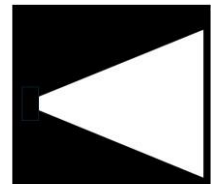


# Good & Bad Neuro



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## Research Papers

Azadravesh, H., et al (2024). Predicted consumer buying behavior in neural marketing based on convolutional neural network and short-term long-term memory. Multimedia Tools and Applications, 1-17.

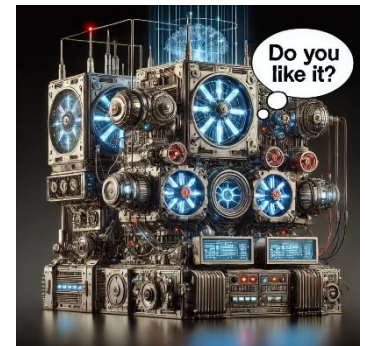
Kislov, A., et al. (2023). The prediction of market-level food choices by the neural valuation signal. PLoS One, 18(6), e0286648.

## Overview

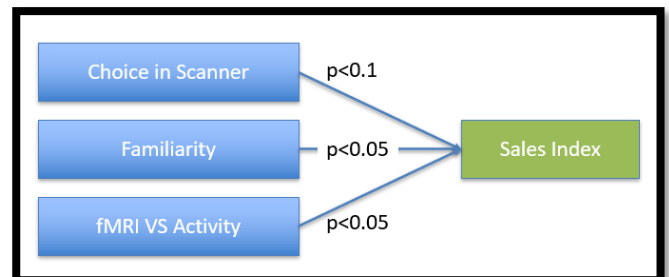
Predicting consumer preferences using neuroimaging data promises to reveal insights beyond traditional surveys or self-reports. However, without validating these models against real-world consumer behaviours, any added value remains speculative. This review contrasts two studies: one using self-reported preferences and another validated by actual market data. It highlights the necessity of external, behaviour-based outcomes to confirm the practical value of neuroimaging methods.

## Key Findings & Insights

Azadravesh et al (2024) used EEG data and a combination of two types of deep learning models to analyse data that has both spatial and temporal aspects, with a remarkable 97% accuracy for self-report preferences. While technically impressive, this is a complex alternative for the simple task of asking people if they like something. The lack of real-world behaviour as a validation variable raises questions about whether this approach adds predictive value beyond what simpler self-report methods offer.



Kislov et al (2023) used fMRI data to forecast consumer choices for a restaurant chain, validated by one-year sales data for dishes on the restaurant's menu. Brain activity in the Ventral Striatum (VS), a region linked to reward processing, significantly correlated with dish sales ( $r = 0.28$ ,  $p = 0.01$ ), and a model combining VS activity with other product characteristics explained 33% of the variance in sales. This real-market validation offers greater ecological validity, showing that neural data can capture factors influencing consumer choice beyond self-reports.



## Methods

In the Azadravesh et al study, EEG data was pre-processed with advanced signal techniques to minimise noise, enhancing feature extraction. Participants rated images based on “like” or “dislike,” providing the model’s target variable. In the Kislov et al study, fMRI data from 22 participants observing dish images correlated with subsequent sales data across 47 restaurant locations. The combined model included in-scanner choices, survey data, and VS activity to predict market behaviour, generating a more useful prediction than the first study’s focus on self-reports.

## Conclusion

This comparison underscores the importance of behaviour-based validation in neuro-forecasting research. Note that we should not infer that fMRI is a better technique, as it’s possible that an alternative EEG approach or fNIRS could also predict consumer behaviour in terms of market share.