be the change you want to see

"No man is an island entire of itself; every man
is a piece of the continent, a part of the main" John Donne

In an associated handout – *"Cooperative behaviour cascades in social networks"* – I wrote about how generous and selfish acts can spread through a social network. In this handout I want to extend this research review much more widely. Human beings affect each other in many ways. Obviously we exchange viral and bacterial infections, but we also exchange knowledge and ideas. Our behaviour affects those around us too, and so do our moods. There is a huge "social support" literature on these face-to-face effects – for example in research on marriage and on families. There is now however an overlapping, and increasingly health-relevant, literature on social networks – on how we affect and are affected by people we may never even have met.

I probably started thinking about this more rigorously in 2007 after Christakis & Fowler published their ground-breaking paper *"The spread of obesity in a large social network over 32 years"* which showed that *"Discernible clusters of obese persons ... were present in the network ... and the clusters extended to three degrees of separation."* In other words, if I become obese it more than doubles the chance of one of my good friends (people who I name and who also name me as a friend) becoming obese. Their friends then have an increased chance of becoming obese as too, in the turn, do their friends. My obesity affects the friends of the friends of my friends – even if I have never met them. Similar patterns were subsequently shown for alcohol use – see *"The spread of alcohol consumption behavior in a large social network*" – and for stopping smoking –*"The collective dynamics of smoking in a large social network"*. It is very likely that research will show parallel pictures for other healthy and unhealthy health behaviours like physical exercise, healthy eating, sleeping patterns, and so on.

Nicholas Christakis and James Fowler have authored all the studies I've mentioned so far. Christakis is both a Professor of Medicine and a Professor of Sociology at Harvard. His website (http://christakis.med.harvard.edu) is full of interesting information about social network research, including full text links to his publications (including all the research studies mentioned in this handout), amazing images, and even videos of the social networks he has studied. James Fowler is also a Professor who spans Medicine and Sociology, but he is based at the University of California with a web-site (http://jhfowler.ucsd.edu) that is appropriately a bit more West Coast. Christakis and Fowler have recently published a general-audience book on social networks –*"Connected: the surprising power of our social networks and how they shape our lives"* – which has already been translated into 20 or so languages.

Research on social networks is flourishing. It's relevant to public health, and also to many other fields. Interesting recent work has used online networks to look at several types of influence, including preferences in books, movies & music, drinking behaviours, privacy settings, and even smiling. See *"Tastes, ties , and time: a new social network dataset using Facebook.com"* and the fascinating network diagrams on Christakis's website.

And it's not just behaviours and preferences that are transmitted along chains of influence in this way. Depression, loneliness and happiness can all behave "infectiously". See *"Social network determinants of depression"*, *"Alone in the crowd: the structure and spread of loneliness in a large social network"* and *"The dynamic spread of happiness in a large social network: longitudinal analysis over 20 years in the Framingham Heart Study"*. Emotions can very genuinely behave like infections as highlighted in the article *"Emotions as infectious diseases in a large social network: the SISa model"*. This last article's abstract reads: *"Human populations are arranged in social networks that determine interactions and influence the spread of diseases, behaviours and ideas. We evaluate the spread of long-term emotional states across a social network. We introduce a novel form of the classical susceptible-infected-susceptible disease model which includes the possibility for 'spontaneous' (or 'automatic') infection, in addition to disease transmission (the SISa model). Using this framework and data from the Framingham Heart Study, we provide formal evidence that positive and negative emotional states behave like infectious diseases spreading across social networks over long periods of time".*

[cont.]

As the author Arehart-Treichel has put it - *"The company you keep really does matter".* Obviously we want to support people we know who are struggling with difficult emotions, unhealthy behaviours and even unhelpful ideas. It's very important though to be intelligent about who we are choosing to spend much of our time with. There is a real tendency to "hang out" with others who are living in much the same way as we are. See, for example, the studies on smoking and obesity mentioned earlier in this post. One can find parallel effects for mood, with people who are unhappy spending time with others in similar states e.g. the research *"It takes three: selection, influence, and de-selection processes of depression in adolescent friendship networks"*. Relationships though are, in some ways, like nutrition. We want a large proportion of our diet to be healthy, if we ourselves want to flourish. Some relationships we have little choice over, or we may compassionately choose to be around somebody else who is struggling. Remember though *"The company you keep really does matter".*

If we can, it's good to spend time with others who are happy, caring, brave, even wise; others who have sensible health behaviours. These effects also extend to studying, to work practices and to the adoption of new ideas. It's probably the overall balance that matters, so the research *"The spread of behavior in an online social network experiment"* reported that *"Individual adoption (of a behaviour) was much more likely when participants received social reinforcement from multiple neighbors in the social network".* We don't want to be cruel or unkind, and it's fine – important – to have a mix of friends. Remember though, not only do *"birds of a feather flock together"*, but how someone's *"feathers"* develop and change over time is powerfully affected by the other *"birds"* around them.

Sobering. Exciting. We're permeable. We affect each other all the time, whether we mean to or not. So we have choices, and the choices are not just for ourselves. As Gandhi put it so truly and powerfully –

"Be the change you want to see in the world."

This handout is based on a blog, posted at www.stressedtozest.com on 17.10.10, which contains links to all the research studies and other material described.