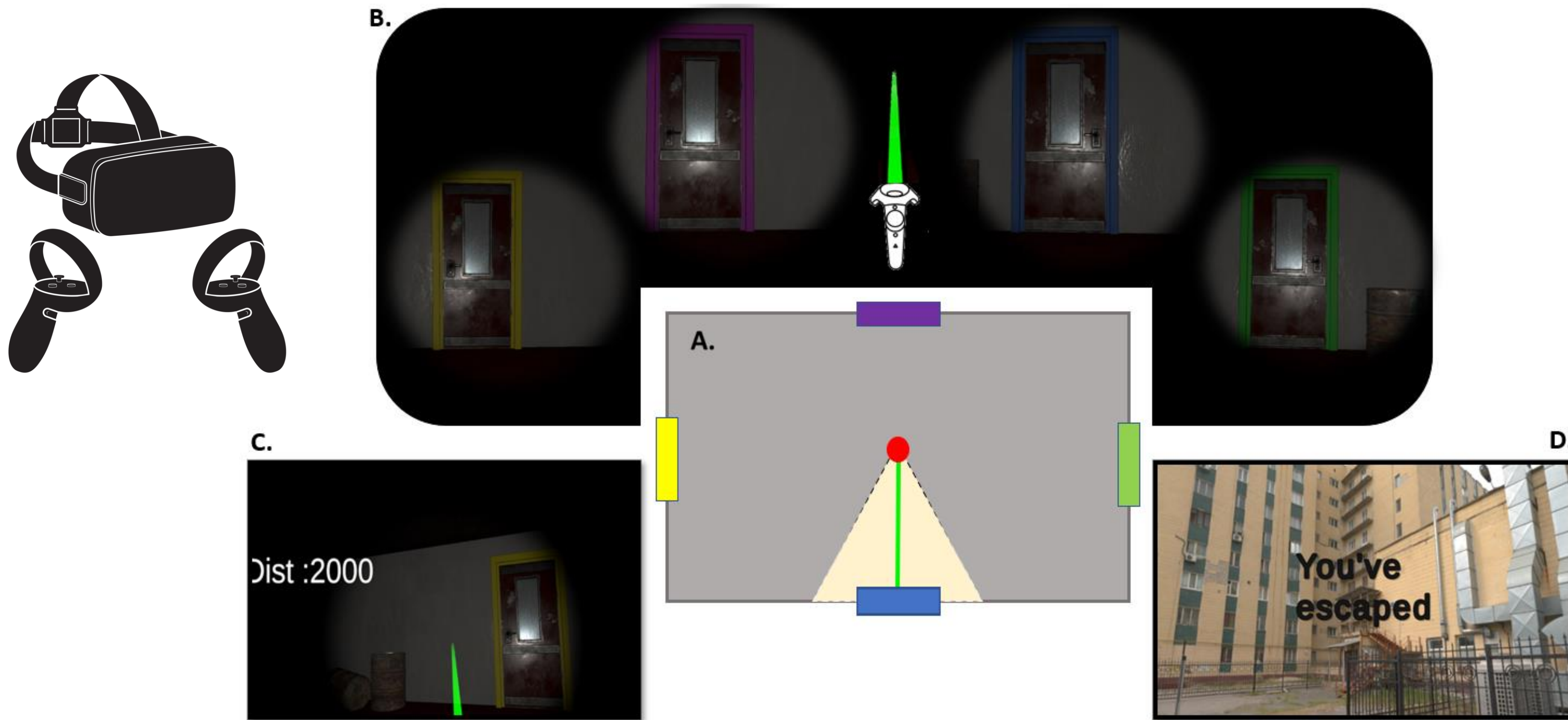


Individuals living and working in hazardous settings (e.g., military personnel) must make complex decisions in threatening environments. Nevertheless, research on complex decision-making within threatening environments is limited given obvious safety and ethical concerns. **Here we present a complex decision-making task embedded within an immersive virtual world to allow for the manipulation of environmental threat (VRIGT).** This task was developed around the functional elements of the Iowa Gambling Task, a behavioural paradigm that has been widely used to operationalise complex decision-making performance (Bechara, et al.,1994).

