

Chapter 8

'Morphogenesis Unbound' from the Dynamics of Multilevel Networks: A Neo-structural Perspective

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8.1 Dynamics of Opportunity and Constraint in the Organizational Society

The double trend of *individualization* (created by increasingly open competition for the lower levels in terms of socio-economic stratification) and Weberian *rationalisation* (stemming from the bureaucratic search for control and efficiency) has constituted a society that Charles Perrow (1991) calls "organizational" and Ronald Breiger (1974) calls "dual". This rationalization in turn imposes strong interdependencies between actors with many diverging interests, and simultaneously requires an unprecedented amount of coordination among them. In this organizational society, managing these interdependencies of all kinds (functional, symbolic, epistemic, normative, emotional etc.), which are of exceptional complexity, can marginalize or exclude, make or break careers, in part determine the distribution of power and status, as well as influence the social processes that produce or prevent change.

The organizational society is characterized by complex and rapid forms of organized collective action at the meso-social level that "absorb society" and externalize social costs (Perrow 1991). The sociology that I term neo-structural assumes that behaviour, in this context, is largely determined, on the one hand, by more or less conflicting categorical (macro and meso) affiliations, and on the other hand, by the system of economic and symbolic interdependencies between these conflicting actors. The term "structural" refers here to the observed regularities in the relations and multiple socio-economical exchanges, formal and informal, between these individual and organizational actors with divergent interests and at the

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same time relations of multiple and multilateral interdependencies. Contemporary neo-structuralism is different from the structuralism of the 1960s because it relies on a theory of individual and collective action. I suggest here that it is quite close to Archer's brand of structuralism, co-evolving with agency and culture. As indicators of durable, multilateral interdependencies, relations are defined in terms of symbolic and moral commitment, as well as economic sources of resources. Actors are seen as members of socially organized settings that can be represented as webs of regularities, as relational structures entailing both opportunities and constraints (White 1970; White et al. 1976; Donati 2010). Fundamental social processes (such as socialization, particularistic solidarity and discrimination, social control and conflict resolution, regulation and institutionalization, etc.) are, in part, the product of these regularities in the management of interdependencies by competing/conflicting actors (Lazega 2003, 2006, 2012).

From this perspective, a social phenomenon must be observed at several analytically different levels of action, which makes the analysis of individual relations and conflicts inseparable, but distinct, from that of organizational relations and conflicts. To take into account this vertical complexity of the social world, it is necessary to differentiate and articulate these levels and their respective dynamics. Sociology, in my view, is still struggling to combine multilevel and dynamic approaches to social phenomena at the meso-level. The perspective opened by neo-structural sociology is that of the study of the dynamics of systems of layered interdependencies. A first step in that direction (Lazega et al. 2007) was to propose a structural form of articulation of these levels that examines separately the systems of oppositions and interdependences pertaining to different levels; and that articulates them based on the systematic information on the affiliation of each individual at the first level (inter-individual) to one of the organizations of the second level (inter-organizational). This approach to examining interactions between the global and the local is only in its infancy.

The purpose of this chapter is to provide elements of this neo-structural theory and methodology that contribute to research on the specific processes characterizing the 'Morphogenic Society' (Archer 1982, 1995: 2013a). More specifically I will argue that it is possible to conceptualize and measure 'Morphogenesis Unbound' (MU) as a dynamic and multilevel – both individual and organizational – phenomenon. Archer's (1995) ontological dualism has long considered it crucial to incorporate the role of time in sociological theory. From the perspective of her analytical dualism (1995: 66), "the emergent properties of structures and agents are irreducible to one another . . . and given structures and agents are also temporally distinguishable". Because neo-structuralism comes from a brand of structural symbolic interactionism for which structure is not a suspect concept (Stryker 1980), it is, I believe, consistent with Archer's (1995: 43) conception of structures as sets of social relations, rules, and roles that are quite independent from individual interpretations – although both levels influence each other over time.

Elements of vocabulary are needed to reason in that way. In the following I will define structure as a stabilized multi-level system of interdependencies. Interdependencies are both economic and symbolic, i.e. inextricably combining

resources and commitments. Culture will be defined as a set of languages and norms that help actors stabilize or destabilize prior structures when trying to give meaning to actions and to defend their political/regulatory interests. Agency will be defined as action that mobilizes and combines both culture and structure, by relying on 'appropriateness judgments' guiding behaviour,¹ i.e. mobilizing reflexivity and culture to create new relationships, new opportunities, and sometimes new organizations. From this perspective, the essence of networks is, in part, to cut across pre-existing formal boundaries of organized social settings in which members are currently affiliated, sometimes to hoard these new opportunities.

In the context of the organizational society, individuals are seen as competing, but interdependent members forced to coordinate to get access to production-related resources. At the level of organizations as units, competition, resource dependencies and efforts to coordinate are even more obvious. Neo-structural analysis offers sophisticated measurements of resource interdependencies, status and power that rely on inductive reasoning, thus avoiding reification of the notion of structure. But looking at society as an organizational society also helps in focusing on its multilevel character. Multilevel refers to the fact that in a stratified society, there are many superimposed levels of agency, each of them characterized by horizontal interdependencies that sociologists can examine as sets of 'local' social systems. Individuals acting on their own behalf in a highly personalized inter-individual system of interdependencies constitute a specific level of agency, with its own resources, commitments and rules. This level of agency is different from that of organizations (a family, a company, a non profit organization, etc.), to which these same individuals are affiliated: organizations, in which hierarchy to some extent reflects wider societal stratification, are represented by their managers who act on their behalf. They interact with other managers from different organizations at an inter-organizational level of agency. At that level, interdependencies are much less personalized. Resources, commitments and rules are of a different nature from those characterizing the inter-individual level of agency.

