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Education

Ph.D., Marketing, June 2018 (Expected)
Columbia University, New York, United States

M.Sc., Operations Research, September 2011
London School of Economics and Political Science, London, United Kingdom

M.Sc., Economics, June 2010
Hong Kong University of Science and Technology, Hong Kong

B.A., Management, June 2009
Sun Yat-sen (Zhongshan) University, Guangzhou, China

Research Interests

- Incorporating Behavioral Phenomena in Analytical Models
- Consumer Information Processing and Firm Information Design
- Competitive Strategy

Dissertation

Title: "**Information-Theoretic Bounded Rationality and Its Implications for Consumer Behavior and Firm Strategy**"
Dissertation Committee: Kinshuk Jerath (Chair), Miklos Sarvary, Andrea Prat, Ran Kivetz

Working Papers (abstracts available in appendix; papers included)

- **"Optimally Biased Attention Allocation: Implications of Information-Theoretic Bounded Rationality"**
  (Job market paper, under review at *Journal of Marketing Research*, with Kinshuk Jerath)
- **"Firm Information Design Under Endogenous Consumer Attention Allocation"**
  (Working paper, with Kinshuk Jerath)
- **"Product Line Design Under In-Store Temptation"**
  (Working paper, with Kinshuk Jerath)

Selected Work in Progress (abstracts available in appendix)

- "Optimal Control, Goal Pursuit and Incentives"
- "Endowment Effect, Free Trial and Auto-Payment Schemes"
- "Temptation and Optimal Self Control" with Kinshuk Jerath

Conference Presentations

- "Consumer Information Processing with Endogenous Signal Precision and its Marketing Implications" (Marketing Science 2016, Shanghai)
- "Consumer Information Processing with Endogenous Signal Precision and its Marketing Implications" (UTD-FORMS Conference 2017, University of Texas at Dallas)

Conferences Attended

- UTD-FORMS Conference 2017, University of Texas at Dallas, United States
- Marketing Science Conference 2016, Fudan University, China
- Marketing Science Conference 2015, Johns Hopkins University, United States
- Summer Institute in Competitive Strategy 2015, UC Berkeley, United States

Selected Graduate Coursework

- **Marketing**

  Analytical Models in Marketing (Kinshuk Jerath)
  Mathematical Models in Marketing (Rajeev Kohli)
  Empirical Models in Marketing (Oded Netzer)
  Bayesian Modeling and Computation (Asim Ansari)
  Applied Multivariate Statistics (Kamel Jedidi)
  Marketing, Decisions and Methods (Donald Lehmann)
  Consumer Behavior I and II (Daniel Bartels and Eric Johnson)

- **Economics**

  Advanced Microeconomic Analysis I, II, III, IV (Paolo Siconolfi)
  Game theory (Eduardo Perez)
  Industrial Organization (Andrea Prat)
  Econometrics I and II (Jushan Bai and Christoph S Rothe)
  Economics and Optimization in Online Marketplaces (Gabriel Weintraub)
  Cognitive Mechanisms and Economic Behavior (Michael Woodford)

- **Operations Research, Mathematics and Others**

  Foundations of Optimization (Jacob Leshno)
  Dynamic Programming (Awi Federgruen)
  Machine Learning (Tony Jebara)

Selected Courses Taken at London School of Economics: Measure Theory, Mathematical Programming, Games of Incomplete Information, Techniques of Operations Research, Model Building in Mathematical Programming

Teaching Experiences and Interests

- Teaching Assistant: Digital Marketing (MBA)
- Teaching Interests: Marketing Strategy, Digital Marketing, Game Theory (PhD)

References

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Appendix: Abstracts of Papers

Optimally Biased Attention Allocation: Implications of Information-Theoretic Bounded Rationality

(Job market paper, under review at *Journal of Marketing Research*, with Kinshuk Jerath)

Consumers may engage in costly information acquisition to reduce the uncertainty about a product's fit before purchasing it. We model the information processing decision of a consumer using a framework based on information theory in which a consumer determines how much and which information to process by choosing the structure and the precision of the signal he obtains about product fit. Specifically, the consumer decides how much to focus on "positive" and "negative" information, where the former (latter) enhances the signal when the product fits (does not fit). We obtain a number of insights regarding consumer information processing behavior and firm marketing strategy. Regarding consumer behavior, we show that "confirmation bias," in which a consumer conducts his information search to confirm prior beliefs, can be optimal behavior rather than biased behavior as it is typically interpreted. We also find that if purchase and consumption are separated and consumer preferences are unstable, i.e., they can change between purchase and consumption, then more stable preferences may lead to a lower purchase probability because the consumer will engage in more disconfirmation behavior. As information processing cost increases, these effects become stronger in magnitude. Regarding firm strategy, we find that firm price and profit may first decrease and then increase in information processing cost. In particular, biased attention allocation decreases the firm's pricing power and thus hurts the firm's profit. We also find that offering a return policy induces a consumer to focus more on positive information, and the firm should offer such a policy except if information processing cost is very high.