## Pilot Study

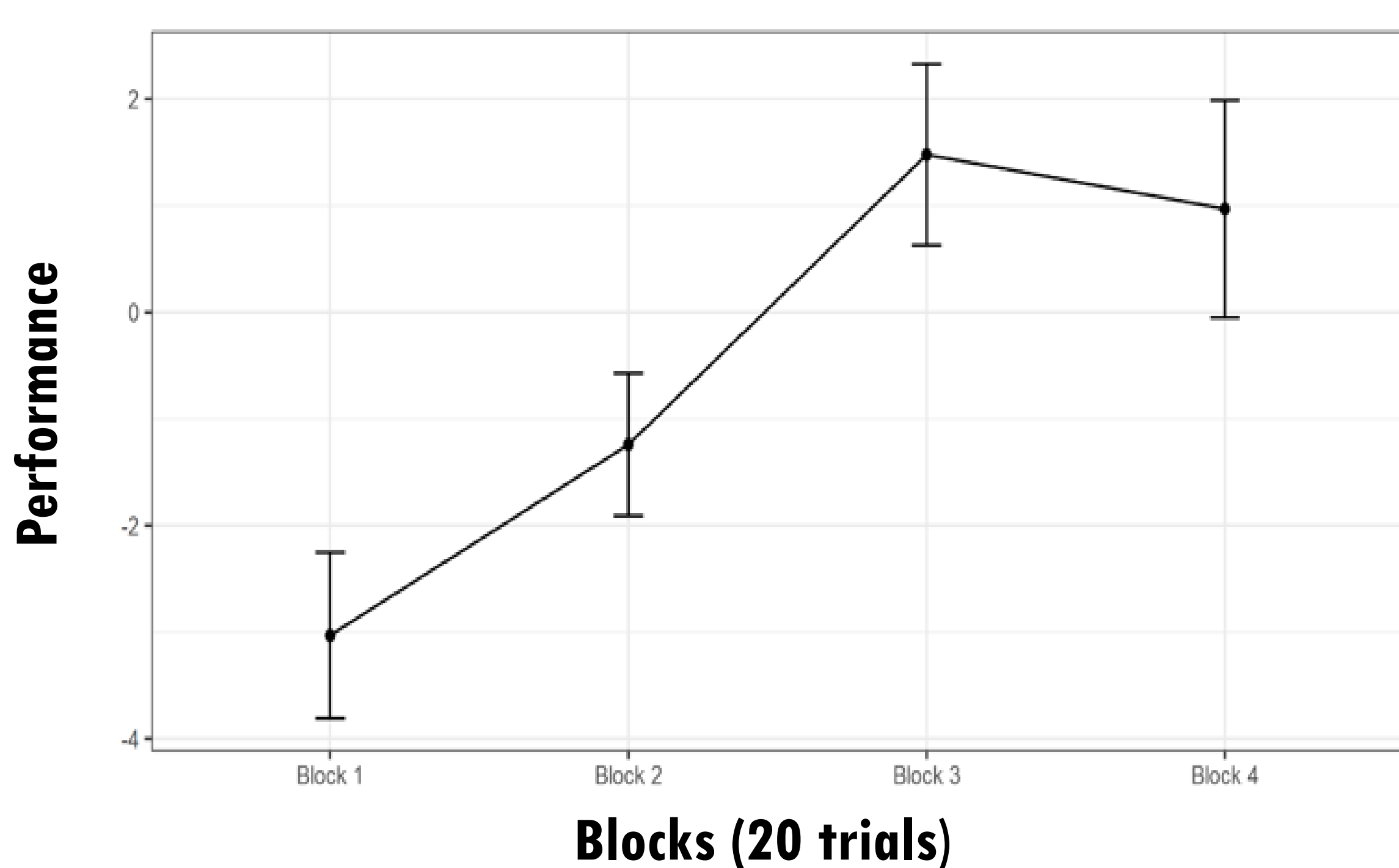
**We conducted a pilot study (N= 58) to observe if performance on the VRIGT was comparable to the traditional Iowa Gambling Task.**

