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# Online networks of eating-disorder websites: why censoring pro-ana might be a bad idea

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Between February and March 2012 Tumblr and Pinterest, two fast-growing online social networking services, announced their decision to ban all contents related to "thinspiration"[1], the ritualised exchange of images and quotes meant to inspire viewers to be thin. This practice is distinctive of online blogs, groups, and communities known as pro-ana (anorexia nervosa) and pro-mia (bulimia).

Contributors to ana and mia websites are persons living with eating disorders who often display a proactive stance and critically abide by medical advice. In media narratives, they depict their life experiences posing as heroic sufferers, and go as far as calling their eating habits a lifestyle "choice" rather than a disease[2]. Recent research unveils a more complex picture[3]. Although these websites offer everything from tips on starving and purging to airbrushed photos of celebrities, they also act as tools for the self-help and empowerment of persons with eating disorders. Some of them provide online support for sufferers and occasionally accompany them toward treatment and recovery.

The decision to prohibit such controversial contents is not new. The first to ban ana-mia websites were AOL and Yahoo as far back as 2001-2[4], when the phenomenon was confined to the English-speaking world. But ana-mia websites survived, and are now known to exist in many languages including Spanish, French, German and Dutch. After the attempts of some governments, notably in France and the UK[5], to put into place restrictive legislations, web service providers and blogging platforms have been increasingly wary of these contents, though without fully eradicating them.

How large is the ana-mia webosphere today, and how has it managed to survive for so long? To answer these questions, we have mapped the French ana-mia community over two years using Navicrawler, a web-mining tool, and Gephi, a software package for exploratory data analysis and visualisation. These tools capture only blogs, forums and web pages. Though less effective with social networking services, they suffice to reveal key features of this otherwise invisible portion of the Internet. Figure 1 offers snapshots of it in March 2010 and March 2012: nodes represent web pages and edges represent links between them. The structure of links between pages provides a global view of communication patterns within this part of the web, showing how a user may discover ana-mia contents by browsing, starting from any one of the websites in the map.
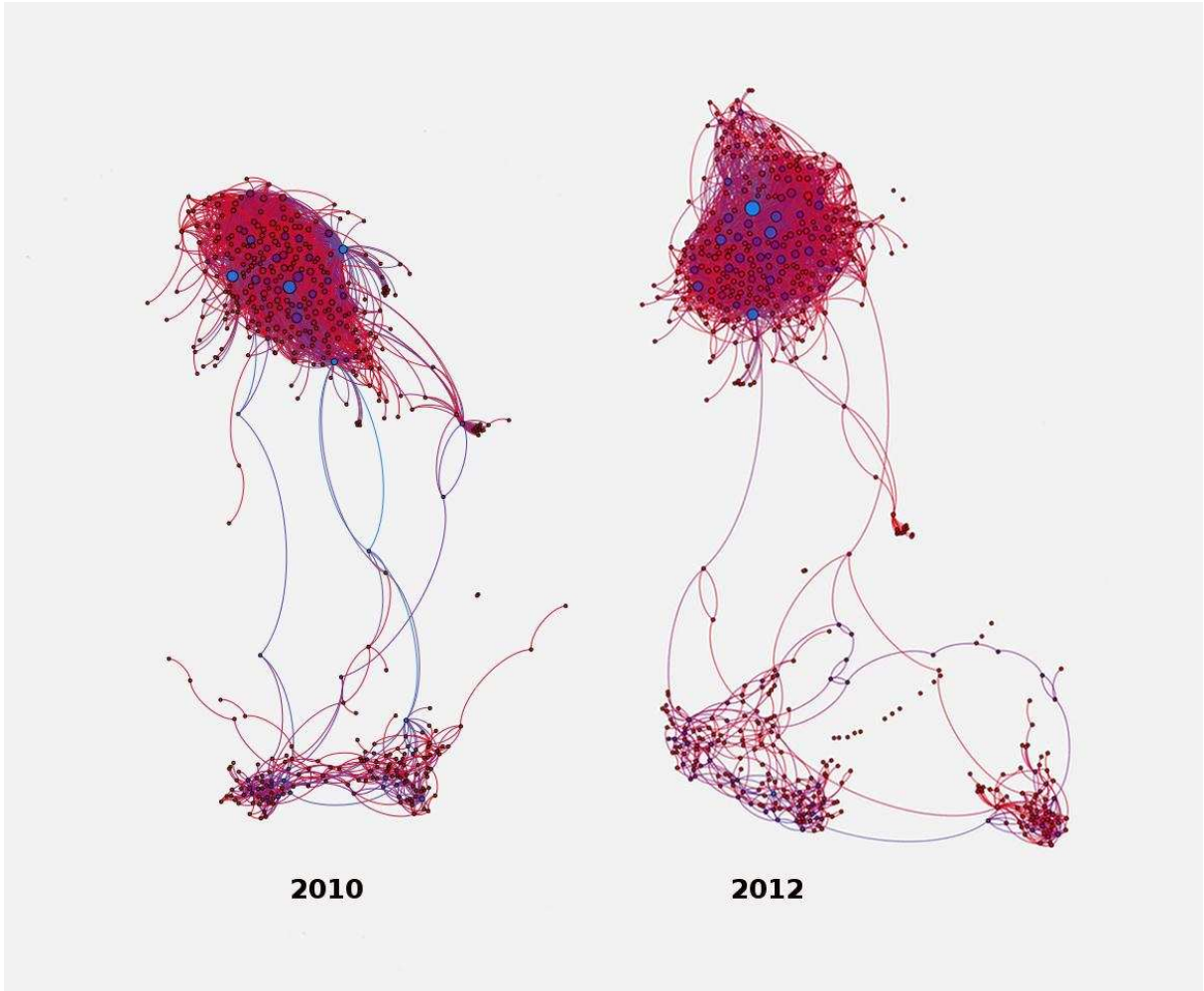
**Figure 1 – Network map of French ana-mia websites (2010-2012). Node size (small, medium and large) depends on number of links, while colour represents intermediation capacity (red = low, purple = medium, blue = high).** *Source: Authors' elaboration.*

At first sight, the two networks look very similar. Indeed the crawling tool detects about the same number of sites at the two dates: 559 in 2010, and 593 in 2012. Despite regulatory pressure and social stigma, the network has not shrunk.

