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Commentary

Invited Comment on “Opinion Leadership and Social Contagion in New Product Diffusion”

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Iyengar, Van den Bulte, and Valente (2011; referred to as IVV in the rest of this paper) address a number of important questions in their paper, “Opinion Leadership and Social Contagion in New Product Diffusion.” They have assembled a unique data set in which they are able to observe not only adoptions and network ties, but also marketing effort and two different potential measures of recipients’ leadership, one self-reported and the other sociometric. Their paper delivers a number of important and interesting results: (1) contagion exists even after controlling for many possible confounds including, most significantly, marketing efforts; (2) contagion is moderated by the recipients’ self-reported opinion leadership: opinion leaders are less responsive to the actions of others; (3) this is not true of sociometric leadership (indegree); (4) contagion is moderated by usage: adoption by a heavy user has a bigger impact on her ties’ decision to adopt; and (5) time of adoption is increasing in both indegree and self-reported leadership: influentials adopt earlier.

Their paper promises to contribute to the evolving literature on word of mouth (WOM), and word-of-mouth marketing, in a number of ways. In this comment, I offer some opinions on where the paper stands in this literature and, perhaps more important and I hope more interesting, where the literature itself stands. The authors ground their inquiry in a set of three fundamental assumptions. I will discuss these assumptions that motivated their work and offer my perspective on IVV’s contribution to our ability to have faith in these assumptions. I will particularly highlight where I feel there may exist deeper, unanswered questions. I feel it important to stress that it is not my goal to write a review article on contagion or

word of mouth. My goal is a simple one: to emphasize the contributions offered by IVV and to note the very real potential their paper offered to shift the focus of future researchers in the area.

The authors argue that the field of word-of-mouth marketing is characterized by three assumptions. I address each of them in turn.

Assumption 1: Contagion Exists

The authors position this as the “most fundamental assumption of network marketing” (IVV, p. 2) and it is difficult to disagree with this assessment. After all, without this assumption, there would be no network marketing! Researchers and practitioners in the field are both driven by the assumption that people are influenced by the actions of others. Academics have expressed their agreement with this assumption by writing an astonishing number of papers in recent years on various aspects of word of mouth and social networks. Practitioners have voted with their wallets by shifting dramatically their promotional budgets from traditional media like newspaper and radio to “new media” and “social media,” which hold out the promise of affecting contagion in their favor.

To this point, I would suggest that the authors overstate somewhat the weight of evidence *against* this assumption. To be sure, as the authors note, there are many studies that fail to find strong or, in some cases, any statistical evidence for social effects (Van den Bulte and Lilien 2001, Marsden and Podolny 1990). However, is there truly a sizable segment of the academic community that would argue that contagion does not exist? Indeed, Cialdini (1998) lists social validation as one of the six fundamental laws of persuasion. Each of us can certainly recount many examples

of instances in which we were influenced by others in the making of a decision. As a particularly ironic example, the study of contagion has emerged as one of the most popular within the past five years. Much of this, I would suggest, is due to researchers sitting in seminars, talks, and conferences and saying, "Wow, this is interesting, I should work on it." Contagion at work!

In our Ph.D. programs, we're taught that the scientific method has four main components: observations of phenomena, hypothesis development, prediction, and experimentation. I would suggest that, in the study of contagion, the *observation* has to be that contagion exists. Thus, the test of the hypothesis that "contagion exists" is neither appropriate nor consistent with the scientific method. I recognize that this view is both strong and subjective. However, even the core result of Van den Bulte and Lilien (2001), which suggests that contagion was not a driving force behind the diffusion of tetracycline, is taken as an observation against which to compare the "fact" that contagion exists. In their 2010 follow-up paper, Van Den Bulte and Lilien show that by enhancing the model to better reflect the complexities of consumer decision making, they are able to recover the impact of contagion. Thus, they take as their observation the fact that contagion must exist and hypothesize that their (and others') simple model did not pick up the effect.

