

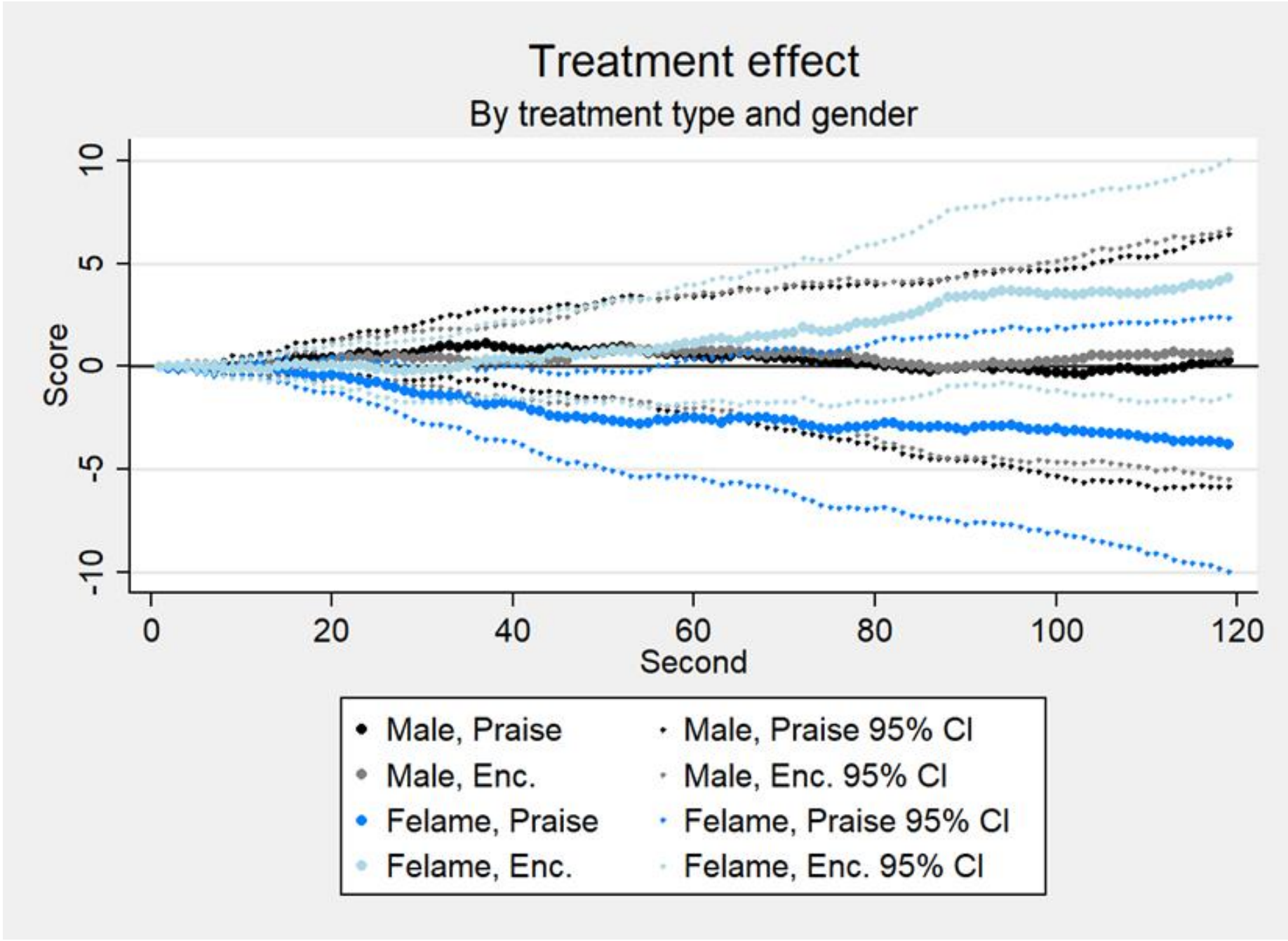
- **Outcome measures**
  - Performance (score)
  - Clicks/Accuracy

- **Explanatory variables**
  - Demographic: gender, age, country, education
  - Game-related: play often, touchscreen
  - Self-reported „confidence” measure
    - How good are you at games?
    - 5 categories, we use 3

- **Sample:**
  - collected via social media ads
  - Selection: voluntary participation

