

Book Review

A review of *Six Degrees: The Science of a Connected Age*, by Duncan Watts, 2003. New York: W.W. Norton, 374pp. ISBN 0393041425. \$15.95 USD.

Reviewed by:

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“I read somewhere that everybody on this planet is separated by only six other people. Six degrees of separation. Between us and everybody on this planet” (p. vii). With this quote by Ouisa, in *Six Degrees of Separation*, by John Guare, Duncan Watts begins an entertaining and scholarly study of connections. The title represents two important elements of the book. First, “six degrees” is a popular colloquialism. Many of us are familiar with John Guare’s play and with the Kevin Bacon parlor game that connects movie stars with a performer who may be the center of the universe (at least on film). Second, “The science of a connected age” accounts for Watts’ scholarly research investigation into the larger cultural phenomenon. Watts uniquely combines these two approaches to explore the theoretical underpinnings of a new science. In contrast to traditional science writing that is often viewed as dull and boring, Watts strives to write a readable and scholarly narrative that conveys the “messiness” and reality of scientific exploration. To achieve this challenging task, Watts explores the science of networks as an emerging discourse based in the experiential world.

Two dominant themes weave their way through Watts’ narrative account. Watts describes the science of networks—what they are and how they work—along with stories about networked and connected phenomena. These phenomena are embedded in a variety of systems that range from finance, health, epidemics, culture, and organizations. Accordingly, Watts defines a network as, “a collection of objects connected to each other

in some fashion" (p. 27). Watt's definition is simple. However, the reality and dynamics of networks are far from simplistic. What seems simple is actually incredibly complex. And so Watt's narrative unfolds ...

The concept of "six degrees" originated in Stanley Milgram's research in the "small world problem" (p. 37). Milgram investigated how many steps it would take to get a letter from one part of the globe to another. The simple answer was about six. This observation led to a meta-theory that everyone in the world is separated, or connected, by only six other people. Enter pop culture and the six degrees of Kevin Bacon. After recounting Milgram's theory, Watts documents critical flaws that are often overlooked by the larger cultural milieu. For instance, the actual data in Milgram's experiments was very limited. Watts also notes a difference between being connected to someone with a short route and being able to actually find that route. However, despite these fundamental flaws, Watts asserts that Milgram was on the right path. Watts follows Milgram's trail and begins to explore a more expansive theory of the science of connections.

Watts utilizes linkages to research and mathematical proofs to deepen the exploration of the science of connections by illustrating a variety of complex examples. These accounts are rich with alpha models and clustering coefficients. However, these examples may be a challenge to non-scientific readers. In essence, Watts' theories and formulas are readable, but dense. With perseverance, the reader will find a strong scientific basis from which Watts' theories on the science of connections stand their ground and, as a result, have significant import for research in the social sciences and humanities. For example, Watts revisits Milgram's famous social psychology "shock" experiments to explore the "minds of individuals and the social environment in which they typically operate" (p. 130). In these now classic tests students were asked to "shock" research subjects who disobeyed orders. To demonstrate the lasting implications of this research we have to look no further than the most recent investigations into Iraqi prisoner abuse. A finding from these experiments that still holds true today concludes, "bureaucracies that [had] distanced individuals from the ultimate consequences of their actions were [the] most effective in dispensing brutality" (p. 131).

Watts introduces a compelling question early in the text: "How does individual behavior aggregate to collective behavior?" (p. 24). Exploration of this question provides powerful insights into the nature and importance of connections. We are living in a connected world with economies, terrorism (especially post September 11th), epidemics, and organizational learning communities that span traditional understandings of time, space, and place. Watts uses these illustrations to demonstrate how we often continue to think and act in fundamentally mechanical and linear ways in contrast to

systems that operate in nonlinear and connected patterns. Watts proposes that we need a new lens to see and understand this complex web. Accordingly, Watts articulates the story of the “tragedy of the commons” (p. 203) to illustrate this main thesis. In this historical narrative villagers overuse a common grazing plot. Essentially, it is in their individual advantage to do so since the plot is collectively owned and costs the individual nothing. The overgrazing leads to the destruction of the commons and to the eventual demise of grazing. The tragedy of the commons is a microcosm of our connected world. If we do not see the connected consequences of our individual actions we threaten an increasingly connected global civilization.

To highlight this point Watts summarizes three important lessons regarding connectivity. We may be connected to everyone by only six other people, but so what? Sometimes the distance of foreign settings makes the potential for connection irrelevant. Other times the potential brings financial crisis or epidemics to our doors. Second, we must become aware of cause and effect. Sometimes cause and effect are clearly related, but at other times the connection is not always apparent. Rather than relying solely on history to clarify events we can work to develop a present understanding of events by seeing connections, influences, and relationships. Third, the study of connections is quickly emerging as a new science. This study is increasingly undergirded with research from physics, biology, and mathematics, but clearly it has application in sociology, education, and economics as well.

The 2003 edition of *Six Degrees* has a new and important chapter that reflects the current SARS epidemic and the east coast blackout of 2003. Both are analyzed as further mounting evidence of our increasingly interdependent world. While the revised and older editions of Watts’ text only briefly address education, there is a relationship between connectivity and learning communities that is worth exploring. At its center, a learning community is based on networks and connections. Educators need to deeply understand this connectivity. One reason is due to the increasing number of mandates from policy makers outside of education. These policy directives often reinforce linear chain-of-command style thinking that is ineffective in addressing complex organizations such as schools. Educators also need to more clearly understand the dynamics of interactions within their classrooms and schools. Official lines of communication and leadership may be organized in more linear ways, while the day-to-day relationships among workers operate in substantively more networked and connected ways. The complexity of most schools requires increased interaction among all members of the organization, as the sharing of information is critical to decision making and planning. As we learn to move agendas forward through networks rather than through linear command-and-control mechanisms, edu-

cators will benefit from an understanding of the inherent theory and practice of connections.

In summary, *Six Degrees: The Science of a Connected Age* is both a readable and scholarly narrative. Readers who wish to indulge in an engaging study of connections will find interesting trivia and stimulating stories that underpin many of our cultural beliefs and urban myths. Readers who are searching for scholarly research as well as global implications and applications will find fertile ground for further inquiry.

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