The Brain's Reward Echo

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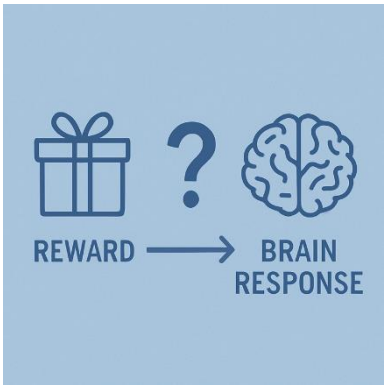
Overview

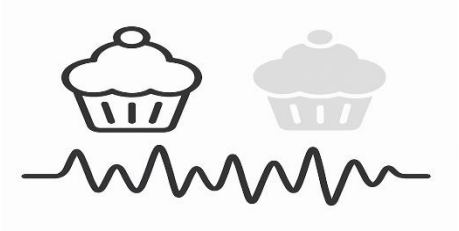
Brain-based measures of reward are increasingly used to assess consumer reactions, emotional responses, and decision processes. One such measure, the *reward positivity* (RewP), shows clear and repeatable changes in brain activity following rewarding outcomes. But do these signals reflect flexible, meaningful shifts in how people actually value things, or are we sometimes measuring something more mechanical? Two studies provide a useful reminder to probe what our brain measures are really capturing.

Key Findings & Insights



The first study used a complex reinforcement learning task, where participants made decisions leading to rewards across three timeframes: immediate, short-term, and long-term. The RewP signal integrated all these layers smoothly. Brain responses scaled up as the total sum of rewards increased, and these patterns were highly stable over time, even when retested after three months. In short, RewP provided a consistent, repeatable signal of cumulative reward outcomes.

The second study asked whether this brain measure would flex when people's motivational states changed. Participants first played a game to win two types of snack food. Then one food was devalued by eating it to satiety. As expected, people's preferences and choices shifted; they wanted the devalued food less and chose it less often. But the brain's RewP signal barely moved. Despite changes in subjective desire, the reward positivity continued to respond as though both foods remained equally rewarding.



What these studies highlight is that RewP is both impressively stable and surprisingly insensitive to some real shifts in internal motivational states. The signal tells us when reward feedback is received, and reflects the summed structure of outcomes. But it may not capture dynamic shifts in value that occur as people's states, preferences, or desires change. In short: it tracks *reward receipt* very well, but *reward value* less flexibly.

As the use of brain measures expands in applied settings, including consumer research and product testing, it becomes important to keep asking what these signals actually reflect. Measures like RewP can offer reliable indicators of reinforcement structures and learning processes. But if we wish to use them to infer how much people like something, or how their preferences shift across time or context, we may need to combine them with complementary methods, or proceed with care.

A signal can be stable and consistent (reliable) yet not necessarily reflect changes in your target motivation or behaviour

Conclusion

Brain measures like RewP offer stable and fascinating windows into reward processing. But they don't automatically tell us what people want. As we integrate brain-based methods into applied research, we need to stay curious: are we measuring the experience of reward, or simply its structure? The signal meaning still needs careful thought. When a brain lights up for reward, is it showing how much you want something, or just that you got it?

Rommerskirchen, L., Lange, L., & Osinsky, R. (2021). The reward positivity reflects the integrated value of temporally threefold-layered decision outcomes. *Psychophysiology, 58*, e13789.
Shaffer, L. S., Crowder, H. D., Kakalec, P. A., Duong, L. T., McDonald, C. G., & Thompson, J. C. (2025). The reward positivity is insensitive to reinforcer devaluation. *Cognitive, Affective, & Behavioral Neuroscience*, 1-18.