



Testosterone administration promote the prosocial learning: evidence for the social status hypothesis

Xin Wang¹, Yin Wu^{1,2}

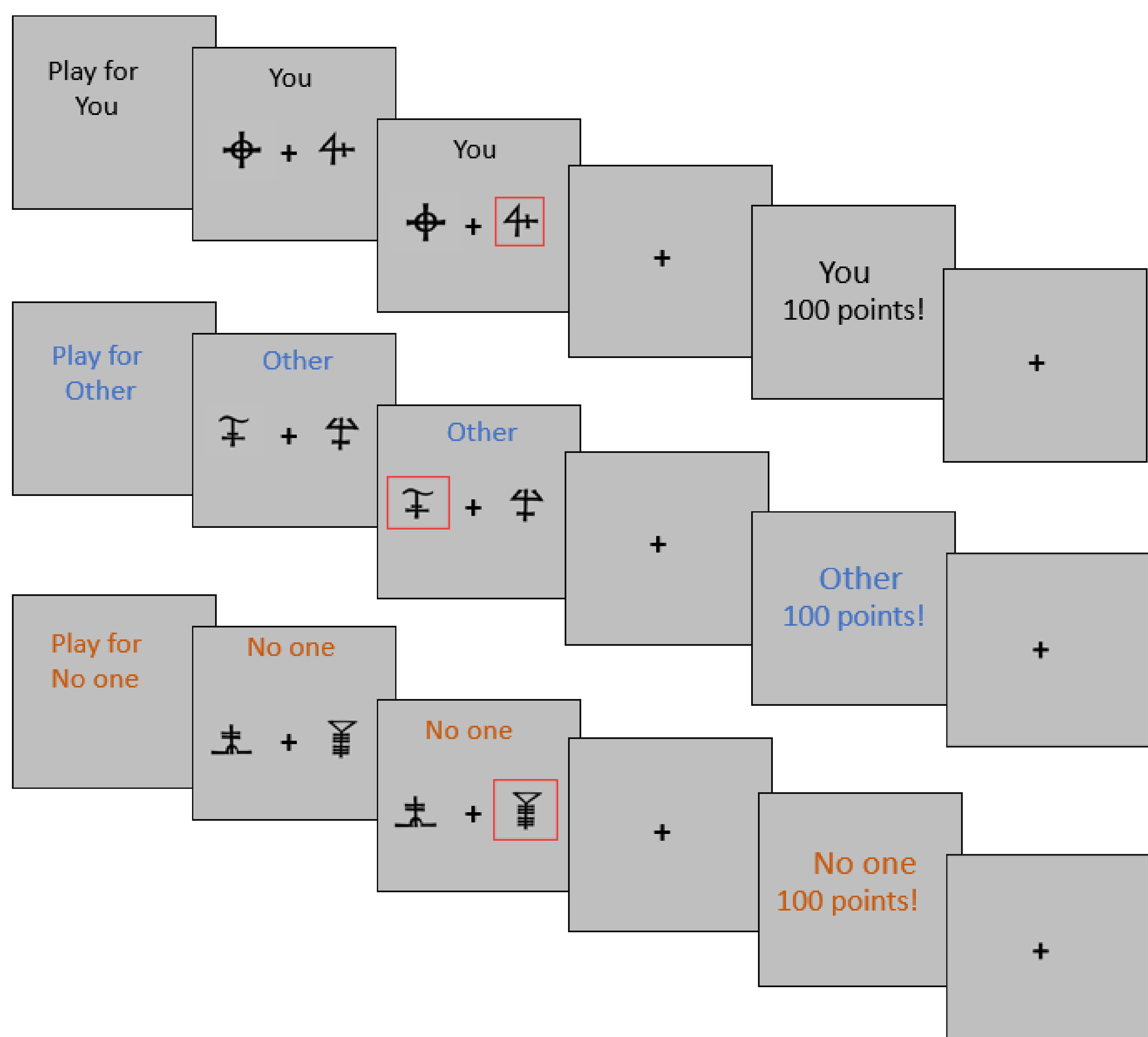
¹School of psychology, Shenzhen University, ²School of psychology, Shanghai University of Sport

INTRODUCTION

- Testosterone has been suggested to play an important role in social cognition and social interaction.
- In several animals, testosterone promotes aggressive behavior in male-male aggression. However, in human males, testosterone can increase both pro-social and anti-social behaviors that enhance social status in social context.
- Recent studies using reinforcement learning theory to characterize the cognitive process in social behavior, it has been shown that people can learn to obtain rewards for others but do so more slowly than when learning to obtain rewards for themselves.
- To our knowledge, the cognitive process underlying the effects of testosterone on social learning remains unknown.
- Here, we aimed to investigate the effect of testosterone on social behavior in reinforcement learning framework with pharmacological manipulation and computational analyses in a double-blind, placebo-controlled study.

