'Formal Models of Culture'

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1. Introduction.

By our accounting, a formal model of culture is, first of all, an output from a quantitative study of collected data that seeks to describe, explain, interpret or otherwise represent some feature or aspect or content of culture. As a model, the output has been transformed into a summary or a representation (in reduced form) of the data that purports to be analogous (in some fashion) to the phenomena under consideration. Thus it is precisely the use of quantitative methods, or the formal analysis of data, which is the distinguishing criterion for inclusion in the present classification. In this essay we trace some of the broad contours of change in the history of culture modeling. We simplify this task in two ways. First, we focus on just one case, American sociology in its first century or so of professional formation. Second, we highlight just one difference, distinguishing interpretative from non-interpretative intents. Thus in the history presented here we look separately at models of culture that have explicitly hermeneutic goals in contrast to those that don't. Practitioners of the former sort want to use formal tools to make interpretations, to unlock useful readings of texts. Those of the latter persuasion usually seek robust measures of cultural forms that can be fitted onto other explanatory frames.

Our goal is to describe some major changes in how culture has been modeled by social scientists over the last century or so, but we will also say something about the enduring frictions between qualitative and quantitative styles of social scientific research. Thus, in the final section of the essay we take up the question of how these two different modalities of knowledge production have been linked in the history of American sociology and we offer a preliminary interpretation of what this articulation structure says about the recurrent 'Methods Wars.' We conclude with a few thoughts about the applicability of these ideas to other disciplines, to other national intellectual milieus, and some other possible futures for the formal modeling of culture.

2. Two Ways to Know

The very possibility of using formal methodologies to study culture has long been the source of debate in the human sciences. There are those who hold to the importance of interpretation arguing that, more than anything else, it is the meaningfulness of human institutions that most essentially defines their character, they are discursive and they must therefore be approached with a very specific and hermeneutically grounded method of interpretation. In contrast formal modelers have long been convinced that there is much utility to measuring cultural phenomena, and they are divided as to whether the formal analysis of culture can (or should) be directed toward the problem of interpretation. For a long while this seemed to be a debate about the essential nature of the social world. If, for example, the discursive character of social institutions meant that they were historically contingent and thus variable then it was argued that formalist procedures would bear no fruit because they were focused on finding 'nomothetic' or law-like properties and these conditions did not apply in the world of culture. However that debate is now moot. After the cultural turn there are few sociologists left who still aspire to discover universal laws of nature that motivate human action. But this does not mean that the debate has subsided. On the contrary, if anything it has intensified and shifted ground to questions of method, and especially to the question of what is interpretation and how might we use the tools of formal analysis to advance a hermeneutic agenda?

3. A Brief History of Culture Modeling in American Sociology, 1900-2009

In the case of American sociology there have been significant changes in both the way that culture is understood and in the way that it has been modeled. To simplify matters we divide the history of modern American sociology into six roughly equivalent time periods (see Table 1). In each period we describe the way that interpretative and explanatory models were used for analyzing culture.

Period 1: Pre-formal Phase

The first period includes the origins of modern American sociology up to the mid-1920's. Quantitative methods were still quite primitive during this period. Two streams of formal modeling that tried to address matters of culture are worthy of comment. First, social workers were in the early stages of professionalization and they were beginning to develop standardized procedures for gathering systematic data from clients on attitudes, cultural orientations, social situation, and the causes of economic failure. Mary Richmond (1917), Director of the Charity Organization Department at the Russell Sage Foundation, contributed elaborate theories about

inference strategies and validity assessments of information sources that social workers encountered. But Richmond drew on the medical profession as a model, and her systematizing efforts were devoted to a kind of abstract theorization of social pathologies and of the diagnostic skills needed to identify these problems.

