

## Definitions

**Security robots (SRs)** are defined as any robot used to deter unwanted activities through their presence, surveillance, and ability to alert authorities about unauthorized individuals or actions [1].

**Social Power** is defined as potential influence or the capacity to influence [2].

**Reward power:** controlling rewards;

**Coercive power:** administering punishments;

**Referent power:** based on identification;

**Legitimate power:** inherent right granted by social norms or structures to prescribe certain actions;

**Expert power:** stems from specialized knowledge.

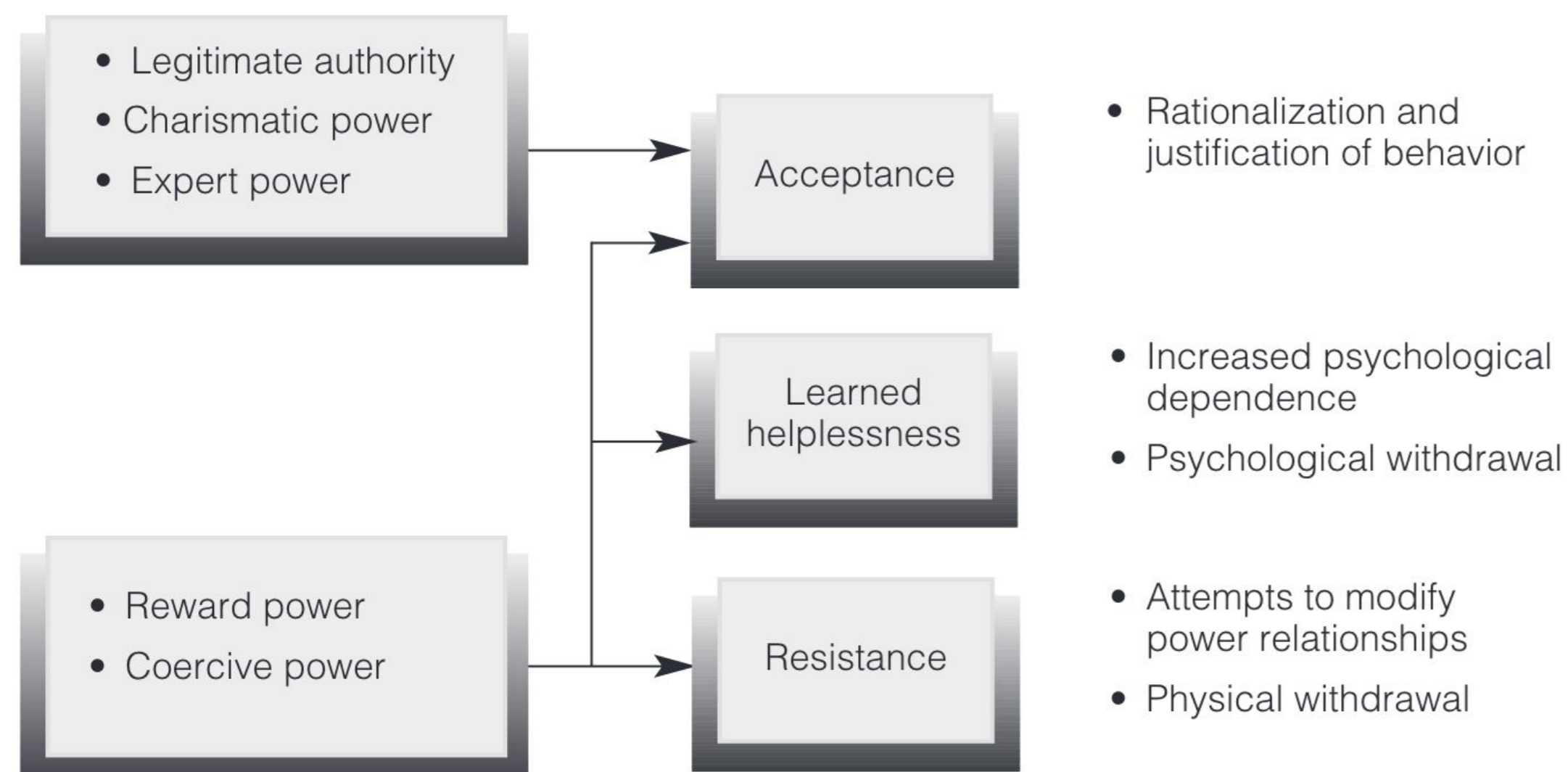
## Motivations

As SRs become more prevalent and employ various forms of power in their operations [3], it is essential to understand whether increasing power in deployment strategies could improve public acceptance.

## Hypothesis

Perceived legitimate power (a), perceived referent power (b), perceived expert power (c), perceived reward power (d), and perceived coercive power (e) in security robots are positively related to robot acceptance.

•We assumed that SRs' role in public safety inherently signals legitimate use of power.



SOURCE: From H. L. Tosi, J. R. Rizzo, and S. J. Carroll, Managing Organizational Behavior. Copyright 1986 by Pitman Publishing Company. Reprinted by permission of Harper & Row Publishers, Inc.

