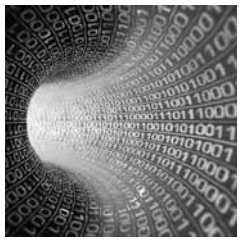

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ARTICLE

# The limits of networks as models for organizing the social

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## Abstract

Social network services exhibit dual processes that enable both the creation of new public spaces and the controlling and monitoring of these spaces through mechanisms facilitated by the architecture of the network itself. This article explores how network science informs the design of for-profit networking services by providing templates for organizing the social. As the case of social networking websites illustrates, networks have gone from scientific frameworks or even mere descriptive metaphors to actualized models that normalize a particular kind of privatized sociality. In an attempt to theorize forms of resistance to these templates of social organization, I suggest two concepts crucial to the articulation of a critical theory of networks: nodocentrism and paranodality. The goal of such a critique is not a complete rejection of networks as models for organizing sociality but rather a shift in our ways of knowing the world through the epistemological exclusivity of the node.

## Key words

critical theory • ICT • networks • new media • public sphere • social network analysis • technology and society

## INTRODUCTION

In a controversial and well known article, 'Is Google Making Us Stupid?', Nicholas Carr (2008) argued that the internet is diminishing our powers of

concentration, taxing our attention with advertisements, and promoting a broad but superficial kind of knowledge that erases the possibility of a shared cultural meaning. Of course, he targets Google because of the company's dominant although by no means exclusive role in turning information into a commodity and wanting to supplement – perhaps eventually even replace – our brains with an artificial intelligence that can process information more efficiently. Although far from being a radical anti-capitalist, Carr's point in critiquing Google is that much is at stake over who gets to define what the models of information processing look like. This is a point that can also be made about some corporations' influence in defining emergent models of social organization. If Google is making us stupid, Facebook might be making us compliant and docile. In order to understand why this might be the case, we need to consider the economics and market structure of an emerging industry: the technologizing of society through social networking services.

Social network services such as Facebook and MySpace are web-based platforms that allow users to create a personal profile by filling out a form that collects personal information. Once a profile has been created, the user can 'friend' or 'unfriend' other users by linking to their profiles or removing existing links. Users can also become members of various groups on the same network that share similar interests (for a more extensive discussion of the characteristics and dynamics of social networking websites, see Boyd and Ellison, 2008). Social network services can map already existing networks (for instance, a group of students taking a college class) or they can map new networks of people who were previously unconnected but who are brought together by a common interest (for example, a local, national or global group supporting a social cause).

The growth of this industry has been remarkable, and it is not insignificant that the most active social networking websites today are under the control of corporations and operate in an industry that is becoming increasingly conglomerated. For instance, MySpace (which currently has over 185 million members) was bought in 2005 by Rupert Murdoch's media conglomerate News Corporation for US$580 million (Gunther, 2006). As an example of explosive growth, take the current flagship of social networking websites: Facebook. Founded in 2004 by a Harvard sophomore, by early 2007 Facebook, Inc. was adding on average 250,000 new members on a single day (Melber, 2008). According to industry reports, the social networking market as a whole grew 87 percent from February 2006 to February 2007, accounting for 6.5 percent of all internet visits (Britton and MacGonegal, 2007: 80). During roughly that same window of time, MySpace grew from 66.4 to 114.1 million users, Facebook went from 14.1 to 52.2 million members, and Orkut (owned by Google) from 13.6 to 24.1 million members (Britton and MacGonegal, 2007: 80). Part of this explosive growth can be

explained by the fact that users can join these services for free. However, socializing comes at a cost. The business model of social network services is driven by advertisements that are targeted to users based on the demographic data they enter in their profile. The amount spent on advertising in social network services was projected to be $865 million in 2007 and it is estimated to reach $2.2 billion by 2010 (Britton and MacGonegal, 2007: 80).