➔ **342 people, 602 game observations**

	Total				
	Total	Praise		Encouragement	
		Control	Treatment	Control	Treatment
N (individuals)	343	88	82	79	94
N (games)	602	170	142	131	159
Female	0.42	0.41	0.39	0.41	0.47
Age	30.29	31.56	30.13	29.94	29.55
Education: elementary	0.03	0.03	0.05	0.01	0.02
secondary	0.11	0.14	0.05	0.12	0.14
college or university	0.86	0.83	0.90	0.87	0.84
Plays games often	0.9	0.93	0.87	0.91	0.87
Touchscreen	0.31	0.32	0.30	0.30	0.31
Confidence	1.96	1.85	1.91	2.18	1.91
Females					
N (individuals)	144	36	32	32	44
N (games)	274	81	54	53	86
Age	30.38	30.19	31.19	30.94	29.52
Education:					
elementary	0.05	0.08	0.06	0.03	0.02
secondary	0.08	0.08	0.00	0.06	0.14
college or university	0.88	0.83	0.94	0.91	0.84
Plays games often	0.52	0.58	0.47	0.47	0.55
Touchscreen	0.32	0.42	0.25	0.31	0.30
Confidence	1.56	1.53	1.59	1.66	1.48
Males					
N (individuals)	199	52	50	47	50
N (games)	328	89	88	78	73
Age	30.24	32.50	29.46	29.26	29.58
Education:					
elementary	0.02	0.00	0.04	0.00	0.02
secondary	0.14	0.17	0.08	0.15	0.14
college or university	0.85	0.83	0.88	0.85	0.84
Plays games often	1.17	1.17	1.12	1.21	1.16
Touchscreen	0.32	0.25	0.34	0.30	0.32
Confidence	2.25	2.08	2.12	2.53	2.30


Treatment effect
By treatment type and gender
Score
10
5
0
-5
-10
0
20
40
60
80
100
120
Second
Male, Praise
Male, Enc.
Felame, Praise
Felame, Enc.
Male, Praise 95% CI
Male, Enc. 95% CI
Felame, Praise 95% CI
Felame, Enc. 95% CI

Results: Treatment effect by gender

		Control	Treatment	Difference	P-value[(2)]
Encouragement	Females	31.5	36	4.5	0.07
	Males	32.8	32.9	0.1	0.47
Praise	Females	38.6	35.1	-3.5	0.09
	Males	37.4	37.8	0.4	0.45

