Forms of Capital and Social Structure in Cultural Fields: Examining Bourdieu's Social Topography[1]

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This article tests one key assumption of Bourdieu's theory of culture fields: that actors are positioned in a "topography" of social relations according to their endowments of economic, social, and cultural capital. Blockmodeling procedures are used to analyze data on German writers and to identify a social structure in which positions vary according to the types and amounts of capital accumulated. A strong split between elite and marginal writers dominates the social structure, and even the fundamental distinction between high and low culture is embedded in this bipartition. Significant differences in both cultural and social capital distinguish elite from nonelite positions; within this bipartition, pronounced differences in cultural capital separate high and low culture. Relative to cultural and social capital, economic capital plays a lesser role in understanding the social structure of cultural fields.

INTRODUCTION

Recent advances in the sociology of art and literature focus on the structure rather than the content of cultural fields and look at the organizational system in which art is produced, distributed, and consumed (Becker 1982; Blau 1989; Bourdieu 1985*a*, 1992; DiMaggio 1987; DeNooy 1992; Peterson 1985). To varying degrees, current work in this realm addresses the long-standing sociological problem of the relation

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between the economic and the cultural and between the material and the artistic. Common to most of these efforts are refinements of Marxian distinctions between structure and superstructure, or Weberian concepts of status and class position, in primarily cultural systems. Usually, such distinctions are conceptualized as dichotomies that classify art, artists, and artistic systems into high and low, serious and light, legitimate and alternative, high brow and low brow, elite and peripheral, or artistic and commercial segments.

Bourdieu (1985*a*, 1992) has presented the most elaborate theoretical statement about the structure of cultural fields. Bourdieu goes beyond the Marxist concept of class as a system of property rights and introduces a more complex class notion that takes account of different forms of capital—that is, social and cultural as well as economic. In a way, his "field theory," based on the distinction of class and status (Bourdieu 1985*a*), "value spheres," and "spheres of life conduct" (Weber 1972, p. 536), owes as much to Marx as to Weber. Bourdieu positions actors in a social space, or topography, according to economic, social, and cultural characteristics. In contrast to Weber's macrosociological approach, however, Bourdieu's field theory is primarily located at the mesolevel. Similar to usage in organizational sociology (DiMaggio and Powell 1983), fields encompass the relations among the totality of relevant individual and organizational actors in functionally differentiated parts of society, such as education, health, and politics, or, as in the case examined here, in art and literature.

Within cultural fields, as in all others, actors are assumed to compete for social positions. This competition gives rise to social structure, which, understood here as a social topology, positions actors relative to each other according to the overall amounts and relative combinations of capital available to them (Bourdieu 1989; Müller 1985, p. 164). The topology is "so constructed that agents who occupy similar or neighboring positions are placed in similar conditions" (Bourdieu 1989, p. 17), which in turn makes such actors more likely to develop similar dispositions, interests, and habits. In analytic terms, Bourdieu defines the structure of a field as a "network, or a configuration, of objective relations" among positions (Bourdieu and Wacquant 1992, p. 97).

Besides its general plausibility, however, Bourdieu's theory rests on two basic propositions that need critical empirical support: first, the theory assumes that differences in capital endowments are in fact related to the social topography (social structure) of cultural fields in a significant and meaningful way; and second—in a manner similar to DiMaggio's (1987) classification principles—the theory posits a close correspondence between the social topography and the cognitive structure of cultural

fields, that is, the mental maps actors have of social positions and their organizational and cultural correlates. In this article, we will primarily explore the empirical foundation for the first assumption.

Bourdieu's social topography of fields as a configuration of relations among positions bears considerable affinity to the concept of structural equivalence (Lorraine and White 1973; Sailer 1978), which provides the theoretical bedrock for much recent work in network analysis, specifically blockmodeling (White, Boorman, and Breiger 1976; Wasserman and Galaskiewicz 1993). Structural equivalence is a mathematical principle that groups actors according to their relations with others. Identity in such relations to third parties places actors in equivalent structural positions. By implication, structurally equivalent actors are substitutable, and the set of relations among actors can be reduced to a simpler structure or, mathematically, to a homomorphic image, in which individual actors are replaced by classes of actors, or blocks.

As a formal principle, structural equivalence operationalizes a significant part of Bourdieu's conception of social topography as the relative social positioning of actors in terms of similarity and dissimilarity of social relations. Structural equivalence does not, however, extend to include similarities in interests, cognition, and behaviors, or habitus, as Bourdieu's social topography does (Bourdieu 1985*b;* 1990, chap. 3). Nonetheless, representations of social structure in terms of structural equivalence appear as the first step necessary to examine the extent of similarities in the conditions, interests, and behaviors among actors. Indeed, Bourdieu and Wacquant (1992, p. 105) suggest that we "map out the objective structure of relations" among positions before analyzing the habits and dispositions of actors in a given field. It is, therefore, surprising that despite the clear affinity between the concept of structural equivalence in network analysis and Bourdieu's social topography in his field theory, no systematic empirical tests of Bourdieu's theorizing have been carried out using a relational approach.

We conduct such a test in this article by studying a group of writers and literati in the city of Cologne, Germany. Through the use of social network and categorical data collected with the help of personally administered questionnaires, we look at the pattern of social relations among writers and examine the amounts and types of capital accumulated. Thus, we intend to explore the usefulness of Bourdieu's social topography in understanding the relation between forms of capital and social structure in the field of literature. Specifically, we provide initial tests of Bourdieu's field theory and examine the relative impact of factors such as market position, reputation, and organizational influence on the social positioning of writers.

FORMS OF CAPITAL AND SOCIAL STRUCTURE

Bourdieu's concept of "capital" is broader than the monetary notion of capital in economics; capital is a generalized "resource" that can assume monetary and nonmonetary as well as tangible and intangible forms. Bourdieu (1986, p. 243) distinguishes between three general types of capital, which may assume field-specific contents:[2]

Economic capital refers to monetary income as well as other financial resources and assets and finds its institutional expression in property rights. For example, writers differ in the extent to which they earn income from publishing, public readings, or other literary activities.

Cultural capital exists in various forms. It includes long-standing dispositions and habits acquired in the socialization process, the accumulation of valued cultural objects such as paintings, and formal educational qualifications and training. For example, through the study of literature and fine arts, writers may acquire tastes and styles distinct from others. Important for our purposes is the distinction between *incorporated* cultural capital, in the form of education and knowledge, and *symbolic* cultural capital, the capacity to define and legitimize cultural, moral, and artistic values, standards, and styles. High-culture genres and writers of literary criticism may have high degrees of symbolic capital, whereas writers in other genres, such as folk art, may enjoy little.

Social capital is the sum of the actual and potential resources that can be mobilized through membership in social networks of actors and organizations. For example, writers may differ in the size and span of their social networks to cultural institutions.

The types of capital differ in liquidity and convertibility and in their potential for loss through attrition and inflation. Economic capital is the most liquid, most readily convertible form for transformation into social and cultural capital. By comparison, the convertibility of social capital into economic capital is costlier and more contingent; social capital is less liquid, "stickier," and subject to attrition. While it is difficult to convert social into cultural capital, the transformation of cultural into social capital is easier.

The differences in the liquidity, convertibility, and loss potential of forms of capital entail different scenarios for actors in social fields. Some positions are characterized by high volumes of economic capital, yet

[2] Bourdieu's usage and definitions of the various forms of capital is sometimes somewhat cursory. His paper (Bourdieu 1983) on forms of capital, available in English in 1986, offers the most complete and systematic discussion of capital forms; see also Müller (1985), Gartman (1992), and Bourdieu and Wacquant (1992).

lower volumes of cultural and social capital; others will rank high in terms of cultural capital, yet somewhat lower in other forms. The nouveaux riches, for example, are typically well endowed with economic capital relative to a paucity of cultural capital. International business consultants rely on high levels of social capital, relative to cultural and economic capital, and intellectuals typically accumulate higher amounts of cultural and symbolic capital than they do economic and social endowments. Writers of avant-garde literature may have little economic capital available to them, but they may appear well endowed in terms of symbolic-cultural capital; in contrast, writers of romance novels may rank high in accumulated economic capital, yet low in cultural capital as well as in relevant social capital.

Dominant Forms of Capital and Social Structure

Bourdieu (1985*a;* 1992, pp. 165–81) argues that the dominance of specific forms of capital is characteristic of different types of social fields. Of particular importance for cultural fields is the distinction between the field of *restricted cultural production* and the field of *large-scale cultural production.* Both fields differ to the extent to which economic and noneconomic capital forms become dominant. The field of restricted production is relatively autonomous from market considerations. Economic success is secondary to symbolic value, and writers compete for cultural capital in the form of recognition, reputation, and legitimacy rather than for monetary rewards. In contrast, the field of large-scale cultural production is characterized by the predominance of economic considerations and market success. In the large-scale case, writers compete as producers in a market to seek financial returns first and foremost.

Based on this reasoning, the social topography of cultural fields appears bipartite (Bourdieu 1992). The two segments, however, seem largely unrelated: in one segment, writers are artists; in the other they are commercial producers. The distinction between the fields of restricted and large-scale production suggests rigid boundaries imposed upon segments. Each field forms a segment in which different primary "currencies"—prestige versus money—are exchanged; and each segment is internally structured according to either market or reputational success. Different mechanisms operate within each segment. In the field of restricted production, the distinction between the writing of text and its evaluation and legitimation as "literature" introduces hierarchical elements into the social structure. Critics and "metaliterati" act as the cultural legitimator and fabricate "creative interpretation for the benefit of the creator" (Bourdieu 1985*a,* p. 18). Critics provide data for the

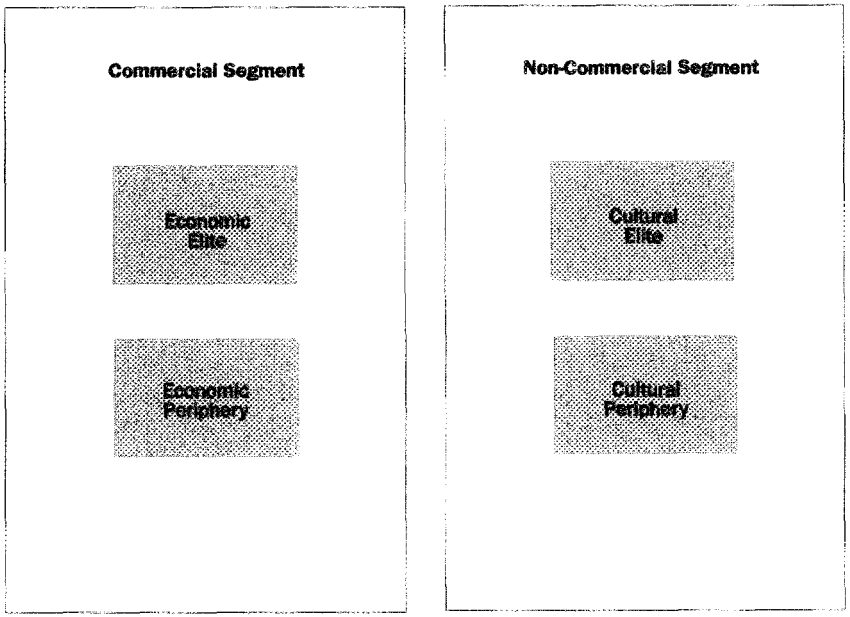

FIG. 1.—Basic model of restricted and general cultural production

competitive audience of peers as the writers' alter egos and offer the basic material for the reputational hierarchy in the struggle for symbolic, cultural, and social capital.