The issue of corporate ownership often gets overlooked because there is a widespread perception that new internet information and communication technologies, including social networking websites, are increasing civic participation. The focus of current research seems intent in corroborating this perception. *The Internet and the 2008 Election*, a study by the Pew Internet & American Life Project, reported that 46 percent of the population has used the internet, email and/or text messaging to 'get political news and share their thoughts about the [US presidential] campaign' (Smith and Rainie, 2008: 8). Although, as expected, the larger portion of that figure is comprised of people who simply use new media to receive or retrieve information, the study reports that around 11 percent of the population of the USA has actively used those tools to contribute to the political conversation by forwarding or posting someone else's commentary about the race. Specifically, 5 percent of the population posted their own original commentary or analysis to an online news group, website or blog (p. 8). It should come as no surprise that young people are leading this trend. And one of the tools they are most likely to use for this purpose is a social network service. About two-thirds of internet users under the age of 30 have a user profile in a social networking website like Facebook or MySpace, and according to the Pew report about 40 percent of them have used these sites to engage in political activity of some kind (p. 10).

Some authors have begun to wonder about the limits of a participatory culture in the context of capitalism and consumerism. Levine (2008), for example, discusses the challenges that students face and will continue to face in finding appropriate audiences for their civic-oriented participatory media work in an environment dominated by commercial products. As Montgomery (2008) also points out, despite the numerous examples of youth empowerment through digital media, important questions remain about whether these new models of participation can be adopted by larger segments of the population and applied to a range of issues outside of the high-profile character of occasional events such as national elections. Furthermore, she argues that 'the capacity for collective action, community building, and mobilization are unprecedented. But the move toward increasingly personalized media and one-to-one marketing may encourage self-obsession, instant gratification, and impulsive behaviors' (Montgomery, 2008: 42). Additionally, Coleman (2008) questions the capacity of government-driven digital media curriculums to address questions that might potentially challenge

the power and legitimacy of corporations or the state. His work serves to remind us that the models of participation that the technology affords are shaped to a large extent by the politics of the institutions that make the technology available.

On the one hand, then, we see an increase in the use of social networking services. Most of the research cited above seems to suggest that a growing portion of the population (especially the youth) will continue to use social network services to engage in some form of social participation. On the other hand, we must also acknowledge the fact that the most popular of these social networking sites are privately owned. Of course, there are examples of non-commercial social network services oriented towards educational, religious, medical and other communities. But when compared to the millions of users of for-profit social network services, it is obvious that they cannot compete with them in terms of popularity and reach (at most, we can infer that people use a mix of commercial and non-commercial services).

In the end, while it is true that a few corporations control the industry, it might be argued that these companies are not monopolizing the 'DNA' of emerging forms of online social organization, but merely capitalizing on a model found throughout the universe. After all, science has identified small-world networks (networks composed of small isolated groups which are connected by a few acquaintances) everywhere in the natural and social world, from protein networks to terrorist networks. But as Monge and Contractor (2003) suggest, the theory of the small-world network is useful not only for *identifying* but for *designing* networks as well. The question then becomes which designs become dominant, and what forms of social participation they normalize.

## RESEARCH QUESTION AND OUTLINE

It is the commercial nature of social network services and its impact on new forms of social organization and participation that concerns this article. To understand these new forms of social organization, I argue, we need to look at how the scientific principles of social network analysis inform the design of these services. Social network analysis, or the study of society as a network of interconnected actors, is a discipline with a 70-year-old history which predates the internet. It is informed by a series of observations about the characteristics and behaviors of networks known as network science, the organized study of networks based on the application of the scientific method. These scientific principles can shed light on how social network services are put together, and what forms of social organization they engender. I can thus frame my research question as follows: *How does network science inform the modeling of social network services in ways that advance the interest of corporations and limit the production of alternative forms of social organization?*

This article does not seek to provide the empirical data to answer this question. Rather, by exploring the conceptual limits of networks as templates for organizing sociality, it aims to suggest a theoretical framework for articulating new forms of knowledge that can emerge from the unmapping of the dominant network model.

