

Formalism, Behavioral Realism and the Interdisciplinary Challenge in Sociological Theory

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1. INTRODUCTION: FORMALISM VERSUS BEHAVIORAL-REALISM: SECURING THE DISTINCTION

A commonplace theme in sociological theory circles revolves around the issue of whether the perennially elusive micro/macro link or the still befuddling agency/structure problematic are the most central issues in contemporary sociology (on the first issue see the papers collected in Alexander, Giesen, Münch, and Smelser 1987; White 1997 and also Lawler, Ridgeway, and Markovsky 1993 on the second see Giddens 1979, 1984; Sewell 1992). In this paper I identify and highlight the importance of another major theoretical divide which while not having received the same amount of attention as these two may in the end carry more importance for the future development of sociological theory. This issue can be thought of—at the risk of some oversimplification—as the emergence and consolidations of two antithetical *styles of production* of general sociological theory. This can also be seen as the appearance of two “intellectual strategies” in the sense of Camic (1987: 424) and Bates and Peacock (1989: 567), which have been used by some theorists to attempt reorient and unify the field according to their preferred parameters. What is the best way to characterize these two intellectual strategies?

1.1 Formalism

On the one side, stands the pull toward the development of a “pure” (Black 1979, 1995, 2000a, 2000b) or “relational” sociology (Emirbayer 1997), one that with the aid of mathematical formalization and parameterization (Fararo 1989a, 1997; Fararo 1989b; White 2000) will develop a species of social-scientific discourse that will finally dispense with the need to refer to “pre-scientific” and “non-sociological” entities such as motives (Berkowitz 1988), attitudes (Wellman 1988), the person (White 1992) or even individuals (Mayhew 1980, 1981). The move towards formalization is driven by the goal of finally realizing the Comtean project of an

intellectually independent science of society. This time the autonomy of sociology will be achieved through the development of formal models of *strictly sociological* processes. This new sociology will not require any sort of reliance on the conceptual baggage and ontological assumptions of other sciences especially psychology and biology.

Whenever theorists deploy this intellectual strategy they tend to evince a preoccupation with *mathematical formalization* and *abstract* theory building. The primitive entities that are considered to be the building blocks of social structure are not necessarily concrete but are usually processes, “relations”, or unobservable macro-structural tendencies of social systems such as homophily (Bates and Peacock 1989; Fararo and Skvoretz 1987; McPherson, Smith-Lovin, and Cook 2001) or socially constructed categorical and graduated distinctions (Blau 1977a; McPherson and Ranger-Moore 1991). The more recent versions of this form of general theory building strategy differ from classic predecessors (e.g. Coleman 1990; Homans 1950; Parsons 1937), in that the *social actor* is abandoned as a both a useful unit of analysis and a basic component constitutive of larger processes. This is what I would refer to from now on as *formalism* (Blaug 1999, 2003; Lemert 1979: 931).¹

1.2 Behavioral-Realism

On the other hand, it is possible to observe the gradual development of an alternative (and in many ways antithetical to formalism as we will see below) intellectual strategy whose distinctive quality is an equally strong push toward conceptual and empirical integration with those very same disciplines that from the formalist viewpoint are perceived as compromising the integrity of sociology. This path involves relinquishing the very idea of sociology as an autonomous conceptual edifice composed of abstract models of *exclusively social* processes. Here concepts and mechanisms derived from biology (Ellis 1996; Smith and Stevens 2002; Udry 1995) or psychology and cognitive science and psychology (Carley 1989; Dimaggio 1997, 2002; Thoits 1995), are considered to be equally important.