Thus the basic model of the structure of cultural fields includes two dimensions: first, the distinction between economic and noneconomic capital in the constitution of two separate segments of literary production; and second, the internal stratification of each dimension into dominant and peripheral groups of writers. Bourdieu's thinking would lead us to expect a social topography with two segments and four groups, as graphically represented in figure 1.[3]

The distinction between the fields of restricted and large-scale production of culture is ideal-typical; and any cultural product is, as a manifestation of economic and noneconomic capital, both commodity and symbol (Bourdieu 1989). If we move beyond the dichotomy of economic versus noneconomic capital, different combinations of capital may involve intermediary positions, and Bourdieu (1985*a*) acknowledges that cultural fields may contain a variety of intermediate forms between art as a com-

[3] We would like to thank the *AJS* reviewer who suggested this expected structural outcome of Bourdieu's topography.

mercial commodity and as a symbolic and cultural good. For these intermediate positions, commercial success and critical acclaim do not necessarily coincide. Social capital, for example, may be a more important means of status competition in high-culture genres than in mass culture; moreover, some writers may regard membership in professional organizations and circles as inopportune, perhaps even contrary to their self-understanding as artists, while others see it as an important ingredient for the accumulation of the economic, cultural, and social capital needed for status competitions.

Although not fully developed in his writing, Bourdieu's (1979, 1983, 1985*a*) work suggests that the dominance of different forms of capital may correspond to distinct configurations in the social topography of cultural fields. This implies that the basic model presented in figure 1 is not the only one possible and that different topologies of social positions may result from different capital forms. It is useful to engage in a "thought experiment" to explore the relations between forms of capital and social structure. We do so by relating the dominant form of capital to two types of partitions in social structures: segmentation and hierarchy.

Segmentation refers to the number of relatively distinct, structurally separate, and unrelated parallel components of the social structure. Typical of segmentation in culture are the basic distinctions between restricted and large-scale production of cultural goods or the symbolic differences between "high culture" and "low culture," "serious literature" and "light literature." A segmentation is represented in the partition between the commercial and the noncommercial segments in figure 1.

Hierarchy refers to the extent to which partitions yield clusters of social positions in terms of status differences. Typical hierarchical elements of cultural fields include the positions of prominent writers as the elite and the unknown, "struggling" writers as the periphery. Segmentation elements are relationally independent, but as social positions are linked across different statuses hierarchies emerge. In figure 1, hierarchies are found in the elite-periphery split within each segment.

In reference to DiMaggio (1987, pp. 447–52), who explores the relationship between industry structure and artistic classification systems, we can construct three types of ceteris paribus relations between dominant forms of capital (as the independent variable) and the partition of social structure (as the dependent variable) in the field of modern literary production. Each form of capital adds specific tendencies to the degree of segmentation and hierarchy in the social structure.

A predominance of economic capital leads to weaker degrees of segmentation between genres that are based on market success. The hierarchy of the social structure would be pronounced, though relatively fluid,

to reflect graduated distinctions in terms of economic success, as commercial producers try to reduce the strength of genre distinctions in search of larger audiences as markets.

A predominance of social capital leads to multiple though weakly institutionalized segments that are maintained, along the lines of differentiated genres, by professional organizations and other loci of interest mediation that often take the form of complex social networks. Hierarchies are less pronounced than they would be under the predominance of economic capital, a flexibility that reflects membership participation and ranks in formal and informal associations.

A predominance of cultural (symbolic) capital tends to lead to highly segmented and hierarchical social structures. The social structure would be divided into a segment of legitimized art, or high culture, and another segment of nonlegitimate art, or low culture. The relationship between the two segments is hierarchical, as are relationships between the position of legitimator and producer of literature within the high-culture segment. Moreover, the high-culture segment is stratified according to reputational status positions, as competition among writers leads them to innovate and develop new styles.

Thus economic, social, and cultural capital differ in terms of the structural patterns they generate. Economic capital differs from social capital in terms of hierarchy and from cultural capital in terms of segmentation; social capital differs from cultural capital in terms of hierarchy. Table 1 contains a representation of the major components of an operational model of forms of capital and social structure in art. Each of the three forms of capital implies a basic distinction. Economic capital focuses on commercial success versus failure with money as the major currency and economic status as the major indicator. Social capital distinguishes between membership and nonmembership in professional organizations and informal networks with "contacts" as the major currency and differences in membership affiliation as the major indicator. Cultural capital marks a distinction between recognition and indifference in the perception and reception of literature with prestige as the major currency and reputation and education as indicators; symbolic cultural capital makes a distinction between art and nonart or high and low culture with artistic legitimation as the major currency and genre hierarchies as the major indicators.

In each case, we hypothesize specific forms of partitions in terms of segmentation and hierarchy. Economic capital operating alone will result in a social structure characterized by low segmentation and strong hierarchies. Social capital by itself leads to high segmentation and weak hierarchies, and cultural capital produces strongly segmented and hierarchical social structures.

TABLE 1

AN OPERATIONAL MODEL OF FORMS OF CAPITAL AND SOCIAL STRUCTURE IN CULTURAL FIELDS

Form of Capital	Basic Distinction	Major Currency	Degree of Segementation	Degree of Hierarchy	Indicators
Economic	Monetary success versus failure	Money	Weak	Strong	Economic status
Social	Member versus nonmember	Social contacts and connections	Strong	Weak	Membership
Cultural	Recognition versus indifference	Prestige	Strong	Strong	Reputation, education
Symbolic cultural	Art versus nonart	Legitimation	Strong	Strong	Genre hierarchies

In blockmodel images, a segmentary social structure between two blocks, A and B, is indicated by

	A	B
A	1	0
B	0	1,

and, in a weaker form, as

	A	B
A	1	0
B	0	0,

where neither of the two segments (blocks) relates to the other; instead, each segment constitutes a distinct, separate component. In other words, there are relations among the positions of each block (indicated by "1"), but none between blocks (indicated by the "0" off-diagonal entries in the two image matrices). As mentioned above, the partition between restricted and general production is an example of segmentation in cultural fields.

Next, hierarchical social structures are indicated by nonzero off-diagonal entries in the image matrices. A strong hierarchy is represented by the image matrix

	A	B
A	1	0
B	1	0,

where block B relates to A, but not vice versa. Positions in A are related, whereas positions in B are not. The relationship between elite writers (block A) and a disparate, unrelated set of unknown writers trying to gain access to elite positions (block B) would be an example of a strong hierarchy. A weak hierarchy,

	A	B
A	1	0
B	1	1,

ranks two interrelated blocks, for example, the relation between a group of established elite writers (block A) and a cohesive circle of younger

writers (block B) aspiring to seek the friendship or advice of the first group. The center-periphery model,

	A	B
A	1	1
B	1	0,

is a variation of the simple hierarchy, whereby block B represents a set of positions that, while unrelated to one another, have some form of mutual relationship with the interconnected positions of block A. For example, a cohesive group of writers occupying central positions in the social structure relate to peripheral writers who are themselves unrelated to each other.

Of course, actual social structures are composites of such basic segmentary and hierarchical elements. The positions of elites in the social topography of writers are of particular interest. Do different forms of capital exchanged within the same cultural field lead to a single elite or to multiple elites? Do elites differ in the extent to which they represent financial achievements and reputational success or in their ability to legitimize and to organize their interests? Is it true, as Mannheim (1940, pp. 82–83) suggests, that we can detect in the field of culture organizing elites distinct from artistic or political elites? Can we find partitions similar to those of fragmented elites in politics and intellectual circles in general (see Kadushin 1974, 1976), with counterelites leading the rebellion against established art and its representatives? Do elites form an inclusive network linking all top positions in the social structure, as suggested by the integrated elite model? How do peripheral writers compare to elite writers in terms of capital and composition of forms?

The following analysis proceeds in two steps. First, we describe the social structure and attempt to identify social positions in terms of segmentation and hierarchy. Second, we examine how social positions differ according to the overall amount and composition of capital.

DATA AND METHODOLOGY

Our research design and data collection focused on the social networks among writers in the city of Cologne, Germany.[4] Rather than taking a sample, we decided to include the total population of writers living in

[4] Art and literature in Germany are not dominated by a single cultural capital; the country is characterized by several competing cultural centers such as Cologne, Munich, Hamburg, and Berlin.

the greater metropolitan area. We defined *writer* as any producer of fictional texts, thereby excluding authors of science, travel, and "how-to" literature. We applied neither aesthetic, artistic, social, nor any other criteria to differentiate between prominent and unknown writers, between "serious" and "light" literature, between high culture and popular culture. We used several published and unpublished directories in addition to gathering information from publishers, critics, cultural institutions, and local writers' groups to identify 222 writers.[5] We managed to conduct personal interviews with 150 (67.6%) of the 222 writers by administering a semistandardized questionnaire.[6]

The social network among writers was measured in four dimensions, or types of ties, using an "aided-recall" method by presenting subjects with the complete listing of the 222 writers living in or near Cologne; these one-page lists were submitted to respondents in the course of asking the various network questions during the interview.

1. Familiarity with the work of other writers (AWARENESS):[7] "On this list, would you please check the names of those authors whose work is familiar to you?"
2. Friendship ties to other writers (FRIENDSHIP):[8] "On this list, would you please check the names of those authors whom you consider as friends?"
3. Received help and assistance from other writers (ASSISTANCE; results are derived from a Boolean union of the following two questions):[9] "On

[5] In addition to published directories of writers, we consulted lists of local writers maintained at municipal and other libraries, the membership lists of the local chapter of the German Writers' Association (VS), and numerous conversations with individual writers themselves.

[6] Writers were contacted by letter and phone, appointments were made, and in most cases interviews took place at the writer's residence. We conducted some interviews and some were conducted by students of the University of Cologne. The interviews lasted about 90 minutes. To the extent possible we collected data on the missing cases. Using a number of secondary sources such as recent editions of *Kürschners Literaturlexikon* (the most complete directory of German writers available), we succeeded in gathering data on age, sex, and number of publications. For all three variables, we found no statistically significant differences between the 150 writers we interviewed and the missing cases.

[7] This is a cognitive tie measuring awareness of other writers, similar to "citation" ties in other network studies (see Burt 1982; Burt and Minor 1983; Romo and Anheier 1991).

[8] Friendship and other close personal relations have often been identified as crucial factors in understanding the background and history of writers and their literary work, e.g., the friendship cult in the late Enlightenment, literary clubs, salons, and coffee houses (Back and Polisar 1983; Gerhards 1986).