— Insert Table 1 About Here —

The second initiative of note was the Pittsburgh survey of 1907 and the flood of more than 2,500 similar endeavors over the next two decades. The Pittsburgh project follows in a line of work that extends back through W.E.B. DuBois's study of the Philadelphia black community, Jane Addams' studies of immigrant neighborhoods around Chicago's Hull House, and Charles Booth's studies of the London working class. With funding from the Russell Sage Foundation, the initiative had seventy-four field staff compiling a mass of information about all manner of social and cultural processes. This was not a systematic door-to-door canvassing or questionnaire survey, however. 'Rather it was an effort to provide an inventory and an overview of the state of the city, for which the investigators were omnivorous in their methods of data collection' (Converse 1987: 24). Much of the data came in the form of the schedule which, 'in the hands of the social surveyors was an instrument for making observations *or* for conducting interviews with respondents, or a mixture of both' (Converse 1987: 34). But there was a seriousness to these tasks that reflected an appreciation for the role of qualitative distinctions. The checklist for clothing included check-off categories for, 'spotted… dusty… torn… worn… patched… mussed… wrinkled…' One innovation came from 'John R. Commons (on the staff of the Pittsburgh survey and later a distinguished political economist) (who) devised a Dwelling House Score Card, published in 1908, which featured a maximum of 100 possible points by the weighting of points added and subtracted for desirable and undesirable features. This method of quantifying qualitative observations, now so familiar in rating athletic and artistic competitions, was one that commons borrowed from ratings used for stock animals, and it was apparently new to social science' (Converse 1987: 34). Finally, they borrowed from social work's methods by collecting 'case – history interviews, which were gathered and then counted and compared among some dimensions, thus providing a 'casemounting' that represented a merger of the case study and statistical methods.'

But, as Bulmer points out, 'the Survey used quantitative data in more of an exploratory and descriptive than analytic way' (1996: 18). Here and elsewhere, 'It was as if there was an intuitive sense of the value of collecting extensive data about individuals in the population being

studied, without the necessary knowledge either about sampling or how to handle the data once collected other than to compute simple counts of characteristics and then treat respondents on a case-by-case basis' (1986: 26). Thus, with minor exceptions, culture was not subjected to systematic modeling during this period.

Period 2: The Formalist Turn

The second period marks a fundamentally important change in the field as sociology shifted toward a far more intense scientism in what we call the formalist turn (Ross 1991). A variety of factors contributed to this change but a key influence was the emergence, spread, and professionalization of modern survey research technologies in the late 1920's and early 1930s. Surveys gave sociologists, for the first time, a flexible, adaptable, convenient tool for creating quantitative models of most everything. Three developments were critical. Statistical innovations in sampling theory, the rise of election and public opinion polling organizations, and the invention of attitude scaling. Sampling theory meant that it was possible (at relatively low cost) to ask a question to a reasonable size group of respondents and to have some degree of confidence that you can extrapolate from those opinions to be able to say something reliable about 'the mood of the nation.' This broke the long-standing dependence of social scientists on the state as the provider of useful statistical information about the polity.

The invention of attitude measurements provided the means to use surveys to systematically measure cultural content. W. I. Thomas is generally credited with having invented the modern notion of attitudes in his work with Znaniecki (1918) on *The Polish Peasant in Europe and America*. Attitudes conveyed the sense of a deep structure of meanings and orientations in the world that had direct consequences for action in the world. In 1925 both Floyd Allport and Emory Bogardus published independent approaches to developing formalized 'attitude scaling.' Later developments by Thurstone, Likert, and others produced rapid advances in the use of surveys for measuring subjective experience, including cultural orientation, values, systems of meanings and beliefs, and subjective understandings of social situations (Converse 1987). In this period both interpretative and explanatory models of culture were abundant and they were undergoing periods of rapid innovation, development, and diffusion.

Period 3: Institutionalization of Formalist Program

The third period begins with the Second World War. Although the war was relatively short, the impact of those years on the social sciences was profound. Many sociologists were employed in support of the war effort and they were frequently mixed together with scientists

from other disciplines, a situation that promoted interdisciplinary borrowing of methods and procedures. Large teams of coders were put to work analyzing newspapers and other public communication systems to learn about enemy propaganda. Others used surveys to learn about both civilian and military populations. Stouffer surveyed over a half million American soldiers during the war, asking a wide range of attitude questions about unit solidarity, the legitimacy of authority, social integration and the like (Stouffer, et. al. 1949). Lazarsfeld credits these developments as being key catalysts for the institutionalization of formal methods in sociology. Stouffer's work in particular represented a level of sophistication in survey methodology that went far beyond previous efforts, as a consequence ''Survey analysis' now took on a broader connotation. It became the language of empirical social research, possessing its own rules for forming basic concepts and combining them into meaningful propositions" (Lazarsfeld 1968: vii).