Interorganizational networks are created most often by contractual agreements between organizations specifying the contributions, rights, and responsibilities of each organization in the pursuit of a particular objective. Interpersonal networks consist of individuals tied together within or across organizations through, for example, work, advice, and friendship relationships. The content of these relationships differs. The boundaries of interorganizational and interpersonal networks are defined by the relevance of the relation in facilitating individual access to resources that may be helpful in the pursuit of a particular objective; but also by the social space in which the specific social processes driven by these relationships take place in a meaningful way (Lazega and Pattison 2001).

¹The micro-foundations of neo-structuralism are based on a structural brand of symbolic interactionism stressing identity criteria, precarious values and status as combined elements of a theory of appropriateness judgments guiding behaviour (Lazega 1992, 2011).

Needless to say, society is not made of two levels of agency only. There are many levels in actors' contexts, beyond the organizational one. However for the purpose of this chapter – approaching MU – I will stick to two, postponing the discussion of possible generalization of this reasoning to n or multiple levels. The main idea is that MU comes from ongoing interactions and conflicts between interpersonal and inter-organizational networks that generate each other. I argue that each level interacts with, and introduces change in, the other level, thus creating dynamics that may well be, as Archer argues, unprecedented in history. Under conditions that remain to be specified (no conflation), each level reconfigures the other in slow and irregular, but unstoppable, chains of reactions.

In this context, one way to understand MU is to use multilevel network analysis. Here I will refer to research in which this method is applied to a set of empirical data so as to generate a network translation of MU and observe its outcome. In this case in point, I report results in which actors use the resources of their current organization to create new relationships beyond the boundaries of the organization to which they are affiliated, thus reshaping/expanding their own personal opportunity structure beyond the limitation imposed upon them by pre-existing structures. In this case, half the population of innovators observed (here: highly competitive scientists) deploy 'independentist' strategies, i.e. all their new personal ties are beyond the constraining perimeter predefined by their organization's inter-organizational network. The kind of organization that they might create would not establish inter-organizational ties with their current organization. Over time, measurements suggest that this independence takes them close to Nowhere in terms of further achievements. Slightly more pedestrian forms of Morphogenesis, i.e. perhaps less Unbound, based on a relational strategy called here 'individualist', in which actors keep a strong foot in the organization in which they are affiliated so as to use its resources to create a new set of ties – and eventually a new organization – outside their current organization's perimeter, seem to be of a more rewarding kind of networks to Somewhere, closer to the "prizes [that] go to those who will explore and can manipulate contingent cultural compatibilities to their advantage" (Archer 2013b). In this latter case, even if some of the opportunities that they could create for themselves are hoarded by their current organization (or boss). Such neo-structural measurements of Morphogenesis are used to understand upon situations in which the two situational logics of action identified by Archer (2013b), *competition* and *opportunity*, coexist; as differentiated from the situations in which the latter would replace the former. Creating new ties beyond the boundaries of one's current position, and sometimes even new kinds of organizations, is a highly cultural form of agency. This suggests that Breiger's notion of 'weak culture' helps explore actors' capacity to innovate by reshaping opportunity structures and by reaching heterogeneous alters in spite of resistance from a rather stable, change-averse, tightly-connected organizational society promoting ordinary incremental innovation that will not challenge pre-existing entrenched interests.

8.2 Reshaping Opportunity Structures and Opportunity Hoarding in the Organizational Society

Saying that structure reflects both opportunity and constraint is equivalent to saying that, over time, individual actors try to manage the constraints in order to reshape their opportunity structure in the context of the organizational society. What opportunities? Those of obtaining a job, funding for a project, an apartment, a place in kindergarten for the children, a place in good schools, a steady flow of business, etc. Individuals trying to reshape their opportunity structure can be represented as strategic but also interdependent actors who seek contexts in which they can find and exchange these resources at low cost. Once in such contexts, they can seek various forms of concentration of these resources – i.e. power – so as to be in a position to define the terms of such exchanges.

As a consequence, the contemporary definition of social class is more complex due to the growing importance of relatively invisible opportunity structures at the intra- and inter-organizational levels. In *Durable Inequality*, Charles Tilly (1998) proposes an organizational view of inequality-generating mechanisms. These are the organizational structures that allow for exploitation and that naturalise and stabilize it. In this perspective, contemporary social stratification also articulates exploitation (by the elite owners of much of the resources and power in society) and “opportunity hoarding” by intermediary classes, as two complementary mechanisms for creating stabilized inequality. By organizing themselves legally, socially and in such an inconspicuous way, less visible than the distinction between bourgeoisie and proletarians, the opportunity monopolists construct well organized communities; and this organization is the basis of their ability to capture these opportunities. It is not easy to see if someone has the opportunities that others may not have. These opportunities can be compared to the implicit or informal rights, often self-granted in an organized group, linked to the positions in the inconspicuous relational structure, which although traceable, is nevertheless very efficient (White 1970).

