

# "Small world" dynamics in focused networks

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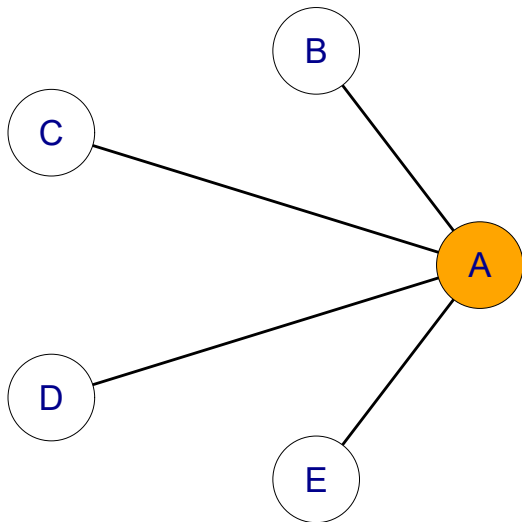
David Nield

University of California, Berkeley

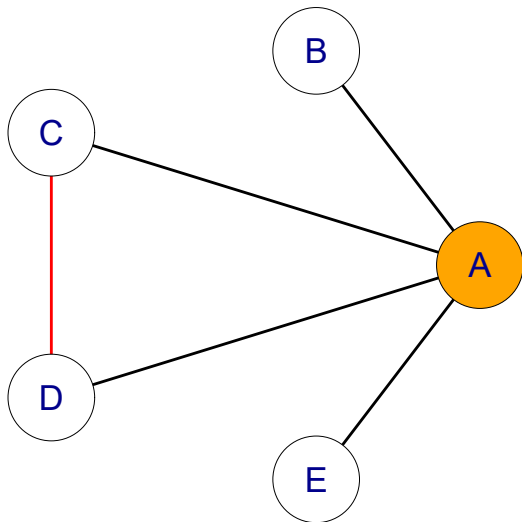
# Small Worlds

- Travers and Milgram's "Small World" study, average of 5.2 intermediaries (popularized the notion of 6 degrees of separation) [Travers and Milgram, 1977]
- Replicated in 2003 using a global population and 18 targets in 13 different countries with median path lengths between 5 and 7 [Dodds et al., 2003]
- But how? One avenue: a few weak ties [Watts and Strogatz, 1998].