The remainder of this article is structured as follows: First, I describe the characteristics of social network services by focusing on how private ownership shapes the dual processuality of these networks, enabling both the creation of new social spaces and the controlling and monitoring of these spaces through mechanisms facilitated by the architecture of the network itself. I illustrate the tensions created by these dual processes by asking whether social network services engender publics (where opinion can be expressed freely and at the same time informs action) or masses (where opinion can be expressed freely but is not realized in action). Next, I look in more detail at how the science of networks informs the design of social network services by providing an organizing rationale. My point is that as the case of social networking websites illustrates, networks have gone from scientific frameworks or even mere descriptive metaphors to actualized models that normalize a particular kind of privatized publics. In an attempt to theorize forms of resistance to these templates of social organization, in the next section I move away from a focus on social network services and suggest two concepts crucial to the articulation of a general critique of networks: nodocentrism (an epistemology based on the exclusionary reality of nodes) and paranodality (a model for disidentifying from the network). Lastly, I briefly note some possibilities for conducting further research employing these concepts and suggest that the normative goal of a critical network theory does not imply a complete rejection of networks as templates for organizing sociality but rather a shift in our ways of knowing the world through the epistemological exclusivity of the node.

Before proceeding, it must also be acknowledged that a multi-layered analysis of the affordances of social network services is bound to engage in at least two forms of reductionism. First, an exclusive focus on social network services is bound to privilege social networking websites to the exclusion of other networked ICT such as email, listservs, blogs, file sharing, instant messaging, etc. that often work in conjunction with (not separately from) social networking websites to engender new forms of social organization. Second, in spite of trends towards conglomeration, the market structure of the social network services industry is between monopolistic competition and an oligopoly, meaning that there are a number of large companies in this market competing with each other (as evidenced by the fact that users can and often do have accounts in more than one service, e.g. a Facebook account, a MySpace account, and a defunct Friendster account). To talk

about social networking sites owned by the corporate media as a class is therefore to conflate a number of competing and diverse offerings.

## CHARACTERISTICS OF SOCIAL NETWORK SERVICES

It is undeniable that social network services provide significant opportunities for social and civic participation. But while most of the emerging research is being devoted to the *kinds of opportunities* that these services provide, there are still not a lot of questions being asked about the *kinds of markets* in which the providers of these services operate. eMarketer projects that 49 percent of all adult US internet users will use a social network service by 2011 (Thierer and Eskelsen, 2008: 33). Meanwhile, according to a Pew report, 55 percent of US teenagers already have one or more accounts on a social networking website (Britton and MacGonegal, 2007: 80). Although no data could be found at the time of this writing that aggregates figures for the non-profit social network service providers, it is safe to assume that in the future most internet users across the globe will use a social networking website owned and operated by a corporate provider (from now on, I will simply use the term 'social network services' to refer to *for-profit* services, unless otherwise indicated).

When looking at traditional forms of media like television or radio, we usually distinguish between corporate and public providers because we believe the issue of ownership makes a difference in terms of mission, financial objectives, social obligations, use of advertising, view of audiences as consumers or citizens, diversity of voices, transparency, attitudes towards regulation, etc. (see for example Croteau and Hoynes, 2005). But curiously, even those researchers who see social networking technologies as advancing more active forms of citizenship have mostly neglected the question of how these forms will be actualized under the corporate models that most users will be exposed to. Missing, then, is a discussion of the increasing privatization of public space and the commodification of social life that accompanies late capitalism; or, to paraphrase Vandenberghe (2002), an exploration of how the social is becoming part of the economy, as opposed to other models where the economy is part of the social.

One of the defining characteristic of social network services, and of social networks in general, is their dual processuality. As Van Dijk (1999) observes, networks simultaneously generate a scale expansion and a scale reduction. For instance, international trade and the transnational expansion of corporations (scale expansion) are accompanied by a reduction in the average size of a company's workforce (scale reduction). Dual processuality can help us contextualize some of the specific characteristics of social network services that seem to produce contradictory effects. For example:

- *User freedom* (users deciding what groups to form, what content to create) seems to expand on the one hand, while on the other hand

*corporate determination* (the corporation deciding which new features to implement, which members to expel, or even whether the network will exist tomorrow or not) curtails that freedom.

