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Education

2020-Now Ph.D. Candidate in Marketing, University of Toronto
– Committee: Nitin Mehta (Chair), Matthew Osborne, Mengze Shi, Zemin (Zachary) Zhong

2015-2018 M.A. in Economics, University of Rochester

2011-2015 B.A. in Economics & B.S. in Mathematics, Wuhan University

Research Interests

Substantive: Economics of Digitization and AI, Media Consumption, Platform Strategy, Personalization

Methodological: Structural Modeling, Causal Inference, Game Theory, Experimental Methods

Job Market Paper

Competitive Gamification in Digital Consumption: Evidence from TikTok
with Matthew Osborne and Nitin Mehta

Abstract: We study the gifting behavior of consumers and leaderboard design in the context of livestreaming. Using real-time data from TikTok, we provide causal evidence for two distinct gifting motives: the competitive motive and the appreciation motive. The appreciation motive reflects the tendency to gift in response to popular content. The competitive motive arises from TikTok's gifting leaderboard, which prominently displays the ranks and cumulative gifting amounts of the top three contributors. This public visibility creates incentives to compete for recognition and social utility. We find that the strength of the competitive motive depends on the consumer's relative position: when a consumer's cumulative gifting amount is far from that of immediate competitors, the return from competing diminishes, reducing the competitive motive. To evaluate the economic value of the leaderboard and guide the design of the leaderboard, we build and estimate a continuous-time dynamic game model of consumers' gifting behavior. Our results show that, for an average session, the leaderboard-induced competitive motive accounts for 43% of the total revenue. We also conduct leaderboard design to manage the competitive intensity and optimize the platform revenue. We find that (1) reducing the number of rewarded top ranks from three to two intensifies the competition among top-ranked consumers, increasing total revenue by 2.9%; and (2) revising the scoring system to weigh recent gifting activity more heavily increases revenue by 19.7%. Our findings underscore the critical role of leaderboards in driving engagement on digital platforms and the importance of leaderboard design in optimizing platform revenue. Our findings underscore the role of competitive motives in driving engagement in digital consumption and highlight the importance of gamification design in optimizing platform revenue.

Working Papers

1. **Predictive Accuracy, Consumer Search, and Personalized Recommendation**
with Mengze Shi and Zemin (Zachary) Zhong
Invited for Resubmission to ***Marketing Science***

2. **Product Relevance, Consumer Search, and Competition**
with Bing Jing and Mengze Shi
Invited for Resubmission to ***Marketing Science***

3. **Preference for Diversity**
   with Ying Zeng, Jiajia Liu, and Jingyi Lu
   Invited for Resubmission to ***Journal of Consumer Research***

4. **Comparing Human-Only, AI-Assisted, and AI-Led Teams on Assessing Research Reproducibility in Quantitative Social Science**, social science crowd-analysis with many coauthors
   Under Review

Work-In-Progress

1. Paid Subscription and Tipping on Live Streaming Platform
   with Nitin Mehta and Clarice Zhao

2. Pricing Automation with Artificial Intelligence: Evidence from U.S. Retail Chains
   with Carlos Estrada and Min Fang

Presentations

1. 2025/06 Summer Institute in Competitive Strategy, University of California, Berkeley*
2. 2025/06 INFORMS Marketing Science Conference, Washington D.C.*
3. 2024/03 TD MDAL Grant Research Roundtable
4. 2023/12 Conference on AI, ML, and Business Analytics, Temple University
5. 2023/06 INFORMS Marketing Science Conference, University of Miami
6. 2023/05 Empirical & Theoretical Symposium for Canadian Marketing Strategy, Queen's University
7. 2023/04 Marketing Brownbag, University of Toronto
8. 2022/04 Applied Theory Reading Group, University of Toronto
9. 2022/03 Marketing Brownbag, University of Toronto
10. 2021/09 Marketing Workshop, University of Toronto
11. 2021/06 INFORMS Marketing Science Conference, University of Rochester^{v}
12. 2019/07 International Conference on Game Theory, Stony Brook University

* indicates "attending but a coauthor presented the paper" | ^{v} indicates "virtual"

Fellowships and Awards

1. 2025 ISMS Doctoral Consortium Fellow, Washington DC
2. 2024 Management Analytics Research Cluster Fund ($7000), University of Toronto
3. 2023 TD MDAL Research Grant ($4000), University of Toronto
4. 2023 ISMS Doctoral Consortium Fellow, Miami
5. 2022-2023 BEAR/BI-Org Ph.D. Research Grant ($5000), University of Toronto
6. 2021-2022 BEAR/BI-Org Ph.D. Research Grant ($2000), University of Toronto
7. 2020-2025 Rotman School of Management Fellowship, University of Toronto
8. 2018-2020 Wallis Institute Fellowship ($25000), University of Rochester
9. 2015-2018 Graduate Fellowship, University of Rochester
10. 2011-2015 First Prize Undergraduate Scholarship (×4), Wuhan University

Research Experience

1. Research Assistant for Prof. Avi Goldfarb, University of Toronto, Fall 2021 - Spring 2022
2. Research Assistant for Prof. Mengze Shi, University of Toronto, Spring 2020 - Fall 2021
3. Research Assistant for Prof. Jeanine Miklós-Thal, University of Rochester, Spring 2019 - Spring 2020
4. Research Fellow, W. Allen Wallis Institute, University of Rochester, Fall 2018 - Spring 2020
5. Visiting Student, School of Management, Yale University, Summer 2019