Organizations, for example, help in aligning social cleavages to create a system of inequality in which these cleavages reinforce each other to achieve exclusion or exploitation. Tilly sees in the monopolizing of opportunities the key mechanism of reproduction of social inequality, articulating the meso-social level to the macro-social level. Organization and stratification mutually reinforce each other, even if the knowledge of the opportunity structure for the individual actors are not evident, if the modality and the yields of monopolization are not mechanical. They depend on the articulation of long term process at macro level, and the articulation of local organizations with their stabilized and specific social disciplines. The starting point proposed by Tilly is a complex socio-economical process that is at the heart of the neo-structural approach of relations between meso- and macro-social levels. Neo-structural sociology measures and models this monopolization using social and

organizational network analysis – a method that was developed for updating the
variable forms of both conflicts and interdependencies between actors and between
categories of actors.

My main argument is that in the multilevel context of this organizational society,
individual actors can try to reshape their complex opportunity structure by creating
new ties, languages and organizations that use the resources and escape the control
of the organizations with which they are still affiliated. By doing so they reap
benefits that may incite them to move and set up new organizations that are meant
to protect access to these benefits and to hoard the new opportunities created by
breaking off the constraints that were imposed on them by their former bosses. Thus,
under specific circumstances, ongoing interactions between interpersonal and inter-
organizational networks create changes, as opposed to simple consolidation, at each
level. These changes may be strong enough to reconfigure the multilevel system if
they drive the creation of new organizational actors, i.e. new opportunity hoarding
collectives. In these dynamics culture plays a central role. No collective can be set
up without the language that is needed to formulate the conditions under which the
“synergy” (Archer 2012) is reached, and without institutionalizing the rules of this
synergy. Thus the major role of culture is both in providing the language for creation
of relationships with heterogeneous others and in the institutional dimension of
organizations that emerge from these efforts.

8.3 Meso-social Order and Agency in Superposed Systems of Interdependencies

Thus in order to explore the meso-social order and the multi-level dimension
of social phenomena, we must observe two systems of superposed and partially
interlocked interdependencies, one inter-organizational, the other inter-individual.
Attempts at solving this problem of joint examination include Breiger’s “dual”
approach (1974) of bipartite or two-mode networks. When a fixed set of actors
belongs to a fixed set of organizations, it is possible to derive multiple memberships
from inter-individual networks (assuming that a connection exists between two indi-
viduals because they belong to the same organization), and from inter-organizational
networks (assuming that a connection exists between two organizations because
they share common members). The typical example is that of “interlocking”
connections, i.e. connections created between two enterprises when one or more
individuals simultaneously belong to the boards of both enterprises. The networks,
derived at two different levels, can also be reconstituted in a multi-level structure.
However, this structure provides relatively poor insights into social phenomena
because relationships are presupposed and are symmetrical by construction.

A second important contribution in multilevel network analysis is that of Fararo
and Doreian (1984). They generalize Breiger’s and Wilson’s (1982) formalisms
in order to craft a “formal theory of interpenetration” of distinct entities such

as individuals and groups. Seen from the perspective of their tripartite structural analysis, our approach uses a network (call it P) of relations among persons, a network (call it G) of relation among groups, and a network (call it A) of affiliations of persons to groups. Unlike in Breiger's (1974) approach, only A is an affiliation network; P and G are networks of social relations and interdependencies (such as getting advice from a colleague, or agreements among organizations to share equipment, respectively). Fararo and Doreian's article points out many kinds of relations among levels (consider, for example, AGAT, the network of ties between people whose laboratories have agreements to share equipment). Similar ideas are extended and used below, in particular to reconstitute "overlaps" between the two kinds of networks (P and G via A) and reconstitute individual strategies of management of resources originating from both levels.

Articulation of distinct levels of action can be partly accounted for, beyond bipartite structures, using a method called *structural linked design* (Lazega et al. 2007, 2008, 2013) that brings together networks of different levels using individuals' (mono or multiple) affiliation ties. Our goal is to apply this multilevel approach and reason in terms of the dynamics of these networks because, as mentioned above, the temporal dimension of social processes and of the creation of organizations is a fundamental aspect of social reality in late modernity. At this level, actors attempt to structure the contexts of their interactions and have to manage the constraints that these contexts impose upon them by new attempts to redesign their opportunity structures.

In this approach, each complete network is examined separately, and then combined with that of the other level thanks to information about the membership of each individual in the first network (inter-individual) and to one of the organizations in the second network (inter-organizational). Work undertaken until now within the framework of this complex vertical architecture shows that dual/multiple positioning in superimposed systems of interdependencies makes it possible to formulate precise assumptions about the relation between members' position in the structure and individual achievements. It is especially the case when this positioning is articulated with specifiable strategies of actors.

This form of dual positioning in the structural contextualization of action explicitly distinguishes two levels of agency (one individual and one organizational) and their co-constitution, but without conflating them. Insofar as each level constitutes a production and exchange system that has its own logic, it is important to examine them separately (as the literature usually does), but also jointly. To study the levels jointly means identifying, in particular, the actors who profit from a more or less easy access to resources circulating in each level and measuring their relative achievement. The term "strategy" refers to the fact that actors manage their interdependencies at different levels by appropriating, accumulating, exchanging and sharing resources, both with peers and with hierarchical superiors or subordinates. These strategies are observed by looking at the choices of inter-individual and inter-organizational exchange partners.

