Risky behaviour in social networks

There is increasing awareness in health policy that people's health-related behaviour is affected by their relationships with family and friends. Research by Sergio Currarini and colleagues is exploring how social networks influence individuals' decisions to take risks with their own and others' health – for example, by smoking.

The health behaviour of friends and family members can have a crucial influence on individuals' own health behaviour. This happens through what are known as 'peer effects', where people follow the behaviour of others within the same social group.

Risky health behaviour, such as smoking, can also exert 'externalities' – that is, it affects other people, in the case of smoking by creating passive smoke. Typically, those affected are in the same groups through which peer effects operate, such as family, friends and colleagues.

Moreover, individuals may be aware, to varying degrees, of the effects they have on their friends and family, and they may care about the health consequences. Such 'altruistic' concerns are likely to affect individuals' decisions about how to behave. Our research looks at the role of social interactions in shaping individuals' incentives to adopt risky behaviour when both externalities and altruistic concerns are present.

Peer effects

Peer effects generally refer to individuals' behaviour affecting others in a group because of various psychological and sociological forces stemming from emulation, group acceptance, identity and so on. This means that one person's actions, such as taking up smoking, can be amplified as others in the same social group react and copy the behaviour. The amplification of individual behaviour that arises from being in a group is usually referred to as the 'social multiplier' (Glaeser et al, 2003).

Research in network economics has looked at the role of social structure in driving peer effects and behaviour (Ballester at al, 2006; Galeotti et al, 2010). But many questions remain. For example, are peer effects stronger in groups that are more cohesive or which have more intense social interaction? Should we expect more risky behaviour when social ties are stronger, and which policies are likely to be more effective in closer social contexts? And how does risky behaviour relate to whether an individual plays a central or peripheral role within a group?

Peer effects and externalities

When people's actions affect others, we would expect them to take account of these externalities when deciding how to behave. In the case of smoking, for example, passive smoke may alter the perceived damage of smoking an extra cigarette and, therefore, the associated incentives to do so. If people are aware of the increasing marginal damage of smoke (well documented in extensive medical research), a larger amount of passive smoke should deter people from smoking because of the larger expected damage from the extra cigarette.

When passive smoke comes from the same people that generate the peer effects, the final effect of being part of a social group is a trade-off between these two factors. For example, within a family, if one individual takes up smoking, this may influence other family members to do the same. But if this is the same group who will be exposed to the passive smoke, this may lessen the overall amount they smoke.

One implication of this is that empirical studies that try to measure peer effects could understate their magnitude if in practice they are dampened by the presence of such negative externalities.

Policies to reduce the prevalence of smoking should take account of the structure of social relationships

The role of altruism

The effect of externalities becomes more salient when people care about the negative consequences of their behaviour on their friends and family. Because of altruism, an individual takes account of the damage inflicted by the extra passive smoke on her friends, when deciding whether to smoke an extra cigarette. This extra damage is higher the larger the amount of passive smoke these friends are already exposed to.

Within a social group, this accumulated amount of passive smoke is affected by the nature of the social network – for example, whether the individuals socialise frequently or live in the same household, or whether they are less closely connected.

In a closely connected group, high levels of smoke would be more difficult to sustain. This is because everyone would be exposed to large amounts of passive smoke over time, which, in the presence of altruism and increasing adverse health

effects from additional smoke, would increase the perceived marginal damage of smoking.

Again, this illustrates the trade-off. A closer network of social connections implies stronger peer effects in terms of individuals behaving in the same way, implying higher levels of smoke. But at the same time, the closer network in this example implies more pervasive negative externalities and greater incentives to reduce smoking.

Since passive smoke increases strongly with the number of individuals in the group, with each being exposed to the passive smoke generated by all the others, the effect of this negative externality can outweigh the peer effects in some cases, leading to overall smoking starting to decrease.

Segregation and 'central' individuals

Social networks can be characterised by a certain degree of segregation. This might be due either to homophily (the tendency to connect to similar people) or the effects of policies aimed at separating different types of people (for example, smokers from non-smokers as the result of a smoking ban).

If only peer effects are present, then if people form groups according to their preferences for smoking, this could lead to polarised groups – those who smoke and those who do not. If individuals are altruistic and negative externalities are present, this is no longer the case. For high segregation, with people sorted into groups according to their preferences for smoking, heavy smokers face strong incentives to reduce smoke because of the high prevalence of passive smoke among their group.

Individuals can be categorised according to how 'central' they are within their social network, and people's behaviour can be related to this characteristic (Ballester et al, 2006). These central individuals are well connected and linked to people who are themselves well connected.

Our research shows that in the presence of altruism, central individuals have strong incentives to reduce smoking. To see why, note that friends of central individuals are likely to be exposed to large amounts of passive smoke because of their high connectedness. This raises the marginal damage from smoking perceived by these central individuals, who consequently choose to smoke less to decrease the effect of their smoke on their friends' health.

In a society where the negative effects of passive smoke are well understood, we would therefore expect heavy smokers to be placed at the periphery of the social network. This result is consistent with various empirical findings for the United States (Christakis and Fowler, 2008).

Effectiveness of policies

Our research shows that policy-makers should take account of the structure of social relationships when designing policies that aim to reduce the prevalence of smoking (or other risky behaviour). Our results show that different types of policies can be more or less effective, depending on the structure of the social networks in which people live.

Compare, for example, a policy that stresses the damages of active smoke to another stressing the damages from passive smoke and targeting people's altruistic concerns. When the network is closely connected, the latter is more effective than the former, while the reverse is true in less closely connected networks.

The most effective policies for reducing risky behaviour will target people who are central within a social group

Moreover, policies can often target only a limited number of people, in which case the question becomes which groups to target. For example, advertising aimed at decreasing the perceived private benefits from smoking are often most efficient when they target specific social groups.

Our results suggest that the highest impact on aggregate smoking is achieved by targeting those people that are central within a network where altruistic concerns about passive smoking are present. This suggests that taking account of altruistic behaviour can be important for the fine-tuning of anti-smoking policies.

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Further reading

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Nicholas Christakis and James Fowler (2008) *'The Collective Dynamics of Smoking in a Large Social Network'*, New England Journal of Medicine 358: 2249-58.

Andrea Galeotti, Sanjeev Goyal, Matthew Jackson, Fernando Vega-Redondo and Leeat Yariv (2010) *'Network Games'*, Review of Economic Studies 77(1): 218-44.

Edward Glaeser, Bruce Sacerdote and José Scheinkman (2003) *'The Social Multiplier'*, Journal of the European Economics Association 1(2): 345-53