## Methods

- A quasi-experimental online study.
- 100 Subjects randomly assigned to view one of two positive and one of two negative interaction videos.
- Measuring perceived power, acceptance [4], and interaction perceptions after each video.

✓ **Manipulation Check: Perceptions of the interaction**

⊙ **Measurement Validity and Reliability**

Perceived referent power was excluded from further analysis due to very low validity.

## References

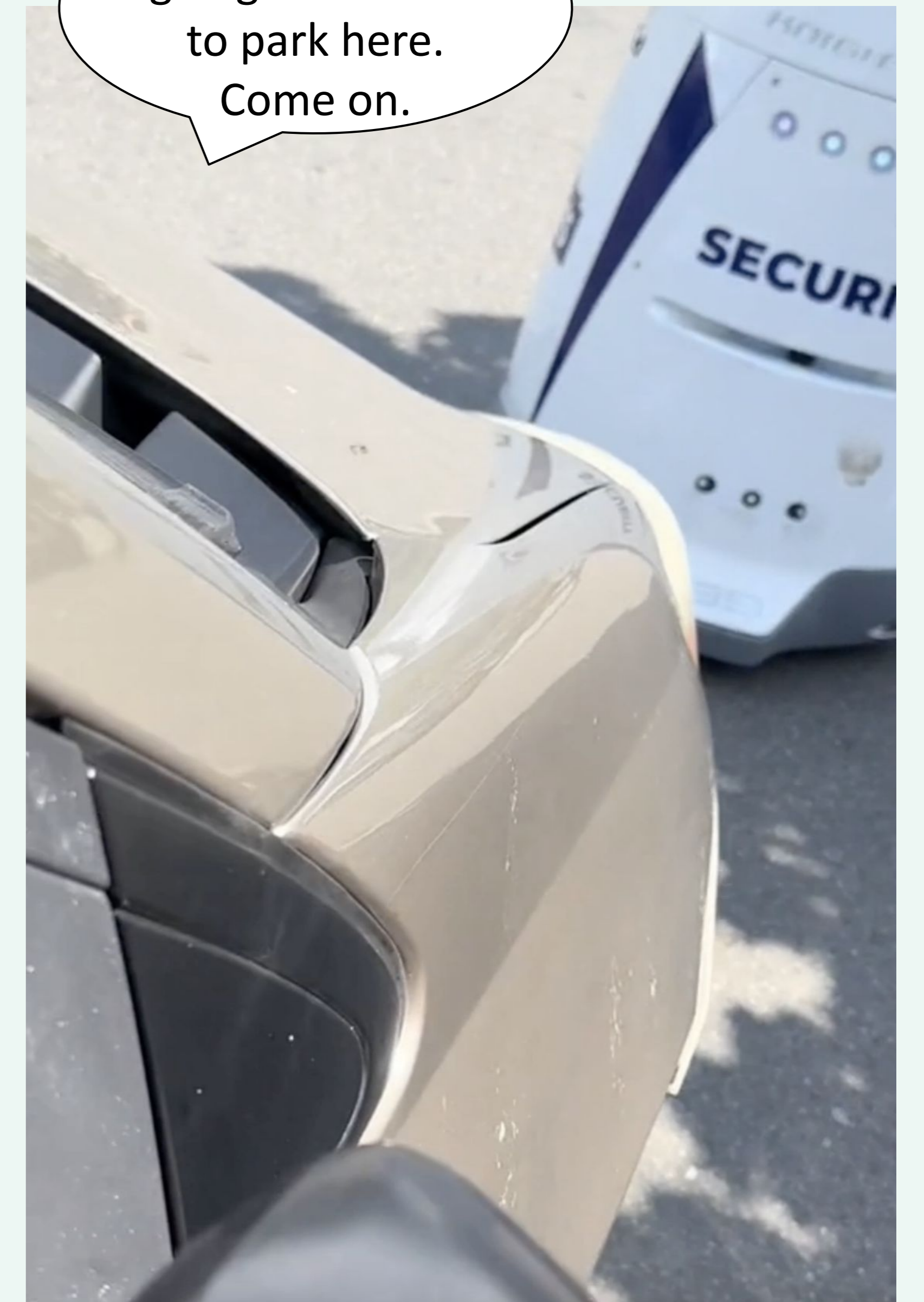
- [1] X. Ye and L. P. Robert, "A human–security robot interaction literature review," *J. Hum.-Robot Interact.*, vol. 14, no. 2, Dec. 2024.
- [2] J. R. French and B. Raven, "The bases of social power," *Studies in social power*, vol. 150, p. 167, 1959.
- [3] G. Marcu, I. Lin, B. Williams, L. P. Robert Jr, and F. Schaub, "Would I feel more secure with a robot?": Understanding perceptions of security robots in public spaces," *Proceedings of the ACM on Human-Computer Interaction*, vol. 7, no. CSCW2, pp. 1–34, 2023.
- [4] X. Ye, W. Jo, A. Ali, S. C. Bhatti, C. Esterwood, H. A. Kassie, and L. P. R. Robert, "Autonomy acceptance model (AAM): The role of autonomy and risk in security robot acceptance," in *Proceedings of the 2024 ACM/IEEE International Conference on Human-Robot Interaction*, 2024, pp. 840–849.

