Chaos: Stanford University

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The big news about chaos is supposed to be that the smallest of changes in a system can result in very large differences in that system's behavior. The so-called butterfly effect has become one of the most popular images of chaos. The idea is that the flapping of a butterfly's wings in Argentina could cause a tornado in Texas three weeks later. By contrast, in an identical copy of the world sans the Argentinian butterfly, no such storm would have arisen in Texas. The mathematical version of this property is known as *sensitive dependence*. However, it turns out that sensitive dependence is somewhat old news, so some of the implications flowing from it are perhaps not such "big news" after all. Still, chaos studies have highlighted these implications in fresh ways and led to thinking about other implications as well.

In addition to exhibiting sensitive dependence, chaotic systems possess two other properties: they are deterministic and nonlinear (Smith 2007). This entry discusses systems exhibiting these three properties and what their philosophical implications might be for theories and theoretical understanding, confirmation, explanation, realism, determinism, free will and consciousness, and human and divine action.