- *Increased opportunities and tools for content production* are countered by the *transfer of property rights* to the corporation (this happens when corporations acquire the intellectual rights of whatever users create or upload to the network).
- The proliferation of *user-generated content* is juxtaposed to the *commodification of collaboration* (as when the content created by one user is presented to another with advertisements from which the corporation profits).
- The *diversity of voices* (no limits to the creation of communities of interest) is countered by the *homogenization of platforms* (all communities must use one set of tools and abide by one set of rules: the corporation's).
- The creation of a *level playing field* (where voices have the same chance of being heard) is countered by the *reproduction of social inequalities* (where, as Van Dijk (2005) points out, inequality resides in access to certain positions within network, not just access to the network).

## PUBLICS OR MASSES?

When we take into account the characteristics described above, as well as the fact that in the near future around half of the population of the US is likely to engage in social participation using these corporate-owned services, the question arises as to the forms of social organization that we can expect to see.

One way to understand these new formations is through a comparison of the features of the public and the mass. Although the definition of these terms is anything but straightforward, a general comparison of the kinds of societies represented by the two concepts can be illustrative. Some authors (for example Castells, 2000; Van Dijk, 1999; Wellman, 1998) have suggested that we have experienced a shift away from a mass society to a new kind of network society: from densely-knit urban communities that are isolated from each other but organized under the umbrella of the nation-state, to a society comprised of diffused individuals operating in small sparsely-knit communities not bound by location but interconnected by networks. Other authors imbue this transition with normative connotations, arguing that the network society represents an opportunity to reverse the process of mass-formation (mass culture disseminated through mass media) and return people to the status of a public. This is because new technologies such as social networking websites, they argue, allow individuals to become producers and not mere consumers

of culture, making it possible for individuals to receive but also to express opinions. This sentiment is captured in Jay Rosen's manifesto 'The People Formerly Known as the Audience' (2006). According to Rosen, users of the new networked media are saying to the old media: 'You don't own the press, which is now divided into pro and amateur zones. You don't control production on the new platform, which isn't one-way. There's a new balance of power between you and us' (para. 24).

This position seems to echo that of philosophers such as Tocqueville (2004), Dewey (1991), Lippmann (1993), Mills (1956), and Habermas (1991), to name but a few, who believe that an authentic democracy requires an informed public to operate, whereas non-democratic forms of government function on the consensual passivity and ignorance of a mass. Most of these philosophers are engaged in a critique of mass culture and mass communication by placing it in direct opposition to a somewhat romanticized notion of the public. Mills (1956), for instance, describes the disparity between publics and masses in terms of three main differences. First, in a public 'as many people express opinions as receive them' while in a mass, 'far fewer people express opinions than receive them; for the community of publics becomes an abstract collection of individuals who receive impressions from the mass media' (Mills, 1956: 303–4). Second, in a public 'communications are so organized that there is a chance immediately and effectively to answer back any opinion expressed in public'; on the other hand, in a mass 'the communications that prevail are so organized that it is difficult or impossible for the individual to answer back immediately or with any effect' (Mills, 1956: 303–4). Based on the first two criteria, those who are optimistic about the democratic potential of social network services can argue that new networked media facilitate the formation of publics because individuals have increased opportunities for self-expression and can contribute immediate reactions to public discourse with unprecedented effectiveness.

Of course, one can counter this optimism with the arguments of other authors who have seen in the dynamics of mass society not the curtailment of self-expression, but its unabated promotion. For example, Benjamin, concerned with the link between mass media and the rise of Fascism, pointed out that 'Fascism sees its salvation in giving these masses not their right, but instead a chance to express themselves' (1968: 241). More recently, Deleuze made the following observation about control societies: 'Repressive forces don't stop people expressing themselves but rather force them to express themselves. … What we are plagued by these days isn't any blocking of communication, but pointless statements' (1997: 129).

