

## Desert island assurance games and COVID-19

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*Article #7 of the NSW WEN fortnightly blog series in partnership with the NSW Economics Society of Australia and the National WEN.*



This blog post applies a game theory lens to social distancing during COVID-19.

### Assurance games – a social dilemma

In game theory, ‘assurance games’ are games in which players can choose whether or not to contribute to a positive outcome that would be shared by the whole group. In an assurance game, no one player alone can make a contribution that is sufficient to produce the collective benefit, and so requires some cooperation by the players.

Assurance games are sometimes referred to as social dilemmas because it may be the case that every player’s best *individual* strategy is to choose not to contribute, while *as a group* the best strategy is for all the players to contribute.

By way of example, imagine that a group of individuals become stranded on a desert island with no supplies and need to make fire using sticks. If a sufficient number of individuals commit their full energy to the task, they will create enough friction to start a flame. If only a small number of individuals put in their full effort, the odds of fire reduce significantly.

Because the group are on a desert island without food or water, any efforts expended without the reward of fire are very costly. Each individual would prefer to:

- contribute their full energy **if and only if** the other players do the same; otherwise
- not contribute at all, conserving their energy (since no fire is likely to be produced either way).

### **From desert islands to COVID-19**

This blog post is not an attempt to undertake a comprehensive analysis of the range of responses to COVID-19. I acknowledge that it is important not to trivialise these decisions and that actions should not be taken/analysed out of the broader economic and social context that will surely define this period in history.

Nevertheless, the decisions faced by individuals in response to community transmission of COVID-19 draw parallels with the game theory setting described above. In particular, minimising community transmission of COVID-19 requires that people who experience any symptoms get tested and to isolate if they are exposed to the virus, and for everyone to maintain social distancing.

If everyone follows these rules strictly, then it is likely that community transmission could be minimised. However, the costs associated with following the rules can be high for individuals at certain times, who always face the choice between doing the 'right thing', or ignoring the rules.

### **Lessons from the desert island**

Laboratory and field studies of assurance games have found that the level of trust or sense of community between the players can be an important predictor of the outcome of the game.<sup>1</sup> In simple terms, if one player believes that the other players will put in effort, it becomes individually rational to put in effort, too.

New Zealand's response to the pandemic offers a potential case in point - the confidence in Jacinda Ardern's government and the sense of community between individuals is likely to be a key factor explaining New Zealand's successful response to the pandemic (also noting its geographic and other advantages!).

Another way to improve expectations about whether others are putting in effort is to make that effort more transparent, or to make defection (not putting in effort) easier to detect and penalise.

### **Practical options for resolving the dilemma**

Measures that would likely assist in increasing everybody's expectations about how much care others are taking in the COVID-19 world might include:

- making masks compulsory in certain settings – for example having a no mask, no entry policy in supermarkets and on public transport. Masks have the benefit of offering immediate visual feedback demonstrating whether people are behaving in the best interests of the group (or not);
- handing out masks at train stations might be an effective use of public funds to encourage further up-take;

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<sup>1</sup> See, for eg, F Jansson and K Eriksson, Cooperation and shared beliefs about trust in the assurance game, PLoS ONE 10(12), 2015.

- making the State level guidance very clear, so that it is easy to both follow the guidance and observe whether others are following them; and
- assessing whether the media coverage of COVID-19 is excessively weighted towards sensationalised and negative content, undoubtedly designed to get clicks or views but which are likely to exaggerate the levels of non-compliance by individuals and undermine the sense of community and trust;
  - there is some anecdotal evidence that some news media are exaggerating negative perspectives in relation to social distancing. For example, [news photographers have been accused of using camera tricks that make it look like people are particularly close together](#);
  - more generally, I would hypothesise that media coverage of COVID-19 (including the 'sentiment' of that coverage) varies in nature by country substantially, and that this variance is likely to have important consequences for individuals and communities dealing with COVID-19; and
  - if this is found to be the case, it would be helpful to address media companies' commercial incentives in some way (one extreme example might be to restrict the ability to derive advertising revenues on COVID-19 related articles) - a much more complex and challenging issue to tackle, relative to masks!

George Box, a famous statistician, noted that: "All models are wrong, some are useful."

While we cannot boil the current second-wave problems in Australia down to a simple game, it is very likely that some simple steps can be taken to align individuals' incentives more closely with that of the group.