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978-0-521-73230-7 - The Three Cultures: Natural Sciences, Social Sciences, and the Humanities in the 21st Century

Jerome Kagan

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THE THREE CULTURES: NATURAL SCIENCES,  
SOCIAL SCIENCES, AND THE HUMANITIES IN  
THE 21ST CENTURY

In 1959 C. P. Snow delivered his now-famous Rede Lecture, “The Two Cultures,” a reflection on the academy based on the premise that intellectual life was divided into two cultures: the arts and humanities on one side and the natural sciences on the other. Since then, a third culture, generally termed “social science” and comprising the fields of sociology, anthropology, political science, economics, and psychology, has grown in importance. Jerome Kagan’s book describes the assumptions, vocabulary, and contributions of each of these cultures and argues that the meanings of many of the concepts used by each community are unique to its methods because the source of evidence contributes to meaning. The text summarizes the contributions of the social sciences and humanities to our understanding of human nature and questions the popular belief that biological processes are the main determinant of variation in human behavior.

Jerome Kagan is a developmental psychologist, a member of the Institute of Medicine of the National Academy of Sciences, a Fellow of the American Academy of Arts and Sciences, and emeritus professor at Harvard University. He has received the Distinguished Scientist Awards from the American Psychological Association and the Society for Research in Child Development. Jerome Kagan has written several books dealing with the assumptions of the social sciences. He is best known for his research on moral development, infant cognition, and temperamental biases in children.

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# The Three Cultures

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CENTURY

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*Harvard University*



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## Preface

On a gray March afternoon in 2006 I saw a copy of C. P. Snow's *The Two Cultures* on a shelf above the location of the two books I was searching for in the cavernous Widener Library at Harvard. Recalling the debate it provoked when published more than fifty years ago, and aware that I was looking for a theme to probe during the coming summer, I added it to the pair of books I had come to borrow. After reading Snow's essay the following weekend, it became clear that the changes in the sciences and research universities over the past half-century had rendered Snow's analysis a bit archaic, and a comparison of his views with the current reality seemed to be a worthwhile pursuit.

The most obvious change was the ascent of big science projects in physics, chemistry, and molecular biology that required expensive machines and teams of experts with varied talents and motives. The typical scientist during my graduate years went to the basement of the university building where the shop was housed and constructed himself, or had built by the department's technician, whatever apparatus was required for an experiment designed and run by the faculty member or with the help of a graduate student who assisted with the gathering and analysis of the evidence and the writing and rewriting of a paper reporting an interesting result. Two minds and four hands, often with no outside funds, performed all the work. Under these conditions the pride savored if the experiment were successful, or the blend of frustration and sadness if not, was restricted to a pair of agents.

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These emotions are seriously diluted when hundreds of experts design experiments to be executed by teams visiting the international space station, preparing the Hadron Collider for probes that might reveal new particles, documenting the human genome, or studying the brain with magnetic scanners. The joy or pain felt in these settings is dispersed among many, not unlike the mood of the bank managers who bundled and sold thousands of mortgages to hedge funds in order to reduce the risk of any one of them defaulting.

The observations produced by the machines of big science have changed the ease of imagining the concepts invented to explain the mysterious signals they produced. Strings oscillating in ten dimensions, the Higgs boson, and genetic drift in a population are examples of concepts that are more difficult to imagine than concepts like bacteria, planetary orbit, molecules, or genes. A majority of scientific ideas, from Galileo to Mendel, were friendly to the human capacities for imagery and, therefore, easier to understand and to explain to a curious public.

The machines created two additional problems. Their high cost meant that investigators needed large grants from the federal government and/or private philanthropies, and only the small number of fortunate investigators working at settings with these machines would be able to make important discoveries. Thus, a young, ambitious scientist had to be at the right place in order to enjoy the advantage of these magical, powerful probes. This situation created a division between the small number of privileged investigators and the majority interested in the same question who happened to be too far from the action. The odds of a monk in an isolated monastery making a major discovery in genetics are far lower today than they were when Mendel experimented with pea plants.

It did not take long for deans and provosts to appreciate that their physicists, chemists, and biologists were bringing large amounts of overhead monies to their institutions, and they felt an obligation to reciprocate the kindness by allowing them more relaxed teaching

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responsibilities and a bit more respect. Predictably, many natural scientists interpreted their new status as justly earned, and a few began to display some arrogance in their pronouncements.

Snow had celebrated the natural scientists because he thought the products of their research would reduce world hunger and perhaps hasten international peace. He did not anticipate the narrative that history composed during the next two generations. Each university campus in Snow's era was a family with which many faculty members identified. When the federal government and philanthropies became major sources of research funds, hosting conferences in exotic places, many scientists shifted their primary loyalties from their institutions to these generous organizations.

