Unconscious Influences in Decision-Making? Measuring Awareness Using Post-Decision Wagering

Emmanouil Konstantinidis (emmanouil.konstantinidis.09@ucl.ac.uk)

David R. Shanks (d.shanks@ucl.ac.uk)
Department of Cognitive, Perceptual and Brain Sciences
University College London
26 Bedford Way, WC1H 0AP, London, United Kingdom

Keywords: Iowa Gambling Task; Decision-Making; Post-Decision Wagering; Implicit Learning; Uncertainty.

Abstract

In a paradigm (the Iowa Gambling Task, IGT), that has been claimed to simulate real-life decision-making, participants choose between decks of cards with different monetary payoffs. The original version of the task consists of four decks of cards and 100 card selections. In terms of their expected value, two of the decks are “good” (i.e. have long-run positive payoffs) and the remaining two are “bad” (i.e. have long-run negative payoffs). Successful performance in the task requires learning to consistent sample from the “good” decks.

A major issue concerning the IGT is at what stage in the game participants learn the advantageous strategy and whether this knowledge is guided by implicit or unconscious biasing signals. When participants were asked broad open-ended questions about what they knew about the task, explicit knowledge lagged behind advantageous selections (Bechara, Damasio, Tranel, & Damasio, 1997). This was taken to indicate implicit influences in decision-making. However, when participants’ awareness was probed by more detailed and focused questions, optimum performance and knowledge of the task occurred concurrently (Maia & McClelland, 2004).

Persaud, McLeod, & Cowey (2007) addressed the issue of knowledge and awareness in the IGT by asking participants to place wagers after their card selections (Post-Decision Wagering, PDW). The rationale is that if participants have some awareness that their decision is an advantageous one, they will wager high. Persaud et al. used PDW in combination with different types of questioning. When participants were asked the questions of Bechara et al. (1997) or no questions at all, they showed a preference for the good decks but they did not maximize their winnings by appropriately making high wagers, indicating a dissociation between performance and awareness. But when they were asked the questions of Maia and McClelland (2004), both deck selection and wagering developed simultaneously. Persaud et al. concluded that there are implicit components that guide choice behavior and that the awareness assessment of Maia and McClelland altered participants’ choice behavior.

In the present study we investigated the wagering strategies that participants develop in the IGT by modifying the pay-off matrix of the original PDW. In Persaud et al.’s experiment, equal amounts of money can be won or lost on any given wager. In our experiment, the amounts of money were dependent on the primary decision and whether the wager was high or low (Clifford, Arabzadeh, & Harris, 2008).

Two groups of participants were administered the IGT with PDW. The first group (simple-wagering) participated in a replication of Persaud et al.’s IGT task with wagering. The second group (modified-wagering) was administered the IGT with wagering but using the modified pay-off matrix proposed by Clifford et al. (2008).

In the simple-wagering group, “good” deck selection started on trial 47 and the onset of awareness was located at trial 73. This result replicates the main finding of Persaud et al., that implicit signals regulate decision strategies. However, in the modified-wagering group, positive deck selection started on trial 34 and advantageous wagering on trial 37, indicating no dissociation between performance and awareness. Also, we investigated the confidence-accuracy relationship using Type II Signal Detection Theory. The analysis revealed that the modified pay-off matrix made PDW more sensitive in assessing participants’ knowledge about the task.

The results of our study indicate that PDW becomes a more sensitive method of assessing conscious content with the appropriate improvements in the pay-off matrix. Also, our results contribute to the view that there is little evidence that decision strategies in the IGT are dissociable from awareness.

References