8 SACS Today

Now that we have a basic sense of when SACS emerged and how it developed over the past decade, it is time to examine its negotiated ordering, circa 2008. Our examination is organized into four major sections

Overall Connectedness: We begin with a general picture of SACS, focusing on the unique and combined information provided us by Maps 4, 6 and 7, with a focus on the degree to which SACS is internally connected. This discussion builds on our Chap. 7 review of how SACS evolved between 1998 and 2008. With this general picture, we then turn to a detailed review of the most important scholars and areas of research in SACS.

Powerbrokers: As we discussed in Chap. 6, the most important scholars and areas of research in SACS, which we call powerbrokers, are those nodes with the biggest impact on the structure and dynamics of this intellectual town. While these powerbrokers go by many names, we focus on four types: hubs, authorities, gatekeepers, and household names. We end this section summarizing this information to identify the top areas of research in SACS.

Internal Division: Next, we examine the dynamics and internal trajectories of SACS. While the focus here is on SACS, circa 2008, we continue to note the same two themes discussed in Chap. 7: the growing intellectual division within SACS between the west and the east side, and the dominating presence of the east side on the current trajectory of SACS. The question, however, is why? What is the cause of these opposing trajectories? The majority of this chapter will be spent answering this question.

The Near Future: Finally, we examine where SACS might be heading next. While the trajectory of the east side currently controls the direction of SACS, how long will this last? Alternatively, if the east side does not remain dominant, what might happen next? For example, are there any new scholarly stars on the rise? Or, are there any new areas of research that might significantly shift the current negotiated ordering of SACS?

8.0 Negotiated Ordering

8.0.1 Generating Map 6

We begin our review of SACS today (circa 2008) by discussing how we created the layout for Map 6. It was created using an energy command from *Pajek* (Nooy, Mrvar and Batagelj 2005). An energy command is a layout procedure that iteratively moves the nodes in a network to a set of locations in two or three dimensional space in order to "minimize" their overall variations in line (ties, links, etc) length. An energy command stops when the network settles into a state of relative equilibrium (Nooy, Mrvar and Batagelj 2005, p. 16). We created Map 6 with the Kamada-Kawai command because it is designed to produce stable results for smaller, connected networks (Nooy, Mrvar and Batagelj 2005, p. 17). With this in mind, we turn to a review of the general structure of SACS today.

8.0.2 General Structure of SACS

When looking at the layout of Map 6, the first thing that stands out is its tremendous similarity to the layout of Map 4—which is exactly what we had hoped for. Both maps, for example, situate sociocybernetics and the LSC next to each other in the upper western region of SACS; and, they both situate computational sociology and the BBC near each other on the east side of town, with CSNA positioned down near the bottom. Map 6 also highlights how the scholars associated with the new science of networks and global network society cluster into two different areas, albeit the inverse of their position in Map 4. Finally, all three maps place Wallerstein and the team of Klüver and Stoica between sociocybernetics and the LSC on the one side and computational sociology, CSNA and the BBC on the other.

The strong similarities in the spatial layout of Map 4 and 6 suggests that our historical and quantitative examinations of SACS have given us similar results and thus our general model of SACS is reasonably valid and reliable. It is valid because the overall layout of the scholars and areas of research in both maps are similar. It is reliable because two different sources of information—historical and archival on the one hand and quantitative and citation-based on the other—resulted in similar findings.

Still, despite these similarities, there are some interesting differences between our two maps. For example, while Map 4 places the BBC in the lower right corner, Map 6 places it to the right of computational sociology,

in a more mid-eastern position. Furthermore, in Map 6 the top three scholars in the BBC (Byrne, Gilbert and Urry) are positioned at a distance from their primary areas of research—Urry is located all the way down near CSNA; Byrne is located close to computational sociology; and Gilbert is in the upper right-hand corner.

These results suggest that, somewhat contrary to Map 4, when the citations amongst the Top 25 scholars are considered, the BBC appears less intellectually integrated, with the respective subclusters of research to which Byrne (complex complexity), Urry (global network society) and Gilbert (simulation) belong pulling them away from one another. In other words, not only is the BBC somewhat marginal to the overall dynamics of SACS, it appears that the BBC is intellectually distributed, with its three top scholars extensively involved in their own particular subclusters of research.

How, then, do we explain our argument in previous chapters that the BBC is a major player in SACS? The answer comes from our Chap. 5 discussion of intellectual mobility: the BBC is a highly mobile area of research that is heavily invested in creative marginality. The strength of the BBC, therefore, is the extent to which it infuses itself into the other areas of SACS—specifically global network society, the new science of networks, computational sociology and general simulation. Said another way, the spatial arrangement of the BBC within SACS matches its intellectual profile. Rather than clustering inward like the scholars of the LSC and sociocybernetics, it extends outward to the other areas of research in SACS.

Computational sociology is similarly diffuse. While data mining, dynamical systems theory and simulation are the three main subclusters of computational sociology, they are somewhat distant from one another. Gilbert, for example, is located along the upper east side of Map 6, surrounded by all of the scholars involved in simulation, while Ragin and Abbott are positioned more toward the center and right side, respectively. Again, this diffusion does not suggest a lack of cohesion—all of the scholars are close to the computational sociology node. Instead, it suggests that the orientation of computational sociology is outward, with links to other areas of research in SACS, particularly those on the east side of town.

The same diffusion is found in CSNA, which takes up the entire bottom right to bottom center of Map 6. With the scholars of global network society on the left side of CSNA and the new science of networks on the right, CSNA reaches (links, connects) outward to the larger town of SACS.

In fact, one could make the case that *outward diffusion* is a major theme for the east side of SACS. For example, while the west side has only three directed links extending outward from sociocybernetics and the LSC to the rest of SACS, there are seven links running from CSNA, the BBC and computational sociology to the west side.

Still, despite these differences, as we will discuss next, the town of SACS as a whole is connected, constituting the typical structure of a scientific network. In other words, while the differences we are highlighting amongst the five areas of research in SACS are important, we do not wish to overstate them. Let us explain.