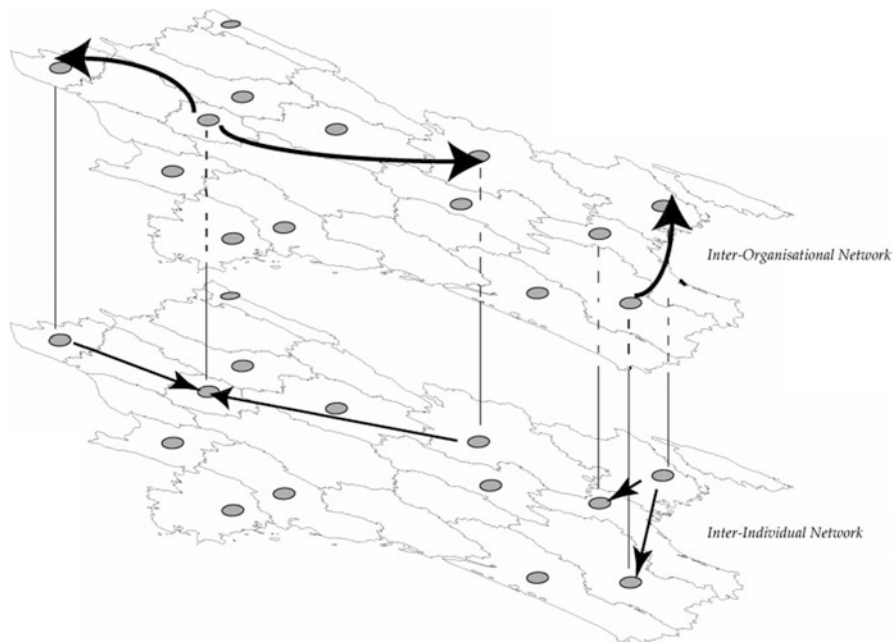


Fig. 8.1 Example of visualization of multilevel networks in French cancer research (1999)

8.3.1 *Neo-structural Approach and Multilevel Analysis: An Empirical Case of Co-constitution Without Conflation*

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This approach can be illustrated using a case study in the sociology of science. In this case, the “elite” of French cancer researchers in 1999 was examined at both the inter-individual and the inter-organizational levels. In this context, we identified the systems of superimposed interdependencies, of the strategies of the actors who manage these interdependencies, and of their achievements measured at the individual level. No deterministic order is pre-supposed between position, strategy, and achievements, only an analytic one. This approach is particularly sensitive to the existence of inequalities between competing/cooperating actors because these inequalities can render a given strategy more or less “rewarding”, depending on dual positioning as measurement of opportunity structure.

Figure 8.1 illustrates the principle of structural linked design. The upper map represents the ties among laboratories carrying out cancer research in France in 1999, in which we interviewed the director. Arcs indicate the direction in which the resource flows and, in this example, the direction in which recruitment operated. For example a laboratory in Lille and a laboratory in Dijon recruited a researcher in cancerology coming from a Paris laboratory. Another example: a laboratory in Nice recruited a researcher coming from a Toulouse laboratory. The lower map

represents the ties among researchers whom we interviewed. Arcs indicate the direction in which recruitment-related advice was sought among researchers in these laboratories. For example, a researcher in Nice sought advice from a researcher in Montpellier and from another in Toulouse regarding recruitment for his/her research project. Likewise, a researcher in Dijon and a researcher in Lille sought advice from a researcher in Paris regarding recruitment. Finally, vertical lines linking nodes in the upper map with nodes in the lower map indicate that the individual researcher represented in the lower map belongs to the laboratory represented in the upper map (linked design principle).

Thus, the approach proposed here builds upon the idea of duality, but distinguishes itself by separately reconstituting systems of interdependencies at least at two different and superposed, partially interlocked levels of analysis: inter-individual and inter-organizational interdependencies. The flow of resources and the specific social exchanges at each level can be examined separately at first, and then jointly. This principle of the dual-positioning of individual actors (in the network of their inter-individual relationships and in the network of relationships between the organizations to which they belong) has two advantages.

8.3.2 *Fish/Pond Relative Status*

Firstly, dual positioning constructs a new typology of the positions in the system, i.e. to characterize individuals and the organizations in which they work in the same "dual entity". Dual positioning corresponds to a form of relative status, or a double structural characteristic of the individual. Here it is constructed by measuring both the centrality of the individual and the centrality of the organization (in inter-organizational networks) to which he or she belongs. The status of an actor is measured by his/her 'indegree' centrality in the advice network of the research elite. The types of centralities used here are 'indegrees' and 'outdegrees' because incoming and outgoing ties are important in our measurement of overlap between the relationships of the individuals and that of organizations, as shown further below.

This produces an endogenous partition of the population into four classes that are baptized metaphorically, for a more intuitive understanding of this dual positioning, big fish in a big pond, big fish in a small pond, little fish in a big pond and little fish in a small pond (BFBP, BFSP, LFBP and LFSP). In these metaphorical terms, the actors are identified, thanks to centrality scores, as big or little "fish"; organizations are identified likewise as big or little "ponds." Belonging to one of the four categories locates actors in a meso-social space of opportunity structures, simultaneously inter-individual and inter-organizational. Carrying out this multi-level approach by measuring this relative status of actors and organizations provides a uniform basis for the interpretation of our results in the reconstitution of strategies of mobilization and articulation of heterogeneous resources at different levels, i.e. the dynamics in which we are interested.

