

A Comprehensive Design of Consumer Response Experiments to Generative Prompts and an Impulse Purchase Suppression System

Jiyeon Kang, Soohyun Park and Kyungsik Han
School of Data Science, Hanyang University

Research Motivations

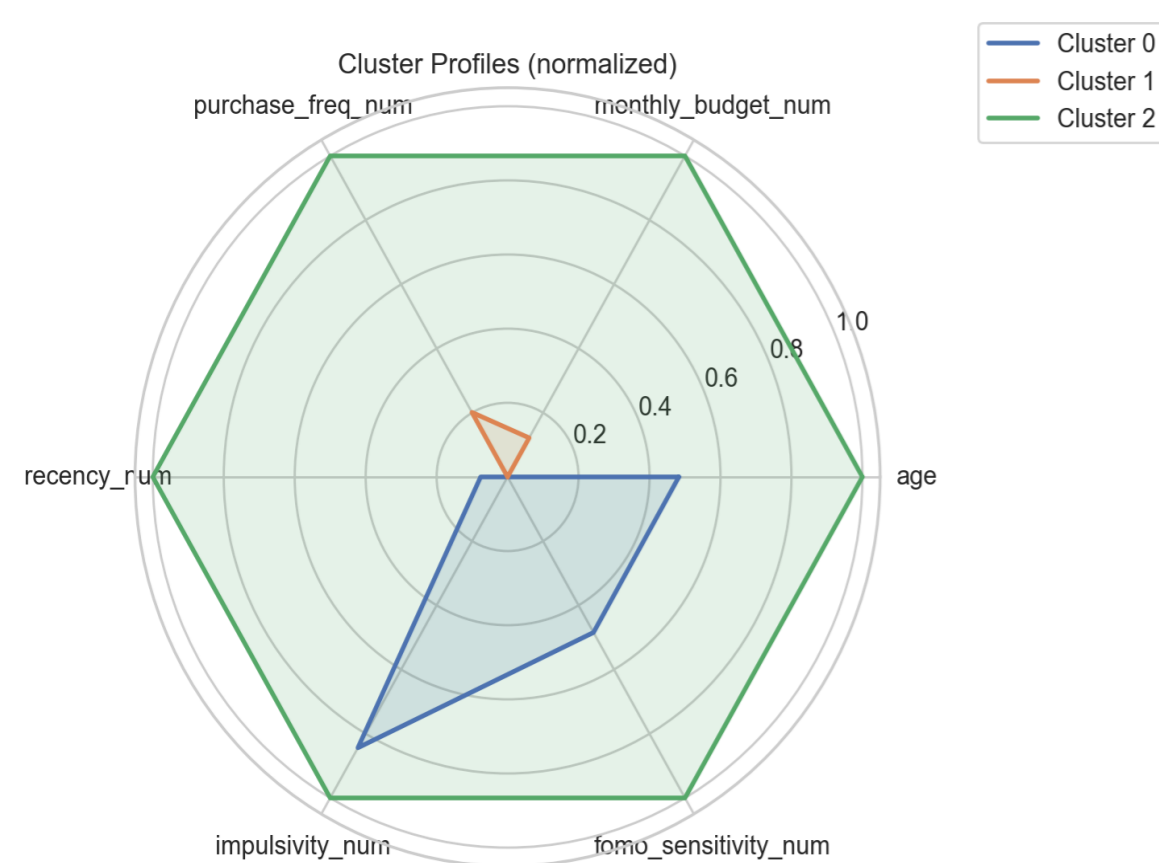
In digital commerce environments, emotional triggers such as FOMO (Fear of Missing Out) strongly elicit impulsive purchases. Although these cues effectively drive immediate clicks, their influence quickly diminishes with repeated exposure and can even produce adverse fatigue effects, limiting long-term behavioral control. In contrast, suppression-oriented messages reliably reduce impulsive behavior and offer a promising intervention strategy, yet remain largely unused in practical service design. Existing studies have also relied heavily on self-report measures, leaving limited understanding of how consumer behavior shifts dynamically under real-time emotional stimuli.

This study integrates generative prompt stimuli, user state data, and behavioral signals to quantitatively model FOMO-suppression responses and examine how these messages influence real consumer behavior. We also analyze how emotional effects change over time and how user decision processes are regulated, providing empirical evidence that emotion-based persuasive messages can be adaptively tailored to individual user characteristics.

We propose a behavior prediction model that integrates multimodal user data and generative prompt stimuli to embed and quantitatively model FOMO-suppression responses.

User Study

Cluster Analysis



Cluster 2 represented high-spending, high-sensitivity users. Cluster 1 consisted of controlled, low-reactivity users and Cluster 0 reflected a moderate-impulsivity group with latent responsiveness.