"So what?" one may ask. Is it really that important to determine whether "contagion exists" is more appropriately categorized as a hypothesis or an observation? After all, a number of the studies that have addressed this question have also demonstrated useful methodologies to the marketing audience (Van den Bulte and Lilien 2001, 2010; Chevalier and Mayzlin 2006). However, it is my strong opinion that there are far deeper, richer, and more impactful questions that could be addressed, some of which have been touched on by IVV. Again, by and large, these questions take the existence of contagion as a given and attempt to peel back the phenomenon and learn more about it. It would be my hope that, following up on IVV's results, we see further and deeper inquiry into these other areas.

Why Does Contagion Exist?

The current paper adds to an emerging and rich literature that is only beginning to seek the basis for contagion and the related moderating factors. At a blunt level, we do not know whether contagion effects are primarily awareness based on one hand, or persuasion or evaluation based on the other. That is, why is it the case that we so often observe that B is more likely to adopt something once her friend A adopts? Is it because B wasn't aware of it before A adopted?

Closely related to this, is it because A's adoption made a known product *salient* to B? Or, perhaps B was aware of it all along and A's adoption—and perhaps, the opinions she shared about it—changed B's opinion of the product.

Of course, we might expect that the answer to such a question may be moderated by many factors. Godes and Mayzlin (2009) argue that it may be the case that, when the product is characterized by low-risk trial and/or usage, the awareness effect may dominate. As a result, they show network saturation effects may render WOM from less loyal customers more impactful than loyal customers. IVV, on the other hand, study a product where adoption is both costly and risky. Moreover, it is a context in which awareness is accomplished through firm-driven marketing (detailing, in their case). As a result, it is reasonable to conclude that their effect is not driven by awareness and, instead, by changes to physicians' evaluation of the product's value.

What is not clear in this context is whether the distinct results—the disproportionate impact of heavy users—is due to the relative riskiness of the product domains, on one hand, or to other factors. Surely, the riskiness of the product may be one dimension along which the awareness-versus-evaluation distinction is meaningful. However, it could also have been because awareness was "taken out of the equation" by virtue of the firm's marketing efforts. There remains far more work to be done in terms of both (a) understanding when and why awareness may dominate in some, but not other, domains; and (b) more importantly, what other benefits—beyond increasing awareness and evaluation—do others' adoptions confer? For example, contagion could reasonably be expected to follow from risk reduction—a narrowing of the spread of the distribution as opposed to a shift in the mean.

When Does Contagion (Not) Matter? How Much Does It Matter?

Beginning with the "fact" that, as social creatures, humans pay attention to—and draw information from—the opinions and actions of others, it is clearly the case that this is likely to happen more in some contexts than in others. When do we rely on others more? A straw man would be that we do so when the purchase is a particularly risky or important one. However, this does not square with casual observation, which suggests that contagion is at least as impactful in cultural products—music, movies, or books—as for, say, car purchases or home purchases. Related to this question is the extent to which positive or negative opinions have more of an impact. Chevalier and Mayzlin (2006) suggest that negative reviews have a bigger impact than positive. However,

it is possible that their result could be domain-specific: online book reviews are notoriously positively skewed. As a result, a negative review may generate more salience and, thus, attract more attention. It is notable in this regard that Amazon.com now presents their ratings in a balanced way, showing both the "most helpful favorable review" and the "most helpful critical review" side-by-side.

Researchers in the field are well aware that, for all the tribute we pay to contagion, it is not necessarily trivial to demonstrate it empirically. IVV, for example, demonstrate that contagion exists for 43% of the recipient physicians who were lowest on self-reported leadership. Moreover, it only occurred when the contagion parameter was volume, not use or adoption. Likewise, Godes and Mayzlin (2009) report overall contagion effects in both the lab and the field. However, loyal customers and opinion leaders did not appear to spark contagion. Why are these effects so hard to find if they're as pervasive as we believe (and I claim) them to be? One answer may be that the effects just aren't that strong. Perhaps social effects matter, but they don't matter that much on average, across the population? Another possible explanation is that the models being used have not been rich enough to identify the effects. Indeed, Van den Bulte and Lilien (2010) make this precise point. As these researchers suggest, as we develop a deeper understanding of the mechanisms behind contagion—whether they be awareness, evaluation, or something else—we will be better positioned to capture these insights in richer models that may—or may not—demonstrate consistently stronger contagion effects.

Is Contagion Good?