This failure to translate verbalism into activism by promoting never-ending self-expression – something that seems alive and well in networked media – brings us to the third and final difference between publics and masses

according to Mills. In a public, he argues, 'opinion formed by such discussion readily finds an outlet in effective action, even against – if necessary – the prevailing system of authority'; on the contrary, in a mass, 'the realization of opinion in action is controlled by authorities who organize and control the channels of such action' (Mills, 1956: 303–4). What is at stake in the privatization of public space advanced by social network services is not just the control over the channels of information (which are indeed more evenly distributed than before), but over the control of the modes for transforming information into action. I therefore suggest that an authentic challenge to the prevailing system of authority must come from the conceptual *outsides* of the network. Before considering these outsides, however, we must take a closer look at the science that informs the models of action programmed into social network services.

## NETWORK SCIENCE

As I have been suggesting throughout this article, social network services do not merely map or describe social networks but provide specific templates or models for organizing society. This technologizing is possible because of previous scientific work in applying networks as frameworks for understanding the structure of society. This branch of network science is known as social network analysis. Social network analysis uses scientific methods for describing how a set of social ties connect all or some of the members of a network (Wellman, 1998). Social networks can describe systems as small as a family or as complex as a transnational corporation. The nodes in these networks make use of the ties or links that connect them to exchange resources, ideas or messages.

One of the insights afforded by social network analysis is that the concept of *community* today is no longer confined to one location in space; an individual's community can truly encompass the world. In essence, social network analysis attempts to shed light onto the mystery of how community is formed and maintained. According to Wellman, there are two aspects to what he calls the Community Question: 'How does the structure of large-scale social systems affect the composition, structure, and contents of interpersonal ties within them?' and 'How does the nature of community networks affect the nature of large-scale social systems in which they are embedded?' (1998: 2). This resonates somewhat with Van Dijk's (1999) observation about the dual structure of networks, which simultaneously facilitates scale reduction and scale expansion: a shift in the social dynamics at the micro level can have an impact at the macro level, and vice versa.

The study of social networks attempts to explain these dynamics through the application of the scientific method. There are a variety of metrics that have been developed to study social networks. These metrics can describe

the properties of the network as a whole (metrics such as size, density, centralization, inclusiveness, symmetry, transitivity), the properties of the nodes themselves (in/out-degree, diversity, closeness, betweenness, prestige), or the properties of the ties that connect the nodes (indirect links, frequency, stability, multiplexity, strength, direction, reciprocity) (see Monge and Contractor (2003) for definitions of each concept).

It is also important to point out that social network analysis assumes a scarcity of resources in a society, and it therefore looks at the 'structural integration of a social system and the interpersonal means by which members of this social system have access to scarce resources' (Wellman, 1998: 3). One of the concepts in social network analysis that attempts to explain the value or importance of ties to overcome scarcity collectively is the concept of social capital (see for instance Bourdieu, 1984; Coleman, 1990; Putnam, 2000; Lin, 2001). Nodes with more social capital have a greater chance of overcoming scarcity.

According to Monge and Contractor (2003: 88), the exchange of social capital in all social networks can be described in terms of eight rules of communication (each based on scientific theories that are beyond our present goal to summarize): nodes try to keep the cost of communication at a minimum (theory of self-interest), nodes try to maximize the collective value of their communication (theory of collective action), nodes try to maintain balanced interactions among those they communicate with (balance theory), nodes are more likely to communicate with someone who has what they need or needs what they have (resource dependency theory), nodes are more likely to communicate in order to reciprocate for past exchanges (exchange theory), nodes are more likely to communicate with others who are similar and not with others who are different (theories of homophily), nodes are more likely to communicate with others who are physically near or electronically accessible (theories of proximity), and nodes are more likely to communicate with others in order to improve their individual fitness or the fitness of the network (co-evolutionary theories).

The design of social network services has taken these scientifically-derived *descriptive* observations of behavior in networks and, by programming them in the code that regulates the interaction among nodes, has transformed them into *normative* rules of behavior. That this translation from observations to rules has taken place is not surprising since, to a certain extent, the application of scientific knowledge in the creation of systems is what engineering as a discipline is all about. What should be open to critique, I argue, is the deployment of these rules in such a way that they become dominant models of social subjectification: controlled by a few, consumed by most, and presenting an obstacle to the creation of alternative forms of social organization.