Firm Information Design Under Endogenous Consumer Attention Allocation

(Working paper, with Kinshuk Jerath)

When consumers are uncertain about a product's fit before purchasing it, the firm may have an incentive to help consumers resolve this uncertainty by providing relevant match information. However, since processing information is costly, consumers often pay more attention to some information but less attention to other information. The firm designs the information environment accounting for this endogenous and asymmetric attention allocation by the consumers. In this paper, we model costly information processing by a consumer, allowing him to choose the structure and the precision of the signal he obtains about product fit, where the cost of information processing is given by a metric based on information theory. In particular, the consumer decides how much to focus on "positive information" and "negative information", where the former (latter) enhances the signal when the product fits (does not fit). Given this, we study the firm's information design problem in which the firm imposes constraints on the structure of the signal received by the consumer (i.e., the firm chooses how much positive and negative information to provide). We find that the optimal information design depends on the consumer's attention cost and prior belief. Interestingly, the firm may have an incentive to provide negative information, especially when the consumer has a low prior belief that the product will fit, otherwise the consumer may not search at all. Moreover, the lower the attention cost is, the higher capability the firm has of influencing consumer attention allocation through information design. We also study the pricing under information design and find that the firm may charge a lower price when it can fully design the information environment than when it has no control on the information environment. Finally, we show that the implications obtained under asymmetric attention case can be quite different from those obtained under a forced symmetric attention case.

Product Line Design Under In-Store Temptation
(Working paper, with Kinshuk Jerath)

Upon visiting a store, consumers often impulsively purchase a product different from the one that they planned to purchase before visiting the store. One explanation is that when facing the menu of products in the store, consumers become sensitive to temporarily constructed comparative valuations among products. In this paper, we model the behavioral phenomenon of in-store constructed preference. We show that even with homogeneous consumers the optimal product line may consist of two types of products: an "invitation product" to induce consumers to visit the store and a "temptation product" that they actually purchase in store. When consumers are more sensitive to quality comparison than price comparison in store, the invitation product is a low-quality-and-low-price product while the temptation product is a high-quality-and-high-price product. Conversely, when consumers are more sensitive to price comparison than quality comparison in store, the invitation product is a high-quality-and-high-price product while the temptation product is a low-quality-and-low-price product. If consumers are highly sensitive to quality comparison relative to price comparison, both the price difference and quality difference are large between these two types of products; however, if consumers are highly sensitive to price comparison relative to quality comparison, the quality difference is large but the price difference may be small. Finally, the product line consisting of these two types of products is more profitable if consumers are either highly sensitive to quality comparison or highly sensitive to price comparison. If these two sensitivities are close, the firm may prefer offering a product line with a single product.

Optimal Control, Goal Pursuit and Incentives
(Work in progress)

Using Optimal Control Theory, we develop a dynamic optimization model in which a goal pursuer (e.g., a consumer in a loyalty reward program or in a health gym program) chooses optimal effort level for each period and sets an optimal completion time to achieve an exogenously given goal or an optimally self-set goal. We show that the goal-pursuit behavior in this model exhibits both goal-gradient phenomenon (exerting more effort when approaching to the goal) and illusion of goal progress (e.g., customers who receive a 12-stamp coffee card with 2 preexisting "bonus" stamps complete the 10 required purchases faster than customers who receive a "regular" 10-stamp card). These findings offer a rational dynamic optimization explanation for the classic behavioral findings on goal pursuit. We also consider how a program designer should optimally design a program by taking into account a consumer's optimal goal pursuit behavior.

Endowment Effect, Free Trial and Auto-Payment Scheme
(Work in progress)

Firms often offer free trials of their products using which consumers can determine whether or not a product fits their needs by trying it out for free. Along with the free trial, a firm may require the consumer to sign up for auto-payment, i.e., the consumer needs to provide payment information (e.g., credit card information) using which he will be charged at the end of the free trial period unless he explicitly cancels the sale. However, under a non-auto-payment scheme, the consumer simply first tries the product and then decides whether or not to pay. In this paper, we consider the case where signing up for auto-payment leads to an endowment effect such that the consumer incurs a feeling of loss of ownership on cancellation; this induces consumers to purchase the product that they should have not purchased otherwise. We show that in a duopoly market in which two firms with homogeneous products choose product prices and the

types of payment schemes (auto-payment versus non-auto-payment), there exists an asymmetric equilibrium in which one firm chooses non-auto-payment and obtains high profit and the other firm chooses auto-payment and obtains low profit. By choosing different types of payment schemes, the firms differentiate their products using the endowment effect which softens price competition leading to higher profits for both firms. We also find that a stronger endowment effect does not necessarily lead to lower consumer welfare.