A closely related question that IVV addresses tangentially is whether contagion is beneficial to individuals and/or society. On one hand, as with the models of informative advertising (Stegeman 1991), we would assume that more information is good, so, of course, contagion is beneficial. However, the truth is still far from clear. On one hand, the pioneering herding work of Banerjee (1992) suggests that observational learning—a form of nonverbal contagion—may lead to suboptimal outcomes. Effectively, rational agents at some point ignore their own information and, instead, simply follow the herd. In a different setting, online reviews, Li and Hitt (2008) demonstrate that consumers do not factor into their purchases the fact that the arrival rate of reviewers may be systematically biased. As a result, presumably, they make less accurate purchases. Far more work needs to be done to understand the nature of the postchoice impact of contagion on individual utility. Moreover, the impact on social welfare is likely to have important components to consider beyond simply the aggregation of

possible short-term purchase errors. For example, one could envision a setting in which contagion leads to more winner-take-all outcomes. To what extent, one may ask, do the information benefits of contagion outweigh the long-term consumer surplus loss that could result from the decrease in competition?

Assumption 2: Some Customers' Adoptions and Opinions Have a Disproportionate Influence on Others

As with the first assumption, I would again argue that this is effectively a given: little evidence points to the opposite result. *Of course*, it must be the case that individuals vary in the extent to which they have influence! I might suggest that one reason for the appearance of a "puzzle" here is the narrow approach the literature has taken to its consideration and definition of opinion leadership. The authors argue that the disproportionate impact of the "opinion leader" is likely to be observed more easily when these actors have more ties—when they are more central. When this is not the case, IVV suggest that each node in the graph will have roughly the same impact as others. On one hand, I agree with the authors—indeed, it is hard to disagree on this level—that opinion leadership is derived in part from the structure of the network. However, influence surely derives from other—perhaps many other—sources than simply sociometric centrality (see, for example, Goldenberg et al. 2006).

It is notable that IVV go well beyond the literature on this issue. In fact, it is my opinion that the paper's biggest contribution lies in its analysis of individual-level contagion moderators. That the actions of heavy users seem to have a bigger impact on contagion and that those with higher levels of self-reported leadership are less vulnerable to contagion are very interesting results. Moreover, these results have the potential to open up broad new areas of inquiry. As with Assumption 1, I think the work of IVV in addressing this raises a host of additional, important avenues of inquiry.

Which Customers Are More Influential? Why?

The question facing the literature is not whether this is the case, but on the contrary, *given* that it must be the case, which customers are they, and equally important, why? IVV's result demonstrating contagion in their volume model but not in models of either usage or adoption provides evidence that "heavy users" are more influential than the average user. Usage levels are a particularly attractive proxy for influence because, for many firms, it is relatively easily observed.

The obvious question here is why this is the case? Why do heavy users have more influence? On one

hand, it could be a correlation between the heavy users' status in the field and their prescription amount: the physicians who work in high-volume clinics may also be those that are most highly respected by other physicians and, thus, are those that create the most contagion. On the other hand, it might be the case that usage is a proxy for involvement such that more highly involved physicians are more likely to talk about the product. The second explanation would relate to the probability that the doctors talk about it, whereas the first would relate to the likelihood that they're listened to. Of course, evidence as to which mechanism explains contagion—in this context and more generally—would be critical information for marketers in their efforts to design effective word-of-mouth marketing campaigns.

It would be very important to follow up on this result and assess the extent to which the heavy-user result is general: are heavy users *typically* more influential? A case could be made for this general result in that the marginal gains to quality are higher for heavy users, and thus, their opinion ought to carry more weight. Moreover, one might suspect that a heavy user would have had more experience in the category and, thus, more opportunities to judge high from low quality. Having said that, one can also make arguments on the other side. Heavy users are likely to have more deeply embedded relationships and processes than lighter users. As a result, heavy users may be somewhat less innovative and more risk averse. Thus, their opinions about new offerings and developments may not be sought out. Godes and Mayzlin (2009) show in both empirical and experimental data that loyal customers—those with the highest usage—are not necessarily those whose incremental recommendations have the biggest influence on others. They argue that this is because these heavy users are likely to be friends with other heavy users already.