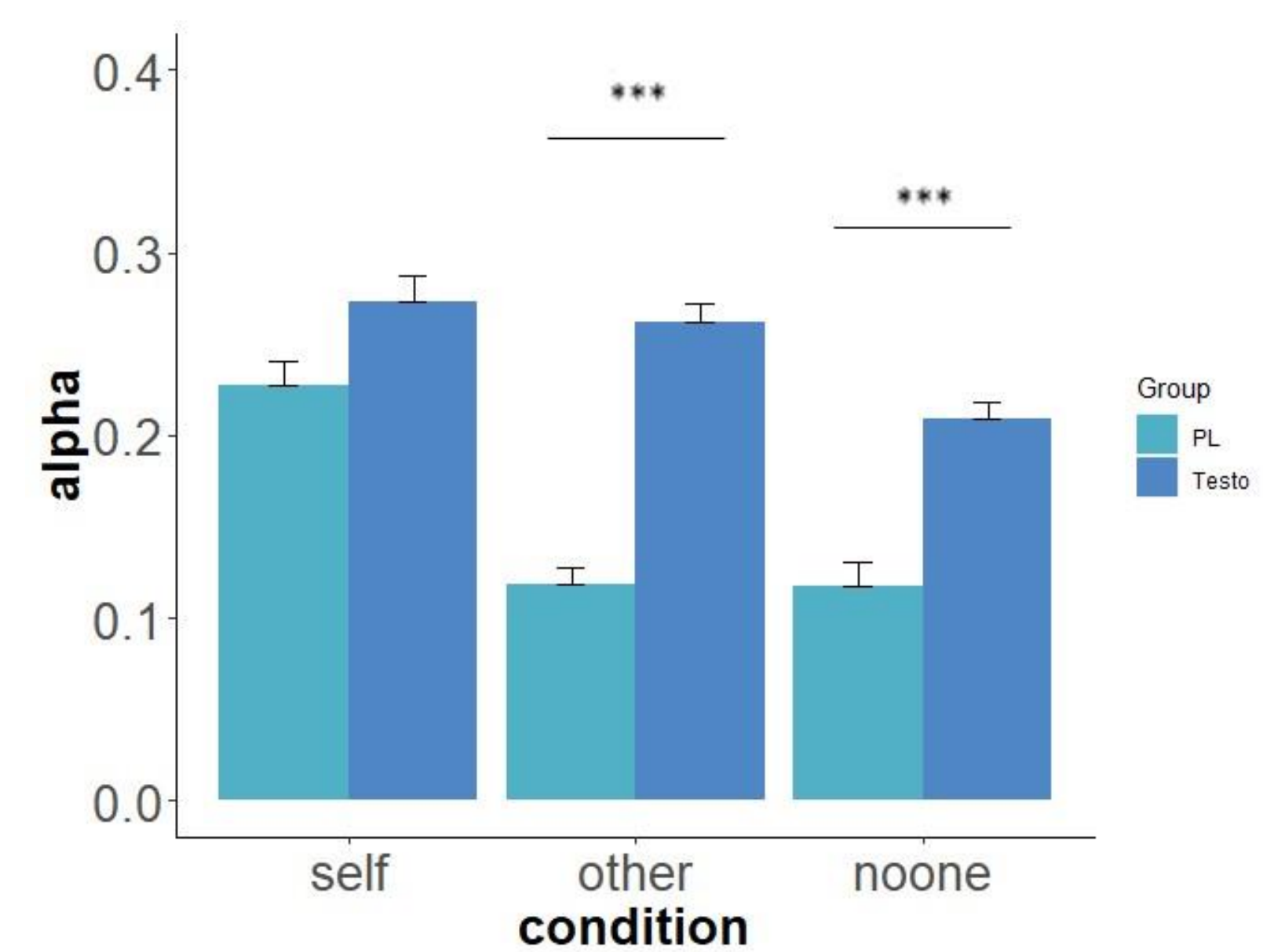
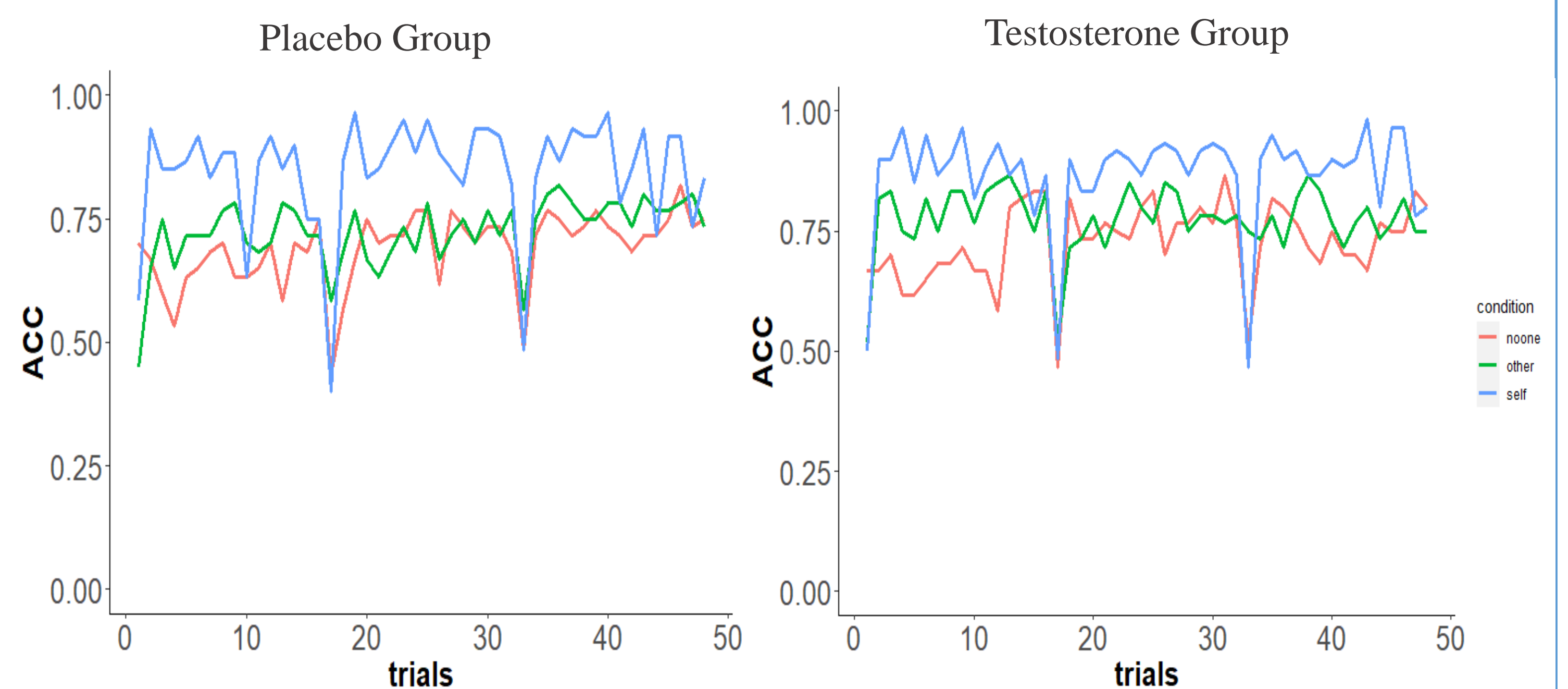
METHODS