Thus, the question of how network science informs network modeling (how theory becomes practice) becomes a question of the dual political structure of social network services, a structure that simultaneously expands and limits the scales of control and freedom. In other words, the issue is not how scientific concepts such as the theory of structural holes (a network's propensity to bridge the gap between two unconnected nodes; see Scott, 1991; Burt, 1992) informs the design of web services, but how these concepts are used in applications with negative social effects. An ongoing debate, for instance, concerns the use of viral marketing in social network services to target the marketing of junk food to minority children in poor urban areas at a time when almost 19 percent of children in the US between 6 and 11 are overweight (see Holahan, 2008). Instead of relying on centralized dissemination, this kind of viral marketing applies network science to propagate marketing messages by using social ties. Another example concerns the use of network concepts like transitivity – which establishes that if A is connected to B and B is connected to C it is likely that A will connect to C – to exploit social networks in order to provide targeted product recommendations. And beyond the marketing applications, there are the surveillance applications: the same science that can be used to identify the perfect audience for a product can also be used to identify potential threats to the security of the network (see Melber, 2007). What we end up with is an increasingly commodified and surveilled public space.

## NODOCENTRISM AND PARANODALITY

A monopoly over online forms of social organization capitalizes – quite literally – on our desire for nearness, our need to close social gaps and fill structural holes, overcoming the distance that separates us from what is not on the network. The underlying assumption, of course, is that everything is a potential node that can be added to the network. Disciplines such as pervasive or ubiquitous computing are precisely devoted to figuring out how to bring elements and events outside the network inside the network, making them accessible. This is imperative because a network is quite incapable of recognizing things that are not nodes. If something is available in the network, it is perceived as part of reality, but if it is not available it might as well not exist. I call this effect *nodocentrism*, although the phenomenon has been described before by other means. For instance, Castells writes:

> The topology defined by networks determines that the distance (or intensity and frequency of interaction) between two points (or social positions) is shorter (or more frequent, or more intense) if both points are nodes in a network than if they do not belong to the same network. On the other hand, within a given network, flows have no distance, or the same distance, between nodes. Thus, distance (physical, social, economic, political, cultural) for a given point or

> position varies between zero (for any node in the same network) and infinite (for any point external to the network). (Castells, 2000: 501)

Nodocentrism is the assertion that only nodes need to be mapped, explained or accounted for. Nodocentrism means that while networks are extremely efficient at establishing links between nodes, they embody a bias against knowledge of – and engagement with – anything that is not a node in the same network. The point is not that nodocentrism in social networks impoverishes social life or devalues the near: nodes behave neither anti-socially (they thrive in linking to other nodes) nor anti-locally (they can link to other nodes in their immediate surrounding just as easily as they can link to remote nodes). The point, rather, is that nodocentrism constructs a social reality in which nodes can only *see* other nodes. It is an epistemology based on the exclusive reality of the node. It privileges nodes while discriminating against what is not a node – the invisible, the Other.

At its most benign, nodocentrism doesn't provide a 'wrong' picture of the world, just an incomplete picture. But nodocentrism also rationalizes a model of progress and development where those elements that are not in the network can only acquire currency by becoming part of the network. 'Bridging the digital divide' is normalized as an end across societies that wish to partake of the benefits of modernity. The assumption behind the discourse of the digital divide is that one side (technologically advanced and accomplished) must help the other side (technologically underdeveloped or retarded) to catch up.

To describe that which networks leave out, that which resists being part of the network, I use the concept of the *paranode*. In neuroscience, the paranodal describes a specific type of cellular structure that, while not part of the neural network, plays an important role in excitatory signal transduction. Here, I use the term to refer to the conceptual space that lies beyond the borders of the node. In the network diagrams we are all familiar with, the outsides of the network and the space between the nodes and links are rendered in perfect emptiness. But this space is not empty. It is inhabited by multitudes that do not conform to the organizing logic of the network. As far as the network is concerned, the paranodal exists only to be bypassed or collapsed in the topological act of linking, of reducing the distance between nodes. But this space gives nodes their history and identity: shifts in the paranodal translate into changes in the location of nodes and the relationships between them, and consequently into changes in the network itself.
In short, the instability of paranodal space is what animates the network, and to attempt to render paranodal space invisible is to arrive at less, not more, complete explanations of the network as a social reality.

