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Labovitz School of Business & Economics, University of Minnesota Duluth, 11 E. Superior Street, Suite 210, Duluth, MN 55802

Opinion Leadership and Social Contagion in New Product Diffusion

Raghuram Iyengar, University of Pennsylvania, USA

Thomas Valente, University of Southern California, USA

Christophe Van den Bulte, University of Pennsylvania, USA

We study the adoption of a new drug and address three research questions. First, is there social contagion over social ties such that better connected adopters exert more influence than less connected ones, over and above the effect of marketing efforts and system-wide time-varying influences? Second, to what extent does sociometric and self-reported opinion leadership overlap, and do they have the same influence on the time of adoption? Finally, is contagion a function of prior adopters' product usage, i.e., is their social influence affected by their usage status or volume rather than simply by their having tried the product?

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SYMPOSIUM SUMMARY

Social Networks and Consumer Behavior

Andrew Stephen, Columbia University, USA
Jonah Berger, University of Pennsylvania, USA

EXTENDED ABSTRACTS

“Opinion Leadership and Social Contagion in New Product Diffusion”

Raghuram Iyengar, University of Pennsylvania, USA
Thomas Valente, University of Southern California, USA
Christophe Van den Bulte, University of Pennsylvania, USA

We investigate the role of network position and opinion leadership in social contagion. Our study combines actual network data on advice and patient referral ties among physicians in three cities, demographic data on those physicians as well as a measure of self-reported opinion leadership, individual-level prescription data for the new drug as well as two other drugs launched earlier for treatment of the same medical condition, and individual-level sales-call data for the new drug. This data set allows us to perform a modified replication of the classic study *Medical Innovation* as extended by Van den Bulte and Lilien, with the additional benefit that the marketing effort variable varies not only over time but across physicians as well. Hence, we are able to investigate the presence of contagion dynamics in real market settings in which more traditional marketing efforts are being deployed as well, a question that is of great importance to both practitioners and researchers.

Another key feature of our study is that we use both sociometric and self-reported measures of opinion leadership. Physicians who are often nominated by their peers as people they turn to for expertise and discussion about disease management are likely to be true sources of influence. Physicians, who perceive themselves to be influential, in contrast, may indeed be so but may also have an inflated sense of self-importance. As a result, not everyone who believes is an opinion leader will actually be at the cutting edge of medical practice due to above-average expertise and clinical judgment. On the other hand, early adoption may be affected more by how one perceives oneself than by one's true status. This raises the possibility that sociometric leaders and self-reported leaders do not adopt equally early, but leaves the sequence in doubt.

A final distinctive feature of our study is that we observe not only time of adoption but also the number of prescriptions (usage volume) in each subsequent month. This allows us to shed further light on who is influential when. Prior research indicates that opinion leadership is associated with product involvement, suggesting that it is also associated with usage level. Someone who is using the product extensively is likely to be more enthusiastic and credible than someone who is not. To the extent that peers' product usage affects the amount of contagion exerted on potential adopters, heavy users are more influential and hence more attractive seeding points in a viral campaign, over and above their greater “stand alone” customer value.

We address three research questions. First, is there social contagion operating over social ties such that better connected adopters exert more influence than less connected ones, over and above the effect of marketing efforts and system-wide influences that vary over time? Second, to what extent does sociometric and self-reported opinion leadership overlap, and do they have the same influence on the time of adoption? Finally, is contagion emanating from prior adopters a function of their product usage, i.e., is their social influence affected by their usage status or volume rather than simply by their having tried the product?

We find evidence of social contagion even after controlling for marketing effort and controlling non-parametrically for any other changes over time. This justifies the deployment of network-based marketing strategies with the hope of accelerating new product diffusion. It further suggests that the dyadic social influence between individuals that is often observed in the lab can aggregate into broad social phenomena such as trends. In addition, we find that the influence of prior adopters is moderated by their prescription volume of the new drug, suggesting that heavy users are attractive viral seeding points over and above their greater “stand alone” customer value. Finally, the results indicate that sociometric and self-reported leadership are different constructs. Not only are their measures only weakly correlated, but they behave differently in the theoretical or nomological network we study. Sociometric leadership has a direct, main effect on time of adoption but does not moderate the sensitivity to social contagion. Self-reported leadership, in contrast, not only has a main effect but is also associated with a lower sensitivity to social contagion.

Taken together, these results provide insight into how social networks and actual product experience influence diffusion.

“Social Hubs: Do They Exist and What is their Role?”

Jacob Goldenberg, Hebrew University, Israel
Donald Lehmann, Columbia University, USA
Sangman Han, Sungkyunkwan University, Korea

Growth processes are important to marketing in general, and new product adoption in particular, where the diffusion of an innovation is governed, among other things, by word of mouth. In social systems, growth processes are thought to be strongly influenced by individuals who have large number of ties to other people. Although recent work by Watts and Dodds (2007) suggest that this influence was overrated, a heated debate about their existence and magnitude of impact of influentials exist.

In the social network literature, such people are called influentials, opinion leaders, mavens or sometimes hubs. Somewhat surprisingly, however, until recently there has been relatively little attention paid to these individuals in the marketing literature. Further, when the marketing literature does address such individuals, the focus is typically not on how they influence the overall market, but rather on either assessing their influence on people they are in direct contact with or identifying their characteristics. Broadly speaking, influential people are thought to have three important traits: 1) they are convincing (maybe even charismatic), 2) they know a lot (i.e., are experts), and 3) they have large number of social ties, they know a lot of people.