- **Participant:** 120 health men in Shenzhen University
- **Procedures:**
 - All sessions started at 12.30-13.00 and lasted approximately 4 h.
 - Participants received a single dose of testosterone or placebo gel, both containing 150mg.
 - After 3h, participants completed the reward learning task and asked to choose different stimuli which were probabilistically associated with rewards for themselves (self), others (prosocial), or no one (control), lasted 25min.
 - The reward learning task has 48 trials of each 3 block. Each block has two different symbols which one associated with a high probability (75%) and another associated with a low probability (25%).



RESULTS

- We found that both groups can learn to obtain rewards for self, other and no one.



- When learning in the self-condition, two groups' learning rate had no difference. But, in the other-condition, participants in testosterone group had a significantly higher learning rate than those in placebo.
- In a post hoc analysis, participants in placebo group had a significantly higher learning rate when they learn to obtain rewards for themselves than others. Instead, learning rate in both self and other conditions was no difference in testosterone group.

Discussion

According to the social status hypothesis, testosterone in human social behavior is to achieve and maintain social status. Recent studies have found that participants in testosterone group are more likely to perform altruistic behavior in the absence of status threats. In some cases, altruistic behavior is often accompanied by losing of self-interest. However, our findings indicate that testosterone administration promotes prosocial behavior without reducing self-interest.

Conclusion

In conclusion, these results demonstrate that testosterone administration increases learning rate when learning to obtain rewards for others, which provides causal evidence for the social status hypothesis in men.

Contact

Tencent meeting ID: 226700325
 Name: Xin Wang
 Organization: School of psychology, Shenzhen University
 Email: 870750391@qq.com
 Phone: 18859692375