Teaching Assistance

1. Introduction to Big Data Analysis (Master), University of Toronto, Fall 2022, Fall 2023
2. Prices and Markets (Master), University of Toronto, Fall 2022, Fall 2023
3. Principles of Marketing (Undergraduate), University of Toronto, Fall 2021
4. Quantitative Reasoning for Management (MBA), University of Toronto, Fall 2021
5. Pricing (MBA), University of Toronto, Summer 2021
6. Economics & Marketing Strategy (MBA), University of Rochester, Spring 2019
7. Marketing & Statistics (Undergraduate), University of Rochester, Spring 2019
8. Advanced Game Theory (PhD), University of Rochester, Spring 2018
9. Intermediate Microeconomics (Undergraduate), University of Rochester, Fall 2017

Miscellaneous

Languages: Chinese (native), English (fluent)

Computer Skills: Julia, R, Python, Stata, MATLAB, LaTeX

References

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Selected Abstracts

Predictive Accuracy, Consumer Search, and Personalized Recommendation

with Mengze Shi and Zemin (Zachary) Zhong

Firms use predictive technology to attract and direct consumer search through personalized product recommendations. This paper examines the firm's recommendation strategy by analyzing a key trade-off: accurate recommendations draw high-search-cost consumers into the search process (the "participation-drawing effect") but may narrow the search intensity of moderate-search-cost consumers (the "search-narrowing effect"). When pricing is inflexible in response to environmental changes, the search-narrowing effect dominates in markets with intermediate predictive accuracy or limited search costs, leading firms to forgo recommendations despite their value in reducing search frictions. However, with pricing flexibility, the no-recommendation strategy is optimal only when both predictive accuracy and search costs are low. Flexible pricing enables firms to capture the surplus from accurate recommendations, strengthening the participation-drawing effect. It also shifts the firm's strategic focus from managing search intensity to managing search participation, increasing the profitability of personalized recommendations. Our findings underscore the dual impacts of personalized recommendations on consumer search behavior and highlight the importance of pricing flexibility in optimizing recommendation strategies. This research provides actionable insights for firms leveraging predictive technologies in customer management.

Product Relevance, Consumer Search, and Competition

with Bing Jing and Mengze Shi

When consumers incur search costs to evaluate match, the product sampled first is more likely to make the sale. Product relevance (i.e., the probability of match) then becomes a source of competitive advantage because all else equal, consumers will first sample the product with greater relevance. We examine relevance and price competition in a duopoly. Interestingly, even when consumers have homogeneous search costs, the ex-ante symmetric firms choose different product relevance. The rationale is as follows. If the firms chose an identical relevance, the firm with even a slightly lower price would attract all consumers to first sample its product, intensifying price competition. Differentiation in relevance relaxes price rivalry, as a firm must undercut the competitor's price by a sufficiently large amount to alter consumers' search sequence. Moreover, relevance differentiation expands at low or high search costs but dwindles at intermediate search costs. When search costs are uniformly distributed, one firm chooses a greater relevance and a higher price than the other. Each product is prominent to a different segment of consumers: The consumers with relatively high (low) search costs first sample the product with greater (smaller) relevance.

Preference for Diversity

with Ying Zeng, Jiajia Liu, and Jingyi Lu

How do consumers navigate the ubiquitous competition? Prior research has focused on strategies that improve qualification factors that vertically differentiate consumers and determine competition outcomes (e.g., performance or exam scores). Our work uncovers another prevalent yet understudied strategy: diversification on alignment factors (e.g., constellation or token color), which horizontally differentiates consumers without affecting their relative rank. Eight preregistered experiments and a large-scale analysis on gifting decisions in TikTok Live consistently revealed diversification seeking in competitions: consumers prefer to diversify from their competitors, even when explicitly informed that alignment factors do not influence outcomes, when diversification is priced with a premium, and when diversification further disadvantages those already behind. Process evidence supports a motivated reasoning account of belief in obfuscation: when facing competitive disadvantage, consumers are motivated to believe that diversification reduces direct comparisons and obfuscates their disadvantages, thereby improving chances of winning. Consistently, diversification seeking attenuates when (1) competitive motives are weakened, (2) there are few or no competitive disadvantages to obscure, and (3) decisions are made for others (vs. oneself). This research contributes to the literature on consumer competition, motivated reasoning, and differentiation, while also making practical implications for practitioners and individual consumers in competitive contexts.

Comparing Human-Only, AI-Assisted, and AI-Led Teams on Assessing Research Reproducibility in Quantitative Social Science

Social science crowd-analysis with many coauthors

Large Language Models (LLMs) such as ChatGPT are transforming how scientists conduct and validate research. LLMs are thus seen as promising tools to improve scientific reproducibility. We experimentally test how collaboration between researchers and LLM assistants influences the reproduction of quantitative social science findings. Study I (2024) assigned 288 researchers to 103 teams working in three groups: human-only, AI-assisted, and AI-led. In the AI-led group, the LLM conducted reproducibility checks with minimal human oversight. Study II (2025) replicated the design with 95 researchers in 34 teams. Human-only and AI-assisted teams reproduced published results at comparable rates, and both outperformed AI-led teams. Human-only teams also identified more major errors than AI-assisted and AI-led teams. Finally, both human-only and AI-assisted teams outperformed AI-led approaches in both proposing and implementing robustness checks. In an exploratory analysis, we observe that the gap in most outcomes between AI-led and the other two groups began to narrow by the final event of 2024 and was further reduced in 2025. Despite rapid model advances, expert human judgment currently remains indispensable for reliable empirical verification.