Chapter 12

Evolutionary Stability: Social Convention Aggression And Cycles

We apply the idea of evolutionary stability to consider the evolution of social conventions. Then we consider games that involve aggressive (Hawk) and passive (Dove) strategies, finding that sometimes, evolutionary populations are mixed. We discuss how such games can help us to predict how behavior might vary across settings. Finally, we consider a game in which there is no evolutionary stable population and discuss an example from nature.

Lesson: We can have multiple evolutionary stable conventions. These need not be equally good.

Monomorphic: Evolutionarily stable pure strategy Nash Equilibrium.
Polymorphic: Evolutionarily stable mixed strategy Nash Equilibrium.

Definition: A strategy p’’ is evolutionary stable (in mixed strategies) if
A. (p’’, p’’) is a symmetric Nash equilibrium. i.e. u(p’’, p’’) >= u(p’, p’’) for all p’ AND
B. If u(p’’, p’’) = u(p’, p’’) then u(p’’, p’) > u(p’, p ’).
Cannot be strict since it is mixed.
Need to check u(p’’, p’) > u(p’, p ’) for all possible mixed mutations p’

SLF - Sneaky Little Fucker

Lessons from Hack Doves game

1. If v < c, then evolutionarily stable mix has v/c hawks. As v increase we see more hawks in evolutionarily stable strategy. As c goes up we see more doves in evolutionarily stable strategy.
2. Payoff: (1- (v/c))*(v/2). As c increases, payoff increases.
3. Identification: We can tell what the ratio (v/c) is by looking at the data.