We focus on the third trait and present empirical findings on social hubs—individuals who maintain a large number of ties to other people—and their influence on the overall process of innovation adoption. We argue, somewhat contrary to recent suggestions, that social hubs adopt sooner than other people not because they are innovative but rather because they are exposed earlier to an innovation due to their multiple social links. We examine this argument using a mapped network and data on diffusion processes. Although social hubs have a higher adoption threshold, thus making them less “innovative,” they adopt sooner than less connected individuals because their exposure exceeds this threshold sooner.

We further distinguish between innovator and follower hubs. We show that the first influence mainly the speed of the adoption in

a network while the latter influence mainly the number of people that eventually adopt the innovation. The reason for the difference is consistent with dual market theories: innovative hubs adopt sooner and they turn on the process. If they adopt later the entire process will be slower. However, innovators are not trusted by the majority so innovative hubs have less influence on the market size. Follower hubs however are more reliable and their adoption can influence people to consider adoption as well. Hence they have a small influence on the speed of growth but a strong influence on market size. We also show that a small sample of hubs can be used to make an early forecast of the entire diffusion process.

Finally, we examine the advice and recommendation interaction from a point of view of an advice seeker. We focus on case in which advice providers can be people with high or low technical expertise (high in technical knowledge) and/or high or low socially connection. Somewhat contrary to intuition, information sources who are high on social connectivity are hypothesized to be relatively more attractive for more innovative products in case of a low innovativeness individuals. Consistent with this, a meta-analysis indicates that the correlation between knowledge and opinion leadership is indeed lower for more innovative products. Our studies also show that innovators consistently prefer to consult with people who are high on technical expertise, while those who are less innovative prefer to consult with socially connected individuals for more radical new products. For incremental products they prefer the experts. Finally, we show that while even less innovative consumers prefer to consult with experts about technical performance attributes for radical innovations, they still prefer to talk to a socially connected person for information about attributes that require skill to use.

Overall, this research provides an array of findings about social hubs and their role in diffusion and social contagion.

“Creating Contagious: Cascades in Spatially Dispersed Social Networks”

Andrew Stephen, Columbia University, USA

Jonah Berger, University of Pennsylvania, USA

What drives social epidemics? Cultural information and practices (e.g., products, websites, songs, or ideas) often spread like viruses across social ties between people. This diffusion is a key process through which consumers learn about new products. Further, it can be responsible for a product’s amazing success (or dismal failure) with relatively little, if any, investment in conventional marketing communications or promotion strategies. But what drives these situations where products spread like wildfire through a population? How does (a) the number and network position of the early adopters and (b) characteristics of the cultural item being shared influence whether the item catches on?

This paper explores these questions by studying how information spreads across a realistic social network. People belong to physical communities (e.g., geographic centers) and are socially tied to other people both within and outside their communities. We use a stochastically generated social network of 1,000 people and an agent-based simulation model to consider the diffusion of a new product across a range of conditions. In this model, information about an innovation spreads over social network ties, and consumers are “infected” on a continuous scale. Consumers who have higher infection levels can be seen as more aware or enthusiastic about the innovation, and thus more likely to influence other consumers. Every period, one of each consumer’s friends is randomly chosen as a potential influencer. We then use a simple influence model where consumers’ influence one another based on their own level of awareness or infection.

We examine how characteristics of the early adopters and of the innovation itself determine how widely and quickly a product catches on. Regarding early adopters, we vary the proportion of the population that is initially infected (via advertising, for example). We also vary how the early adopters are spatially distributed over the network (i.e., where they are positioned) and their connectivity characteristics (e.g., are they well-connected with many friends or less connected but within reach of many others?). The positions of the early adopters can also be thought of in terms of the “seeding strategy” that a marketer might use to try to initiate a cascade (e.g., select the well-connected people, randomly select people). Regarding the innovation itself, we vary how conducive it is to spreading. Some products or information spread easily while others are more difficult to diffuse. Specifically, some innovations are easy to try whereas others require much greater interest. Thus, we vary the trial (or adoption) threshold. Also, while products or ideas may be top of mind right after a person hears about them, their accessibility, or how enthusiastic people are about the innovation, soon declines. We therefore vary the rate at which this decline or decay occurs, with higher decay rates meaning that the innovation is harder to remember over time.

We then examine how these factors influence product adoption. In particular, how quickly and broadly the product catches on. We find that the network positions of early adopters can dramatically impact diffusion outcomes, particularly in cases that are not conducive to diffusion (e.g., information being hard to remember or adoption requiring high awareness or enthusiasm). Even when the innovation’s characteristics are well suited to it catching on the network positions of the early adopters influences adoption outcomes. Interestingly, when early adopters are well-connected (the traditional definition of a social hub or an opinion leader), the innovation does not diffuse widely and does not take-off. However, when early-adopters are positioned between many other people (i.e., social intermediaries) the innovation is much more likely to achieve widespread success. In fact, even when the early adopters have few connections, but are randomly dispersed throughout the network, more people eventually adopt the product than when early adopters are well-connected. This suggests that how well-connected early adopters are is largely inconsequential; rather, where they are positioned in the network is what influences whether they trigger a successful cascade. We also find evidence of some compensatory effects between the characteristics of the innovation. In particular, the adoption-dampening effects of high adoption thresholds can be mitigated by low decay rates (although the reverse is not true: high decay rates are not offset by low adoption thresholds).

In contrast to recent findings (Watts and Dodds 2007) our results suggest that easily influenced people are not necessary for cascades to occur. Rather social epidemics depend on the positions of the early adopters. In fact, cascades can still occur “against all odds” (i.e., when conditions are not conducive to diffusion) provided that the early adopters are positioned throughout the network. Overall, these results provide insights into how different initial conditions and micro-level behaviors influence macro-level outcomes in social contagion processes. They have direct implications to research on word of mouth, social influence, and diffusion more broadly.