[9] This included discussion of manuscripts, assistance in finding a publisher, and help in gaining access to cultural institutions, e.g., help to initiate and establish contacts to arrange public readings.

this list, would you please check the names of those authors with whom you have discussed manuscripts in the past?" "On this list, would you please check the names of those authors who were helpful in establishing contacts with publishers?"

4. Loyalty and reference ties (INVITATION):[10] "On this list, would you please check the names of those writers you would like to invite for dinner?"

Based on these data, we constructed four binary matrices, whose ijth entry is "1" if a specific tie exists between writer i and writer j. Since possible distortions introduced by missing cases are difficult to assess in relational data structures, we excluded from the analysis writers who had not been interviewed and several writers who declined to answer the questions listed above. This reduced the number of valid cases to 139. A blockmodel of the 139 writers and four types of ties (White et al. 1976) was obtained by applying the ICON-H algorithm, an operationalization of the structural equivalence principle and a hierarchical clustering procedure based on combinatorial optimization (Romo and Anheier 1991, 1994).

With multiple binary incidence matrices as input, ICON-H seeks to partition the population into $c > 1$ blocks "to separate as effectively as possible high-density from low-density regions" (Boorman and Levitt 1983, p. 2) in the permuted and blocked matrices. By utilizing an iterative hill-climbing method in maximizing a target function (ratio of between-block sum of squares to within-block sum of squares), ICON-H calculates a local optimum.[11] Repeated applications of ICON-H yield a target function (goodness of fit), which seems to suggest a social structure with seven blocks; in this case, partitions beyond the seven-block level yield singletons, in which individual writers occupy identified social positions. The appendix offers a brief discussion of the mathematical, theoretical, and technical background on ICON-H and compares ICON-H to alternative blockmodel techniques.

Table 2 presents descriptive statistics for the seven-block solution and the results of a principal component analysis to obtain reliability and

[10] DiMaggio (1986) uses a similar measurement in his study of American resident theaters.

[11] An alternative blockmodel technique uses Johnson's (1967) diameter (maximum) method, a clustering algorithm based on Euclidian distances, as implemented in the STRUCTURE program (Burt 1982, 1987). As reported in Anheier and Gerhards (1991), it yields similar results and interpretations of the social structure, as did the hierarchical cluster analysis (CONCOR) reported in Gerhards and Anheier (1989), although the ICON-H solution is clearly superior to both distance-based and factor-analytic models. See the appendix for a fuller discussion of the methodological background to ICON-H and the overall goodness of fit of the blocking solution in relation to alternative algorithms.

TABLE 2

DESCRIPTIVE STATISTICS

Block	Description	Block Size	Size* (%)	Variation† (%)	Average Prominence‡
A	Cultural elite	6	4.3	49.04	.752
B	Organizational elite	5	3.6	73.46	.531
C	Subelite	20	14.4	86.01	.311
D	Semiperiphery 1	22	15.8	79.81	.217
E	Semiperiphery 2	33	23.7	86.03	.078
F	Light culture	10	7.2	91.35	.022
G	Periphery	43	30.9	87.45	.033
Total		139	100.0		

* This is the relative block size as a percentage of the total number of writers in the network.

† Percentage of variance in the distance among occupants of position B_i (block), which is accounted for by a single principal component.

‡ Aggregate prominence ranges between 1 and 0; 1 = the most prominent person in the network, 0 = the least prominent person(s). Aggregate prominence reported here is the mean aggregate prominence for each block.

goodness-of-fit indicators (Burt 1982, 1987) that are useful for an initial independent validation of the ICON-H results. Except for block A, all blocks show acceptable proportions of variance explained by a single component in the distance among occupants of a position (block). Moreover, except in the case of the elite, reliability indicators are at least .9 or better for all but 10 of the 108 writers in the semiperiphery and the periphery. Thus, reliability indicators suggest an acceptable blockmodel solution (see the appendix for a comparative assessment of the ICON-H solution). Table 3 presents the density matrices for the four types of ties, whereas table 4 shows the image matrices.

RESULTS AND DISCUSSION

To identify different elements in the social structure in terms of segmentation and hierarchy, we interpret the mutual (relative) absence of interblock relations as an indication of segmentation, while the presence of unequal interblock relations signifies hierarchy. For example, the virtual absence of relations between block G (periphery) and block F (light culture) in all four matrices in table 3 would suggest a segmentation. Moreover, the rows and columns for the peripheral block G for all four types of ties show an absence, rather than a presence, of relations both internally and externally to other blocks. The unequal relationship between block E (semiperiphery 2) and block A (cultural elite) would be an example of a hierarchical element in the social structure: as shown in the first

TABLE 3

DENSITY MATRICES FOR SEVEN-BLOCK SOLUTION*

	G	F	E	D	C	B	A
				AWARENESS			
G	1	3	1	2	5	5	13
F	2	64	2	6	4	2	7
E	3	5	6	6	19	24	60
D	5	5	9	21	39	68	84
C	2	1	2	5	15	26	43
B	10	6	17	53	77	95	90
A	3	0	7	20	31	60	70
				FRIENDSHIP			
G	0	0	0	0	1	1	0
F	0	8	0	1	1	0	0
E	0	1	2	1	0	1	2
D	0	2	1	3	3	8	9
C	0	0	1	1	6	9	8
B	0	0	1	6	5	10	17
A	0	0	2	8	4	17	20
				ASSISTANCE			
G	0	0	0	0	1	0	2
F	0	11	1	1	0	0	0
E	1	1	2	2	1	5	8
D	0	1	1	3	2	11	16
C	0	0	1	1	1	7	9
B	0	0	1	5	2	5	20
A	0	2	2	8	5	20	27
				DINNER INVITATION			
G	0	0	0	1	1	1	4
F	0	8	0	0	1	0	3
E	0	1	1	1	4	2	14
D	0	0	1	4	5	10	14
C	0	0	1	1	3	4	10
B	0	0	1	12	14	40	57
A	1	0	4	11	17	20	37

NOTE.—For descriptions of blocks A–G, see table 1.

* Densities—the ratio between possible and measured ties—range between 0 (no ties present) and 100 (all possible ties present). Mean densities for each matrix are AWARENESS = 22.5; FRIENDSHIP = 3.3; ASSISTANCE = 3.8; DINNER INVITATION = 6.3.

TABLE 4

IMAGE MATRICES FOR SEVEN-BLOCK SOLUTION*

	G	F	E	D	C	B	A
	AWARENESS						
G	0	0	0	0	0	0	0
F	0	1	0	0	0	0	0
E	0	0	0	0	0	1	1
D	0	0	0	0	1	1	1
C	0	0	0	0	0	1	1
B	0	0	1	1	1	1	1
A	0	0	0	0	1	1	1
	FRIENDSHIP						
G	0	0	0	0	0	0	0
F	0	1	0	0	0	0	0
E	0	0	0	0	0	0	0
D	0	0	0	0	0	1	1
C	0	0	0	0	1	1	1
B	0	0	0	1	1	1	1
A	0	0	0	1	1	1	1
	ASSISTANCE						
G	0	0	0	0	0	0	0
F	0	1	0	0	0	0	0
E	0	0	0	0	0	1	1
D	0	0	0	0	0	1	1
C	0	0	0	0	0	1	1
B	0	0	0	1	0	1	1
A	0	0	0	1	1	1	1
	DINNER INVITATION						
G	0	0	0	0	0	0	0
F	0	1	0	0	0	0	1
E	0	0	0	0	0	0	1
D	0	0	0	0	0	1	1
C	0	0	0	0	0	0	1
B	0	0	0	1	1	1	1
A	0	0	0	1	1	1	1

NOTE.—For descriptions of blocks A–G, see table 1.

* Cutoff densities are based on mean density: densities below and equal to the mean density = 0; densities above the mean = 1. Cutoff densities for each matrix are AWARENESS > 22.5; FRIENDSHIP > 3.3; ASSISTANCE > 3.8; DINNER INVITATION > 6.3.

part of table 3, the density of AWARENESS from block E to A is 60%, but only 7% from A to E.

The blockmodel analysis reveals a general partition of the social structure into two major segments (fig. 2).[12] The first segment constitutes the periphery of the social structure (blocks F and G) and consists of 38.1% of the writers. The second segment includes all other blocks (A–E), and represents the core segment, with 61.9% of the writers. As we will see, however, the segments are very different. While the core segment is internally differentiated in terms of a hierarchical social structure, the peripheral segment is not, and instead of hierarchical elements, we find a further segmentation, embedded in the first, that separates the light-culture block from a larger group of peripheral writers.

Very few ties link the core and peripheral segments. In table 3, AWARENESS has a density of 13%, the highest relation between core and periphery; most other interblock densities range between 2% and 5%. Within the peripheral segment, the independence between the set of peripheral writers in block G and the light-culture block F is even more pronounced. Interblock ties are absent in the matrices FRIENDSHIP, ASSISTANCE, and DINNER and, with 2% and 3%, are extremely low for AWARENESS. The light-culture block is a segment contained within the structure of a larger segment of peripheral writers, which seems to indicate a split in the social structure embedded within the larger and dominant pattern that sets the core segment apart from the peripheral segment. Thus we find the strong segmentary pattern,

$$\begin{matrix} 1 & 0 \\ 0 & 1, \end{matrix}$$

replicated in the relation between the core and light culture, and the weak segmentation,

$$\begin{matrix} 1 & 0 \\ 0 & 0, \end{matrix}$$

between the core and the periphery.

By contrast to the segmentary patterns, the five blocks in the core segment reveal pronounced hierarchical elements, either in terms of strong and weak hierarchies or in terms of center-periphery configurations. This segment comprises two elite blocks made up of 7.9% of all the writers in the study, a semielite representing 14.4% of the sample,

[12] The labeling of the different strata and blocks will become evident as we continue presenting our results. The labels are based primarily on the structural location of blocks while taking into account average prominence scores of block members.