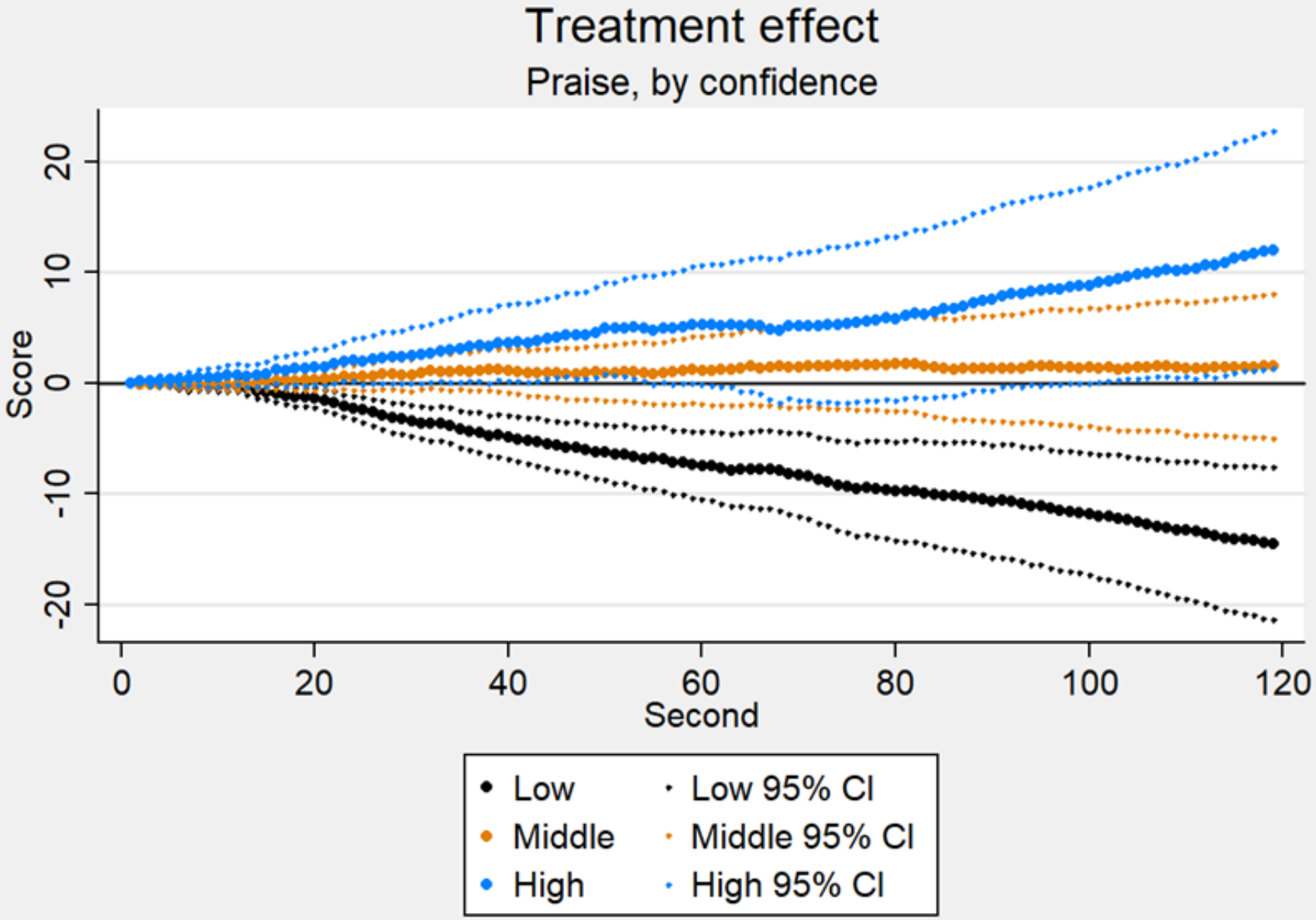
The role of task-related confidence

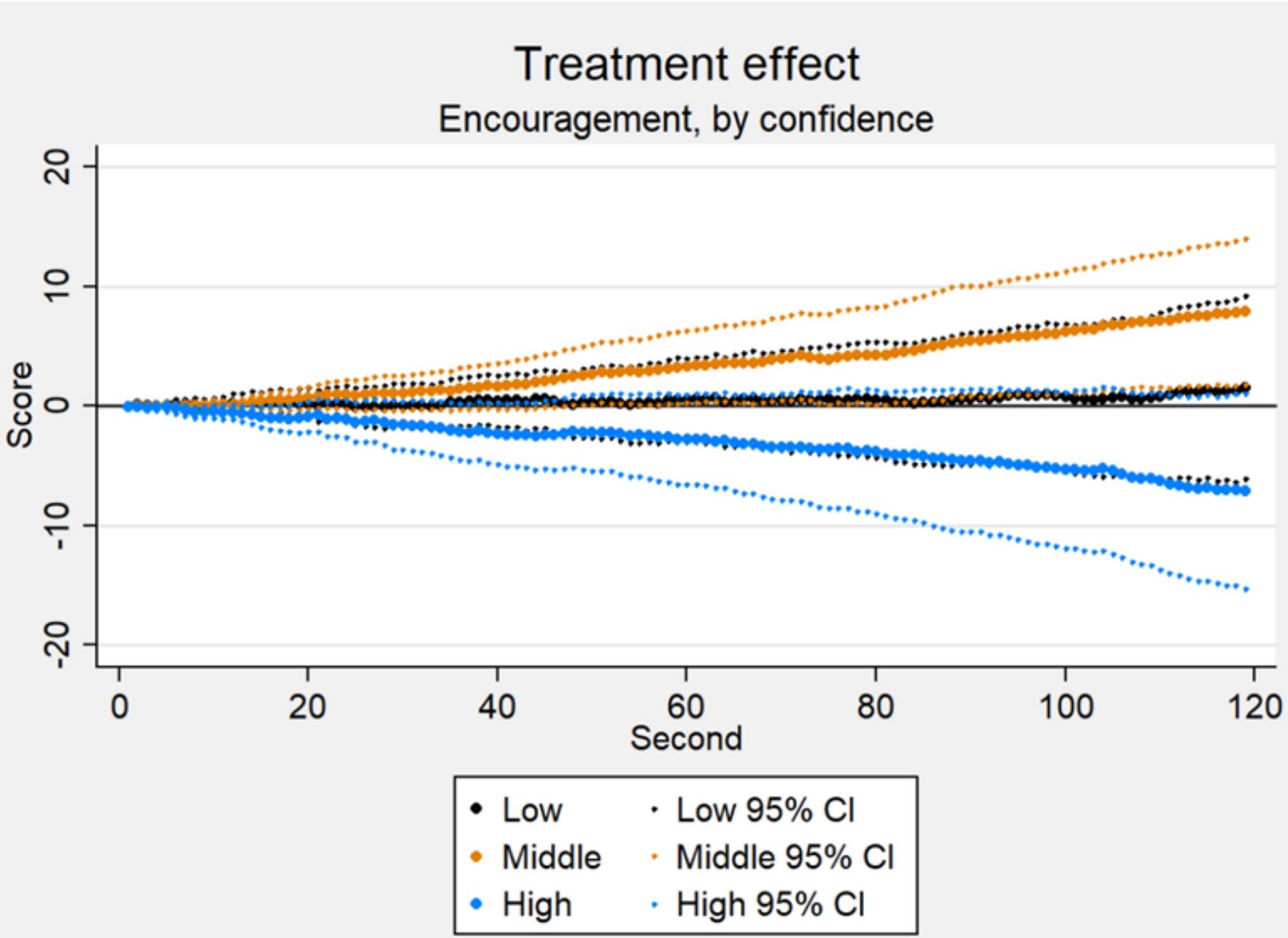
- „How good are you at computer games?" ➔ low, medium, high
- General question, after the description of the game – captures task-related confidence ➔ proxy for expected performance
- Depends on: ability, info about game, relevant experience, general confidence (baseline conf. and valuation of past experience)
- Bigger gender gap than general confidence, esp. in stereotypically male tasks (less experience, societal expectations=previous SFB)