8.0.3 Degree of Connectedness

Taking into account the last decade of global and local interlinking within SACS—all of which we discussed in Chap. 7—this town (circa 2008) appears to be a typically connected scientific network. Here is why. Following the work of Newman (Newman 2001a, 2001b; Newman and Park 2003) on the structure of scientific networks:

- No one node is isolated from the rest, thereby allowing the researcher to go on a semi-walk from any one scholar or area of research in SACS to any other. (For a review of the term *semi-walk*, see Chap. 7, Sect. 7.2.2.4)
- The degree of separation amongst the scholars and areas of SACS is also reasonably small, with 5 being the maximum degrees of separation between any two nodes, and 2 to 3 being the average degrees of separation between any two nodes.
- Each of the five areas is connected internally; that is, the scholars for all five areas, despite their diffusion, are spatially located near rather than away from one another.
- The subclusters of research in SACS are spatially tight, with the scholars involved in global network society, the new science of networks and general simulation positioned close to their respective subcluster of research.
- The five areas of research, along with their subclusters, are connected to one another through a series of weak-ties—single directed arrows. (For a review of the term *weak ties*, see Chap. 7, Sect. 7.1.4)

Given that our citation network is comprised of only N=30 nodes (25 scholars and five areas of research), one may not think much of the above results. In fact, one might think a modest-sized network like SACS is going to constitute a *small world*, no big insight. This would be, however, a false assumption. While comprised of only N=30 nodes, the scholars and research areas of SACS are spread out across a wide number of disciplines, from sociology and physics to economics and managerial science to applied mathematics and computer science. Furthermore, the scholars of

SACS come from all over the world: Australia, England, Germany, United States, etc. In many ways SACS is a large network, with rather significant disciplinary and geographical distances. Nonetheless, and despite these distances, this network constitutes a *small world*: while clustered into non-random, local areas of research (and subclusters of research), the weak links amongst these clusters (also not random) ensure that this new intellectual town is well-connected, keeping the paths between any two scholars to less than 5-degrees of separation (For more on the definition of a small world, see Watts 2004).

The small world character of SACS is further supported by the average number of first-degree ties in this town (mean = 6.60; median = 6). First-degree ties connote the primary links amongst scholars, representing one-degree of separation. (As a side note, the more first-degree ties a network of attracting clusters has, the more densely connected it is.) The lowest first-degree score in SACS is 3, which goes to Fuchs. This means that Fuchs is directly connected to only three other nodes (two areas of research and one scholar). The highest first-degree score is 15, which goes to computational sociology.

Another observation is that the distribution of degree scores in our citation network follows a *power-law distribution*, with the lowest degree scores (3 and 4) being the most frequent (seven nodes) and the largest degree score (15) being the least common. (For a review of the power-law, see Chap. 1, Sect. 1.2.3.1) We do not, however, put much weight behind this observation because the total number of nodes in our model is N=30.

In terms of the dynamics of strong ties, there is a trifecta in SACS between Watts, Newman and Barabási; and another near trifecta between (1) Bonacich, Barabási and Newman and (2) Gilbert, Troitzsch and the scholars of socionics. These trifectas and near trifectas are the classic triangles or partial triangles, respectively, discussed in the "strength of weak ties" work of Granovetter (1973), who found that strong ties do not occur in isolation; instead, they tend to form triangles or partial triangles. Trifectas are also found in the work of Newman (2001a, 2001b, 2001c, 2004), who discovered that the collaborative ties amongst scientists tend to be triangular: if a scholar publishes with two different scientists on a regular basis, there is a high likelihood that the other two scientists will likewise collaborate, forming a triangle of first-degree collaboration.

Given Newman's work (2001a, 2001b, 2001c, 2004), it is worth pointing out that this town lacks the number of collaborative triangles one would expect. For example, one would think that there would be at least one collaborative triangle amongst the top scholars in each of the five research areas. This is not the case. For example, despite Urry's tremendous networking skills, he is not part of a collaborative triangle—at least not amongst the Top 25 scholars in SACS. Given the low number of collaborative triangles,

it appears that while SACS is highly clustered, it is by no means done forming its internal connections.

Overall, however, SACS has evolved into a scientific community with local connections for each of its attracting clusters and subclusters of research, with typical weak ties running from one area of research to the next. Furthermore, these weak ties create a small world: despite being a geographically and intellectually diverse town, SACS is a connected community. Nonetheless, and in terms of these connections, SACS appears to be in its formative stages.

8.0.4 Powerbrokers

Our analysis of the hubs, authorities and gatekeepers of SACS, as well as our assessment of the top three areas of research in this new community, results in the same set of themes we discussed in Chap. 7:

1. The LSC and sociocybernetics have formed a sort of twin science, resulting in a rather dense network of local (inward) connections located on the upper west side of Map 6.
2. In contrast, the newer areas of SACS and their subclusters are congregated together on the east side of town, forming their own somewhat diffuse network of local (outward) connections.
3. An intellectual rift exists between the west and east sides of town.

8.0.4.1 Hubs

Using *Pajek*, we searched for the top hubs in Map 6. Because all 25 scholars are connected to their respective programs of study, we expected most of the hubs to be areas of research. This was the case. The three most important hubs were sociocybernetics, the LSC and computational sociology.

Given their high degree of internal (inward) connections, we expected that two of the largest hubs in SACS would be sociocybernetics and the LSC. They are directly connected to eleven of the Top 25 scholars in SACS; two-degrees of separation from the next nine, and only three-degrees of separation from the remaining five. They are also the two oldest areas in SACS. Given their "elder" status, they have had the time to collect a large number of internal connections. This turned out to be the case.

Sociocybernetics and the LSC also boast the top two scholarly hubs, Luhmann and Buckley. As the two oldest scholars in SACS, their work

stretches back to the 1960s and 1970s. Their historical position in SACS seems to be to their advantage. They are the scholars most often cited by the other top 23 scholars in this town. Nonetheless, the majority of these citations mostly come from other scholars in sociocybernetics and the LSC, not the rest of SACS.

The importance of computational sociology points to a different story within SACS. While the LSC and sociocybernetics are hubs because of their historical importance to this town, computational sociology is a hub because of its methodological use. As the methodological hub of SACS, computational sociology has 15 first-degree ties and 9 second-degree ties.

8.0.4.2 Authorities

Our list of the top authorities in SACS reveals a different aspect of this town. As the reader may recall, in a scientific network an authority is a scholar who cites, reviews, comments on, or makes use of the greatest number of other scholars, particularly the major scholarly hubs. (In Map 6, these are the nodes with the greatest number of outward arrows, particularly to the hubs in the network.)

Given the historical status of the LSC and sociocybernetics within SACS, it was no surprise that the leading authorities were Geyer, Zouwen, Bailey and Mingers. While Luhmann and Buckley are scholarly hubs because their ideas are central to the work of the LSC and sociocybernetics, Geyer, Zouwen, Bailey and Mingers are authorities because they most often cite their sociocybernetics and LSC colleagues. The major problem, however, with the "internal" citing record of Geyer, Bailey and Zouwen is that this record does not translate into outward influence on the rest of SACS. Because the citations of the east side are mostly inward to their own cluster, the authorities located in this part of town have not had an impact on the rest of SACS. For example, other than the LSC and sociocybernetics, Bailey has no links to anything else in SACS: Geyer and Zouwen at least reach outward to computational sociology, but these links are not strong-ties.