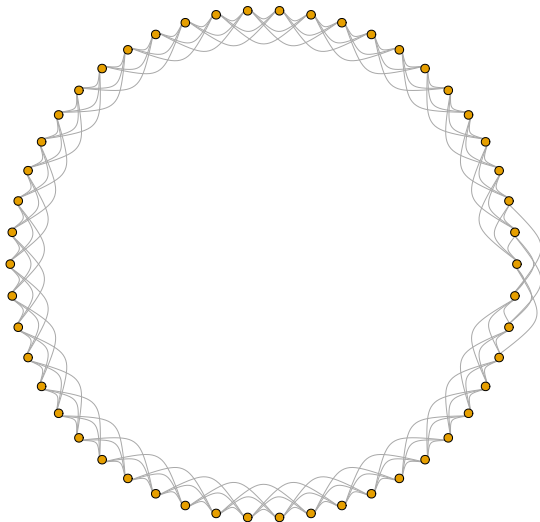
Transitivity of 'A': 0



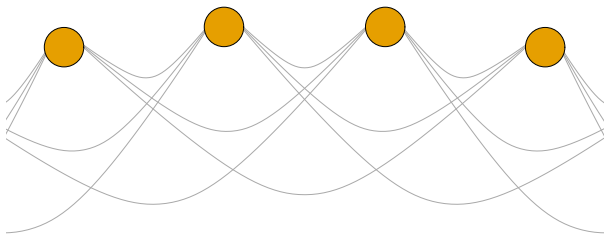
Transitivity of 'A': 0.1667

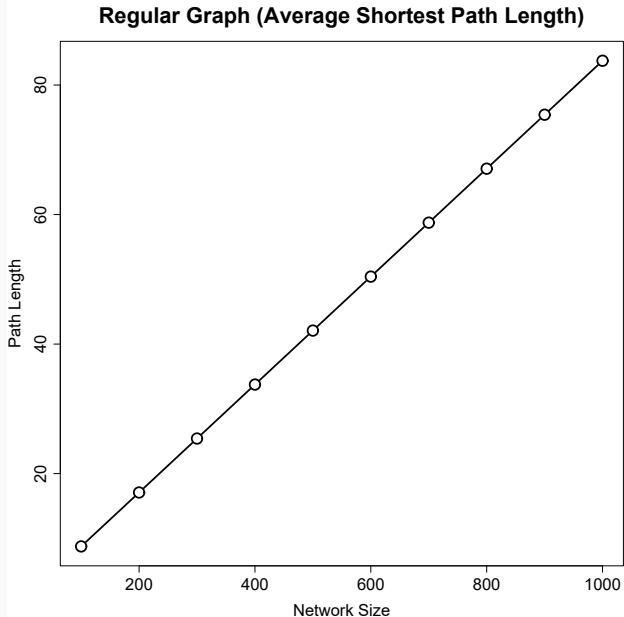


**Regular Graph**

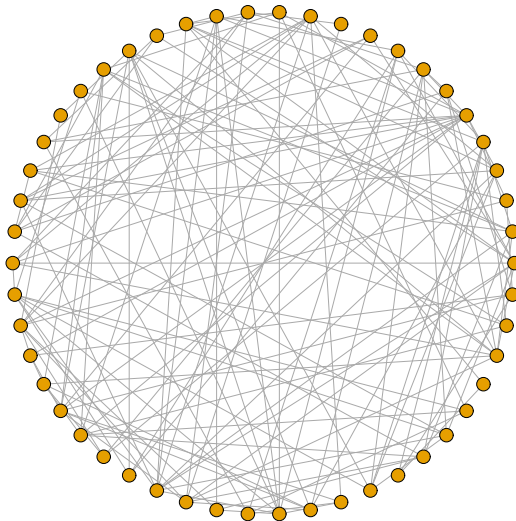


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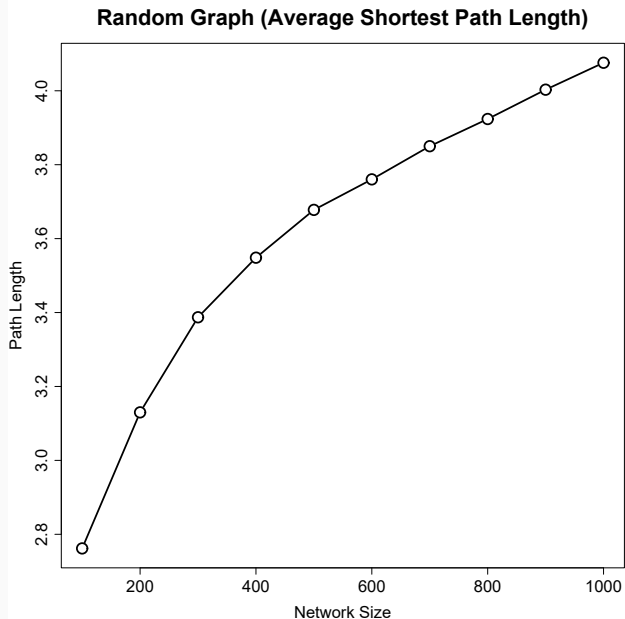