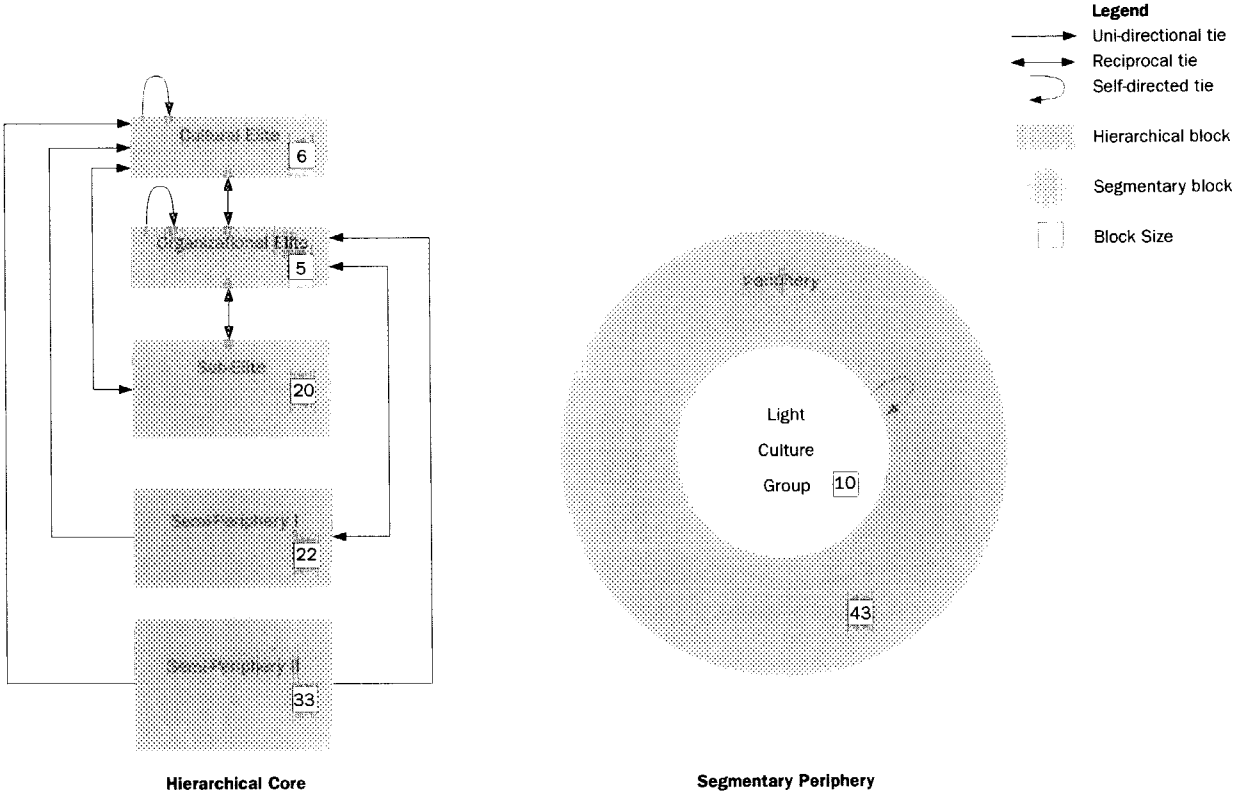

FIG. 2.—Simplified graph of block relations

and two larger, semiperipheral blocks with 30.2% of the sample (see tables 1 and 2). In this respect, it is useful to observe the prominence scores displayed in table 2.[13] Average prominance declines from .752 and .531 for the elite blocks within the core segment, to .311 for the subelite and .218 for semiperiphery 1 and .078 for semiperiphery 2. For the periphery, the average aggregate prominence score declines to .033 and to .022 for the light-culture block embedded within it.

Although we will examine block relations more closely further below, this first glance at the overall block structure seems to suggest that the primary distinction in cultural fields may not be segmentation into high culture and low culture, as predicted by Bourdieu (1983, 1985*a*). Instead, as reflected in figure 2, we find a pronounced segmentation between a hierarchical core and a largely undifferentiated peripheral segment, with the distinction between high and low culture embedded in the periphery. We will now take a closer look at some blocks.

Elite.—The elite group is divided into a cultural elite of six writers, an organizational elite of five, and a larger block, the subelite, with 20 writers.[14] Members of the cultural elite in block A combine high degrees of cultural capital and prestige with the gatekeeper role of an elite based on privileged access to central institutions. As we will show below, the cultural elite form the aesthetic *and* reputational elite primarily, and an organizational elite only secondarily. In contrast, members of the organizational elite, block B, are still relatively prestigious writers with an average prominence score of .531; however, compared to the cultural elite, they are less known for their cultural, aesthetic, and literary significance as writers than for their centrality in organizational matters.

Several examples may illustrate the differences between the cultural and the organizational elite:[15] the cultural elite group includes well-known literary critics and editors of prestigious literary series and programs, such as the editor of a highly influential literature journal who is acclaimed not only for his own literary work but also for having discovered and supported "young literary talents." Another member of the cultural elite is perhaps the most widely known author among the respondents; one of his latest novels found international recognition and was,

[13] Aggregate prominence, a measure of individual network structure (Knoke and Burt 1983, pp. 206–7; Burt 1982, 1987) assigns "1" to the most prominent individual in a network. All less prominent network members have scores expressed as fractions of the maximum prominence, with "0" indicating the least prominent member in the network.

[14] We provide a narrative for elite blocks only; the larger semiperipheral and peripheral blocks are described with the help of correspondence analysis below.

[15] The following descriptions are based on information we collected about elite writers in addition to the data gathered in the course of the personal interviews.

for example, reviewed in the *New York Times Book Review* and other gatekeeping publications in cultural centers. He is not very active in professional organizations, with the exception of PEN (International Association of Poets, Playwrights, Editors, Essayists, and Novelists). Because of his high reputation, he is invited to virtually all major cultural and literary events in the greater Cologne area. Previously editor-in-chief at a leading publishing house, he is credited for his support of younger writers.

Consider, by contrast, a typical profile of a member of the organizational elite. One of the most recognized members of block B is known as "organizer" and "literature manager"; he is very active in the German Writers' Association (VS), the formal representative body of German writers; he organizes public readings and is involved in most larger organizational events. Despite his prominence as a writer, he is primarily known for his qualities as an organizer. Another member of the organizational elite is the chief editor of the literature program section of Germany's largest radio and TV station. He is also very active in professional associations such as the VS and has been involved in the publishing of a prominent literary magazine.

Both cultural and organizational elite members are connected with leading publishing houses. It seems difficult to establish a strict rank order among publishers of elite writers: Fischer, Suhrkamp, Reclam, and Rowolth are high-volume, high-quality publishers, followed by Insel, Hoffmann and Campe, and Kiepenheuer and Witsch. Claasen, Gutenberg, and Schneekluth are smaller yet well-regarded literature presses. In contrast to peripheral writers, publishing houses of elite authors are household names.

Subelite.—Not only because of its larger size but also because of its very structural position, it is more difficult to present an illustration of the subelite (block C), which includes a greater variety of literary types and genres than the two elite blocks. Members of this block are still relatively well known, although their average aggregate prominence amounts to only 41% of that of the cultural elite and to 59% of that of the organizational elite. In contrast to elite writers, members of the subelite are typically not full-time writers; they do, however, tend to work in other, related cultural areas. The subelite of block C includes a well-known journalist and documentary writer who only recently shifted to fine art genres, a recent recipient of the best foreign novel prize from the Academie Française, a lesser-known Berthold Brecht student who is a theater critic, and a high-ranking official from city hall who writes novels in his spare time, as well as representatives of the young literary scene, including a police officer and author of poetry, drama, short stories, literary essays, and children's stories.

Relational Patterns

How and to what extent do the various blocks relate to each other? Figure 2 presents a simplified graph of the information contained in the density matrices of table 3, and the image matrices in table 4.[16] The structural relations between blocks emphasize why we have chosen the labels "elite," "semiperiphery," and "periphery." Observe that, in all four matrices of table 3, block densities are lowest in the upper-left-hand corner and highest in the lower-right-hand corner, a pattern that indicates a more complex relational structure among elites than among peripheral positions. Similarly, in the image matrices of table 4, "1"s cluster in the lower-right-hand corners, whereas virtually all other entries are zero. In figure 2, note how core blocks are hierarchically arranged, while blocks in the peripheral segment are not.

Periphery.—Relations within and among peripheral blocks are virtually absent, and writers in these blocks tend to be unaware of each other's work. A density of "0" for FRIENDSHIP means that among the 43 writers of the periphery no friendship ties exist; neither do assistance relations or dinner invitations. In fact, zero is the most frequent density of relations between the periphery and all other blocks in the network. Since the absence of interblock relations serves as an indication of segmentation in the social structure, peripheral writers form a separate segment of positions next to writers in the core of the social structure. Thus we conclude that the relationship between core and periphery is segmentary, not hierarchical.

Light culture.—The light-culture group is embedded in the periphery and does not constitute an independent block as such (see the discussion of embedded segmentation in the appendix). Structurally, this group is the result of an internal segmentation within the peripheral segment of a social structure dominated by a core-periphery split. Members of this group are essentially folk artists and poets writing verse in the local vernacular, a genre and language regarded neither as fine art nor high German. Members of this block are part of the local culture rooted in medieval Catholic traditions, and they are not included in the national literary culture. While literary works written in some of the other German dialects may be acceptable among literary critics and publishers, the Cologne vernacular does not normally qualify as an artistic medium. Relationally, the folk art group, in the German context regarded as low

[16] Image matrices represent a summary picture of the information contained in the density matrices and are often used for both analytical and descriptive purposes in blockmodel analysis. Entries at and below the mean density are recorded as "0," and entries above the mean density as "1." Image matrix representations of blockmodel results bring the essential features of the social structure into focus.

or light culture, represents an "isolated island" in the social structure and forms a segment of its own based on genre distinction. Internal AWARENESS, FRIENDSHIP, ASSISTANCE, and DINNER INVITATION ties are the highest of all the groups, with the exception of the two elite blocks.

Semiperiphery.—The members of the periphery and semiperiphery 1 and 2, together representing about two-thirds of all writers, have in common the relative absence of internal block relations. What differentiates periphery and semiperiphery, however, is the pronounced elite orientation of the latter. Moreover, these three groups differ somewhat in the extent to which ties sent to the elite blocks are reciprocated: while all blocks seem to be unaware of the periphery, with only very few friendship and assistance ties or dinner invitations, the two blocks in the semiperiphery receive the recognition of the elite's awareness to at least a small extent, with densities of 17% and 53% from the organizational elite and 7% and 20% for the cultural elite (see table 2).

In many respects, the relational pattern of the semiperiphery is located between that of elite and periphery. In terms of internal awareness of each other's work, the major diagonal in the first section of table 2 indicates that the intrablock density of semiperiphery 1 is 21% higher than that of semiperiphery 2 (6%) and the periphery (1%). Both semiperiphery 1 and 2 are essentially elite oriented, and relations to nonelite blocks are either absent or weak. In turn, semiperipheries receive more attention from the elite than they do from peripheral blocks. The relationship between elite blocks and the semiperipheral blocks can be characterized as either a strong hierarchy, that is,

$$\begin{matrix} 1 & 0 & 0 \\ 1 & 0 & 0 \\ 1 & 0 & 0, \end{matrix}$$

as in the case for the cultural elite block on the one hand and for both semiperiphery 1 and 2 on the other; or as a center-periphery configuration, that is,

$$\begin{matrix} 1 & 1 \\ 1 & 0, \end{matrix}$$

for the relationship between the organizational elite and the semiperiphery 2 block.