Both snapshots of the network are composed of sizable clusters, discernible at the top and at the bottom of the graphs. As many large web-based networks, they consist in subgroups that are tightly knit internally, but have few connections to other subgroups. Within each of them, individual blogs rally around a few "hubs", represented as nodes of larger size. These are often "repository" websites which gather, organize and re-diffuse information.

But resilience is unevenly distributed within the network: not all blogs continue to exist. A closer look at the data reveals a turnover of about 50%, with only 296 blogs surviving from 2010 to 2012. The resilience of the community is due to the surviving capacity of these long-lasting blogs and the continuous renewal of the ephemeral ones around them.
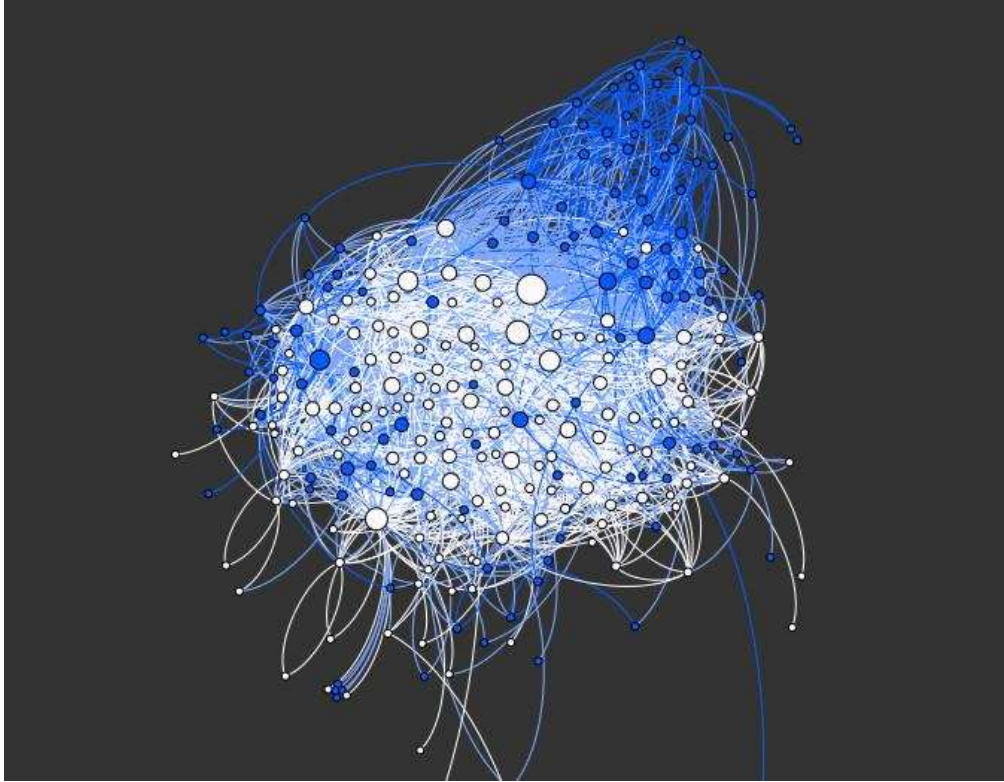
**Figure 2 – Top cluster of the network in 2012. White nodes represent surviving websites (already observed in 2010), and blue nodes represent new websites (created after 2010). Node size depends on number of link*s. Source: Authors' elaborati*on.**

What are, then, the strategies of the surviving blogs? They do not dissimulate proscribed keywords: indeed their names often explicitly display pro-eating disorder stances. The structure of the network unveils more sophisticated approaches. One indicator is the number of links each node has. This is a proxy for nodes' capacity to channel (receive and redistribute) large flows of information through the network. This number is higher for surviving nodes than

for all others, and is particularly high in the top cluster of the graph, which is the densest and also the one with the largest number of survivors, 57% (Figure 2).

Another key indicator is the capacity of nodes to act as intermediaries (brokers) between other nodes that would otherwise be disjoint. Surviving nodes have higher brokerage capacity, often acting as "gatekeepers" able to allow, but also to prevent or restrict, information flows to and from their neighbours; yet they do so only locally, within clusters, not between them (Figure 1). In fact the capacity of the network to connect its parts has decreased from 2010 to 2012, with fewer surviving nodes positioning themselves at the boundary between two or more parts.

Survival involves turning inwards, as these communities become more entrenched. Survivors control major flows of information within clusters, but do not bridge them. In terms of information circulation, that favours redundancy: subgroups of ana-mia bloggers will exchange messages, links and images among themselves and exclude other information sources.

Consequently, any health information or awareness campaign is now less likely to reach out to ana-mia bloggers. If in 2010, such a campaign would target the websites in the middle of the graph so that they relay the message to the margins, in 2012 the middle is virtually deserted, and the chances of  spreading public health-relevant information are lower.

In sum, censorship means bad news for healthcare providers and policy-makers alike. These results cast serious doubts on the effectiveness of repression. Bloggers anticipate even

potential restrictions by reshaping the structure of their social network in dense, less and less interconnected clusters. It will become increasingly hard for physicians, families and charities to reach out to ana-mia online communities if they become ever more secluded and inward-oriented.

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