To the extent that nodocentrism becomes the dominant model for organizing and assembling the social, only the paranodal can suggest designs

for social constructions that exist beyond the epistemological exclusivity of nodes. The paranodal is a site for unthinking nodocentrism, a launching pad for social desires that cannot be contained by the network. The point of conceptualizing the paranodal is not simply to locate and identify what is outside the network in order to bring it within. Rather, the point is to uncover the politics of inclusion and exclusion encoded in the network and suggest strategies for disidentifying from the network. Rancière (1999) argues that new forms of political subjectification are always accompanied by a disidentification from society as a whole and the places we occupy within it. The paranodal becomes, to use Rancière's terminology, *the part of those who have no part*. If social network services are a model for capitalist subjectification – indoctrinating social subjects to operate in the privatized 'public' space of the network – then it is only in the paranodal where disidentification can take place and alternative subjectivities can emerge.

## THE DOUBLE LIMITS OF NETWORKS

My framing of the concepts of nodocentrism and paranodality might suggest that the normative goal of resistance through disidentification is to dismantle networks or at least give shape to a non-capitalist information society. Today, however, information, sociality and capital are entangled in such a way that to suggest an easy separation would be naïve. Furthermore, the spaces of resistance that social network services can open up, no matter how circumscribed by corporate interests, should not be dismissed just yet. As Freire says, 'The best way to accomplish those things that are impossible today is to do today whatever is possible' (1978: 64). So while I do believe that we need to be critical of the use of for-profit social network services as platforms for civic participation, and educate users on issues of corporate versus public interests, I am not calling for a total rejection of the network as a model for organizing sociality, or the dismantling of capitalist networks wherever they may be found. Rather, I believe that a revised theory of networks can be useful in articulating the models that are needed to resist the corporatization of public space.

Networks map into a social domain what was before unimaginable, re-organizing it. They are both the result of previous social models and emerging virtual possibilities. To quote Latour, technosocial networks 'make visible what was before only present virtually' (2005: 207). This actualization of the virtual unveils new associations, new ways in which things that were not linked before are now related, and in which other things are now excluded or forgotten. So while a critical theory of networks will probably not single-handedly dismantle capitalism, its effects can be more intimate and modest. From the perspective of the node, the witnessing of

the ethical resistance of the paranodal (the way it is excluded, the way it resists assimilation) can lead to the kind of self-questioning that can generate personal and social change. 'Change in the individual is a function of how much and in what manner an intimate way of life is altered' (Bruner, 1979: 160). Sensing the presence of the paranodal within and outside us can lead to the alteration of our intimate ways of knowing the world through an increasingly dominant corporate nodocentrism.

Balancing the benefits and disadvantages of nodocentrism (suggesting virtual possibilities, but also immobilizing them as soon as they are actualized) will thus require a new form of network 'literacy' that incorporates the concept of paranodality. By far, the greatest obstacle today to the emergence of this critical literacy is the unquestioning embrace of networks as tools for change (an embrace that can get us to overlook, for instance, how social network services contribute to the formation of masses, not publics). The network is currently seen as an effective model (if not the only alternative) for organizing political opposition. From peaceful grassroots organizing, to large scale campaign coordination, to guerrilla warfare and terrorism, the network offers a model for entering into an asymmetrical conflict with more powerful political actors. Authors such as Terranova (2004), Lovink (2005), Rossiter (2006), and Galloway and Thacker (2007) have engaged in a critique of the use of networks by global capital for control, marketing and surveillance, and at the same time studied possible uses of networks that leverage their decentralizing potential for articulating new forms of resistance and freedom. But perhaps we have taken too literally Hardt and Negri's declaration that 'It takes a network to fight a network' (2004: 58). Can the kinds of knowledge and ethics necessary to resist nodocentrism emerge from the same network logic? Is the goal simply to design a 'better' network? Or do we need to unthink network logic altogether?