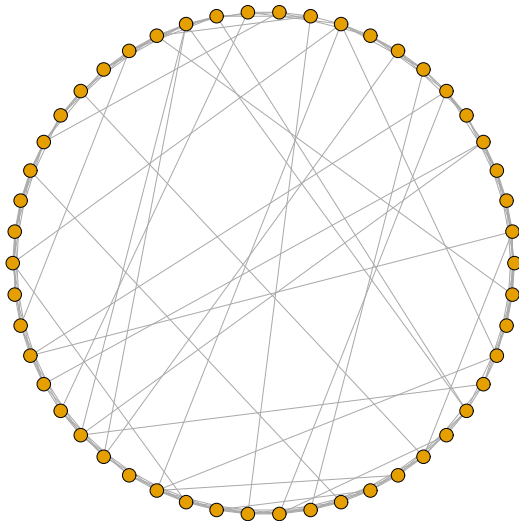
**Random Graph**

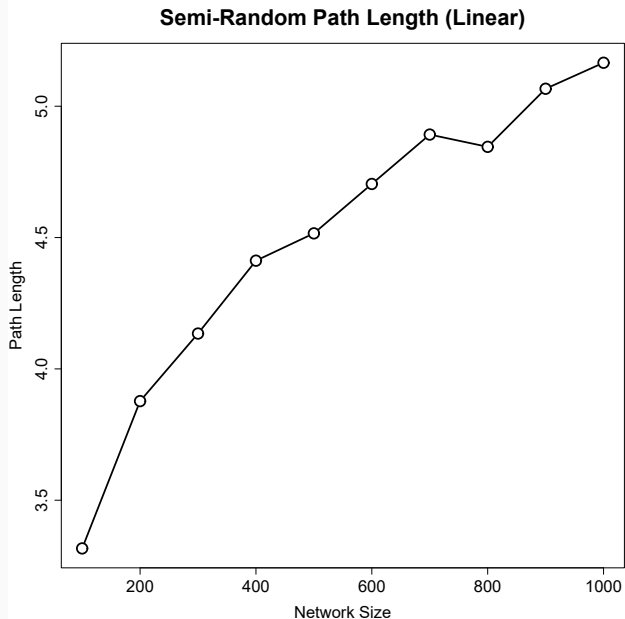


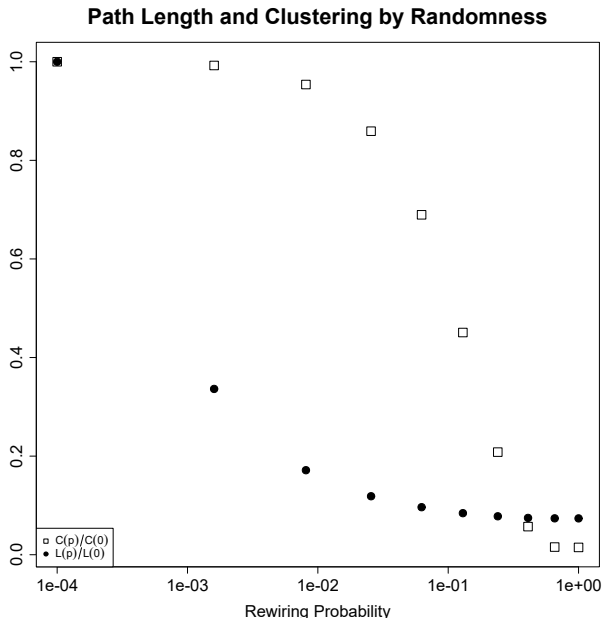




**Semi-Random Graph (10% of edges rewired)**

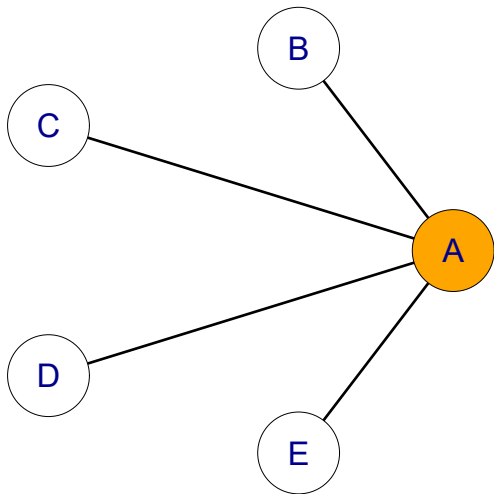




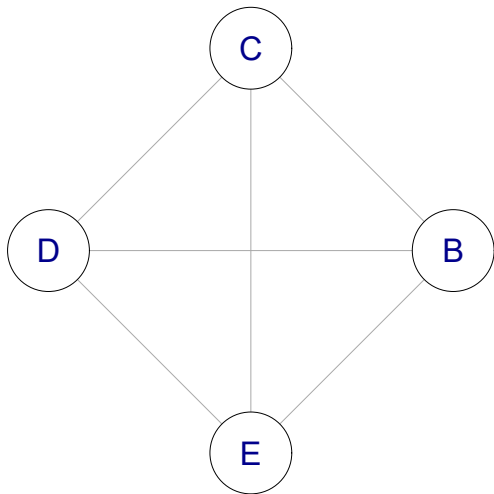


## Small Worlds with Focuses

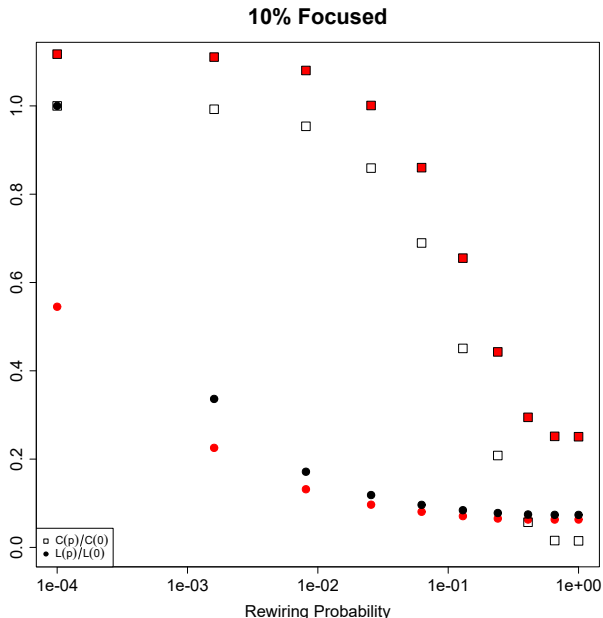
Transitivity of 'A': 0



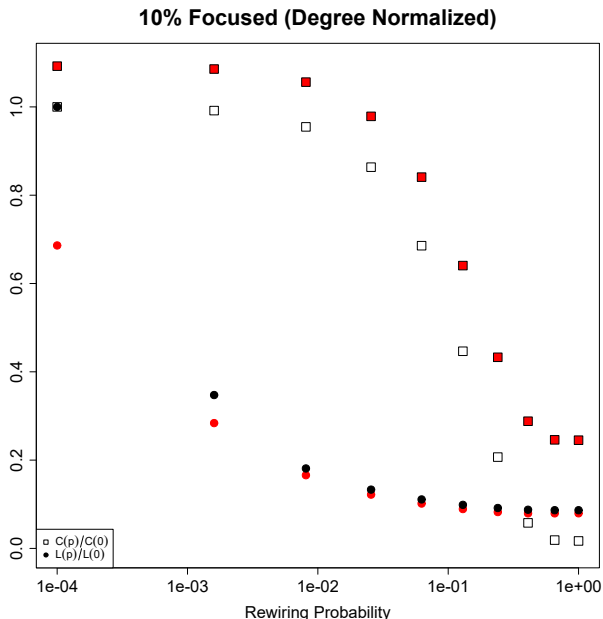
**Bipartite Projection**



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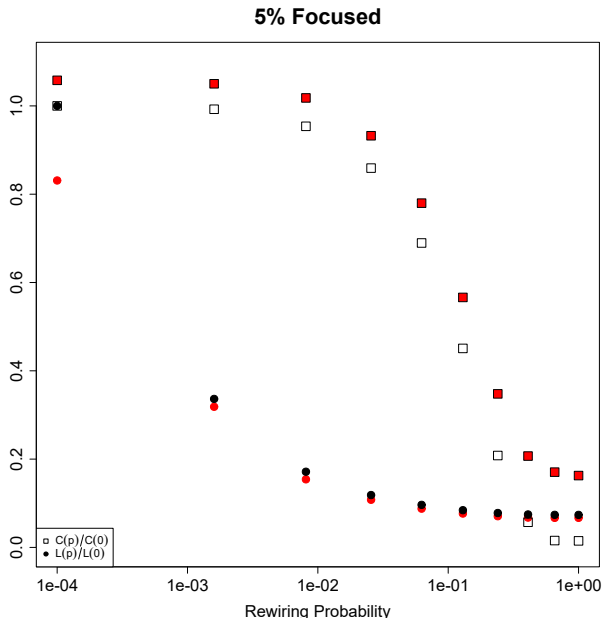