*We investigated the relationship between the power that public view robots as using and their acceptance of security robots using real-world videos of robot-citizen interactions.*

Warning: This area is currently restricted. Please stop and do not proceed further.



Hey. What's going on? I need to park here. Come on.



Check Out All the Videos We Used!:

Positive 1



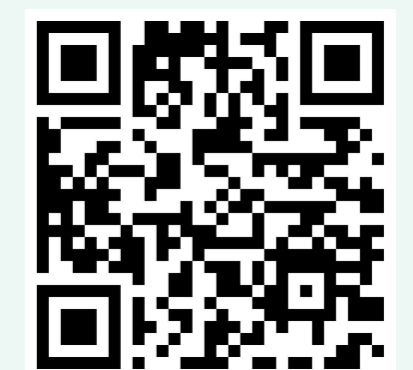
Positive 2



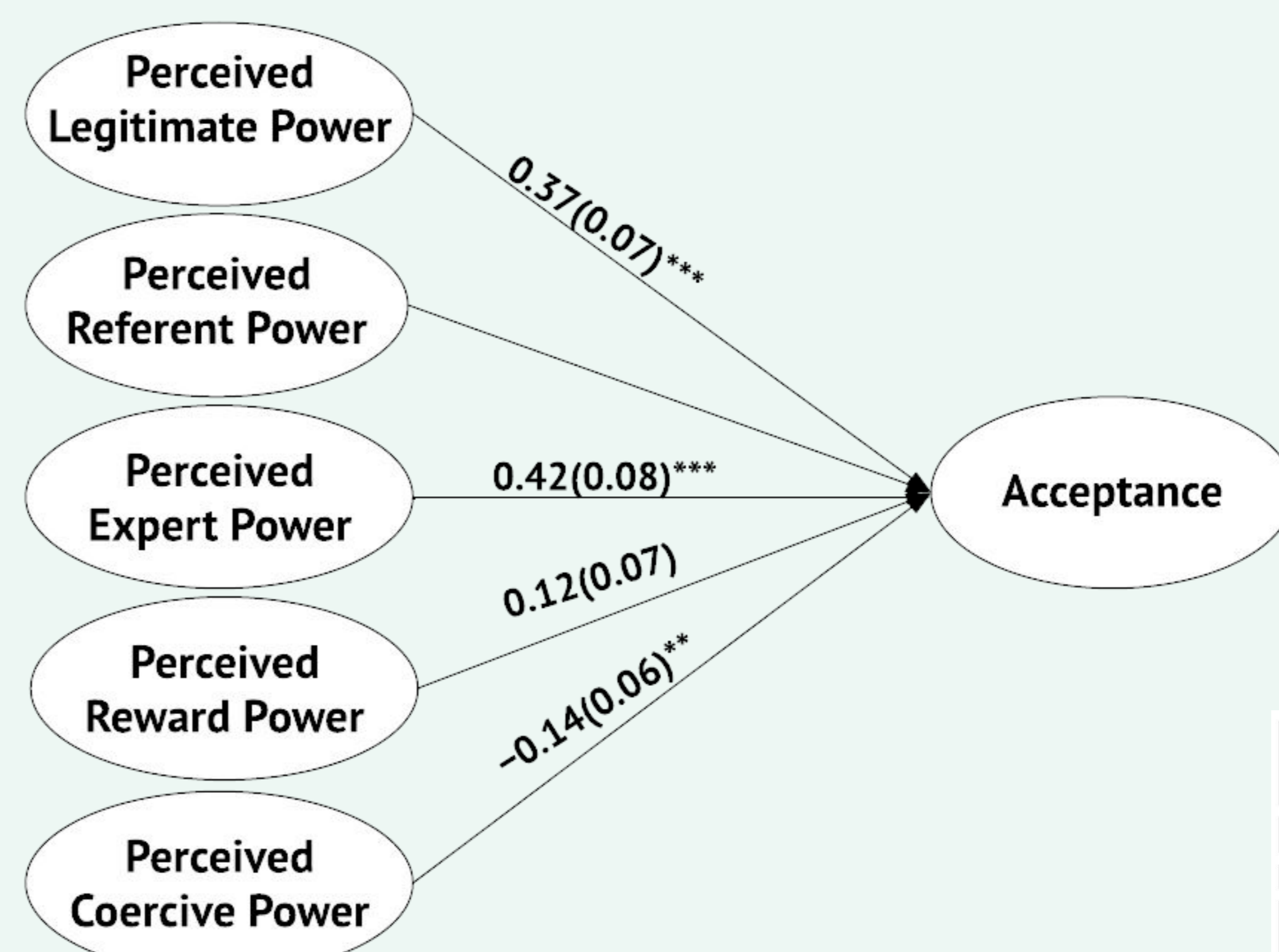
Negative 1



Negative 2



**Higher perceived expert power and legitimate power of security robots are associated with greater acceptance, while perceived coercive power is linked to lower acceptance.**



Full Paper:

