problems (the white Xs are the interventions). What are important are the interaction effects between all of the variables including the intervention, so that the intervention has to be seen as a part of the problem as well as the potential solution. Another random system has been plotted on the grid, but this time the rules of engagement are:

- A cell remains alive with two or three contiguous neighbours and no contiguous intervention.
- A cell dies of overcrowding with more than two neighbours and an intervention.
- A cell dies from exposure if there are less than two live neighbours.
- An empty cell becomes alive if there are three neighbouring cells and no contiguous intervention.
- As before all of the moves are synchronous.
- For the purposes of this exercise the 'interventions' are not dependent upon the system that it is addressing to 'stay alive', it has a life independent of the system.

Diagram 2 **Cellular Automata with Intervention**

1	2	3	4	5	6	7	8
2							
3							
4						X	
5					X	X	X
6					X	X	
7				X		X	
8					X		

Time Step One

1	2	3	4	5	6	7	8
2							
3							
4						X	
5					X		
6							X
7				X	X		
8					X		

Time Step Two

1	2	3	4	5	6	7	8
2							
3							
4						X	
5					X		
6							
7				X	X		
8				X	X		

From this example it can be seen that the 'interventions' do in fact disrupt the system, but importantly that the system adapts, responds to the threat, and moves away from the intervention. It is clear that the more robust the system is in having more variables interacting with each other then potentially, as you try to address the problem, the more opportunity there is for emergent issues to occur.

All we are trying to do here is to model interaction effects and some of the behaviours of complex adaptive systems and particularly to highlight the importance of the system being dynamic, adaptive, and evolutionary in nature. We can use this as a kind of metaphor to help in conceptualising the nature of the problem. Although this abstract model tells us nothing about temporal relations in the real world, it does summarise systems effects and also highlights the importance of where and how interventions are positioned, their extensiveness, and whether there is a need for a multimodal approach (McGuire, 1995). If you use this approach with more intervention variables and position them in and around the system, it is interesting to see the extent to which the system can adapt and survive.

Experiment with 'intervention' variables to see what impact their positioning has on the system.

Motivational working restated

William Miller (2006: 149) states that 'once substance abuse/dependence has been established, education, persuasion, confrontation, punishment and attention typically yield little or no beneficial effect and sometimes exert