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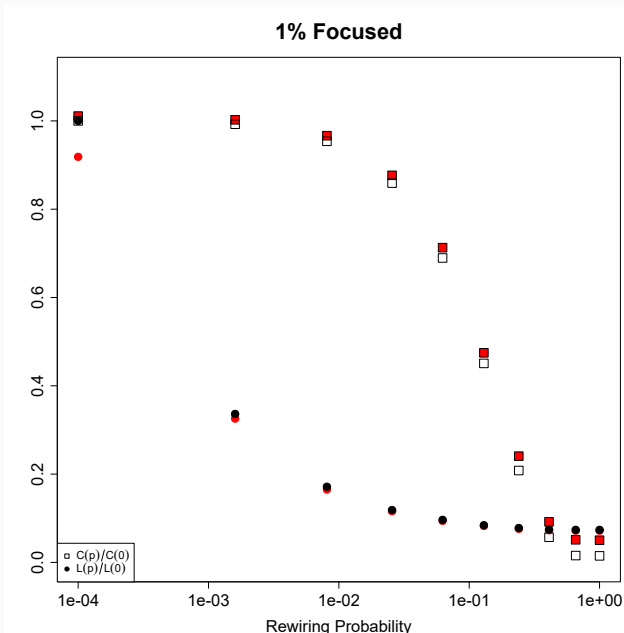




# Small Worlds with Focuses



# Small Worlds with Focuses





Dodds, P. S., Muhamad, R., and Watts, D. J. (2003).  
**An experimental study of search in global social networks.**  
*science*, 301(5634):827–829.



Travers, J. and Milgram, S. (1977).  
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In *Social Networks*, pages 179–197. Elsevier.



Watts, D. J. and Strogatz, S. H. (1998).  
**Collective dynamics of ‘small-world’ networks.**  
*nature*, 393(6684):440.