Elite and subelite.—Turning to the elite blocks in the core of the social structure, we find that relational patterns indicate a hierarchy among elite positions. The cultural elite block shows high internal densities

throughout (70%, 20%, 27%, and 37%) whereas the organizational elite block reveals high intrablock densities in the case of AWARENESS (95%) and DINNER INVITATIONS (40%) only (table 3). In contrast, the subelite block shows low internal densities for all types of ties, with 15% for AWARENESS, 6% for FRIENDSHIP, 1% for ASSISTANCE, and 3% for DINNER INVITATIONS. In terms of ties sent, the subelite group shows a pattern similar to that of semiperiphery 1 and 2; it differs in the pattern of ties received. Here, the subelite group receives higher density ties from both the cultural elite and the organizational elite. Overall, however, the result is a center-periphery configuration with the two elite blocks as the center and the subelite in the position of the periphery.

The organizational elite group shows higher densities of awareness ties to other blocks than does the cultural elite group. In terms of awareness ties received, however, the situation is reversed: the cultural elite group receives a higher density of ties. This pattern is to some extent also present in other relations, whereby the cultural elite group receives higher density ties from nonelite blocks throughout, including the subelite. Moreover, the two elite blocks differ in the way they relate to each other. Except for AWARENESS, densities of ties sent from the organizational elite to the cultural elite are higher than intrablock densities. For the cultural elite, the pattern is reversed: ties to the organizational elite are less pronounced than internal relation for all four types of ties measured. This pattern of unequal relations between blocks seems to suggest a weak hierarchy between the cultural elite and the organizational elite.

Summary.—The blockmodel analysis identified two segments: core and periphery. The first segmentation between core and periphery dominates the social structure, whereas the second segmentation is embedded in the peripheral segment and differentiates the light-culture block and the larger group of peripheral writers. Only the core segment revealed a hierarchical structure, with elite, subelite, and semiperiphery 1 and 2 as major components. While elements of strong and weak hierarchy were present, particularly between the semiperiphery and the cultural elite, the overall network pattern can be interpreted as a core-periphery structure with the following key elements:

1. Elite blocks form the center and relate primarily to themselves and, to a lesser extent, to the semiperiphery.
2. The organizational elite and the cultural elite form a weak hierarchy that is dominated by the cultural elite.
3. The relations between the elites and the subelite reveal a clear hierarchy in terms of a center-periphery configuration.
4. Semiperipheral blocks tend to relate to the elite blocks as the center, rather than to themselves, and are part of a hierarchical system dominated by the elite blocks.

5. The periphery appears structurally isolated, both internally as well as in relation to other blocks, and forms a segment rather than a hierarchical component of the cultural field.
6. The embedded segmentary structure of the light-culture block is a high-density area located like an "island" in the low-density periphery of the social structure.

How does the identified social structure relate to Bourdieu's social topography? First, the structure differs from the basic model suggested by Bourdieu's thinking and represented in figure 1. The identified structure is more complex, particularly in respect to the position of the semiperipheries and the elite differentiations. Second, the basic partition is not between general and restricted production of culture or between high and low culture; rather the dominant partition suggests a core-periphery split as the basic organizing principle. The blockmodel analysis shows a pattern indicating segmentation *and* hierarchy, whereby parts of the social structure are primarily segmentary (the periphery and the light-culture block) and others are primarily hierarchical (i.e., the core segment with elites, subelite, and semiperipheries). The identified social structure does not reveal the relational properties of low segmentation *and* weak hierarchy that would be expected if the structure were based on economic capital alone. Moreover, it does not correspond to the expected outcome of social capital, which by itself would lead to high segmentation and weaker hierarchies. In fact, the identified properties are closest to those expected under the dominance of cultural capital, which will produce a strongly segmented and hierarchical social structure.

Correspondence Analysis

Having described the social structure of the cultural field in terms of hierarchy and segmentation, we now examine how identified social positions (blocks) relate to different amounts and forms of capital endowments. We do this with the help of correspondence analysis (Greenacre 1984; Weller and Romney 1990; Benzecri 1992)—a multivariate technique extensively employed by Bourdieu (1979) in *Distinction*—which enables us to describe and analyze the relationships between variables such as social position and capital endowment. Similar to principal component analysis, it projects rows and columns into a lower-dimensioned vector space. Unlike principal component analysis, which is used for data representing continuous measurements, correspondence analysis accepts nominal-, ordinal-, and interval-level data. This makes correspondence analysis particularly suitable for many social science data problems in which data are typically qualitative and of lower-level measurement.

The data are taken from our survey of writers. The blocks (positions) form the columns and the various categorical measures of capital forms constitute the rows of a contingency table, which provides input to our correspondence analysis and contains the frequencies for the number of times block membership (columns) coincides with particular attributes of categorical variables. For example, the input data would list the number of times members of the elite block were recipients of literary honors and would also contain the same information for all other blocks. Note that correspondence analysis, like related methods such as principal component analysis and multidimensional scaling, neither establishes nor requires any notion of causality between variables—in our case, between block positions, capital forms, and amounts. What the analysis allows us to do, however, is to see to what extent different social positions "correspond" to different forms and amounts of capital.

To examine Bourdieu's (1989, p. 17) argument that positions in a social topography differ by the overall volume and by the composition of types of capital, we select different sets of indicators for each capital form (see table 1 above).

In the case of economic capital, and the underlying distinction between commercial success and failure, we expect positions to differ according to economic variables such as overall income,[17] the proportion of income earned through literary activities,[18] and if writers can normally make a living from literary income alone.[19] For example, elites would be expected to derive a higher proportion of income from literary and cultural activities and thus be more likely than peripheral writers to live off literary income.

In the case of social capital,[20] the distinction between inclusion and exclusion and membership in formal professional associations, special interest organizations, and informal, local literary circles and debating

[17] Income was measured as an ordinal variable with seven ranges indicating increasing average monthly incomes. The obtained distribution was split at the median into "high" and "low" incomes and cross-tabulated with the column variable, BLOCK MEMBERSHIP.

[18] Professional income was measured as the average proportion of average monthly net income derived from activities as a writer and artist, such as royalties, honoraria, including income from other cultural activities. The split between low and high proportions of "cultural" income occurred at the median.

[19] This variable is based on the following questions: "Taking everything into account, can you normally make a living from your activities as a writer?" Answers were coded yes or no and cross-tabulated with the variable block membership to yield input data for the correspondence analysis.

[20] We selected measures independent of the network questions we used for the blockmodel analysis above. For this reason, we did not include sociometric measures such as reachability or span that can be derived from the same data.

clubs differentiate position in the social topography. For example, elite writers are more likely to be members of core interest organizations such as VS. We also include a measure for the extent to which subjects have friendship contacts in cultural fields other than their connections to other writers included in our study.[21]

Unequal possession of cultural capital is part of the differentiation between the elite and the periphery (Bourdieu 1985*a;* DiMaggio 1987). Familiarity with literary history, styles, and tastes and the ability to converse in the language of literary criticism are largely acquired with a university education. In the absence of formal professional socialization, a university-level education in liberal arts and literature (in this case German literature) becomes essential cultural capital and credentials for elite access. Thus we include a variable indicating if a writer studied literature at a university. Elites are in large part the reputational nobility of the social structure. Thus we would expect that elite writers would be members of prestigious invitation-only national and international literary societies such as PEN.[22] As PEN is primarily a reputational association and not an interest association, membership in the club indicates cultural instead of social capital. In contrast to peripheral writers, elites are expected to have received more honors and more official recognition in the form of grants and stipends.[23]

For symbolic cultural capital, the genre distinctions between high culture and low or light culture (e.g., literature in high German vs. the local vernacular), as well as the distinction between the producers and critics of fictional texts, are expected to differentiate among segments and hierarchical positions.[24]

Three coefficients are important in interpreting the results of correspondence analysis (Greenacre 1984, 1990). Inertia (INR), which ranges between zero and one, indicates to what extent rows (capital forms and amounts) and columns (block membership) determine the model and its axes. Inertia coefficients sum to unity for rows and columns, respectively.

[21] We asked a sequence of questions about the number of friends in various fields and institutions of culture and art, such as music, painting and sculpture, theater, radio and television, and museums. The combined distribution of "cultural friends" was split at the median into "few" and "many" cultural contacts.

[22] This variable is based on the question: "Are you a member of PEN?" and answers are coded in dichotomous form.

[23] The variable is based on the Boolean union of answers to two questions: "Have you ever received any literary prizes or official recognitions?" and "Have you ever received a stipend or grant for your literary work?" The resulting joint distribution was split at "1," indicating that the writer has won a prize, stipend, or grant.

[24] The two variables are based on the following questions: "Do you write in the local vernacular (*Mundartliteratur*)?" and "Do you write literary essays?"

For example, in table 5 we see that, for the column variables (block membership), "periphery" determines the entire model to 10% (INR = .100), the first axis to 9.3%, the second to 4.6%. For the row variables in table 6, we observe that, among the social capital variables, membership in formal associations determines the model to 11.2%, the first axis to 16.7%, and the second to 2.2%. In other words, inertia coefficients tell us how important a form of capital is for particular social positions and, vice versa, how important a social position is for a particular capital form. The squared correlations (COR) range between zero and one and express the proportion of variance in the rows and columns that are explained by the axes.[25] In table 6, we see, for example, that under cultural capital the first axis accounts for 81.5% (COR = .815) of the variation of the attribute, "Member PEN: no." Thus, the squared correlations indicate how well the axes capture the variations in amounts and forms of capital on the one hand and variations in social positions on the other. Location (LOC) refers to the coordinates of the positions (blocks) and categorical variables (amount and forms of capital) in the lower-dimensioned vector space, and ranges between plus and minus one. If we imagine a two-dimensional coordination system, we locate the column variable "periphery" at coordinates .155 on the first axis, and at .069 on the second axis (table 5). The row variable "formal membership: high" is situated in the opposite quadrant at coordinates −.572 and −.130. As in multidimensional scaling, the correspondence between columns (block membership) and rows is indicated by the proximity of their locations in the lower-dimensioned vector space.

The results of the correspondence analysis indicate a four-factor (or axis) model.[26] However, the four factors carry different weights (see table 7): the first is dominant and carries 59.90% of the total inertia, followed by 23.60% for the second, and three additional axes with negligible inertias of 8.57% for the third, 6.91% for the fourth, and 1% for the fifth. For purposes of this analysis, we will primarily focus on the first two axes, which together represent almost 84% of the total inertia in the model. To aid interpretation of the detailed results presented in table 6, figure 3 offers a graphical representation of the first two axes and the location of social positions and selected categorical variables in this two-dimensional space.

[25] In interpreting the results of the correspondence analysis, we employ the conventional cutoff criterion of .35 for squared correlations.

[26] For computational reasons, because of the small block sizes, we had to collapse the organizational and culture elites (blocks A and B) to form a joint elite block. For this reason, we cannot follow up on some of the important differences that exist between the two elite blocks in the context of the correspondence analysis.