8.3.3 *Relational Strategies and the First Steps of Organizational Creation*

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Secondly, this localization allows us to identify the strategies that individuals use to appropriate, to accumulate, and to manage both their own resources and the resources of their organizations. Actors vary in their capacity to use organizations as “tools with a life of their own”, to use Philip Selznick’s famous definition. Certain actors use a great deal of the resources of their organization, others much less. In particular, systems of interdependencies at different levels are controlled by actors from different hierarchical levels. Likewise, we can measure the overlap of relationships between individuals by those of their organizations. It then becomes possible to articulate these relational strategies to the achievements of actors. It is in this respect that the contribution of a structural linked design is most original. As information about the relative status of individuals and information about the relational strategies of these individuals are used concurrently, we can eventually examine the achievement of individuals with explanatory variables different from those used in classic ecological analysis – which, to our knowledge, rarely measures the position of an actor in systems of interdependencies.

In our case in point, all the researchers in this elite population are high performers in terms of the number of published articles. However when looking at the strategies for the management of resource interdependencies at two different levels, especially by actors in categories other than the BFBP (i.e. the BFLP and all the Little Fish) we identify different strategies. The connection existing between membership in a class and strategies for the management of interdependencies can be read in the level of overlap between the researcher’s relationships and those of his/her laboratory, for outgoing as well as incoming ties. Figure 8.2 illustrates these overlaps.

A researcher may be cited (in these advice networks) by colleagues belonging to a laboratory that may or may not have inter-organizational ties with his/her laboratory. The comparison of differences between these two types of relationships provides indications about this level of overlap between the two kinds of networks and about the behavior of these actors in their organization, thus offering indicators for their strategies. We interpret choices received as indicators, for the laboratories, of their importance from a functional point of view, and, for researchers, as indicators of their prestige in terms of professional authority. We interpret outgoing ties as indicators of access. In the case of the laboratories, outgoing ties can be read as measures of access to exterior resources; for the researchers, they measure access to sources of learning and of personal support.

Figure 8.2 shows ten types of overlap between ties of researchers and ties of their respective laboratories. A researcher may have a set of contacts contributing to his/her indegree (called here prestige), and another set of contacts constituting his/her outdegree (called access to resources). In Fig. 8.2, codes 1, 4, 7 refer to a weak overlap between the relationships of a researcher and those of his/her laboratory. Code 10 refers to a situation in which there is no overlap at all: choices received by the actor come from colleagues who do not belong to the

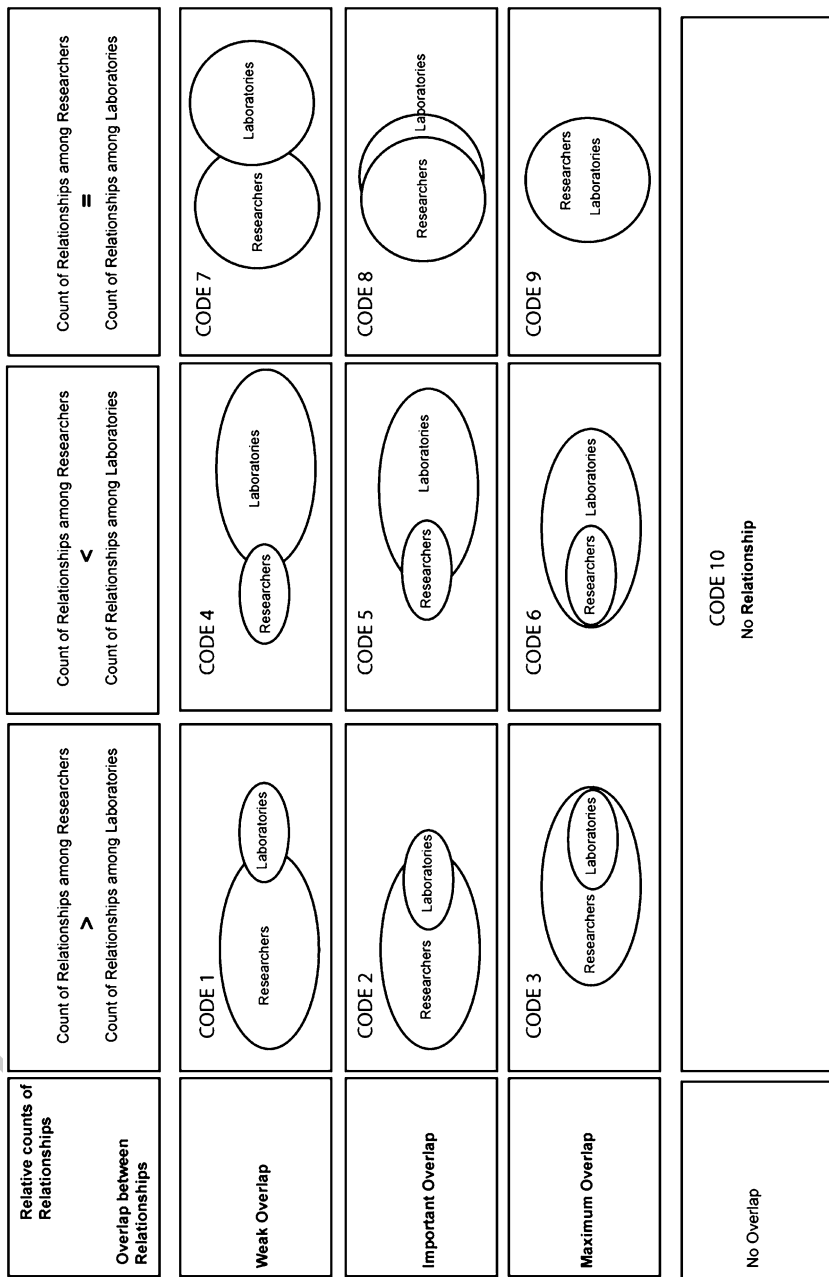


Fig. 8.2 Members' relational strategies as measured by types of overlap between interpersonal and inter-organizational networks

