# Operations in Social Networks: Acquisition, Revenue Generation, and Retention

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## Abstract

The rise of social media and easy availability of social network information has created a new paradigm of customer facing operations. There has been tremendous amounts of literature on optimizing network effects during different stages of operations: (i) seeding and referrals during customer acquisition, (ii) pricing and promotions for profit maximization, and (iii) anchoring for customer retention. Yet, these methods come with limitations and caveats that have been ignored. I will summarize some of my work on quantifying some of these limitations and caveats and providing solutions. I will then focus on findings on customer retention, in particular in online wellness activity platforms. These platforms increasingly utilize wellness programs and social support to motivate healthy activities and improve user engagement. However, many wellness programs suffer from high churn rates that discount their expected efficacy, and negative social influence may lead to a churn contagion that amplifies the churn speed and scale. Hence, a need arises to understand why users churn wellness programs and how social contagion contributes to the churns. Leveraging the exercise challenge setting, the exercise data, and a large social network on a renowned U.S. online fitness platform, we investigate the effect of peers' behavior in exercise challenge churn on ego. To achieve the research goal, we employ an instrumental variable framework (shown in the figure below), using the exogenous variation of peers' weather in locations that differ from the ego's location as instruments. The framework untangles the endogeneity of the estimated effect using variations created by peers' weather as a shock to the ego's churn. We measure churn as a decision an ego makes after being inactive for one to two weeks and define peers as the ones an ego follows on the platform. We find that exercise challenge churn is socially contagious and demonstrates a complex contagion. Interestingly, our analyses reveal that the social contagion of churn diffuses from the sub-central or peripheral egos with fewer friends in the social network to central egos with more friends in the social network. Such churn contagion is mostly confined to low-density network communities with members who are poorly connected. Our findings have important implications for designing intervention plans to stop online wellness program churn based on social contagion.

Different parts of the work were done jointly with students Calvin Roth, Juali Huang, Yuanchen Su, and Yi Zhu, and colleagues Guangwen Kong and Zizhuo Wang.

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## Bio

Ankur Mani is an assistant professor in the Industrial and Systems Engineering department at the University of Minnesota. He is also an affiliate of the Data Science Initiative and Control Systems and Dynamics Group at the University of Minnesota. He received his Ph.D. from the Massachusetts Institute of Technology and B.Tech. degree from the Indian Institute of Technology, Delhi. Ankur's research interests include networks, distributed experimentation, and game theory with applications in social networks, supply chain networks, transportation networks and health care. His research has been published in major journals including Management Science and Nature Human Behavior among others and has received recognitions from the INFORMS revenue management section, INFORMS aviation section, and POMS, among others.

## Date & Time

📅 May 30, 2023

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