

# The Small Worlds of Small Social Networks

Garry Robins

Department of Psychology, University of Melbourne,  
Victoria, 3010, Australia.

e-mail: g.robins@psych.unimelb.edu.au

**Keywords:** small world, Markov random graphs,  $p^*$ , global network structures, local social processes

## Abstract

When a social system is a small world, the individuals in the system tend to cluster together in clique-like structures, yet at the same time paths across the network remain relatively short (Watts, 1999). The small world phenomenon has been principally studied in large networks such as the internet (Albert & Barabasi, 2002), but may also be observed in small scale networks including personal networks and friendship groups. Criteria for deciding whether an observed network is small-world may be based on comparison with relevant random graph distributions. We show how the presence of certain local social processes may result in small worlds (Robins et al, 2002). Yet the overall strength of these processes is important: if all effects were to become stronger, a small world system of short paths may suddenly transmute into a deterministic structure with longer paths. We show how to determine whether an observed network is close to this phase transition point and discuss whether this is a common feature of human social networks. The implications relate to the balance between randomness and structure in human sociality: it may be that human social systems remain stochastic but are close to deterministic structure.

## References

- Albert, R., & Barabási, A-L. (2002). Statistical mechanics of complex networks. *Review of Modern Physics*, 74, 47-97.
- Robins, G., Pattison, P., & Woolcock, J. (2002). Small and other worlds: Global network structures from local processes. *American Journal of Sociology*. Under review.
- Watts, D.J. (1999). *Small worlds: The dynamics of networks between order and randomness*. Princeton, NJ: Princeton University Press.