laboratories collaborating with the laboratory of this actor. For incoming choices, 381
 this is a situation in which the individual researcher enjoys a personal prestige 382
 relatively independent from the prestige of his/her laboratory. For outgoing ties, this 383
 is a situation in which the individual researcher has access to resources relatively 384
 independently from his/her laboratory. Codes 2, 5 and 8 refer to an important overlap 385
 and codes 3, 6 and 9 to a maximum overlap: the actor has access to advice related 386
 resources (learning) from sources offered by the collaborations established at the 387
 level of his/her laboratory. 388

8.3.4 Levels of Overlap, Relational Strategies and Achievement 389

Using this typology, we can establish a correspondence between fish/pond cate- 390
 gory (identified above: BFBP, etc.), level of overlap understood as strategy, and 391
 achievement. Results show, firstly, that there are combinations that articulate little 392
 (or no) common prestige and little (or no) joint access to the same organizational 393
 resources: combinations 1 and 5 and combinations 4 and 8. One could call 394
 these combinations “independent” strategies. It is not difficult to imagine concrete 395
 examples of behavior that reflect independent strategies. For example, a researcher 396
 representing an entire discipline in a scientific council might negotiate, in the name 397
 of the collective interest that he/she represents, to obtain resources for his/her own 398
 individual projects. Second, there are combinations that articulate little (or no) 399
 shared prestige but many of the common resources: combinations 2 and 6 and 400
 combinations 3 and 7. One could call these combinations “individualist” strategies 401
 (benefiting from common resources but not sharing their prestige). Third, there are 402
 combinations that articulate a great deal of shared prestige but little (or no) common 403
 organizational resources: combinations 9 and 13 and combinations 12 and 16. 404
 One could call these combinations “collectivist” strategies (constructing common 405
 prestige by using resources different from those of one’s colleagues’). Fourth, 406
 there are combinations that articulate a great deal of shared prestige and common 407
 organizational resources: combinations 10 and 14, and also combinations 11 and 15. 408
 One could call these combinations “fusional” strategies. The reconstitution of this 409
 typology of strategies yields new insights into the relationship between position, 410
 strategy, and achievement. 411

Analyses show that collectivist strategies are used by big fish more often than 412
 little fish. In other words, the bigger the fish, the greater the overlap between the 413
 relationships of researchers and the relationships of their respective laboratories. 414
 Big fish know how, and are able, to use the resources of their laboratory. Among 415
 the LFBP, the majority have strongly independent strategies. On the other hand, 416
 for the LFSP, one finds a nearly complete separation between the relationships of 417
 researchers and those of laboratories, whether for outgoing or incoming ties. Their 418
 laboratories may also offer resources to which they do not have direct access or that 419
 they do not use. The LFSP have no fusional strategies. Big fish do not seem more 420

prone to use individualist strategies than the little fish. The only marked difference 421
 is the more frequent use of collectivist strategies, but also of fusional strategies 422
 (although in very small numbers). The difference in the use of independent strategies 423
 is not so much between the little fish and/or little pond, but between the little and the 424
 big fish. Little fish – perhaps because of lower access to laboratory/organizational 425
 resources – follow an independent strategy much more often (66 % compared to 426
 34 % for the big fish). Also it is not the BFBP that most often use collectivist and 427
 fusional strategies, but the BFLP; they are more often the directors who could easily 428
 use the resources of the laboratory for their own interest, sometimes, for example, 429
 grabbing credit for other members' work. 430

Finally, we measure the way in which actors' strategies are associated with 431
 achievement levels for researchers who are not BFBP, i.e. who are endowed with 432
 less social resources. The examination of the evolution of the impact factor scores of 433
 all the researchers, and more specifically of those catching up, over five consecutive 434
 years following the study, allows us to identify "long-term catching up". Among 435
 researchers with increasing impact factor scores who were LF, the individualist 436
 strategy is by far the most efficient, mostly for those in a big pond, in order to have 437
 a chance to catch up. The same individualist strategy seems to be counterproductive 438
 for the BFSP. The latter can attain very high levels of achievement (measured at the 439
 individual level) if he/she is the only one in the little pond to be able to appropriate 440
 the necessary resources and enter competition with the BFBP. The collectivist and 441
 fusional strategies are also efficient for these BFSP. Following an independent 442
 strategy does not seem to benefit anyone, especially not the junior researchers. One 443
 may explain this catching up by the fact that some LF, whether in big or small ponds, 444
 have learned, over time, to use the resources of their organization more efficiently. 445
 This means that the LF benefit from building an individual network outside of the 446
 domain established by the network of their boss or laboratory – exactly the first step 447
 in the creation of new organizations. 448

This specific result deserves to be highlighted for our purpose. Younger 449
 researchers try to create ties outside the relational "territory" of their organization 450
 and of their boss in order to gain autonomy in their work. Asking to what extent 451
 this is still possible today without losing access to resources needed to innovate 452
 is equivalent to asking to what extent science is still an "independent" profession. 453
 Individualist strategies are rewarding in terms of achievement for the researchers 454
 who are not BFBP. They break free of organizational constraints to reshape their 455
 opportunity structure and eventually build their own organizational context. 456