A particularly interesting aspect of the question as to who is more influential relates to an emerging recognition in the literature that influence, or opinion leadership, is not a unidimensional construct. As shown by Goldenberg et al. (2006), opinion leadership may be composed of two distinct dimensions: expertise and social connectedness. In a related theoretical study, Mayzlin and Yoganarasimhan (2010) analyze the optimal linking strategy of bloggers, some of whom have content-generation skills and others who have content-identification skills. Finally, this raises a question about the relative informativeness of sociometric measures of network structure compared with self-reported measures of influence or opinion leadership when considering that network structure is endogenous. If actors link to (listen to, friend, call, ask) others that have valuable information for any

reason, then the network structure should be a function of the distribution of expertise. The extent to which empirical networks demonstrate this relationship remains to be considered in the literature.

Which Customers Are More Susceptible to Contagion? Why?

A particularly fascinating result offered by IVV in this paper, which holds the promise of fostering a new and promising domain of inquiry, is the *role of the recipient*. This is a topic that has barely been touched in the literature yet, one would presume, is at least as important as the role of the sender (see Stephen and Lehmann 2010 for one example of current work along these lines).

Of most interest in this regard is the approach taken by IVV to look at the traditional moderators of *influence*—self-reported leadership and sociometric centrality—and assess the extent to which they may also moderate *vulnerability* or *susceptibility* to contagion. To my knowledge, this has not been raised in the literature, yet it would seem to be of great importance. If a concept is to travel virally through the population, then those with significant influence need first to adopt it. Most researchers have implicitly assumed this stage of the process away because—as also shown by IVV—opinion leaders simply adopt sooner. However, in the current highly interconnected world, the two-step sequential flow of information proposed by Katz and Lazarsfeld (1955) would not seem to fit as well. Thus, we ought to be concerned with the extent to which ideas are or are not adopted by these influentials. The literature would benefit, at this early stage, from some theory building as to why it might be that those most influential are also less vulnerable.

A similar assumption is implicit in the use of proportional threshold adoption rules in network simulations (Watts and Dodds 2007): if one needs 25% of her network to adopt before she does, then those with bigger networks will be less influenced by the adoption of one of her peers, all else equal. This assumption has been justified on the grounds that observing *nonadoptions* is informative as well. Thus, in a scoring-based system, each nonadoption should be outweighed by the same number of adoptions to result in contagion. What is surprising here, however, is that it is not sociometric influence, that gives rise to this result but self-reported influence, which, unlike the former, has as one of its components—expertise. Thus, the rationale for the hypothesized (and, in this study, observed) negative correlation between vulnerability and influence would not seem to hold. Why, then, would this be the case? One candidate explanation may be that those with influence are more concerned with their social status and, thus, are more

"picky" about the innovations they adopt. Thus, they wait longer. Another possible basis might be expertise: those with the most influence have achieved their status by virtue of their ability to discern which innovations are worthy of adoption and which are not. The former is based on impression management, whereas the latter is not. Empirical and experimental tests of these—and surely many other—explanations for this observed phenomenon would be both interesting and important.

Why Do People Do It?

The observation that those with more influence adopt more slowly raises the more global question as to why people choose to drive adoption. Why does one choose to be an opinion leader, if in fact this is a volitional choice? Why do some people systematically share more information than do others? Of course, when the mechanism of contagion is observational learning (Banerjee 1992, Zhang 2010), this question is not very interesting or important. However, when word of mouth represents the medium, then the underlying motivation clearly matters. Possible explanations include altruism or helping behavior, involvement and self-enhancement, or signaling (Dichter 1966).

Assumption 3: Firms Are Able to Identify and Target Influentials

Inherent in all of the recent academic and managerial interest in social networks and word of mouth is the assumption that the firm can actually *do* something to influence them. As IVV note, the first step in "doing something" would be to identify who the influential people are, and the second step would be to address them in some way, either by providing information, an offer, or some other inducement. I am in full agreement with the authors that (a) this is an assumption we are all implicitly making in paying attention to the domain, and (b) the veracity of the assumption has yet to be established. To this end, the authors demonstrate that two common measures—indeed, the two *most* common measures—of opinion leadership are only weakly correlated and have different impacts on contagion.