Females						
Confidence[(1)]	Total	% Total	Praise		Encouragement	
			Control	Treatment	Control	Treatment
Low	58	40%	13	13	13	19
Medium	73	51%	21	15	15	22
High	13	9%	2	4	4	3
All	144		36	32	32	44
Males						
Low	25	13%	6	11	1	7
Medium	100	50%	33	20	25	22
High	74	37%	13	19	21	21
All	199		52	50	47	50

Task-related confidence: previous experience

Women						
		Game-playing confidence			All confidence levels	Mean confidence
		Low	Medium	High		
Game-playing frequency	Never	0.63	0.31	0.06	0.49	2.16
	Sometimes	0.20	0.59	0.21	0.44	3.08
	Often	0.07	0.27	0.67	0.06	3.87
Men						
		Game-playing confidence			All confidence levels	Mean confidence
		Very bad / Bad	Ok	Good / Very good		
Game-playing frequency	Never	0.49	0.45	0.06	0.19	2.27
	Sometimes	0.09	0.51	0.41	0.51	3.45
	Often	0.01	0.28	0.71	0.30	3.88


Treatment effect
Praise, by confidence
Score
20
10
0
-10
-20
0
20
40
60
80
100
120
Second
Low
Middle
High
Low 95% CI
Middle 95% CI
High 95% CI


Treatment effect
Encouragement, by confidence
Score
20
10
0
-10
-20
0
20
40
60
80
100
120
Second
Low
Middle
High
Low 95% CI
Middle 95% CI
High 95% CI

OLS results

	Encouragement		Praise	
VARIABLES	1	2	3	4
Treatment dummy	-3.337	1.178	-7.985*	-15.18**
	(0.474)	(0.931)	(0.0616)	(0.0447)
Female dummy		11.25		-0.234
		(0.381)		(0.971)
Treatment X female		-4.435		10.50
		(0.759)		(0.243)
Treatment X Medium confidence	13.10**	8.009	12.47**	16.82**
	(0.0245)	(0.577)	(0.0153)	(0.0473)
Treatment X High confidence	-5.812	-11.60	14.73**	22.74**
	(0.348)	(0.415)	(0.0210)	(0.0130)
Female X treatment X Medium confidence		4.911		-3.935
		(0.757)		(0.719)
Female X treatment X High confidence		16.03		-13.26
		(0.416)		(0.433)
Constant	62.01***	53.64**	0.464	0.939
	(0.000545)	(0.0124)	(0.978)	(0.955)
Observations	286	286	299	299
R-squared	0.280	0.288	0.408	0.423

Conclusion

- Some evidence of mean gender differences in response to subjective feedback content
  - Females: positive for encouragement, negative for praise
  - Males: no significant response
- Due to differential response by task-related confidence
- Effect of praise more confidence-dependent than that of encouragement

External relevance:

- Low stakes environment, brief interaction, small diff in subjective content
- Specific to given content
- Self-selected players

Implications:

- Individualized subjective feedback content can improve the performance of certain groups
- Gender differences can be decreased by environment that is better tailored to the needs of females/lower confidence individuals

Next experiment

- Differences in the effect of competitive stakes by gender
- Does subjective feedback have an even greater impact when stakes are higher – i.e. in a competitive setting?

- Method: same online game, randomized treatment, 4 groups:
  - See high score table at beginning and end of game or not
    - Raises performance-dependent stakes: sense of achievement/failure from doing well/worse relative to others, publicity
  - Receive subjective feedback or not
    - SFB: encouragement + praise of effort/improvement

- Hypotheses:
  - Males motivated by seeing high scores (competitive goal-setting)
  - Females respond negatively to seeing high scores – lower confidence, negative effect of increased performance-dependent stakes
  - SFB can counteract some of this negative impact

Questions/issues

- Plan: funding to develop game further
  - Improve current website-based game
  - Develop Google Play/Apple store app

- Sampling strategy?
  - Online experimental websites (volunteerscience.org, labinthefield.com) – selected participants
  - **App store – real market, real life behavior, larger samples**
  - Laboratory – compensated experiments
- Task relevance?
  - Not job task, but reflects individual behavior when facing new tasks/challenges
- Publication strategy?
  - Labor econ/gender in the labor market
  - Experimental econ
  - HR management