8.3.5 Dual Opportunity Structures, Asynchronies and Emergence

This case in point could illustrate in part the situational logic of action called 459
 opportunity: "The prizes go to those who will explore and can manipulate contingent 460

cultural compatibilities to their advantage” (Archer 2013b). MU can be seen as the result of a succession of such disjunctions and asynchronies created by relational strategies, here mainly “individualistic” ones, in the sense defined above, that allow some actors to combine structure and culture in new ways before they set up new organizations, and the cycle starts afresh. But affiliates choosing fusional and collectivist strategies and values seem to do less well in this context. Exploration of new opportunities creates asynchronies, and exploitation of new opportunities created by this exploration seems to benefit only the established organization and its leaders. A process takes place, by which these established organizations bring ‘wayward’ affiliates back to good order. The “synergy” of both is what we can call synchronization or alignment that increases overlap: the organization catches up with its fusional and collectivist members and is able to hoard the new opportunities that they created, thus preventing MU.

If synchronization is necessary for the organization to benefit from the individual actions of its entrepreneurial members, especially from individual action that takes place outside the organization, creating asynchronies is sometimes what helps individuals break free. Thus collective action at two vertically interdependent levels of agency is also a story of “emancipation” from the influence of the other level, and either catching up with this other level as it stands, or creating a new emergent structure (or more modestly, a new sub-structure). The lag between the two can be considered the main source of morphogenesis and the generalization of lags the cause of MU: structuration at one level drives structuration at the other in mostly conflicting, chaotic, and unequal ways. Time to adjust and adapt are not always available; enormous waste and disorganization may characterize the multilevel structuration process.²

When agents emancipate themselves and create their own organizations, structure and culture can be brought together as status and rules by which opposed parties “collaborate with the enemy”. The form of synergy described above between employers and their scientists “depended upon the swift succession of positive feedback cycles ... all of which led to new variety fostering further variety” (Archer 2013a: 14). In the multilevel system, actors try to take advantage of spatial and temporal gaps between agency at different levels. In our empirical case culture, structure and agency work together because some (young) scientists try to challenge their seniors’ or colleagues’ scientific and vested interests by creating new organizations as “tools with a life of their own”.

²Since this creates dynamics of multilevel networks with different levels of agency, a new family of models is needed to account for such dynamics. We think this family of models is a multilevel extension of Snijders (2001) model of dynamics of networks, using characteristics of level 2 network as set of exogenous factors in the evolution of level 1 network, and the other way around. The coevolution of both level networks is added to the coevolution of behavior and relational choices. In terms of model specification, new ‘independent’ variables from inter-organizational networks operate at the inter-individual level, and vice-versa.

8.4 Weak Culture in the Creation of New Relationships and Organizations?

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Multi-level network analyses, asynchronous dynamics and emergence are thus relevant for the research agenda on Morphogenesis Unbound. But in order to reshape opportunity structures by creating new relationships and new organizations, individuals must also create and use new languages and rules that help them hoard these opportunities and defend their regulatory interests. This is related to the fact that, in effect, creation of new relationships with heterogeneous alters often mobilizes what Breiger calls "weak culture". Indeed Breiger (2010) and Schultz and Breiger (2010) propose that the tie that binds an actor to a cultural taste, for example, "might be strong (purposive, intensive in time or commitment, fostered by a tightly integrated community bounded by social symbols and representations) or weak (banal, non-instrumental, non-demanding, non-exclusive)". They find that weak culture can be efficient in several different respects, for example "by bridging across otherwise disconnected social groups, or by bonding actors to a wider collectivity than is possible on the basis of strong-culture commitments". They report research findings indicating that weak culture, that requires no strong commitment from actors, tends to span preferences and does not need strong approval. In spite of being weak, "weak culture has a strong and significant impact on shaping attitudes about (...) values". Their reasoning is that, with its capacity to help create heterophilous ties, weak culture regenerates structure by bridging across diverse social milieux. In our view this process can help actors in recreating a hierarchy of allegiances and bringing together competing reference groups. Each new collective requires secondary socialization (Lazega 2014). Increased levels of creation of new organizations signals the increased importance of secondary socialization to these organizations.

The recognition of the cultural dimension of affiliation in (and creation of) relationships and organizations has implications in terms of supporting the idea of a fundamental difference between Archer's logics of action (competition and opportunity). Under specific historical circumstances opportunity could become generalized and variety could induce further variety because the process of consolidation and 'recuperation' of agents does not work. Established organizations do not always succeed in hoarding the opportunities created by their members.³

But could that last for very long? If organizations can link opportunities created by members outside of their reach with, for example, promises of career advancement, then individuals can be lured by the prospect of becoming king/queen fish without creating new organizations and structures. This issue is equivalent to asking to what extent these mechanisms (reshaping one's opportunity structures, creation

³Moreover, the chains of interactions between tie generation at different levels are not necessarily centred around subordinates. Sometimes cooperation between superiors and subordinates facilitate or hinder the development of such chains and restructuring (Lazega et al. 2013).

of new relationships outside of the perimeter of one's organization, alignments
 or disaffiliation, desynchronization, boundary spanning and opportunity hoarding)
 can be disentangled from competition as a generative mechanism. Secondary
 socialization has become a central process in contemporary organizations because
 of increased flexibility of labor markets that puts members in increasingly open
 competition and imposes upon them increasingly frequent mobilities and bifurcating
 trajectories. The existence of strong secondary socialization processes, constantly
 nurtured and updated, is often perceived in organizations as an essential process
 mitigating the destructive effects of competition, not replacing it. Perhaps the two
 generic mechanisms (competition and opportunity) are combined in a multilevel
 and dynamic perspective, in the sense that co-evolution of levels of agency
 needs both.