It is interesting to note that the "impact on contagion" studied in IVV is multifaceted. On one hand, they are able to show that heavy users may be more influential. As noted above, it would be interesting to study the extent to which usage and opinion leadership are somehow correlated. On the other hand, they also take the novel approach of investigating the *receptiveness* or *vulnerability* to contagion as a function of opinion leadership.

It is my opinion that one of the barriers preventing advances in this area is the murkiness of the concept

of "influence" and "opinion leadership." I doubt there exists much debate as to whether the commonly used opinion leadership scale is externally valid and predictive. Indeed, both Godes and Mayzlin (2009) and Wojnicki and Godes (2010) find that the amount of WOM is increasing in one's response to this scale. However, it is also clear that administering this scale is prohibitive in a campaign of any reasonable size. This is doubly true for the sociometric measures. Thus, the question is whether the firm can identify the influential members of a community in an efficient and economically actionable way. The answer to this is far less clear. However, the results of IVV offer some promise. Usage levels are easily observed by many firms through the use of loyalty cards or other tracking mechanisms. To the extent that this serves as a proxy for, or moderator of, influence, the firm would be in a better position to leverage the influence of its customers.

Once Identified, Can They Be Motivated?

A remaining question is provoked implicitly by the paper's heavy-user result. If we are indeed able to consider usage as a proxy for opinion leadership, then what comes next? Even if identified and addressed, can these influential consumers themselves be influenced by the firm? IVV are not able to address this directly because the underlying process being analyzed was not itself a word-of-mouth marketing campaign. That is, the contagion that resulted arose organically and not as a direct result of firm actions, other than its detailing efforts, which do not appear to have been guided by expectations regarding influential behavior. What remains an interesting and provocative question is whether IVV's results suggest that the firm could have enhanced adoption and/or accelerated contagion by, for example, detailing the heavy users more vigorously. What could or should the firm have offered these physicians to encourage their influential adoption? One could imagine a range of actions beginning with the provision of more information—presumably closer to what the firm in the IVV study did—all the way to some form of compensation either for actions (discussing the product at a conference) or results (a spiff for colleagues' adoptions). Of course, given the domain, the firm would necessarily be limited significantly in its ability to implement such offers. Nonetheless, the general question is an important one, and the answers are far from obvious. As noted, there is emerging research, not all of it consistent, regarding who creates contagion. However, what is not clear is whether the same people are the optimal target for a firm's word-of-mouth marketing campaign. Godes and Mayzlin (2009) suggest that this may not always be true. However, that study was

done within a specific context with a low-risk product. Far more work needs to be done to establish whom the firms should target and what moderates that decision. Related to this, there exists very little guidance as to how to address and motivate them once the target is chosen. Ryu and Feick (2007) demonstrate that monetary rewards may encourage consumers to create incremental ties. However, the impact of these ties is not studied. To what extent do "firm-influenced ties" or "firm-influenced communication" differ in any meaningful way from organically arising communication?

In closing, and revealing my parochial views, I would make the argument that it is research in this area—the role of the firm—that would most benefit from the marketing discipline's expertise. One of the real exciting aspects of doing work in the field of contagion is that one interacts with other researchers drawn from a diverse disciplinary background unmatched by that associated with any other problem domain. These disciplines include physics, sociology, computer science, and operations, to name just a few. However, none of these disciplines has, as part of their focal interest, the role of the firm in designing contagion-building campaigns. The marketing field has had a great deal to say about the firm's actions with respect to such questions as advertising, sales force deployment, and research and development expenditure. The work of IVV—and the many papers related to it—points out the need for the field to shift its focus similarly to characterizing these choices in the domain of contagion.

Conclusion

The study completed by IVV provides the field with an opportunity to take stock of where it is, what is known, and what is not known. I argue in this comment that IVV all but put to rest the question of whether or not contagion exists (it does). Moreover, they provide additional evidence that some people have more of an impact—and are more vulnerable—than others. It is my hope that one of the paper's main contributions will be in triggering a shift in focus away from mere demonstrations of existence to

deeper analyses of the phenomenon, its mechanisms, and the implications it has for optimal firm strategies.

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