The postwar years witnessed a rapid growth in the sophistication and legitimation of survey methodology. Lazarsfeld was the critical link during these years. As Director of Columbia University's Bureau for Applied Social Research, he played a pivotal role in promoting and facilitating research projects, training and supporting quantitatively oriented sociologists, and in developing the theoretical foundations for full-bodied quantitatively based formalist sociology. Lazarsfeld's own writings during this period constitute a systematic compendium of conceptual problems associated with the difficulty of grounding sociological work in a wholly quantitative system of inferences. He wrote endlessly on how to conceptualize and operationalize variables, how to link indicators to concepts, how to use cross-tabulations to assess causality, how to measure latent structures, and the like. Most notably, for Lazarsfeld there is no hard and fast distinction between qualitative and quantitative methodologies, nor in the phenomena to which they are directed, so much as a continuum from less to more formal modes of investigation and a theory of the social as a system whose totality includes both social and cultural elements. He and those associated with him moved easily back-and-forth between efforts to model social organizational processes and studies that were more directed towards the goal of understanding culture. In this period, American sociologists drew on survey and content analysis methodologies to aggressively pursue both interpretative and explanatory models of culture.

Period 4: Fragmentation Period

The 1950s saw the ascendance and institutionalization of a formalist research project in the discipline, but it also witnessed the end of a theoretical coherence that had been established by Talcott Parsons and other 'structural-functionalists.' By the early 1960s, the legitimacy of that theoretical framework had been severely shaken, and in its place, were the stirrings of the fourth

era of American sociology, which we have labeled the 'Fragmentation Period.' Robert Merton's notion of middle range theorizing provided a kind of cover as the discipline turned its gaze downward, away from grand theory, towards a grounded focus on methods. This happened in both the qualitative and quantitative sides of the discipline. On the one hand there are qualitative sociologists like Harold Garfinkel (add cite) who become committed to an increasingly rigorous and phenomenologically anchored approach to interpretative sociology. On the other hand, there are formal modelers like Blau and Duncan (1967) who use multivariate analyses in new ways to demonstrate a foundational understanding about how social mobility and occupational attainment processes are organized.

The fourth period was also something of a dead zone for formal models of culture. In part this was because, unlike the 50's, many semi-autonomous scholarly regions (or sub-professions) were flourishing, thus allowing qualitative and quantitative scholars to go their separate ways. Qualitative scholars developed increasingly sophisticated research programs with ever more compelling findings even as they developed more elaborate critiques of the methodological assumptions of quantitative sociologists. Meanwhile, formal modelers were turning away from culture for other reasons. For one thing the concept itself was fractured. Under structural functionalism, culture (operationalized as value and norm systems) was a system level construct. With the demise of Parsonian system theory, culture had no natural home. In practice, a new appreciation for the interpretation of culture was being developed by emerging communities of qualitative sociologists, but that work was not getting picked up by quantitative scholars who were focused on their own middle-ranged theoretical projects. Moreover, attitude measures (and other subjective constructs in formal models) were coming to be seen as less relevant in more and more fields. A fierce sort of objectivism had taken hold in many arenas. If you knew a man's father's occupation you could predict that man's own occupation, without knowing anything about what the man thought that or how he was embedded in cultural systems of understanding. Organizational theory was focused on resource dependency relationships. Network analysts were content to emphasize the logic of material connectivity -- real 'empirical' relations were what mattered, not those conceptions of action that were generated after the fact as accounts that social agents offer to explain their behavior. And thus, in the fourth period of American sociology, qualitative and quantitative scholars went their separate ways and culture (with a few notable exceptions such as political sociology which was still focused on the role of opinions in generating outcomes) ceased to be an object for quantitative analysis.

