

QUANTITATIVE REVOLUTION IN GEOGRAPHY/ GEOGRAPHY AS A SPATIAL ORGANISATION

Quantitative revolution or the view of geography as a study of spatial organization started with the publication of Exceptionalism in geography: A method- by Schaefer. F (1953) in Annals of the Association of American Geographers in which Schaefer criticized the chorologic viewpoints of Hartshorne and claimed that the view that geography is an integrative science concerned with the unique was naive and arrogant because such issues were common to many sciences. By refusing to search for explanatory laws, geography condemned itself to what Schaefer called an immature science. Rather than seeking idiographic regions, geographers should seek nomothetic regularities across regions. This critique helped open the door to the rise of positivism and the quantitative revolution.

After the 1950s, particularly after the Schaefer-Hartshorne debate, geography has begun considered as a study of spatial organization or spatial interaction. The hitherto dominant theme of geography, 'areal differentiation' has been abandoned by number of geographers and there was a shift from areal to spatial, absolute space to relative space as well as from areal integration to spatial interaction.

After the Schaefer-Hartshorne debate, space has become the basic organizing concept of geographers. Here, space is not absolute (Euclidian) space which is only an intellectual framework of phenomena, an abstract concept which does not exist in itself independent of object as it has been in chorological science but relative space which is the location of, and distance, between different phenomena in the spatial structure.

According to Schaefer, geography should be conceived as a science concerned with the formulation of laws governing the spatial distribution of certain features on the surface of the earth. In fact, spatial arrangement of phenomena, and not the phenomena itself, are the ones that matter in geography.

Therefore, Schaefer, with his *spatial organisation paradigm*, initiated what may be called the quantitative or theoretical revolution in geography. However, it was only during the 1960s that the major advances towards a unifying methodological and philosophical basis of the quantitative school or *spatial science school* were made mostly through the works of renowned Anglo-American geographers like P. Haggett, R.J. Chorley, W. Bunge and David Harvey (who later shifted his position and turned towards Marxism).

The quantitative revolution is the profound intellectual transformation occurring in Anglo-American geography beginning in the mid-1950s that followed from the use of scientific forms of theorizing and statistical techniques of description and empirical verification. In the process, an older *regional geography* concerned with describing, cataloguing, and delineating unique places was pushed aside and replaced by the “new geography” directed toward explaining, scientifically proving, and abstractly theorizing spatial phenomena and relations.

The new geography that emerged, and that was solidified by the mid-1960s, was characterized by several features.

- *A thirst for rigorous formal theory and borrowing, and stealing of theories from at least five sources outside of geography.* First, Newtonian physics provided ideas of gravity and potential as well as the basis for spatial interaction modeling, that is, the analysis of geographic flows of people and things. Second, neoclassical economics gave the rationality postulate used to theorize geographic choice. Third, an older and hitherto forgotten German school of location theory offered mathematically exact models of agricultural land use, industrial location, and urban–economic settlement patterns. Fourth, urban sociology afforded both intra- and inter-metropolitan explanatory models of population and their sociological characteristics. Fifth, geometry made available axioms of topology (the mathematical study of spatial forms) used in transportation studies. More generally, there was a belief that rigorous theory would reveal and explain an underlying spatial order and, at the limit, could be couched as a series of geographic laws of the type found in natural science.

- *The use of an increasingly sophisticated set of statistical and mathematical methods.* By the mid-1960s, there was widespread use of complex multivariate inferential statistical techniques.

- *A reliance on computerization.* The pioneers of the quantitative revolution were some of the earliest users of computers in American universities. By the mid-1960s, the computer was essential to the new geography.

- *A new professional and social structure.* Young, male, very ambitious, very able graduate students and junior faculty primarily forged the quantitative revolution. In this sense, the quantitative revolution was as much a social and institutional transformation as an intellectual one.

- *The emergence of an alternative philosophical justification for geographic research - positivism.* For the most part, early proponents of the quantitative revolution did not understand their work in philosophical terms. By the end of the 1960s, however, considerable philosophical reflection had gone on around the quantitative revolution’s larger intellectual justification. David Harvey’s *Explanation in Geography*, published in 1969, was the culminating volume arguing that legitimating the quantitative revolution was logical positivism, a philosophy averring that true statements were those—and only those—in which logically consistent theory corresponded flawlessly to experientially grounded facts. It was a far cry from the vision of geography as rote memorization.

Only 4 years later, however, Harvey launched a counterrevolution based on Marxism that, within a decade or so, undid the quantifiers. Partly causing the quantitative revolution's fall was its inability to engage with pressing outside social and political issues and writ large during the late 1960s and 1970s around poverty, civil rights, the environment, war, and gender and racial equality. Partly also, there was a new generation of geographers entering the discipline who, like the quantifiers of the mid-1950s, wanted to make a distinctive mark. In their case, however, it was to be through social theory, not scientific theory. The continuity of that noun—theory—was significant. It ensured that human geography remained part of the social sciences, not lapsing back to the netherworld status in which it languished before the quantitative revolution. This is perhaps where the real revolution lay.

Criticism of Quantitative Revolution

By the 1970s, the quantitative revolution slowed and several of the prominent boosters of quantitative methods began to reconsider the relevancy and legitimacy of quantitative techniques because

1. Critics became disillusioned with the necessity to develop normative models that explain human activity and tended to dehumanize geography.
2. Specifically, some individuals believed that the discipline was increasingly about the models and decreasingly about understanding the meaning of everyday life or describing different peoples and regions.
3. Statistics were incapable of describing or unlocking the mechanisms and structures that created empirically observed differences between social groups, genders, or regions.
4. For this reason, three prominent critiques emerged: structuralism, humanism, and behavioralism. Structuralist geographers—many of them Marxists—recognized that some socio-spatial relationships and observed conditions were the result of the production process. Humanism sought to reposition humans and their experiences at the center of the discipline in an attempt to unpack the meaning of space, place, and region. Behavioralism was an attempt to insert people into existing models by abandoning rational economizing principles of human behavior and inserting the concept of bounded rationality and the satisficer. In concert, these three dominant critiques—as well as the later emergence of poststructuralist approaches—ushered in a legitimate collection of qualitative research methodologies. In many respects, qualitative methods emerged as a counter to the epistemological hegemony of the quantitative revolution.

Resurgence of Quantitative geography

During the 1990s, quantitative geography experienced a resurgence. The primary motivation for the resurgence was the expansion of geotechnical applications, such as

geographic information systems (GIS), the Global Positioning System (GPS), and remote sensing, and the growing dominance of geotechniques.

The new quantitative geography articulated spatially rigorous versions of traditional techniques such as geographically weighted regression. Concomitantly, geographers were arguing for more nuanced applications of established techniques, such as the expansion, by placing quantitative methods within alternative epistemological frameworks. Consequently, the simple quantitative/qualitative dichotomy that initially characterized contemporary geographic research no longer exists. Today, geographers often use a balanced mixture of intensive and extensive methodologies to explore the many facets of everyday life. Indeed, geographers have adopted an approach that emphasizes the complementarity of quantitative and qualitative approaches. In the future, quantitative methods will continue to be used, become more spatially nuanced, and be more fully integrated into the research regime.