Part of the fear of unthinking network logic is that this move threatens to leave us with no knowledge whatsoever. Nodocentrism has come to define the learning act itself: learning is reduced to network-creation, 'a process of connecting specialized nodes or information sources' (Siemens, 2004: para. 95). The proposition is that all knowledge can be represented or simulated in the network, and that only knowledge that can be manifested within the network has any value. So while the paranodal can help us relocate knowledge outside the network – challenging epistemological enslavement – nodocentrism strikes back by merely naming the paranodal in order to bring it back into the database of networked knowledge. This is what Kothari and Metha (2005) call the TITE principle: Total Inclusion allows Total Exclusion. How can a logic that so readily assimilates any emerging alternatives be meaningfully challenged? Any attempt to contest the tyranny of nodes simply creates new peripheral and exotic sites to be indexed.

In this light, nodocentrism can also be described as a fear of the unknown that is resolved through assimilation. And yet, this defense mechanism does not create safety but instead increases a sense of insecurity in the network. A critical network theory needs to dissect the means by which the network secures its borders against radical otherness (as opposed to non-threatening otherness that can be easily assimilated). How does the network protect itself from paranodal knowledge and paranodal subjects? Research in this area can look at patterns of network development from its stages of growth (creating new nodes through assimilation), preferential attachment (favoring rich nodes), hyperinflation (widening of the inequality between nodes), capitalization (converting inequality into gain for a few and loss for the rest), and segregation (purging of unwanted nodes from the network). Of particular importance is the analysis of how the network uses disasters or, in network terminology, cascading failures (wars, natural disasters, massive disruption of service, bubble bursts, etc.), to purge itself of threats to its security. The network uses these opportunities to redraw its boundaries and strengthen its borders against anything that might threaten its logic, securing itself but in the process also creating a perpetual state of insecurity. Such is the paradox of security, as Sützl points out: 'Security knows no radical "other" and therefore, in a tragic turn, security can only be "secured" by insecurity, i.e. its self-affirmation is identical with its self-negation' (2007: para. 2). This kind of research need not be purely theoretical. For instance, I am currently putting together case studies involving events such as the shutdown of the internet in Burma during the recent civil rights protests, the denial of licenses to use wireless frequencies in Palestine, the deactivation of users by companies like Verizon, AT&T and Facebook, the Great Firewall of China, the micro-targeting of voters during the 2008 US election campaign, the US Foreign Intelligence Surveillance Act, the February 2008 YouTube blackout caused by Pakistan's attempt to ban anti-Islamic content, or the use of botnets by the Russian Business Network to conduct distributed 'denial of service' attacks. These case studies can provide important insights derived from empirical data about how the network handles its relationship with the paranodal.

These data could inform our conceptualization of alternatives to the network, imagining technosocial spaces that have a goal opposite from that of social network services. While this is important, paranodality is ultimately not an appeal to design and participate in 'better' networks. The point of paranodality is not to confront the network but to find different ways of relating to it, perhaps in parasitical or paralogical terms. The parasite does not seek to destroy its host, since this would only entail its own destruction as well. Likewise, the paranode disidentifies from the network but continues to be appended to it. Every node is an internal border, and the paranode introduces noise in the information that flows between nodes. It interferes

with the network while forcing it to adjust to its presence (cf. Crocker, 2007; Serres, 2007). It escapes firewalls and intrusion prevention systems and refuses authentication, tracking or encryption because it is masked by the node. The paranode defeats the network by creating something the host cannot rid itself of, because it might not even be aware of its presence. While fighting networks with networks might be necessary at times, networks are powerless against the undetected nature of the paranodal.

And yet, a critical theory of networks must begin by addressing the node, not the paranode. The immediate goal is not to propose a reality without networks as templates for organizing sociality, but to alter the intimate ways in which networks currently condition our ways of knowing and constructing sociality, so that new models may emerge. This requires that we acknowledge and embrace the double limits of networks: their *limits* as epistemological barriers that generate insecurity by trying to assimilate or purge the paranodal, but also their *limits* as borders where those ways of looking at the world are questioned, and where the bond between self and other, node and paranode, is continuously renegotiated.

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