The authority status of Mingers tells us a different story about SACS. While currently a minor player in this community, Mingers is an internationally recognized authority in managerial science and, more specifically, the application of complexity science to the study of complex human organizations. A professor in the Kent Business School, University of Kent (U.K.), Mingers (560 citations) represents a possible future for SACS—something Map 6 does not reveal. While the application of complexity science to the study and management of human organizations is one of the largest substantive foci of complexity science today (Capra 2002), it is an

untapped area of research within SACS. Mingers, however, has not given up, taking up residence in SACS, albeit on the margins. The problem, however, is that the direction of his links currently extend outward to the other Top 25 scholars in the town—on Map 6, all of Mingers' links go away from him. If the direction of these links were to change, however, and other or new scholars in SACS began using Mingers' work, a new attractor point could very easily emerge with SACS. The name of this cluster might be something like *the sociology of complex organizations* or *complex managerial science*.

8.0.4.3 Gatekeepers

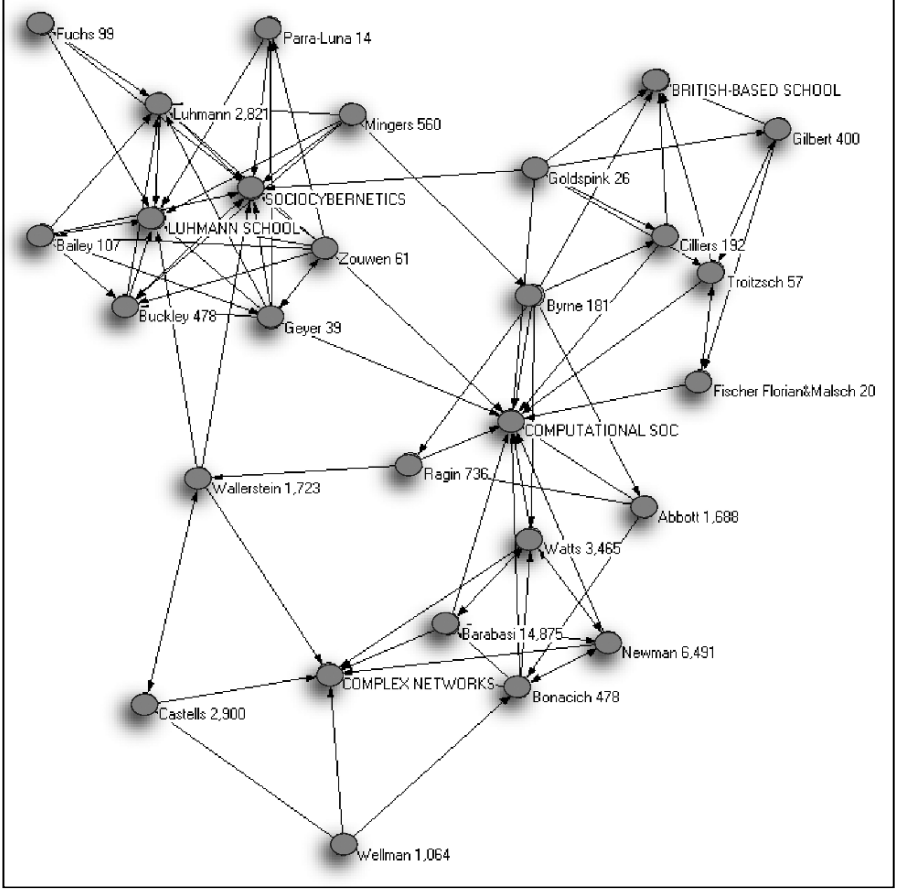
As we explained in Chap. 7, gatekeepers (a type of authority) hold a scientific network and its various areas of research (partitions, clusters, subclusters) together. While working within their own area of research, gatekeepers tend to draw upon or bring together scholars and areas of research outside their immediate focus, thereby making the important global connections (weak-ties) that sustain a scientific network's small world character. In fact, if the gatekeepers in a scientific network are removed, their absence increases the "degrees of separation" amongst the other nodes in the network, and most often also cuts off one area of research or subcluster of research in the network from the rest. It is therefore important to know who the gatekeepers in a network are.

The two major gatekeepers in SACS are Urry and the team of Klüver and Stoica. Urry is important because his links go outward to every major area in SACS; including: (1) Castells and global network society; (2) Watts and the new science of networks; (3) the BBC and its unique approach to complexity; (4) Byrne and computational sociology; (5) Luhmann and the LSC; and, (6) Wallerstein and sociocybernetics. As a gatekeeper, Urry is one of the most important scholars in SACS. Remove his weak-ties from the network of attracting clusters and SACS becomes a little less cohesive, a little less connected, and a little less of a town. Klüver and Stoica are important because they connect the northwest side of SACS to computational sociology.

To test further the gate-keeping abilities of Urry and Klüver and Stoica, we removed them and their links from our *Pajek* database to see how it would change the network. As shown in Map 7, if Urry and the team of Klüver and Stoica are removed, the mean degree score drops from 6.60 to 5.85 and the median degree score drops from 6 to 5. The highest first-degree score (computational sociology) also drops from 15 to 13. Furthermore, as shown in Map 7, the west and east sides of SACS pull further

away from each other, with Luhmann being dramatically shifted to the upper west side and the BBC moving to the upper east side. This is perhaps the most interesting result here: removing Urry or Klüver and Stoica, while not fatal to SACS, does increase the divide between the east and west sides. Furthermore, while the loss of these gatekeepers does not drastically reduce the degree score for SACS, their loss does make this community less integrated.

Map 7: Social Network Map of SACS Minus Gatekeepers



8.0.4.4 Household Names

Household names are an important part of a scientific network (particularly one striving for legitimacy) because they bring important outside attention and recognition. In the case of complexity science, for example, much of its early success was based on the intellectual powerhouses who promoted its "crazy" ideas, including Murray Gell-Mann, Kenneth Arrow, George Cowan, and Philip Anderson (Lewin 1992; Waldrop 1992).

The household names in SACS have brought this town a similar level of success it might not otherwise have attained. At present, the three biggest household names in SACS belong to the new science of networks. With a combined total of almost 25,000 citations, Watts, Barabási, and Newman are three of the most important names in complexity science today. As we previously quoted Bonacich as stating, "We [sociologists] are lucky that physical scientists and mathematicians have become interested in social networks. Of course we feel slighted; not all of our contributions will be noted. But this is the cost of moving onto a very much larger intellectual stage" (2004b, p. 4).

8.0.4.5 Top Areas of Research

So, how do we summarize the above information to identify the top three areas of research in SACS? Given our analysis of the current *negotiated ordering* of SACS and its hubs, authorities, gatekeepers and household names, along with our knowledge of the last decade of development in this town, here are (in order) our top three areas of research: CSNA, computational sociology and the LSC.