### Method

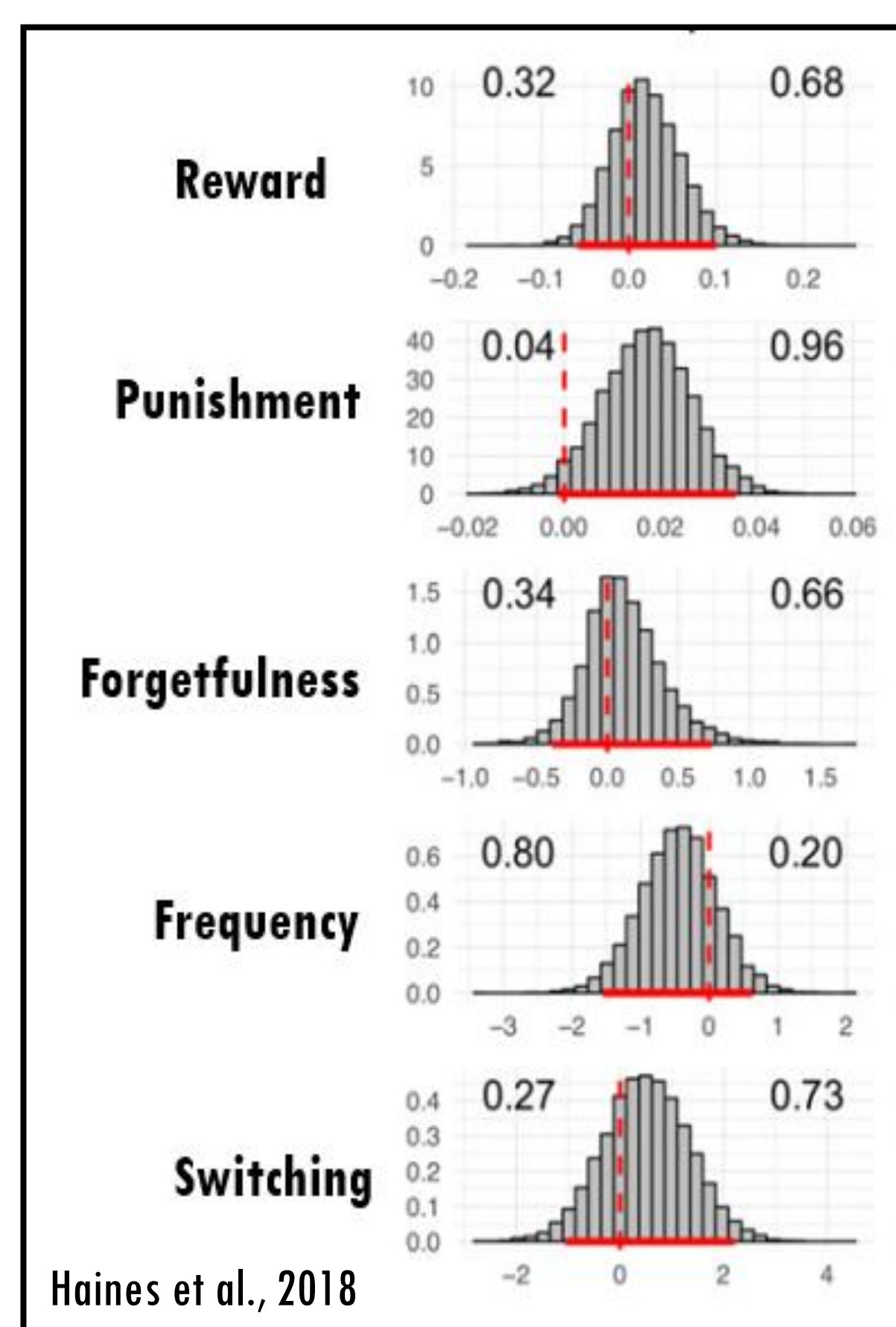


The participant's task is to escape from a collapsing building as quickly as possible. Each trial brings them to a new room in which they must choose between one of four colour-coded doors. These doors are analogous to the cards in the Iowa Gambling Task. After choosing a door, participants are told how much further or closer the choice has brought them to exiting the building. Although the exact response for each door varies between trials, each is associated with a pattern of gains/losses that makes some doors more advantageous than others.

### Results



Participant performance levelled out after around 60 trials. This mirrors what we see in the legacy Iowa Gambling Task.

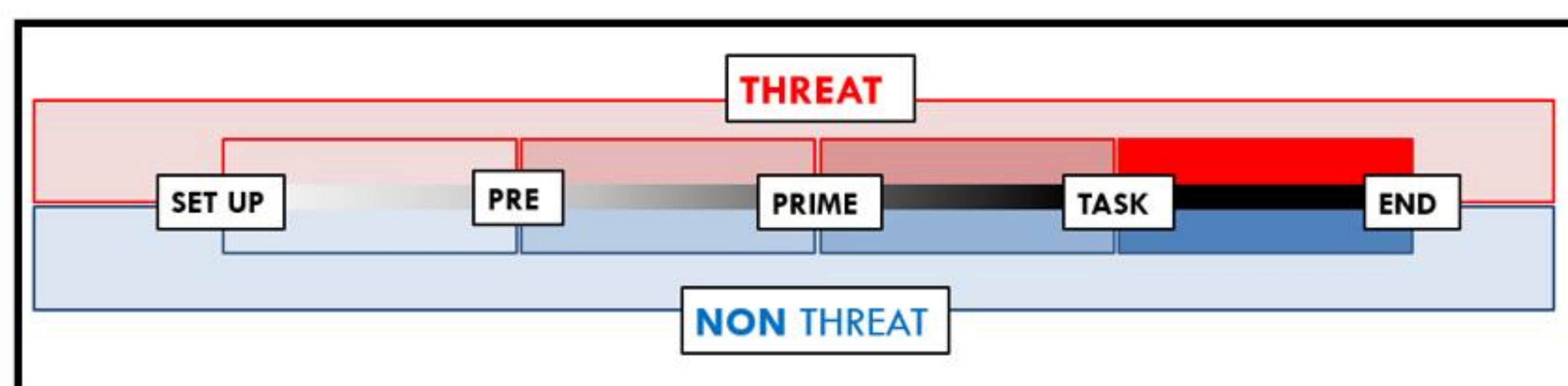


We also examined the data using the Outcome-Representation Learning model (ORL: Haines et al., 2018). As with the traditional Iowa Gambling Task, this computational model successfully predicted behaviour in the VRIGT using a set of parameters designed to estimate participant responses to reward and punishment, their forgetfulness, their response to cost frequency, and their tendency to switch between options.

**The initial finding following a pilot study provides justification for future application of this paradigm to identify differences in learning, performance, and choice perseveration between threatening and non-threatening experimental conditions**

## Future Research

Given the results of the pilot study in validating the VRIGT, future work will look to observe complex decision-making performance between threatening and non-threatening experimental conditions.



Use the QR to view a video of the task

### References

Haines, N., Vassileva, J., & Ahn, W. Y. (2018). The outcome-representation learning model: A novel reinforcement learning model of the Iowa gambling task. *Cognitive science*, 42(8), 2534-2561.

Bechara, A., Damasio, A. R., Damasio, H., & Anderson, S. W. (1994). Insensitivity to future consequences following damage to human prefrontal cortex. *Cognition*, 50(1-3), 7-15.