Period 5: The Cultural Turn

The fifth period marks off a second profound transformation in the field. Here, however, the turn is away from scientism, back towards culture. Interpretative scholars helped push the human sciences into a post-Wittgensteinian phase where it is presumed that the world is, in some utterly fundamental sense, grounded in a socially constructed reality. This does not mean there is full agreement about this state of affairs (as the science wars of the 1990's clearly suggest). Rather different sub-disciplines operate within somewhat distinct intellectual frameworks for understanding the character of the social and each of these discursive sub-communities engages the cultural turn to move across that '*threshold of epistemologization*' in their own time, manner, and form (Agambin 2009: 15).

Formal models of culture stage a comeback during this period. Peterson and Berger (1975) initiate this through their work on the popular song industry. Their goal was non-hermeneutic — they were not concerned with the interpreting the meanings of these cultural forms — rather they sought to find a solid and defensible metric for measuring variability in cultural forms which could then be explained with respect to the conditions within a particular social domain, in this case, in a sophisticated and elaborate theory of the social organization of the culture industry. The next step was taken by DiMaggio (1982) who expanded upon Peterson's detailed attention to the social structural terrain that cultural forms are embedded in. DiMaggio also developed a more sophisticated way to measure variations in the cultural forms themselves. In his work on cultural capital, for example, he used factor analysis to find patterns in the ways in which high school students are oriented with respect to their understanding of, appreciation of, and practical experience with elite cultural forms. Following Bourdieu, DiMaggio theorized that students who have mastered the skills and knowledge associated with elite forms of culture could deploy their cultural capital in ways that were causally linked to social structural outcomes, specifically, the models could be used be as an effective predictor of educational attainment.

DiMaggio's models are non-hermeneutic. Without relying on attitude measures, or interpreting anyone's understanding of events or discursive meanings, he found a useful way of employing surveys to model important cultural processes. These measures were easy to sell to a skeptical quantitative community as being objective, consequential and having reasonable face validity. DiMaggio's models are, on the other hand, very much a reflection of a post-cultural turn sensibility in that they emphasized how culture was a force that shaped the social. The main innovation here was borrowed from Bourdieu, the idea of treating culture as something that was concrete, consequential as a status resource and capable of producing useful models (measured by contributions to R-squared) in the same way that other status factors behaved (within the

Wisconsin tradition of social mobility research). By featuring cultural capital prominently as an independent variable, this essay was marked as one of the early successes of the new (American) cultural sociology project.

Perhaps, not coincidently, just as this new (non-interpretative) cultural modeling project was finding it's footing, the old interpretative cultural modeling (using attitude measures from surveys) was entering a state of crisis. In 1977 a small group of survey research leaders met to discuss '…several events that caused some disquiet among people who collect and use survey data. One such event was the discovery of several instances in which seemingly equivalent survey measurements made at approximately the same time produced surprisingly different results. The discovery of these anomalies raised questions initially about the reliability, and ultimately about the meaningfulness, of commonly used survey data. The discovery of these anomalies coincided with a vigorous protest about the conduct of some particular surveys and with an apparent decline in public willingness to participate in surveys…' (Turner & Martin 1984: xiii-xiv). Thus in the fifth period, culture was once again being modeled, but unlike the previous periods, the focus was almost exclusively on explanatory (rather than interpretative) models of culture.

Period 6: Institutionalization of the Cultural Turn

With the advent of a new generation of non-interpretative culture models, the use of quantitative tools for studying culture had, by the early 1990's, once again become a part of the normal practice of quantitative sociologists. To take one example, the new institutional school of organizational sociologists conceive of their project as a mapping out of the effects of cultural processes in organizational fields and their standard way to model organizational fields has been to employ non-interpretative (explanatory) models of culture to illustrate, for example, the increasing homogenization of organizational forms within an organizational field (Powell and DiMaggio 1991). But as the implications of the cultural turn began to sink in, an increasing number of formal sociologists found themselves wanting to press beyond the use of explanatory models of culture in order to take on more fundamentally hermeneutic types of problems. Harrison White was probably the most conspicuous exemplar of this trend. A longtime leader in mathematical sociology and especially, social network analysis, by the early 1990's White had come around to believe that an interpretative analysis of culture was a necessity for sociology because '…in avoiding and sidestepping the interpretative — and thus any direct access to the construction of social reality — *mathematical models have come to an era of decreasing returns to effort. Another way to say the same thing is that interpretative approaches are central to achieving a next level of adequacy in social data*…' (White 1997:57-58).