There are six reasons why CSNA has evolved to become the top area of research in SACS. First, it is comprised of the two largest growing subclusters of research: the new science of network and global network society. Second, as a result of the growth in these two areas, CSNA has a massive citation base of 31,000 publications. Third, in terms of household names, this area boasts three of the most popular and highly cited scholars in complexity science today; namely, Barabási, Newman and Watts. CSNA also boasts two of the most important scholars in sociology and globalization studies, namely Castells and Wallerstein. Fourth, in terms of internal impact, CSNA has strong ties with computational sociology. Fifth, CSNA also has strong internal ties to the BBC, primarily through the work of Urry. Finally, in terms of environmental forces, the new science of networks is one of the most popular areas of study in complexity science today.

There are four major reasons why computational sociology has evolved to become the second most important area in SACS. First, while not the most highly cited area outside the SACS community, computational sociology is important because of its utility to complexity scientists. Just about everyone in SACS and complexity science use the methods of computational sociology. For example, if you examined all of the publications in SACS and complexity science based on the methods they use or the methodological issues they explicitly or implicitly address, computational sociology is the dominant methodological toolset of choice. As discussed earlier, the importance of computational sociology is further corroborated by the fact that, as we discussed earlier, this area of research has 15 first-degree ties and 9 second-degree ties to the top 25 scholars in SACS. Third, as we discussed in Chap. 6, computational sociology boasts one of the mostly highly connected and important scholars in agent-based modeling and complexity science method, namely Gilbert. Finally, in terms of internal importance, computational sociology is home to the gate-keeping team of Klüver and Stoica.

As one of the original areas of research in SACS, the LSC is the third most important area, primarily because of its fortitude. Little of the research or methods made "vogue" in complexity science today look like the work of the LSC. As we discussed in Chap. 5, for example, the LSC is historical and literary in focus, whereas complexity science is mathematical and computational. The LSC also is rigorously opposed to agent-based modeling, while complexity science is almost exclusively a bottom-up approach. Finally, the LSC is profoundly theoretical, whereas complexity science is more methodological and substantive. Despite these incredible differences, the LSC remains an important area of research in SACS, primarily because of its popularity in Germany and the growing international status of Luhmann.

This is not, however, where our summary of SACS ends. We have to address one last point: why a division exists between the east and west sides of this new intellectual community.

8.1 Internal Division

Following Newman's work on the structure and dynamics of intellectual networks (2001a, 2001b, 2004), SACS is a typical community insomuch as it is comprised of several localized areas of research which are, for the most part, spatially clustered. Furthermore, these areas of research are globally connected through a series of weak-ties. Some of these weak-ties,

however, are weaker than others, particularly in terms of the east and west sides of this town.

The weak-ties between the east and west sides suggest this town has two opposing trajectories, each of which is pulling SACS in a different direction. Of the two, the east side trajectory seems to be the more powerful and, in fact, is currently pulling most of SACS in its direction. Our question, however, is why? To answer this question, we return to our Chap. 4 discussion of the interstitial character of SACS.

8.1.1 The Interstitial Character of SACS

SACS is a town that celebrates the "in-between" of things. Its scholars thrive on creative marginality and mobility. They seek new theories, ideas and methods, as well as new institutional designs and blueprints that allow them to address the growing complexity of contemporary life. Their search has not been in vain, as they have created a cutting-edge scientific community that is resolutely interstitial.

As we explained in Chap. 4, the interstitial character of SACS is manifested in six ways: (1) the type of intellectual space it provides its citizens, which, for the most part, does not exclude any particular area of study or form of inquiry; (2) the diversity of its major areas of research, which draw from all of the sciences; (3) the form of government its residents enact, which has little interest in policing its boundaries; (4) the type of community its supports, which is informally held together through a loose network of scholarly connections; (5) the common concerns of its residents, which go beyond their respective disciplines to embrace a "complex systems" perspective; and (6) the cosmopolitan culture it celebrates, which is highly interdisciplinary and international.

If one were to condense these six interstitial characteristics into one dominant quality, it would be stated as follows: the goal of SACS is to overcome, blur, or erase the interstitial boundaries between the sciences, sociology and the humanities in order to create a new framework for studying social systems.

The problem, however, is that while this effort has accomplished a great deal, it has not entirely succeed. At present, SACS seems to be moving along two different trajectories, which we believe is the result of a major epistemological division between its east and west sides. To make sense of this epistemological division, we turn to Abbott's book, *Chaos of Disciplines* (2001).

8.1.2 The Chaos of Sociology

Abbott's book is not about SACS. It is about sociology. More important, it is about sociology's interstitial character, its epistemological self-similarity, and its fractal, scale-free evolution as a discipline. Abbott's thesis, however, along with several of his key concepts can be employed to explain the epistemological differences in SACS. By epistemology, Abbott means the structured, academic *ways of knowing* scholars use to understand the world: traditions, theories, methods, concepts, etc.

Because sociology (like most of the social sciences) is an interstitial discipline, it is forever caught in an internal war. Not quite sure who the enemy is, sociology has never been completely scientific or humanistic; never quite rational or artistic, never entirely objective or political, never completely quantitative or qualitative, never really macro or micro, never fully structure or agency. Instead, as sociology has evolved over the last century, this discipline's numerous traditions have developed along the same lines of conflict.

What is interesting about these aforementioned conflicts is that they tend to have a dualistic character: consensus versus conflict, culture versus structure, applied sociology versus pure sociology. Even the traditions of sociology are regularly expressed in dualistic terms: micro-sociology versus macro-sociology, functionalism versus conflict theory; statistics versus qualitative method. These dualisms even emerge in sociology's philosophical wars: constructivism versus positivism, for example, or modernism versus postmodernism.

Dualisms aside, what is most fascinating about these lines of conflict is that, no matter what a new or winning area of research does to assuage or dissolve these conflicts, they do not go away. Over and over again, the battle lines in sociology are redrawn, opposing lines of conflict re-emerge, and new languages and methods are, in turn, re-created, all in an enduring effort to push these traditional conflicts to one side or the other: structure over agency, narrative versus analysis. In the end, however, now matter how innovative the "new" tradition or winning area of research, it invariably internalizes, recycles and recapitulates the very conflicts it sought to overcome. This, Abbott explains, is sociology's disciplinary chaos.

To say that sociology is chaotic, however, does not mean that the discipline lacks structure or order. Quite the opposite is true. The title of Abbott's book is therefore somewhat of a misnomer. Instead, the book highlights the fractal structure and order of sociology's disciplinary chaos. Let us explore this fractal chaos further.

Abbott employs a unique approach to the study of fractals. As we discussed in Chap. 5, fractals are geometrical shapes with the following char-

acteristics. First, unlike the shapes of traditional geometry (e.g., squares, triangles, circles, etc.) they are not smooth. Instead they are rough and fragmented. Second, despite their irregularity, they have a distinct pattern and shape: at decreasing levels of scale, one finds that any magnified section of a fractal looks like a reduced version of the whole. A stem on a head of broccoli looks like the broccoli. A small section of a river looks like the river. Mathematicians refer to the process by which a fractal recapitulates itself at decreasing levels of scale as *scale-free behavior* (Mandelbrot 1983). Lastly, there is no one fractal object, either mathematically or naturalistically. The term "fractal" is a general heading for a rather extensive catalogue of objects and phenomena that are non-smooth and yet roughly self-similar at multiple levels of scale.