8.5 Unmeasured Social Costs Dumped on the Weakest and on Society as a Whole

It is suggested here that one way to understand the notion of Morphogenesis
 Unbound is to focus on the meso level of society where evolution takes place, i.e. to
 look at society as an 'organizational society' and to think about the co-evolution
 of structure, agency and culture – the three dimensions of Archer's sociology,
 analytically speaking – in that context. This co-evolutionary vision happens to be
 very close to the research program of neo-structural sociology. In a study exploring
 multi-level networks of superimposed and partially connected interdependencies,
 the first being inter-organizational, the second inter-individual, a method of struc-
 tural linked design articulating the two levels of agency was proposed. First, we
 examined separately the complete networks at each level. Second, we combined
 the two networks in relation to one another using systematic information about the
 affiliation/membership of each individual in the first network (inter-individual) to
 one of the organizations in the second network (inter-organizational), as in bipartite
 networks – but without conflation of the levels. This dual-positioning, or the linked
 design approach, was carried out in an empirical study examining achievement
 variations within the "elite" of French cancer researchers in 1999. By looking at
 measures of centrality, we identified the actors that these top researchers consider
 as central or peripheral at the inter-individual level (the big and the little fish
 among the elite), and the laboratories that the research directors consider as central
 or peripheral at the inter-organizational level (the big and the little ponds among
 all the laboratories conducting cancer research in France at that time). We used
 measurements of scientific achievement to identify "catching up" strategies that the
 little fish use in this system in order to reach a level of performance similar to that
 of the BFBP.

Based on an organizational perspective and paying attention to the connection
 between separate individual and collective forms of action, this neo-structural
 approach helps in modelling the co-evolution of structure, culture, and agency.

In this case the most efficient form of action seems to be individualistic, defined as weak overlap between the network of the affiliate and that of his/her organization. This strategy helps individuals reshape opportunity structures by creating new ties and new organizations. Attempts to generate new ties and create new organizations beyond the established organization, i.e. emancipation from this established organization's attempts to hoard socioeconomic opportunities and grab potential returns offered by such strategies. This strategy helps individuals reshape opportunity structures by creating new ties, and new organizations. The dominance of this individual strategy and disjunction corresponds to a process of change that triggers chains of creation of new organizations. This form of structural emergence could perhaps be part of what Archer considers to be the generative mechanism accounting for Morphogenesis Unbound.

Thus in this approach, the logic of competition and the logic of opportunity are difficult to disentangle because they come together both theoretically and analytically. Opportunities are created culturally as "pools of contingent complementarities" (Archer 2013a: 8) imagined, for example, by founders of new organizations. This does not mean that such opportunities are left unorganized and unhoarded by the pre-existing social organization of interdependencies at the meso level, and eventually at the macro level. In this struggle, innovation is often culturally "weak". Conservative recuperation may be much more difficult with a new religious belief or even with a new style in painting, in movies or in popular songs, than with a new product protected by a challengeable patent. Indeed, there are many more examples of the latter than of the former.

This study has explored a new direction for research on MU based on investigation of mechanisms of social change in multiple levels of agency and their interactions in network dynamics. This neo-structural approach to MU does not entirely confirm the "deviation-amplifying morphogenetic processes that are *decreasingly* held back by negative morphostatic ones", or Archer's new generative mechanism at work for "*variety to induce further variety* (new knowledge, new technology, new occupations, new organizations and new social relations) through the production of an ever enlarging pool of (as yet) unconnected but complementary cultural items by a relational order oriented to innovation." However, we believe that it provides a way to specify and test, within the structure-culture-agency framework, the interplay between the generic mechanisms.

Finally, why bother with all these measurements? There is nothing spontaneous and egalitarian in the new kind of 'morphogenesis unbound' that the organizational society has created. Collective emancipation of organizational entrepreneurs cooperating with competitors, and often violent deployment of their organization, take place in a society that encourages complex, sophisticated, invisible and collective opportunity hoarding. Beyond generating new theory, the issue is also 'Who shall pay for the costs of synchronization and/or asynchronies in the evolution of multilevel networks and thus of opportunity structures in MU?' Separate dynamics at different levels of analysis raise new research questions about invisible effects, in terms of achievements, of agency and culture at different levels. Mutual adaptation of the evolutions at each level of social reality (inter-personal and

inter-organizational) happens in relational adjustments and turnover required, for example, by mobility and increased flexibility in labor markets. Adjustments with invisible costs that are not well measured at the meso level still generate additional inequalities at the micro and macro levels. It will be hard to measure the effects of one level of agency on the other without positioning actors in multilevel structures and without introducing the kinds of formalism that are needed to account for the co-evolution of culture, structure and agency, and for the consequences of this co-evolution. These consequences include – as characteristics of the morphogenic society – the cascading creation of new organizations, systematic redefinition of class based on opportunity hoarding, and dumping of the social costs on the weakest and on society as a whole.

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AQ1. Archer (2012) is cited in text but not given in the reference list. Please provide details in the list or delete the citation from the text.

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