TABLE 5

COLUMN CONTRIBUTIONS

BLOCK	TOTAL MODEL		FIRST AXIS			SECOND AXIS			THIRD AXIS			FOURTH AXIS		
	COR	INR	LOC	COR	INR	LOC	COR	INR	LOC	COR	INR	LOC	COR	INR
Periphery	.991	.100	.155	.559	.093	.069	.108	.046	−.030	.021	.024	.115	.304	.440
Light culture	1.000	.283	.469	.411	.194	−.557	.581	.697	.060	.007	.022	−.029	.002	.006
Semiperiphery 2	.999	.120	.143	.303	.061	.160	.374	.190	.111	.181	.253	−.098	.141	.244
Semiperiphery 1	.998	.075	−.093	.137	.017	−.019	.005	.002	−.199	.629	.554	−.120	.227	.247
Subelite	.957	.139	−.349	.919	.213	−.030	.007	.004	−.005	0	0	.064	.031	.062
Elite	.989	.282	−.655	.894	.422	−.156	.051	.061	.146	.044	.146	−.002	0	0

NOTE.—INR is the degree to which block membership/capital form determines model and its axis (dimensions); inertia ranges between 0 and 1. COR is the proportion of variance in block membership and capital form explained by the axis; range is between 0 and 1. LOC is the location of a variable in the lower dimensioned vector space; range is −1 and +1.

A look at the various forms and indicators of capital (table 6) shows that the three economic capital variables determine the model to 11.4% (total inertia of .005, .009, .015, .035, .013, .037), social capital to 30.7%, cultural capital to 57.9%, which includes symbolic cultural capital with 29.3% of total inertia. This indicates that, with 88.6% of total inertia, noneconomic forms of capital are dominant in the positioning of writers in the social topography of the literary field. Moreover, three indicators of social and cultural capital, that is, membership in PEN (14.2%), membership in formal associations (20.8%), and the genre distinction between literary criticism and other forms of writing (19%), together determine the model to over 50%. Each of these three indicators alone carries more explanatory power than the three economic capital variables combined.

As seen from the social positions (table 5) the first and most important axis establishes the difference between elite, subelite, and semiperiphery 1 on one side, and semiperiphery 2, light culture, and periphery on the other (fig. 3). Here, the elite blocks and semiperiphery 1 load negatively, while all other blocks load positively. The second axis establishes the distinction between popular culture and high culture—in particular it sets the popular culture block apart from semiperiphery 1. The following two axes relate to the difference between semiperiphery 2 and the periphery. Thus, the first axis indicates the differences in forms of capital between the hierarchical core and the segmentary periphery, the second axis between light and high culture, and the third and fourth relate the differences among peripheral and semiperipheral positions. The first axis, however, is by far the most important—with a proportion of the total inertia of about 60%—and shows that the distinction between core and peripheral positions runs across most indicators of capital forms. It is only within this distinction that the difference between high and light culture is played out, as the second axis demonstrates.

Figure 3 illustrates that core and periphery are almost mirror images of each other. Not all variables, however, are equally important in pointing out differences in types of capital held by elite and nonelite positions. Significantly, one cultural capital variable (membership in PEN) and one social capital variable (formal membership in professional associations) determine the first axis to almost 50% with a combined inertia of .497.

Economic capital.—Elites earn a higher proportion of average monthly income from cultural activities; they are also more likely to be able to make a living from literary incomes. Peripheral writers earn lower income proportions from being a writer and are less likely to make a living from writing. Elite and peripheral positions do not, however, differ in the amount of income available to them; as the results indicate, they differ in the structure of economic capital.

Social capital.—Elite writers are more likely to be members of formal

TABLE 6

ROW CONTRIBUTIONS

VARIABLE	TOTAL MODEL		FIRST AXIS			SECOND AXIS			THIRD AXIS			FOURTH AXIS		
	COR	INR	LOC	COR	INR	LOC	COR	INR	LOC	COR	INR	LOC	COR	INR
Economic capital:														
Income: low	.999	.005	.016	.017	0	.011	.009	0	−.054	.203	.012	−.105	.769	.056
Income: high	.707	.009	−.039	.044	.001	.062	.111	.004	.072	.147	.016	.119	.405	.055
Proportion income: low	.980	.015	.148	.670	.016	.030	.028	.002	−.092	.258	.044	.028	.024	.005
Proportion income: high	.941	.035	−.344	.815	.048	−.110	.084	.012	.068	.032	.013	−.039	.010	.005
Makes a living from writing: no	1.000	.013	.113	.477	.011	−.002	0	0	−.077	.221	.034	.090	.301	.058
Makes a living from writing: yes	.989	.037	−.377	.667	.041	.035	.006	.001	.169	.135	.058	−.197	.181	.097
Social capital:														
Formal membership: low	.995	.096	.477	.893	.143	.103	.041	.017	.090	.032	.036	.085	.029	.040
Formal membership: high	.997	.112	−.572	.893	.167	−.130	.046	.022	−.097	.028	.034	−.108	.032	.052
Informal membership: low	.999	.014	−.095	.341	.008	−.081	.247	.015	−.090	.307	.051	.052	.104	.021
Informal membership: high	.996	.059	.383	.358	.035	.293	.208	.052	.368	.329	.226	−.205	.102	.087
Culture friends: low	1.000	.007	.034	.083	.001	−.042	.124	.004	.019	.025	.002	−.103	.767	.079
Culture friends: high	.993	.019	−.078	.055	.002	.113	.118	.009	−.031	.009	.002	.298	.812	.222

Cultural capital:														
University literature														
study: no	1.000	.030	.192	.467	.023	−.157	.309	.039	.111	.155	.054	.074	.069	.030
University literature														
study: yes	.997	.033	−.223	.458	.026	.187	.320	.045	−.122	.137	.053	−.094	.082	.039
Member PEN: no	.988	.018	.157	.815	.025	.070	.161	.012	−.012	.005	.001	−.015	.007	.002
Member PEN: yes	.978	.124	−1.000	.779	.162	−.516	.180	.095	.137	.013	.019	.092	.006	.010
Honors received: low	1.000	.027	.219	.841	.037	.056	.055	.006	−.025	.011	.003	−.073	.093	.036
Honors received: high	.997	.054	−.451	.812	.074	−.127	.065	.015	.073	.021	.013	.151	.091	.071
Symbolic cultural capital														
Literary essays: no	.997	.056	.320	.582	.054	−.175	.175	.041	−.196	.219	.142	−.059	.020	.016
Literary essays: yes	.999	.047	−.266	.554	.043	.147	.170	.034	.181	.257	.140	.048	.018	.012
Dialect literature: no	.998	.026	−.106	.250	.011	.181	.732	.081	−.025	.014	.004	.009	.002	.001
Dialect literature: yes	1.000	.164	.664	.266	.073	−1.000	.710	.493	.188	.021	.041	−.066	.003	.006

NOTE.—INR is the degree to which block membership/capital form determines the model and its axis (dimensions); inertia ranges between 0 and 1. COR is the proportion of variance in block membership and capital form explained by the axis; range is between 0 and 1. LOC is the location of a variable in the lower dimensioned vector space; range is between −1 and +1.

TABLE 7

AXES, INERTIAS, AND PERCENTAGES OF INERTIA

Axes	Inertia	%
1	.0805	59.90
2	.0317	23.60
3	.0115	8.57
4	.0093	6.91
5	.0014	1.02
Total	.1344	100.00

NOTE.—$\chi^2 = 202.15$; $df = 105$.

professional associations and less likely to be part of informal literary circles and clubs. The number of friends in the field of culture does not differentiate between elite and peripheral positions. The results indicate that elite and peripheral writers do not differ in the same way across various measures of social capital. What seems to matter are formal professional structures. Being a "joiner" of literary circles and clubs as such seems indicative of peripheral positions.

Cultural capital.—We find that elite writers are more likely to have studied literature in a university setting, to be members of PEN, and to have received prizes and honors. Thus, elite writers possess significantly higher amounts of all three forms of cultural capital than peripheral writers.

Symbolic cultural capital.—Differences in symbolic cultural capital, as expressed in the division of labor between the critic and the producer of literature, are forcefully replicated in the distinction between elite and peripheral groups. Elite writers are not only producers but also judges of literature. By being writer and critic at the same time, elite members are in a position to evaluate not only their peers but also to review the periphery. Through its metaliterary activity, the elite can offer cultural legitimacy to peripheral and semiperipheral writers.

The second axis of figure 3 separates the low culture segment from all other blocks, exemplified in the difference between the light culture block and semiperiphery 1. The variable "dialect literature" determines the second axis to over 50% with an inertia of .574. The two positions do not differ significantly in terms of economic and social capital. The only other difference is found in the area of cultural capital, with light culture writers being less likely to have studied literature at the university level.

The third axis sheds more light on the semiperipheral positions. Results suggest that semiperiphery 1 and 2 differ primarily in one form of social

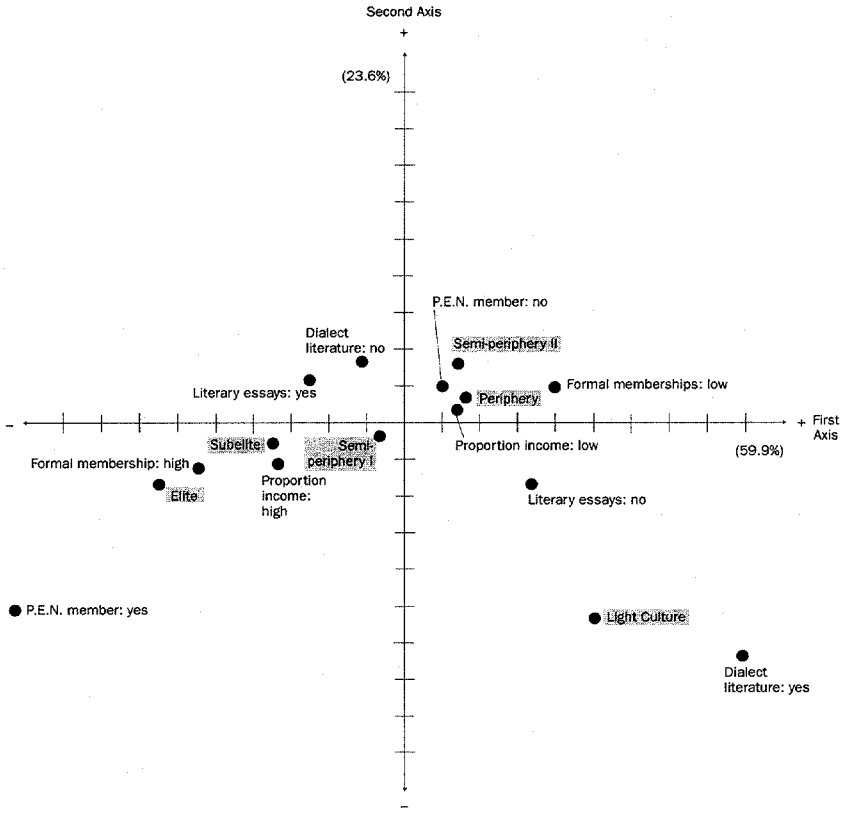

FIG. 3.—Graphical representation of correspondence analysis

capital: the slightly less peripheral writers in semiperiphery 1 tend to rank higher in terms of membership in informal literary circles and clubs. The fourth axis, finally, highlights differences between periphery and semiperipheries. The inertia and squared correlation suggest that these groups differ primarily according to social capital (number of cultural friends) and the amount of economic capital.