Scientists have applied the field of fractals to a wide range of phenomenon, from religious symbols and the complex rhythms of the heart to crowd behavior and the clustering of galaxies (Capra 1996; Mandelbrot and Hudson 2004). Even Mandelbrot (the founder of this field) has spent considerable time studying the "fractal nature" of the stock market (Mandelbrot 1997, Mandelbrot and Hudson 2004).

Abbott is therefore not the first scholar to apply fractals to the study of sociological phenomena. Neither is he the first to use the terms of this field in slightly creative ways. For example, even Mandelbrot's application of fractals to economics can be conceptually difficult, forcing him to reconstruct or invent new terms, such as self-affinity (fractals found in two-dimensional economic charts and graphs) over self-similarity (fractals found in two or three dimensional Euclidian space) (See Mandelbrot 1997, Mandelbrot and Hudson 2004.)

Abbott engages in the same sort of conceptual innovation. While he holds to the general theme of fractal geometry, he retools several of its key concepts for the purposes of sociological analysis.

For Abbott (2001), the lines of conflict in sociology are essentially fractal. This means that these lines of conflict are self-similar and scale-free. It also means that these conflicts tend to be dualistic, even when they are grouped to form the major traditions of sociology. A classic example is qualitative versus quantitative research. As Abbott explains, these two traditions are really a collection of biases along several lines of conflict. Quantitative method tends to favor positivism, analysis, realism, social structure, transcendent knowledge and is cast at the individual level. Qualitative method, in contrast, tends to favor interpretation, narrative, constructionism, culture, situated knowledge and is cast at the emergent level (Abbott 2001, pp. 28–33)

By *self-similar*, Abbott means two things. First, one can examine any tradition or area of research within sociology and find that, upon analysis, its epistemological structure is a reduced version of the discipline, includ-

ing sociology's traditional lines of conflict: macro versus micro, qualitative versus quantitative, etc. At all levels of scale, no matter how one takes sociology apart, one finds the same basic epistemological divisions repeated. In other words, the self-similarity of sociology is roughly scale-free. Abbott explains it this way: "[Whatever line of conflict one uses] to distinguish groups of social scientists, we will then find these groups internally divided by the same distinctions" (2001, p. 10).

By *self-similar* Abbott also means that, as sociology evolves across time-space, it tends to recycle (albeit in new forms) the same basic epistemological distinctions of the past. Abbott refers to this self-similar recycling process as a *fractal cycle*. Organized sociology has never done a good job policing its disciplinary borders. As a result, the discipline is constantly entertaining and embracing new ideas. For example, one can go to just about any annual meeting in sociology and find sessions ranging from mathematical modeling to auto-ethnography, rigorous empirical inquiry to thoroughgoing philosophy of language, epidemiology to literary theory, historiography to political activism. In fact, there is almost no end to what someone with the title of "sociologist" can study or do.

While this type of academic freedom is worthy of applause, it is not without problems. One particular problem, which concerns Abbott the most, is the failure of many of these ideas to break free of their epistemological past. Conceptually speaking, no matter how new or innovative a technique is, it generally recycles many of the same insights and ideas that sociologists have been generating for the past century. This "recycling of ideas" is particularly true at the epistemological level—positivism versus constructionism, fact versus value, science versus politics, and so forth.

As such, Abbott explains, one cannot "make" the history of sociology to read like the natural sciences' steady progress of knowledge. Sociology's history is far too messy. Instead, while some progress takes place (to be fair, Abbott does acknowledge that we have learned a thing or two over the last century) the history of sociology generally reads like the recycling of older ideas, albeit in the language of some new theory, method or epistemological perspective.

And how long is a cycle? According to Abbott, the recycling of sociological ideas takes about 20–25 years. He states: "There is good reason to expect a cycle of about this length. Twenty years is about the length of time it takes a group of academics to storm the ramparts, take the citadel, and settle down to the fruits of victory. There is a common pattern." (p. 24). During this 20-year time period the biases of the dominant position holds sway. Eventually, however, conflicts of the past creep in, causing the dominant position to differentiate along the same old epistemological lines, including the lines it originally opposed.

The question, however, is why? Why is sociology doomed to repeat the past? Why can't it break out of its fractal cycle? Why does almost every new or winning position internalize, differentiate and recapitulate the very lines of conflict it sought to overcome?

The basic answer—which we have already hinted at—is that sociology is too complex. It is no coincidence that sociology is an interstitial discipline. Its topics of study (from global network society to the nuances of organizational behavior to the dynamics of self) are so diverse that, to try to know it all is intellectually punishing. As such, no matter how empirically successful a tradition, philosophy, theory or method, it tends to be *under-determined* by the sociological evidence. Even SACS cannot net the whole of social reality.

Because no one perspective can explain everything, scholars are always searching for other ways to do their work. Ironically, this very search leads them back to the lines of conflict they sought to destroy. In the process, these scholars end up internalizing and, inevitably, recapitulating the very lines of conflict they sought to overcome.

But, we still have not answered our question. Why can't sociology break out of its fractal cycle? Well, sociology actually can and sometimes it does—but only to a certain degree. To accomplish new insights or ideas (particularly at the epistemological level), such a break requires something seldom done.

Before we explain what that "something seldom done" is, let us rehearse what Abbot has so far said. For Abbott, (1) sociology is an interstitial discipline; (2) because of its interstitial character, sociology is prone to internal conflict; (3) the lines of conflict within sociology tend to be dualistic, with opponents taking one side or the other; (4) regardless who wins, each side tends to internalize and recapitulate the lines of conflict they sought to overcome; (5) the fractal recycling of these lines of conflict is a function of the fundamental complexity of sociology (sociological phenomena cannot be fully explained by any one theory, method or epistemological framework); and, finally, (6) sociology generally does not escape this fractal dynamic.

So, what can sociologists do? One possibility is to change the epistemological lines of conflict along which they argue. If one can recombine, intersect or highlight the dualisms of the discipline in a novel way, one is "off and running" into an entirely new area. For example, instead of doing quantitative or qualitative work, combine these traditions to do something new. Given the fractal nature of sociology, it is inevitable that the traditional "quantitative versus qualitative" line of conflict will emerge within your new approach. No matter. While this line of conflict will repeat this longstanding dualism, it will do so along a new and different

trajectory. Think intellectual mobility. Think creative marginality. Think fractal discovery.