Following White's lead, a number of social network scholars began to take up the interpretative study of culture as a focus for formal modeling. This group of 'hermeneutic structuralists' have embraced two key principles. First, following in the path of semiotic theory, cultural meanings are understood to consist of relational systems within which sign elements are linked together in networks of similarity and difference (Mohr 1998; Mohr and White 2008). So, for example, Gibson (2003) models conversations as social networks, Bearman and Stovell (2000) use network models to analyze the narrative structures buried in the life stories of Germans living inside Nazi Germany, while Smith (2007) uses similar procedures to compare and contrast models of the same historical narratives seen from two different perspectives, two ethnic communities living alongside the Yugoslovian/Italian border. Ruef (1999) used text data to map the discursive logic of the health care industry and Rawlings and Bourgeois (2004) do the same for higher education.

The second principle describes the notion of an ordered duality according to which two discrete institutional sub-domains are shown to be connected in such a way that they can be modeled as uniquely ordered structural logics that are also linked through an articulation of co-constitution. Mohr and Duquenne (1997) use Galois lattices to interpret the dual institutional logic of Progressive Era poverty categories and their corresponding relief practices. Mische and Pattison (2000) use three way lattices to model the dualities that link political ideologies with the organizational histories of Brazilian youth activists. Breiger (2000) generalizes these procedures into what he describes as a methodological toolkit for practice theory, which he then applies to an analysis of the dual logic of power and precedent within the U.S. Supreme Court. Mohr and White theorize these relations as expressions of a general logic of institutional articulation that 'links together different orders and realms of social life, notably the agentic with the structural, the symbolic with the material, and the micro with the meso and the macro structures of social organization' (2008: 485).

Thus in this most recent historical period, formal models of culture have once again become an established practice among quantitative sociologists who are now actively pursued both explanatory and interpretative models but, in contrast to earlier periods, these recent efforts tend to highlight the power of culture as a constitutive social force, rather than (as traditionally was true) the other way around.

4. On the Methods Wars

We turn now to the question of why so much friction is generated between qualitative and quantitative scholars. Abbott's (1988) analysis of the roots of inter-professional conflict seems applicable. According to Abbott, professional communities come into conflict as a result of jurisdictional disputes, conflicts waged between two professional sub-communities which are vying for the authority to control the same region of institutional space. This suggests that variations in the intensity of methodological conflicts will reflect variations in the relative strengths of the two parties and the proportion of niche overlaps that are contested.

As a way to explore this idea we have gone back to Table 1 and coded each period in terms of the degree to which inter-group conflict around the qualitative/quantitative divide appears to be low, medium or high. Thus, we have coded the first period (before quantitative sociology was firmly established) as having low levels of methods based conflict, but period 2 as highly conflicted. Here, in part, we are drawing on the work of Platt who used a close reading of textual materials to systematically examine the methods debates in American sociology between 1920 and 1960. Platt notes, 'The period up to the early 1940s shows a marked quantitative/qualitative, humanistic/scientific controversy, with substantial technical work on both sides of the line…After the war, work on purely qualitative topics almost vanishes, though many issues relevant to qualitative work are still raised' (1996: 13). Accordingly we have coded low levels of conflict in period 3, thanks largely to the diminished power of qualitative sociology during these years. We have coded period 4 as being relatively quiescent at least with respect to debates over method. This is not to say that methods issues were not being debated, oftentimes heatedly, during these years, but it also seems as though the general mentality of middle range theorizing served to mitigate the intensity of conflicts, at least those that pivoted around methodology. In contrast, period 5 was more clearly conflictual, (we know that the literature of the time was filled with arguments about culture's proper role and, also, about the failures of naturalistic approaches to science). Still, we have rated this period as featuring only a medium level of conflict, if only because so much of the argumentation was one-sided, directed from cultural scholars towards quantitative practitioners who were themselves not necessarily engaged by the debate. In contrast, the most recent period we have rated as highly contentious, particularly around questions of interpretation and methodology. Again, one thinks of the science wars of the 1990's or of the increasing prevalence of what might be called the 'dirty methods' argument by qualitative scholars who contend that regardless of one's intentions, formal models are necessarily polluting and inherently incapable of being adapted to the kinds of intellectual (hermeneutic) tasks that are required for a proper social science.

