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r	$s_{50}(r)$	$s_{100}(r)$
2	1.00	1.00
3	0.98	1.00
4	0.83	0.97
5	0.55	0.81
6	0.31	0.55
7	0.17	0.32
8	0.08	0.17
9	0.04	0.09
10	0.02	0.04

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- The slogan: *The more likely it is that a success run (of the observed length) occurs somewhere in a string of coin tosses the less the evidence for a hot hand.*
- The conclusion? "The hot hand theory is a widespread cognitive illusion affecting all beholders, players, coaches, and fans."
  — T. Gilovich, R. Vallone, and A. Tversky (1985).

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Summary of Tableau 1

Prelude to a theory of chance
The amazing aspects of fluctuations and the hot hand phenomenon

- The need for a formal theory of chance: Non-intuitive behaviour crops up even in elementary settings in the theory of fluctuations. For instance, success (or failure) runs of moderate length seem to be artificial but are, in actuality, to be expected in truly random sequences.

- A statistical test and the hot hand phenomenon: The appearance of success runs in random sequences vitiates against the need for a mysterious "hot hand" to explain streaks of successes.

- What will a mathematical theory bring? "The worth of an axiomatic model theory in mathematics is in the rich, unexpected theoretical developments and theorems that flow out of it; and its ultimate worth in application is its observed fit to empirical data and the correctness of its predictions. In these the modern theory of probability has been wildly successful — however unsettling some of its predictions to untrained intuition". The quote is taken from S. S. Venkatesh, *The Theory of Probability: Explorations and Applications*, page 5. Cambridge, UK: Cambridge University Press, 2013.

- Quo vadis? Some combinatorial foundations in the next lecture as preparation to be followed by examples of chance in simple settings.