8.1.3 The Fractal Dynamics of SACS

It is time, now, to employ Abbott's argument to explain the intellectual division between the east and west sides of SACS. Over the past decade, SACS has made several important breaks with sociology's epistemological past. These breaks have come in one of two ways: *combining* the opposing sides of several lines of conflicts in sociology or *highlighting* many of the marginalized lines of thought within sociology's systems tradition.

Combining Dualisms: Throughout this book we have we discussed most of the ways SACS has combined various dualisms to head into new intellectual (epistemological) territory. For example, scholars in SACS have: (1) combined theory and method to create simulation as a theoretical tool (Axelrod 1997); (2) blurred the boundaries between the social and natural sciences to generate the new science of networks (Urry 2004); (3) merged qualitative and quantitative method to develop computational modeling (Gilbert and Troitzsch 2005); and (4) overcome Snow's two-cultures war to generate new forms of postmodern epistemology (Byrne 1998). It is these combinations that make SACS a unique contribution to the systems tradition in sociology (and to complexity science). But, this is not where the uniqueness or contributions of SACS stop.

Highlighting Marginalized Ideas: In chapters one through seven, we also discussed the various marginalized ideas SACS highlights. In terms of method, for example, instead of taking a macro-level, top-down, structure oriented, static, variable-based approach to modeling systems, the scholars of SACS have taken a micro-level, bottom-up, agent-based, dynamic, social interactionist approach. And, in terms of theory, the scholars of SACS have inverted most of the theoretical stereotypes associated with Parsons. We reviewed these stereotypes in our introductory chapter: structural functionalism is not a theory; it lacks explanatory power; it explains away conflict and social change; it overplays solidarity and order; it is highly conservative and normative; it is exceedingly abstract, with almost no empirical grounding or application; it makes the same evolutionist errors as Spencer and Durkheim; and, it falls into the trap of treating society as a biological organism. By virtue of inverting these stereotypes, the theoretical orientation of SACS is significantly different. Its theories are highly explanatory; embrace conflict and change; emphasize instability and chaotic order; strive for creative marginality; focus on being descriptive rather than prescriptive; seek to be critical rather than normative; ground

themselves in the data; focus on building models rather than constructing abstracted theory; and, finally, refrain from naïve evolutionism or the idea that social systems are just like biological systems.

These are the dualisms SACS has combined and the marginalized ideas it has highlighted to chart a course into new epistemological territory. Or, this is, at least, partially the case. Over the past decade, while the east side of SACS has been strongly committed to practicing the above dualistic combinations and highlighted marginalized ideas, the west side has not. In fact, the west side seems to support most of the dualisms the east side has tried to overcome. The west side also seems to contest the marginalized ideas the east side highlights.

It appears, therefore, that SACS has its own fractal line of conflict, with the east and west sides taking opposing positions. This line of conflict is also scale-free because it manifests itself at several levels, starting with the east and west side, going down to their respective areas of research and still further to their respective subclusters of research. There are, however, some important qualifications:

- While all five areas of research in SACS (along with their respective subclusters) recapitulate the east-west conflict, this recapitulation has not caused SACS to differentiate at these smaller levels of scale into opposing internal trajectories.
- At least for the moment, the east side's perspective seems dominant.
- The dominance of the east side is due, in large measure, to the environmental impact of complexity science. Complexity science is academically popular, powerful and persuasive. Given this popularity, it has a strong epistemological hold on SACS. In fact, it is so strong that, at present, the epistemological perspective of complexity science is, for the most part, the epistemological perspective of the east side.
- There is a possibility, however, that, despite the popularity of complexity science, the east side's epistemological dominance could change. But, that is a point for discussion at the end of this chapter. Our concern here is to articulate the fractal line of conflict within SACS. The line of conflict differentiating the east and west side of SACS comes from their respective differences on two major epistemological dualisms.

Our two themes for the intellectual (epistemological) divisions between the east and west sides, which we will discuss below, are as follows:

- Following C. P. Snow's famous *two-cultures* distinction, the east side's epistemological bias is toward the natural sciences, while the west side's bias is toward the humanities.
- The east side also supports a micro-level approach to modeling social systems, while the west side supports a macro-level approach.

8.1.3.1 Dualism 1: Snow's Two Cultures

In terms of C. P. Snow's two cultures, SACS is a *microcosm* of the battle within sociology (its parent discipline) over which approach to knowledge (fact or value) is superior.

As an interstitial discipline, sociology sits at the cross-fire of a larger cultural war: the battle over Snow's two cultures. Is sociology a science or is it politics and art? For Abbott (2001), sociologists can never resolve this question. The epistemological options available to them (or at least the ones they seem to repeatedly create), force them into the same two predictable corners of the philosophical map—fact or value. As such, and at all levels of its work, sociology reinstates the cultural war between the natural sciences and the humanities. Abbott puts it this way, "The interstitial quality of sociology recapitulates locally the relation of the social sciences in general to the natural sciences and humanities. The social sciences stand uneasily between these other modes of knowledge, the mode of facts and the mode of values" (Abbott 2001, pp. 6–7).

Consider, for example, a epistemological tree of knowledge for sociology. Moving from left to right along this disciplinary "tree of knowledge," the various epistemological positions and perspectives of sociology can be divided, grouped and catalogued into two major fractal-like branches. One branch grows in the direction of the humanities and the other in the direction of the natural sciences.

Following Abbott, what is fascinating about this tree of knowledge is that, at decreasing levels of scale—that is, smaller and smaller branches—the same initial division between the humanities and the sciences is recapitulated. For example, while postmodernism, multiculturalism, and post-structuralism have their differences, they all push sociology in the direction of the humanities. So do constructionism, constructivism, and pragmatism. Similarly, while differences exist between neo-Marxism, conflict theory and feminist sociology, they too lean sociology toward the humanities, albeit on the political end of the spectrum.

We can go on to find this type of self-similarity at even smaller levels of scale. Moving along the humanities branch, for example, one can tool down to post-structuralism, for example, to find one branch grow-

ing in the direction of Foucault's humanities-based perspective versus Bourdieu's scientific-based perspective. While both scholars lean strongly in the humanities direction, their work still internalizes Snow's cultural division.

We can find the same divisions at decreasing levels of scale along the scientific branch of sociology. On this side of sociology's epistemological tree there is, for example, realistic sociology, logical positivism, critical-realism, and neo-positivism. Nonetheless, even within these categories one finds, for example, that qualitative method leans more toward the humanities, while statistics leans more toward science. Going still further within qualitative method, for example, while ethnography and grounded theory bend toward science, auto-ethnography and constructivist grounded theory bend toward the humanities. Tooling down even further to the individual level, while Glaser and Strauss's grounded theory tends toward the humanities, Glaser tends toward science and Strauss tends toward the humanities. In fact, the epistemological differences between these two scholars led, in part, to their separation and subsequent creation of two different approaches to grounded theory method (See Glaser 1992).