Experiment

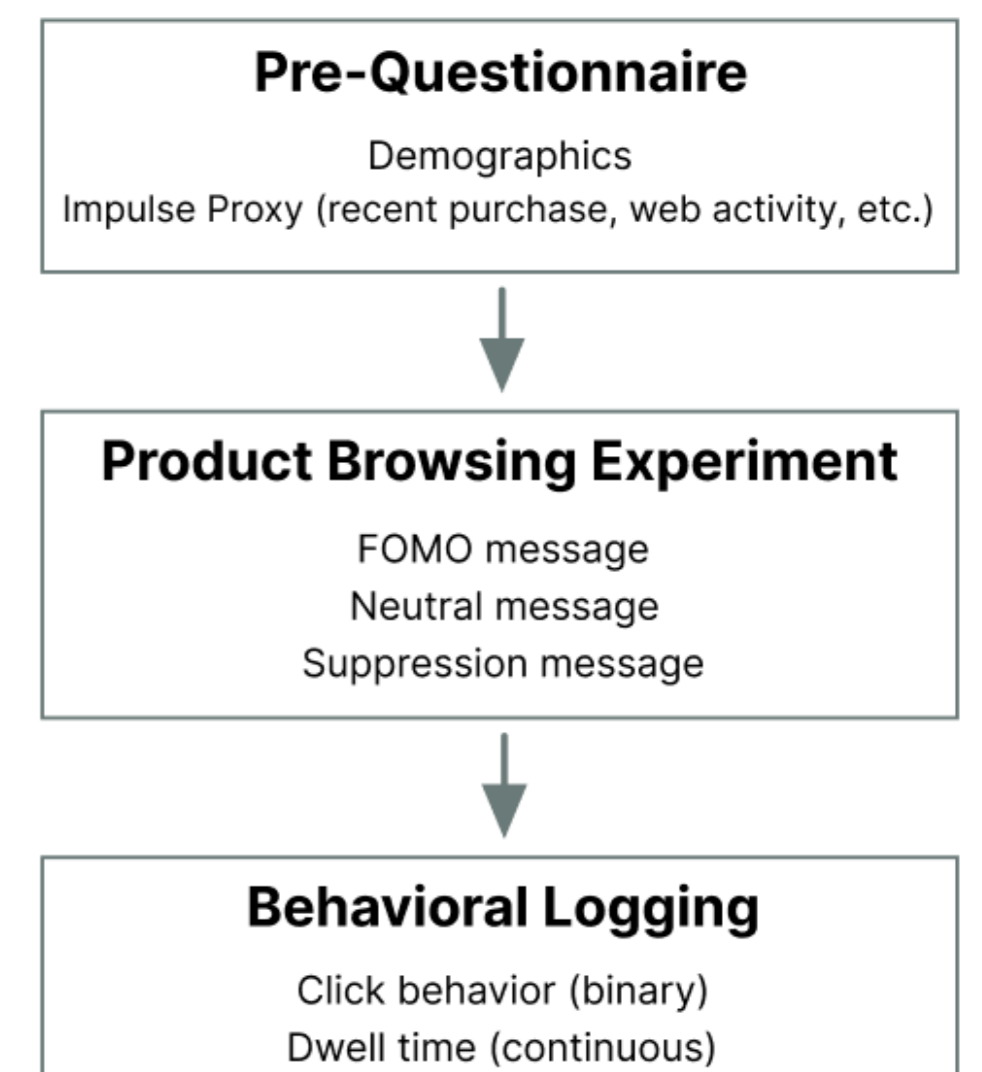


Users were randomly assigned to three message conditions (FOMO, Neutral, Suppression) to observe how emotional cues induced immediate changes in real browsing behavior.