Returning now to table 1, our preliminary interpretation would be that the shrillest conflicts over method will occur during those historical periods when strong professional sub-communities are clashing over the same intellectual turf. The more actively that quantitative models are being applied to the domain of culture, the more conflict there will be generated over methodological issues. One qualification to this hypothesis is that conflict will subside during those periods in which either the qualitative community (e.g., period 3) or the quantitative community (e.g., period 1) is either weak or disorganized. In short, whenever both quantitative and qualitative scholars are (in substantive ways) working on culture, then we are likely to see more intense methodological conflicts (e.g., periods 2, 5, & 6). Moreover, whenever quantitative methodologies are aggressively targeted on cultural forms with both interpretative and explanatory styles of modeling in full swing, that is when the Methods Wars really heat up (e.g., periods 2 & 6).

6. Conclusion.

In this essay we trace the lineage of formal models of culture, focusing in particular on the history of American sociology. In the process we have highlighted one distinction in particular, differentiating between formal models that have interpretative or hermeneutic intentions from other types of formal models that are more explanatory in nature. We show that the division between qualitative and quantitative methodologies has a dynamic character and that for much of the history of sociology, formal modeling was directed at multiple goals (both explanatory and interpretative studies of culture) and that it was only more recently, during the period of theoretical fragmentation, that quantitative methods came to be deemed unsuitable for cultural analysis by those who used these techniques. We show that the return to the formal modeling of culture occurred in two stages, starting first (during the cultural turn period) as non-interpretative models of culture but that more recently this has changed as new types of interpretative models of culture have been coming on the scene. We also argue that this dynamic exchange creates a kind of intellectual crowding, an intensification of jurisdictional conflicts that generate high levels of friction between sociologists from one or another methodological camp and that this partially explains the enduring Methods Wars in the discipline.

Similar stories can be told about the history of formal models in other disciplines and other national milieus. In France, Bourdieu aggressively pushed on developing interpretative models of culture (and he very much insisted on the duality of the two approaches, applying correspondence analysis as the key method that allowed him to pursue his vision). There is also

much sophisticated work, for example, in Germany (and Italy) that has highlighted the use of formal (lattice) models to analyze concept structures and yet there appears to be little overlap between those projects and conventional sociological research in these same countries. Finally, there is the veritable explosion of formal modeling tools for analyzing systems of meanings that has moved outward from the domain of computational linguistics into increasingly visible functions in our massively digitized world. In this context it would seem deeply ironic to not pursue the formal modeling of culture just at this moment of history when formalization and culture have joined forces in the very material and specific sense as our own computers are increasingly listening to us, interpreting us, trying to gauge what we mean in ever more sophisticated ways. In other words, just as our own experience of culture, and indeed of the other and the self, have become increasingly mediated by the digitization of everyday life, as the very culture that we experience is increasingly itself a product of formal models of culture, this should be the moment to move forward – not to go back. For those who would want to smash the machines we say to you, better to take them over, and to use them as best we are able to suit our own ends and needs. We believe a future sociology of culture would be well served by continuing to explore the ways in which formalism and hermeneutics can complement one another more fully than they do today.

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Year	Period	Explan-atory Models of Culture	Inter-pretive Models of Culture	Relative Strength of Qualitative Research Community	Degree of Inter-Group Conflict By Method
1900-1925	1. Pre-Formal Phase	—	—	+	L
1925-1940	2. Formalist Turn	X	X	+	H
1940-1960	3. Institutionalization of Formalist Program	X	X	—	L
1960-1975	4. Fragmentation Period	—	—	+	L
1975-1990	5. Cultural Turn	X	—	+	M
1990-2010	6. Institutionalization of Cultural Program	X	X	+	H
2010-?	?	?	?	?	?

Table 1. Types of Formal Models, Relative Strength of Qualitative Research Community, & Degree of Methodologically Based Inter-Group Conflict Across Six Historical Periods of American Sociology.