In summary, we find that significant differences in cultural and social capital distinguish elite from nonelite positions, pronounced deficiencies in symbolic cultural capital characterize the low culture segment embedded in the periphery, differences in social capital help account for the two semiperipheral positions, and lower economic and social capital distinguish periphery from semiperiphery. Moreover, just as is the case for the dominant hierarchical split in the social structure in the blockmodel analysis, the primary axis here does not differentiate between high culture

and light culture, as one would expect from Bourdieu's theory, but between core and periphery. Only the second, and less important, axis differentiates high from low culture. Significantly, this second differentiation occurs in the periphery itself and is subsequent to the primary distinction between core and periphery. Thus the results of the correspondence analysis fully support what we learned from the blockmodel analysis above.

CONCLUSION

Bourdieu has made significant contributions to sociological class analysis. By developing theoretical links to Weber's distinction between class and status, "value spheres" and "life conduct," he was able to go beyond the primacy of economic capital in Marxist conceptions of class and to lay the foundation for a more refined analysis of the social structure of modern societies, specifically cultural fields. Our analysis here examined the relative importance of different forms of capital in the field of literature. We showed how the various forms of capital correspond to a social structure with multiple elites and peripheries—a social topography more complex than the model based on the dichotomy between restricted and general production of cultural goods. In general, however, we found strong support for Bourdieu's (1989, p. 17) hypothesis that actors are distributed in social space by both the overall volume and relative composition of capital.

The blockmodel analysis identified two segments: core and periphery, with the popular-culture segment embedded in the latter. The core segment revealed a hierarchical structure, with elite, subelite, and semiperiphery as major components. By contrast, the periphery was nonhierarchical. Overall, the blockmodel analysis indicated a pattern of segmentation *and* hierarchy, whereby parts of the social structure are more segmentary and less stratified and others are primarily hierarchical—that is, the core segment with elites, subelites, and semiperipheries. We found that the general properties of the social topography are closest to those expected under the dominance of cultural capital.

For the identified social structure among writers, cultural capital proved the dominant factor in the differentiation of social positions. The positions of elites, semielites, semiperipheries, and periphery are closely related to differences in the amounts of accumulated cultural capital. At the same time, we found that other forms of capital are important, too. We can, however, assume that the primary positioning in artistic fields happens through the accumulation of cultural capital. Once amounts of cultural capital sufficient to maintain social status within the field have been accumulated and secured, additional gains may be converted to other forms of

capital. For example, available cultural capital may be beneficial in seeking prominent positions in interest associations (social capital) and may in turn open up new income opportunities (economic capital).

We identified a social structure in which social positions vary according to the types and amounts of capital accumulated. Significant differences in cultural, symbolic, and social capital distinguish elite from nonelite positions, pronounced differences in symbolic cultural capital separate out the low-culture segment, differences in social capital help account for the two semiperipheral positions, and lower economic and social capital distinguish periphery from semiperiphery. Overall, the results suggest a gradual diminishing of noneconomic capital as we move from the hierarchical core of the social structure to its segmentary periphery.

Within the elite, we detected a differentiation between an organizing elite distinct from artistic or political elites as suggested by Mannheim (1940, pp. 82–83). However, elites did not appear fragmented, as has been observed in political fields, nor did we detect counterelites attempting to challenge established art and its representatives. The core-periphery split, and not internal elite cleavages, dominate the social structure. Even the fundamental distinction between high and low culture is embedded in this general bipartition of the social structure examined here. In short, our analysis suggests that, for peripheral writers, it does not really matter what type of literature they produce—high culture, low culture, avant-garde, or pulp fiction—rather what seems to matter primarily is that they are not part of the elite system. As the correspondence analysis indicated, two organizational factors, membership in PEN and in formal writer's associations, are key to the capital deficiencies of the periphery. In large part, therefore, it is the organizational incorporation of cultural capital (PEN membership) and social capital (membership in formal professional associations), and not the distinction between high and low culture or restricted and commercial production of art that seems to serve as the primary force in the social structure of cultural fields.

While we agree with Bourdieu that sociology is a social topography (1989, p. 16), he has not fully exploited the structural implications of this statement in his empirical work. For example, in his most elaborate empirical work, *Distinction,* social positions were neither defined nor measured in relational terms, as suggested by the principle of structural equivalence in social network analysis, but reduced to nominal, sometimes ordinal variables as representations of occupational groups and rankings as proxy measures. Bourdieu's theory, however, would demand a more structural, empirical approach to explore its usefulness. It is, after all, as Gartman (1992) pointed out, perhaps the most complex general theoretical framework to the study of cultural systems since critical theory. While Bourdieu's theory of cultural fields is well grounded in classi-

cal sociological theorizing, and while it has considerable plausibility, it nonetheless rests on two key assumptions: first, it assumes that differences in capital endowments determine the social topography of cultural fields to a significant extent, and second, that the theory posits a close correspondence between the social topography and the cognitive structure of cultural fields. While this analysis provided systematic empirical support for the first assumption, the second still needs to be explored.

APPENDIX

Blockmodeling Methods

In network analysis, interpersonal choices, typically obtained during the administration of questionnaires, are used to construct square ($N \times N$) binary adjacency matrices, one matrix for each choice. These individual matrices (i.e., networks) are stacked to create a compound data structure. In the data collected on German writers, 139 answered four such interpersonal choice questions (see text above). The compound network structure, then, has 556 rows and 139 columns. A technique of mathematical taxonomy called blockmodeling provides a versatile way of identifying complex relational patterns contained in such compound network structures (see, e.g., Lorraine and White 1971; Breiger, Boorman, and Arabie 1975; White et al. 1976; Boorman and White 1976; Arabie, Boorman, and Levitt 1978; Boorman and Levitt 1983). The technique is based on Lorraine and White's (1971) theoretical logic of "structural equivalence of objects." This particular organizing principle postulates that social structure is composed of characteristic bundles of interlocking relations among a population of objects (e.g., actors, organizations). These characteristic bundles of relations reveal structure because they consistently link specific sets of objects to other sets of objects in the population. In the strictest sense, objects a and b, belonging to the same population C, are considered structurally equivalent if, for any relation R_i and any other object x also belonging to population C:

$$aR_ix \Leftrightarrow bR_ix,$$

and,

$$xR_ia \Leftrightarrow xR_ib.$$

In other words, objects a and b are structurally equivalent to one another if a is related to or, in this case, *chooses* any other object x on C in exactly the same way b does, and if any other object x chooses a in the same way x chooses b. In such a case, objects a and b are a maximal homogeneous group. This deterministic definition of structural equiva-

lence is far too rigid to be useful in studying human populations. A complete inventory of all social choices among human actors will be impossible to obtain, even in small organizations. For practical purposes, network analysts are forced to sample types of social choices from members of a population. The activity of sampling relations introduces measurement error and, consequently, this deterministic concept is unrealistic and impossible to apply.

Given imperfect measurement and stochastic noise, we adopt a statistical definition of structural equivalence of objects. That is, we operationalize the structural equivalence principle from a least squares point of view. In Boorman and Levitt's (1983, pp. 1–3) formulation of this method,[27] the central data structure is a multigraph $\alpha\langle \mathbf{N}; \{\mathbf{A}_k\}_{k=1}^{m}\rangle$, where $\mathbf{N}$ is a set of n entities (usually a set of specific persons) and $\{\mathbf{A}_k\}_{k=1}^{m}$ is a family of directed graphs contained in $\mathbf{N} \times \mathbf{N}$, typically identified with (0, 1) binary incidence matrices $[a_{pq}^k]_{m \times n}$ (usually associated with a set of social networks recording various types of social choices and evaluations that people have of one another). The primary objecive of blockmodeling is to partition $\mathbf{N}$ into $r > 1$ blocks, $\mathbf{P} = \{b_1, b_2, \ldots, b_r\} \in \ell(\mathbf{N})$; that is, partition lattice on $\mathbf{N}$. In general, such a partition requires the effective separation of the high-density from the low-density regions of $\mathbf{A}_k$ (i.e., high- and low-density submatrices resulting from permuting and partitioning the binary incidence matrices with the information in $\mathbf{P}$). Here $|\mathbf{P}| = r$ and reflects the degree of aggregation or blockmodeling refinement ($1 < r < n$) desired by the investigator.

This goal of effective separation can be made concrete by seeking to maximize the following objective target function T over $\mathbf{P}\{\mathbf{P} \in \ell(\mathbf{N}) \;\&\; |\mathbf{P}| = r\}$:

$$T = \sum_{k=1}^{m} \left[\sum_{i=1}^{|b_i|} \sum_{j=1}^{|b_j|} S_{(b_i,b_j)} (D_{ij}^k - \mu_k)^2 \right], \tag{A1}$$

where,

$$S_{(b_i,b_j)} = (|b_i|\,|b_j|) - (\delta_{ij}\,|b_i|), \tag{A2}$$

$$D_{ij}^k = \frac{1}{S_{(b_i,b_j)}} \sum_{p \in b_i} \sum_{p \in b_j} a_{pq}^k, \; \mathbf{A}_k = [a_{pq}^k]_{m \times n}, \tag{A3}$$

$$\mu_k = \frac{1}{n(n-1)} \sum_{p,q=1}^{n} a_{pq}^k. \tag{A4}$$

[27] Early formulations of this method can be found in Kelly (1980) and Romo (1980). For a treatment that explicitly ties this method to the maximization of the between sum of squares and the minimization of the within sum of squares, see Romo (1986).

Here, δ_{ij} is Kronecker's delta, and $|b_i|$ and $|b_j|$ equal the size of the set indexed by the ith row block and jth column block ($i,j = 1, 2, 3, \ldots, r$). Finally, note that in the Boorman-Levitt formulation, any contribution from elements on the principal diagonal, a^k_{ii}, is eliminated: that is, a^k_{ii} is coded "0" in $\mathbf{A}_k$.

A FORTRAN algorithm, ICON-H (Iterative Combinatorial Optimization on Networks with Hierarchical extensions), has been developed to maximize T (i.e., to achieve formally local optima through a stepwise hill-climbing methodology) over multiple binary incidence matrices typically associated with choice networks.