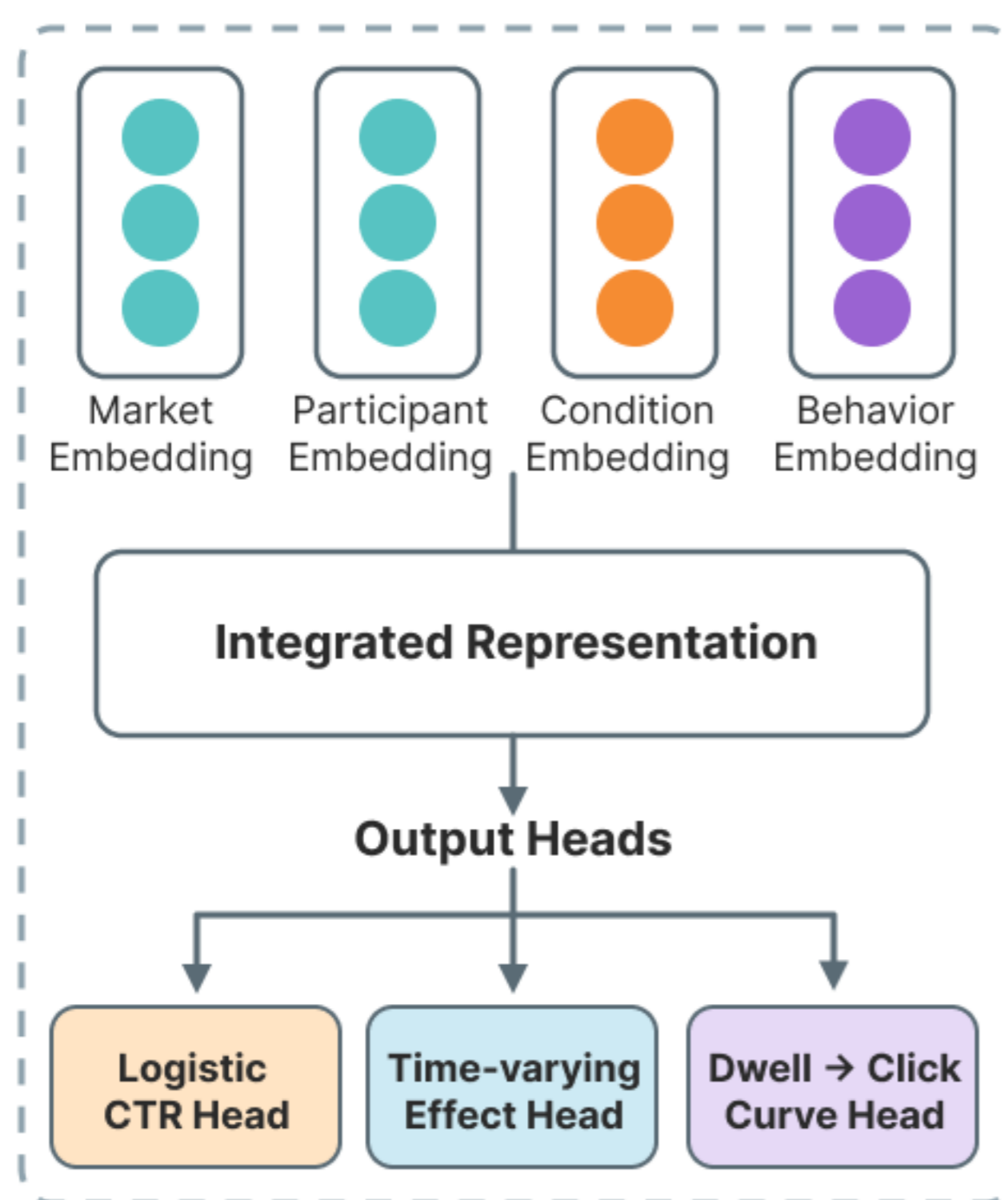
The analysis compared how the influence of FOMO diminished over time (fatigue pattern), how stable Neutral remained as a baseline, and how consistently Suppression reduced click-through rates.

Dwell time was standardized to model its nonlinear relationship with click probability (S-curve), allowing evaluation of how each message condition shifted the curve's slope and inflection point.

Data Collection (126 participants)



Model development



Results

Condition	CTR (%)	Dwell Time (sec)	CTA Click Rate (%)	Exit Rate (%)
FOMO	60.39	27.65	53.14	50.00
Neutral	69.60	24.38	62.80	19.35
Suppression	56.82	148.63	54.55	50.00

- Neutral yielded the highest CTR, whereas FOMO showed only a brief initial increase. Suppression produced the lowest CTR but markedly increased dwell time, reflecting delayed decision-making.
- FOMO's click-through advantage diminished rapidly over time, eventually falling below Neutral and revealing a clear fatigue pattern.
- Suppression showed consistently low CTR, with regression results confirming a strong inhibitory effect.
- Dwell time was the strongest predictor of clicks, with a 1-SD increase producing about a 31-fold increase in click odds.
- Analysis of Kaggle market data showed that the most impulsive consumer group (Q5) responded strongly to emotional cues, displaying rapid behavioral increases similar to participants' initial reactions to FOMO. This alignment indicates that the experiment replicates the short-lived and unstable nature of emotion-driven consumption observed in real market environments.

Future Work

Future work will integrate participant and market embeddings to more precisely model individual impulsivity and to personalize the presentation of FOMO-suppression messages. The time-varying effect head will be refined to quantify the observed decay of FOMO under repeated exposure, and S-curve thresholds derived from dwell signals will be used to detect real-time impulsive purchase cues and trigger automated suppression messages. In addition, linking these modeling strategies with real commerce browsing logs will enable field-level evaluation of how effectively such interventions reduce overspending, ultimately informing the development of scalable systems for consumer overconsumption prevention.