The asymmetry in the largesse available to natural scientists, compared with that accorded social scientists and humanists, created status differentials that eroded collegiality and provoked defensive strategies by the two less advantaged cultures. The social scientists, whom Snow had ignored completely, had enjoyed a moment of exuberance, from about 1940 to the 1970s, when it was thought that their ideas might solve some of the stubborn problems that plagued society, especially mental illness, crime, alcoholism, and the high failure rate of school-age children growing up in economically compromised families. However, the crude synthesis of Freudian concepts with the more empirically rigorous ideas of behaviorism, on which that faith had been based, were too weak to carry their hopes to fruition. Eventually the scaffold collapsed, leaving social scientists without a protective theoretical cloak to cover their wounds or an ideological guide for the next investigation. The next cohort of social scientists, therefore, split into two groups. One rushed to join the natural scientists by studying the relations between brain activity and psychological phenomena. The biologists welcomed these new recruits, assuming they would adopt their language and conform to their rules. The larger group, who had chosen the social sciences because of a love affair with the mystery of human motives, thoughts,

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or emotions, rather than a curiosity about any aspect of nature that would yield its secret to a powerful mind, chose to study the complex, messier problems disturbing the public's serenity. Unfortunately, they were handicapped by a lack of powerful methods appropriate to the task and resembled farmers with pitchforks and hoes trying to grow fruit trees on a dry plateau.

The scholars who had chosen philosophy, literature, or history took a more severe beating because they were not privy to the generous grants that brought many millions of dollars to their campuses. Moreover, the public, aided by the media, had become persuaded that the answers to society's serious problems could be provided only by natural scientists. When the postmodernists, such as Derrida and Foucault, attacked the claims made by members of their own intellectual family, the loss of confidence among humanists became catastrophic.

The civil protests of the 1960s, which Snow did not anticipate, contributed to an ethic of political correctness in which justice began to compete with individual merit. Deans, research review committees, and honorary societies decided it was important to try to divide their rewards in rough correspondence to the population proportions for gender, ethnicity, and region of the country. Fairness was to be added to talent and motivation as a relevant criterion when promotions, honors, and grant funds were allocated. All of these events sculpted new structures and procedures that Snow might not recognize. Newton would have been astonished.

I had written favorably on Bohr's suggestion that the meaning of every scientific concept depended on its source of evidence. The natural sciences, social sciences, and humanities often used the same word to name different phenomena, and therefore a word could have different meanings in the three communities. Many failed to appreciate that the neuroscientists' understandings of the terms "consciousness," "fear," and "memory" were not shared by social scientists or humanists using the same vocabulary. Thus, scholars and the larger public



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had to be reminded that each of the intellectual communities had something important to contribute to an understanding of human nature and societies.

These reflections motivated this brief book, which had three primary goals: to analyze the meanings of the vocabularies used by the three cultures, to describe and critique the seminal assumptions the three communities bring to their work, and, finally, to list each group's unique contributions. The first chapter considers the differences among the cultures in their vocabularies, mental tools, and balance of interest in patterns or single features; the influence of history on problems probed; and, finally, the motive hierarchies of each group. The second chapter analyzes the natural sciences, especially their four seminal premises, their wish to avoid an entanglement with ethics, their insistence on minimizing the differences between humans and other animals, the challenges to their prior hegemony, and the ambivalence among youths interested in natural science toward research that requires team cooperation.

The next two chapters on the social sciences consider the initial reluctance to regard collectives as legitimate phenomena, the problems with their metrics and methods, the loss of confidence following the dramatic advances in biology, the problems surrounding the formal models of economists, and also the significant contributions of social scientists.

The penultimate chapter explains the loss of status among humanists following the ascent of the social sciences and the postmodernist challenge to the validity of claims based on narratives, as well as their seminal contributions to an understanding of the human condition. The final chapter describes the recent disturbing developments in the university, especially the diluted identification with the institution, the crass search for celebrity, and the confusion over the current mission in undergraduate education. The final pages turn skeptical by asking whether life on this planet is better today than it was 200 years earlier and fails to arrive at an unequivocally affirmative

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reply. The text ends with a plea to all three communities to recognize the special forms of enlightenment each brings to a world of diverse societies. I hope readers will find something of interest in an effort that taught me more than I anticipated when I took Snow's paperback from the library shelf.

I thank Robert Le Vine, Steven Reznick, and Jay Schulkin for comments on the full text, Gerald Holton for a critique of the chapter on the natural sciences, and David Warsh for patiently re-reading many versions of the section on economics. I am indebted to Nancy Snidman, Paula Mabee, and Sabiha Imran for help with manuscript preparation; to Eric Schwartz, now at Princeton University Press, for being my advocate with the Syndics at Cambridge University Press; and to Terry Kornak for editing of the text.