And so we come to the end of Abbott's thesis. The fractal-like, scale-free epistemological battle over Snow's two cultures pervades the interstitial discipline of sociology. The resulting picture suggests that, at least on this dimension, sociology is a highly fractal discipline.

So, what does all of this have to do with SACS? It appears that, at least at the present time, despite all of its efforts to become mobile and creatively marginal, SACS has internalized and recapitulated Snow's two cultures war.

Returning to sociology's tree of knowledge, in terms of the divide between the humanities and the natural sciences, SACS is strongly aligned with the natural sciences. For example, all five areas of research in SACS are positioned close to the natural sciences and, more specifically, complexity science—see Map 2. The epistemological bias of the Top 25 scholars in SACS is also scientific, leaning more toward "fact" than "value" (Abbott 2001, p. 7). These scholars do, after all, turn to complexity science to solve their struggles with complexity.

Despite the prevailing tendency of both the east and west sides of SACS to lean in the epistemological direction of the natural sciences, both have differentiated along the traditional line of *fact versus value*. For example, sociocybernetics and the LSC rely almost exclusively upon humanistic forms of inquiry, namely historiography and philosophical method. Their view of the social system is more extensively influenced by continental philosophy (i.e., hermeneutics, phenomenology, etc.); and their epistemological orientation is toward radical constructionism and second-order cybernetics. In contrast, CSNA, computational sociology and the BBC all

tend toward the natural sciences, relying almost exclusively upon mathematical modeling or computational inquiry of one type or another. Their view of the social system is more extensively influenced by the "naturalistic" epistemology of complexity science; and, as such, they are strongly biased toward critical realism and neo-positivism.

One can go further with this recapitulated division. While the LSC (with its connections to continental philosophy) tends strongly toward the humanities, sociocybernetics (with its direct link to second-order cybernetics) tends more toward science. Tooling down further within the LSC, while Luhmann (given his *philosophy of knowledge* orientation) leans strongly in the direction of the humanities, Mingers (given his business orientation) leans toward the sciences.

The same divisions at decreasing levels of scale exist on the east side. While computational sociology and CSNA lean toward the sciences, the BBC leans toward the humanities. Going still further within CSNA, while the new science of networks (with its litany of physicists) leans toward the sciences, global network society (with its politically driven sociologists) leans toward the humanities. Tooling down even further into global network society, while Castells and Wallerstein (with their eye on the data) tend toward the sciences, Urry (with his eye on ways of *knowing* the world) tends toward the humanities.

Still, while these scholars have recapitalized Snow's two-cultures at decreasing levels of scale within SACS, these smaller forms of cultural recapitulation have not perturbed this town into further differentiation. It appears that the epistemological sway of complexity science (as an environmental force) on the eastside is too strong to allow for such internal division. As we discuss at the end of this chapter, however, this sway may not remain the case for long. Still, at present, a division remains at the macro-level between the east and west sides of SACS.

8.1.3.2 Dualism 2: Micro Versus Macro Systems Thinking

The second dualism in SACS is methodological. While the east side takes a micro-level approach to modeling social systems, the west side upholds a more macro-level approach. To explain this difference, we turn to a brief history of the systems tradition in sociology.

In terms of the macro-micro conflict in sociology, the systems tradition has historically upheld the macro position. This "historical siding" means that, as a tradition, systems thinking has tended toward a systems-oriented, historical, macro-level, top-down, structural, emergent, linear, variable-based approach to modeling society. As such, it has generally opposed those traditions within sociology that favor a non-systems,

micro-level, bottom-up, agent-based, nonlinear, dynamic, context-dependent, social interactionist approach.

Despite this general orientation, systems thinking has internally recapitulated the micro-macro conflict on at least three different occasions over the past century. In other words, the systems tradition has followed Abbott's fractal cycle.

Cycle 1: The first movement through this fractal cycle came during the classical era of systems thinking. While Marx, Durkheim and Pareto strongly favored a macro-level perspective, Weber and Spencer took a more micro-level systems approach. Marx had his dialectic and Durkheim has his social fact—both top-down perspectives. In contrast, Weber had his method of *verstehen* and Spencer had his competition amongst individuals, which propelled society to its highest ideals—both bottom-up views of how systems emerge and evolve.

Cycle 2: The second cycle came with Parsons and the structural functionalist movement. With his gargantuan theory of everything, Parsons obviously embraced a macro-level perspective. Not all structural functionalists, however, followed Parsons in his view. The best example is Parsons' protégé, Merton, whom we discussed in the introductory chapter of this book. Merton, seeking a more micro orientation, developed what he called his *theories of the middle range*.

Cycle 3: The third cycle begins with the emergence of SACS in 1998. As with the previous two fractal cycles, scholars would differentiate along the micro-macro split. However, while the west side would perpetuate the traditional, macro-level approach, the east side would do something new. It would break with tradition to practice the most radical *micro-level* approach yet constructed. Let us explain.

While the classical and functional cycles of the systems tradition recapitulated the micro-macro conflict, the micro side of this split was never dominant. Furthermore, the micro-level approach has never really been radically "micro." For all of Weber's emphasis on verstehen, his work is massively historical and macro. The same is true of Spencer. His work is historical, economic, naturalistic and philosophical. Even Merton, the micro-level representative of the functional era, opted for a more meso-level approach, which was consistent with his interests in survey research and bureaucratic analysis—hence his advancement of theories of a middle range. In other words, none of these scholars ever took seriously the idea that a set of micro-level agents, through their complex interactions with one another, could create the larger emergent system of which they are a part. As such, none of these scholars ever advocated a methodology based on a strictly micro-level, bottom-up, agent-based, nonlinear, dynamic, context-dependent, social interactionist approach to modeling society.

The east side of SACS, however, has seriously embraced a micro-level approach. As such, the methodology of the east side constitutes a major epistemological breakthrough in the systems tradition, branching out into new territory. The east side has satisfactorily recombined the traditional biases of the systems tradition to create the first "true" micro-level approach to modeling social systems.

In terms of historical credit, however, the east side has not been alone in the creation of this new fractal trajectory within epistemological space. Powerful environmental forces helped to procure this new approach, namely complexity science and (a force we have yet to discuss) the micro-level traditions in sociology.

The Impact of Complexity Science: The epistemological impact of complexity science on the east side of SACS is obvious and direct. If the epistemology of the east side constitutes a major break with sociological systems thinking—independent of complexity science—the epistemology of complexity science constitutes an even larger break with the systems tradition in general, both in the form of systems science and cybernetics. As shown in Map 1, like the east side of SACS, complexity science is the first micro-level approach to modeling complex systems. In fact, in many ways, Map 1 charts how complexity science broke with its macro-level traditions.