Our analytical interests involve testing whether *aggregates* of writers display consistent cultural characteristics and whether we can observe variation in such characteristics across aggregates, where such aggregates are defined by applying the aforementioned operationalization of structural equivalence (ICON-H) to relational data. This concern for social aggregates is directly applied to our decisions about the level of blockmodeling refinement (i.e., the number of blocks) used to represent structure in relational data. Any blockmodeling algorithm, including ICON-H, is capable of producing blocks with a single member (i.e., unit blocks). In this investigation, we are not interested in such unit blocks. Thus, in applying the ICON-H algorithm to the German writers' networks, we calculated block assignment vectors (i.e., the partition/permutation vector $\mathbf{P}$) starting at the two-block level of refinement ($r = 2$). Then we continued to refine the solution (i.e., increase the number of blocks) until unit blocks began to appear. Here, a terminal point (tp) in the process of block refinement is identified as the solution in which the first unit blocks appear. A likely candidate for the preferred level of refinement is the one that is found in the solution obtained just prior to the solution that produces unit blocks. Thus, if one or more unit blocks appear in the solution for the seven-block level of refinement ($r = 7$), then the preferred solution would be the six-block level of refinement ($r = 6$). Given the demands of any particular investigation, coarser solutions (i.e., higher levels of aggregation and a smaller number of blocks) may be desirable. Coarseness is achieved by further rolling back the level of refinement from tp. Indeed, $tp - r_p$ (where r_p equals the number of blocks in the preferred solution) is a convenient measure of the coarseness of r_p. For the German writers' network, tp is reached at the seven-block level ($tp = 7$). Thus, we utilize the six-block level ($r_p = 6$) in this analysis.

For every level of refinement tested ($2 \leq r \leq 8$), we started with 100 block assignment vectors (Π_{bc}, $r = 1, 2, \ldots, 7$; $c = 1, 2, \ldots, 100$), each representing a random assignment of individual writers to r blocks. The random initial conditions (Π_{bc}) was used as an initial condition upon

which the ICON-H algorithm based its search of a locally optimal solution (i.e., the partition/permutation vector $\mathbf{P}_{bc}$ where the objective target function T can no longer be increased by rearrangements obtained from the stepwise, hill-climbing methodology of the algorithm). This strategy produces 100 solutions (many reproducing one another). From this set of solutions, we chose the one in which T is maximum.

Embedded Segmentation

Note that we have just claimed that we use a six-block-level model in this analysis. Yet, in the main body of this paper, we present a seven-block-level model. The discrepancy is a result of the methodology employed to extract the seventh block. The concept of "embedded segmentation" implies that structurally equivalent blocks are hierarchically embedded in the global structure or in parent blocks. Indeed, the light-culture block is such an embedded segment, extracted from the large ($N = 53$) periphery segment. ICON-H permits investigators to hold constant the parent permutation/partition vector (i.e., the parent block assignment vector) and seek hierarchical segments within a given parent block. All information contained in the parent block assignment vector is used by the algorithm to discover embedded segments.

One immediate question is, Why use hierarchical methods to discover additional blocks? Or, to put this question another way, Is it not enough to simply increase the number of blocks (r) and directly apply the combinatorial methodology discussed above? The answer, of course, depends upon the nature of the data being analyzed. In our data there is a significant difference in the scale of relations in various sectors of the population under study, that is, between the central and the peripheral segment. As Romo (1986) and Romo and Anheier (1991) have pointed out, social networks are often composed of two general components: one component (the α set, which is here the central segment) contains a number of small and relationally active (i.e., exhibits a large number of sent and received ties) blocks; the other component (the Ω set, which is here the peripheral segment) often contains over half of the population clustered into one or two blocks that display a comparatively low incidence of sent and received ties. In a typical ICON-H analysis, the α set produces numerous structurally equivalent blocks characterized by complex and meaningful relational interlock. The Ω set, in contrast, produces no more than one or two very large blocks characterized by what appears as an almost random scattering of the few sent and received ties that they possess. Romo and Anheier's (1991) analysis of the data on German writers shows that members of the Ω set, such as the peripheral segment reported here, are likely to be outside the information loop characterizing the social

organizational milieus within which they operate. Thus, they do not have adequate information about other members of the population to make very many interpersonal choices of others, nor do other members of the population have adequate information about members of the Ω set to include them in their interpersonal choices. This results in a difference in the incidence scale of sent and received ties.

This difference in scale requires hierarchical blockmodeling. If the algorithm is allowed to meander through the data seeking an optimal split, it is likely to find one in the area of the network that contains the greatest incidence of ties; that is, somewhere among the α set. As mentioned above, at some point, this produces single-member blocks (what we have termed *tp*). In order to obtain splits of the large, relationally inactive Ω blocks, a hierarchical extension has been built into the ICON-H algorithm that holds constant all other blocks while it splits the target block.

ICON-H and Other Blockmodeling Techniques

In applying the ICON-H to data characterized by such a large-scale difference in the incidence of relations, it is typical that the Ω set is clustered into a single block at a relatively low level of refinement. Solving the blockmodel for higher levels of refinement results in a greater number of blocks among members of the α set while the Ω block remains relatively unchanged. One solution to this problem is to use factor-analytical techniques (such as CONCOR) that induce clusters on data transformed into pairwise similarity measures based on Z-scores (product-moment correlations). For our purposes, however, product-moment correlations camouflage an important component of the structure we seek to investigate. Not only are we interested in the various aggregate patterns of sent and received ties, we are also interested in how such patterns interact with the incidence or frequency of sent and received ties to form structurally equivalent sets. Clearly, pairwise correlations, which are based on the products of Z-scores, substantially constrain the variability in the incidence of sent and received ties found in the original data. Given the goals of our analysis, this condition is unacceptable.

Nonetheless, another advantage of the CONCOR method is that some implementations are interactive and permit the researcher to select the block that will be subjected to further refinement (i.e., splitting). Thus, researchers can target larger blocks for additional refinement while holding other blocks constant. Other blockmodeling methods (e.g., Ward's method and single linkage, both implemented by Burt's popular STRUCTURE software) induce blocks by optimizing some object target function that presumably operationalizes the structural equivalence principle.

These methods produce blockmodels based on objective criteria, while blockmodels produced by CONCOR can be much more discretionary.

While we reject the use of product-moment correlations as similarity measures, we do like the discretion that an interactive implementation of CONCOR offers. Nonetheless, we are equally attracted to the idea of a baseline blockmodel purely based on optimizing an objective operationalization of the structural equivalence principle. Our strategy in this analysis is to do both. First we use the ICON-H objective target function (see eqq. A1–A4) to induce the six-block-level model. This model is composed of four elite and subelite blocks (the α set), and the semiperiphery and periphery blocks (the Ω set). Then we apply the interactive hierarchical capabilities of the ICON-H method to further partition the periphery.

Finally, Romo and Anheier (1994) have compared ICON-H to the other popular variance-minimizing clustering techniques on over 40 network data sets taken from the Project Metropolitan data archives (Janson 1975). The algorithms they studied include Ward's method, complete link, average link, and single link. Using a goodness-of-fit measure based on one suggested by Noma and Smith (1985), they found that the ICON-H method produced better fitting solutions than any of the other algorithms. Among the data sets used by Romo and Anheier (1994) was the data from the German writers' networks. In table A1 below, we reproduce this part of their analysis.

Noma and Smith (1985) use the squared ratio of the between sum of squares to the total sum of squares as their measure of goodness of fit. As will become clear below, squaring this ratio is superfluous, and, in the case of sparse binary matrices, the squared ratio can obscure major differences between solutions. In table A1 therefore, we use the ratio without squaring it. After Romo and Anheier (1994), we call this the "*R*-statistic," and it can be interpreted as the amount of variation in the network data explained by the block densities. The *R*-statistic varies between zero and one (0 = indicates no fit between the modeled densities and the observed data; 1 = a perfect fit between modeled densities and the observed data).

Table A1 presents the *R*-statistic for each network, the overall between sum of squares, the grand *R*-statistic, and the block sizes for the six-block solutions induced by ICON-H, Ward's method, complete linkage, average linkage, and single linkage algorithms. This table indicates that, for these data, ICON-H provides the best-fitting six-block solution. Concentrating on the grand *R*-statistic, ICON-H and Ward's method solutions produced *R*-statistics that were very close in magnitude (.209 and .171, respectively). However, in the case of sparse binary matrices, this apparent small difference is deceptive. One can get a sense of the difference in the way the two algorithms assign individuals to blocks by considering

TABLE A1

GOODNESS OF FIT FOR FIVE BLOCKMODELING METHODS

	ICON-H Method	Ward's Method	Complete Linkage	Average Linkage	Single Linkage
R-statistic:					
Network 1	.306	.271	.259	.255	.200
Network 2	.286	.302	.266	.269	.252
Network 3	.190	.229	.221	.230	.162
Network 4	.503	.429	.326	.310	.297
Between sum of squares	470.259	435.102	227.952	211.855	181.678
Grand *R*-statistic	.209	.171	.092	.085	.073
Block size:					
Block 1	53	53	131	133	134
Block 2	33	50	3	2	1
Block 3	22	17	2	1	1
Block 4	20	12	1	1	1
Block 5	6	6	1	1	1
Block 6	5	1	1	1	1

NOTE.—This table is drawn from analyses presented in Romo and Anheier (1994).

the block sizes. Note that we use block designations 1, 2, 3, . . . , rather than A, B, C, . . . , to avoid confusion with the block assignments reported in the main body of the text. While block 1 (equivalent to the periphery block and the light culture block in the analysis reported above) in both cases contains 53 individuals (indeed, they were the same individuals), other blocks differ considerably and by as many as 17 individuals (in block 2, the semiperiphery). When a case-by-case comparison is made, there are even greater differences. Turning to the network-specific *R*-statistics, note that ICON-H performs better than Ward's method on networks 1 (AWARENESS) and 4 (DINNER INVITATION), while Ward's method performs better on networks 2 (FRIENDSHIP) and 3 (ASSISTANCE). It is interesting to note that networks 1 and 4 are the densest (i.e., contain the most network ties) while networks 2 and 3 are the sparsest. This analysis identifies an evident weakness in Ward's method solutions: they are overdetermined by sparse matrices. This problem results from transforming the observed binary networks into a single Euclidean distance matrix. Rather than weighting the contribution of a network to the overall solution in terms of the number of ties it contains (i.e., its overall density), the Euclidean distance transformations induced by Ward's method tend to give equal weight to all matrices, irrespective of density. The main problem with Ward's method or any other algorithm that uses Euclidean distances (including complete, average, and single linkage methods) is that, unlike ICON-H, they were not designed to analyze multiple networks simultaneously. In single network problems, our experiences suggest that ICON-H and Ward's method may perform equally well, although we have not formally tested this hypothesis.

Table A1 indicates that three linkage methods perform poorly when compared to ICON-H and Ward's method. All three algorithms produced chained solutions: that is, they create many single-member blocks and one huge cluster of residuals (as illustrated by the block sizes).

In summary, we find the solutions from the ICON-H algorithm to be superior to solutions from other available methods for a number of reasons. ICON-H creates partitions that are not only sensitive to the patterns of sent and received ties, but also to variations in the absolute number or density of network ties. The CONCOR method, because it transforms network data into product-moment correlations, is insensitive to variation in the number of sent and received ties. ICON-H is also appropriate for multiple network problems whereas most of the algorithms that use Euclidean distance transformations are not. This is particularly the case with Ward's method, which gives solutions that are overdetermined by sparse networks. Finally, the ICON-H method is not as susceptible to chaining, whereas complete, average, and single linkage methods are.

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