To make our point, let us go back to Chap. 5 and our discussion of the methods of complexity science. If the reader recalls, we explained that in many ways the revolution of complexity science is a breakthrough in method. The traditional macro-level approach to modeling complex systems (dominant from the 1940s to the 1970s) failed. In general, it proved too difficult to model complex systems using such top-down methods as statistics or differential equations alone. The digital computer revolution, however, created a whole new set of methodological procedures. All of them micro-level and systems-based in their approach: discrete mathematics, fractal geometry, chaos theory, dynamical systems theory, cellular automata, distributed artificial intelligence, computational modeling, social network analysis, data mining, genetic algorithms, the new science of networks. With complexity science, a whole new methodology was born, which we now call *agent-based modeling*. As we discussed in Chap. 7 (and, as visualized in Map 6) the impact of this new method on the east side of SACS is all encompassing.

The Impact of Micro-Sociology: While complexity science is very important, there is another environmental force worth mentioning, the micro-level traditions of sociology. To make our case, we turn again to the issue of complexity science method.

While the computer revolution provided the hardware necessary for a breakthrough in systems method, several micro-level traditions in sociology

helped to provide the *software*. Said another way, the theoretical orientation of systems method (now called agent-based modeling) did not emerge in a vacuum. It came from scholars working in a variety of disciplines and fields of study across the social sciences. Of particular note were those scholars working in what Collins calls the rational/utilitarian tradition of sociology (1994, p. 122). Strongly affiliated with political science and micro-economics (in particular, game theory), these sociological traditions include exchange theory, rational choice theory and social network analysis.

Here is why these theories are so important to the development of complexity science method (and the east-side of SACS): while micro in orientation, they are primarily interested in how micro-level behaviors produce macro-level patterns. For example, how do the interactions amongst a set of nodes create the larger network of which they are a part, including its various patterns? How do weak-ties reduce the degrees of separation in a network? How do two prisoners, seeking their own advantage, work together for their individual good? And, how far will these prisoners take it? Also important, how does this "prisoner's dilemma" transfer to the negotiations amongst companies and nation-states? How does this dilemma result in patterns of stability in the market? And, what do these patterns look like?

As these types of questions emerged within the rational/utilitarian tradition, a fractal differentiation occurred. A macro-level camp emerged, which had, as its focus, the role micro-level behaviors play in increasingly complex systems. Out of this camp came such notable complexity scientists as Robert Axelrod, John Holland, Kenneth Arrow, and, more recently, Scott Page. Along with these scholars also came the new fields of computational economics, computational political science and, in terms of SACS, computational sociology and (in part) the new science of networks. In other words, the micro-level, agency-based epistemology of complexity science and, more specifically, the east side of SACS comes from, to a significant degree, the macro-level camp of the rational/utilitarian tradition.

The intellectual power, popularity and persuasiveness of the micro-level methodologies of complexity science, and the macro-level theoretical camp of the rational/utilitarian tradition upon which they are based, explains why the east side dominates the epistemological trajectory of SACS today. No matter how useful the west side's ideas might be, they are old-school. By old-school we mean that, while the west side breaks with the macro-level theories of Parsons, it has not fully embraced the methodologies of complexity science, and thereby continues to use what is perceived as an outdated, largely ineffective, macro-level approach to modeling social systems. In stark contrast is the new-school epistemology of the east

side. Grounded in the methodologies of complexity science and the micro-traditions of sociology, the east side of SACS not only breaks with macro-level theorizing, it favors a completely micro-level approach to modeling social systems. And so we come to the end of our fractal inquiry.

8.2 The Near Future of SACS

Before ending this chapter, we have one last question to address. What might SACS differentiate into next? Overall, we see little evidence to suggest that the negotiated ordering of this town has settled or will remain stable as it evolves over the next decade. There are several reasons for this conclusion.

First, there is no reason to assume that the new-school trajectory of the east side, despite its support by complexity science, will continue to dominate SACS. For example, if the reader recalls from our Chap. 6 review of the BBC, as the spokesperson for complex complexity (C^2), much of Byrne's work is a thoroughgoing critique of the overly micro-level perspective of complexity science. As we discussed in Chap. 6, while Byrne applauds the new-school trajectory into new epistemological space, he ultimately wants to move past what he sees as its somewhat simplistic theoretical and methodological assumptions about how social systems and human beings, as social agents, work (e.g., Byrne 2001, 2002, 2005).

As we also discussed in Chap. 6, Byrne is not alone in this critique. His concern is echoed by some of the more recent debates in computational sociology over the challenges of simulating humans and their social systems (Goldspink 2000, 2002). It also is echoed in the work of Luhmann and the work of Urry, Wallerstein and Castells on global network society. And, it is a concern we have raised on several occasion in this book—specifically Chaps. 2 and 3, which outlines our theory of social practice and the methodological perspective of assemblage.

While the criticisms of Byrne and others have by no means reached a critical mass, we may find that, as SACS matures, these criticisms cause a fractal break within the micro-perspective of the east-side, resulting in a meso-level approach to modeling social systems. We will have to wait and see.

The second reason for instability in SACS is computational sociology. There is strong reason to believe that this research area is not done dividing. For example, scholars within SACS have yet to fully appreciate the value of data mining and dynamical systems theory for their work. Given the strong bias toward the new science of networks and agent-based

modeling, it may be some time before these other methods take hold. Nevertheless, they do hold great promise.

The third reason for instability in SACS is qualitative method. Given the qualitative focus of Byrne (2005) and Ragin (2000), along with the work we are doing in terms of the integration of computational sociology and qualitative method (e.g., Castellani and Hafferty 2006; Castellani, Castellani and Spray 2003), a new area of research may emerge, separate from computational sociology, such as *qualitative complexity science*.

The fourth reason for instability in SACS is substantive. There are numerous substantive areas that could emerge or become dominant in SACS. One we mentioned earlier (via the work of Mingers) is the integration of complexity science and managerial science (Capra 2002). As a side note, we remain surprised that the application of complexity to human organizations has not captured the attention of sociologists. Just to make sure we were not missing something, we even poured through the conference proceedings for the last couple of American Sociological Association meetings and were unable to find any sessions or roundtables devoted to the study of formal organizations as complex systems. However, if sociologists were to embrace the work of Mingers and others, this could create a new area of research in SACS sufficient to alter its current negotiated ordering. We will see.

The final reason for instability in SACS is globalization. There is a strong potential for the study of global network society to significantly rise in position and importance within SACS. While *globalization studies* is a new area, it is an extremely popular and important topic with no signs of slowing down. How important complexity science will be to Globalization Studies remains to be seen (Urry 2003). At the very least, as globalization studies becomes more empirically grounded, the methodological tools of the new science of networks and computational sociology will be almost mandatory (Urry 2003). There is no other way to really study globalization substantively, as indicated by the work already done in this area by Castells, Wallerstein, Newman, Barabási, Watts and Urry.

And so, we come to the end of our review of SACS today. We turn now to our concluding chapter to examine the legitimacy of this new town and its current impact on sociology.