From this perspective sociology is still seen as the central integrative intellectual hub where all of these strands meet (Gove 1995). However, basic themes that have been historically central in social theory such as the dynamics of micro-interaction (Kemper and Collins 1990; Turner 1988, 2000b, 2002), emotions (Kemper 1981; Turner 1999, 2000a) or the general motivational factors that govern social behavior (Gove 1994; Turner 1987) are considered impossible to explain without recourse to the theoretical and empirical storehouse of neurophysiology (Hammond 2003; Lizardo 2007; Smith and Stevens 1996, 2002; Turner 2000a), cognitive psychology and linguistics (Bergesen 2004a, 2004b), and evolutionary psychology, neuroendocrinology, and behavioral genetics (Ellis 1996; Gove 1994; Smith and Stevens 1996, 2002; Udry 2000).² All sciences traditionally thought of as exclusively dealing

with non-social or intraindividual processes. The processes that are conceived as the ontological “building blocks” of the social (e.g. relations) are from this point of view seen as *generated* from a more fundamental bio-psychological substrate. I will refer to this last type of general explanatory attempt as *behavioral-realism*.³

Like formalists, behavioral-realists are concerned with arriving at universal explanatory frameworks of human behavior. In that sense this style of theorizing shares the same ambitions toward generality and comprehensiveness as its formalist counterpart but generalizations are made about concrete *biophysical* individuals engaged in—potentially—observable interaction in real-life *socioecological* settings (e.g. Collins 1981; Turner 2000b).⁴ From the behavioral-realist viewpoint the formalist tendency to conceive of the social agent as a stylized, disembodied abstraction constitutes a limitation rather than an advantage.

Freese et al. (2003: 244) provide an apt illustration of the behavioral-realist orientation as contrasted with a formalist point of view on the actor:

If one accepts that human beings are material entities all the way through, then all our thoughts and actions are embodied, imply thoroughly physical processes, and are “biological” activities in the sense of being part of our ongoing constitution as organisms. *Even so, the various idioms with which social scientists typically consider behavior rarely require explicit reference to the materiality of human actors; that is, humans can be disembodied abstractions in the language of theory, even if unrelentingly embodied in actual practice.* Proximate physiological mechanisms and processes are thus effectively treated as a black box in much social scientific thinking, but another way of asserting the relevance of “biology” is to assert the necessity or value of opening this black box and extracting information about the physical workings of our bodies and minds (italics added).

In contrast to the implicit (and sometimes explicit) mono-disciplinary stance evinced by formalists, behavioral-realists are of primary *interdisciplinary* bent, proposing a merging of research programs and theoretical orientations that cuts across disciplines as exemplified by such “hybrid” proposals for a “biopsychosociology” (Gove 1994), “evolutionary sociology” (Maryanski 1998), “biosociology” (Ellis 1996), “cognitive sociology” (DiMaggio 2002) or even “neurosociology” (Smith and Stevens 2002). This mode of theoretical integration is not necessarily averse to mathematization or formalization (e.g. Carley 1989, 1991; Sun 2004), but mathematical models are always subordinate to considerations and constraints related to some set of basic processes, entities and mechanisms borrowed from some more fundamental “lower level” discipline. This attitude of integration and transdisciplinary borrowing of concepts and “mechanisms” stands in sharp contrast to the formalist attempt to defend the “purity” of sociology (Black 2000a, 2000b) and its potential theoretical and empirical autonomy from other disciplines (McPherson 2004). This is done mainly by resorting to mathematical and logical schemes that abstract the “social” from its embeddedness in biophysical reality.

In comparison to the many attempts at formalist unification that have taken place in sociology since the middle of last century (e.g. Parsons, Luhmann, Coleman), behavioral realist pleas are both a relatively new entry into the disciplinary contest

of how models of society and social structure should be properly formulated. However, they have become increasingly more frequent and programmatic of late. While both formalists and behavioral-realists share almost identical diagnoses of the state of the discipline pointing to its fragmentation and lack of core consensus, behavioral-realists offer a radically different remedy that pure mathematics and formal theoretical language. They look beyond the disciplinary boundaries of sociology and attempt to borrow conceptual tools from other disciplines such as biology and psychology with the hope of providing social theory with a much needed set of core of fundamental concepts and basic mechanisms. In this way they aim to remedy what is perceived as the unsatisfactory multi-paradigmatic status of sociology.

Both formalist and behavioral-realist theoretical strategies emerge as a response to the perennial state of disintegration that has come to characterize current sociological inquiry (Stinchcombe 1994; Turner and Kim 1999). Further, those who deploy each strategy usually claim to possess the remedy to this malady: *theoretical unification* (Black 2000a, 2000b; Fararo 1997; Gintis 2007; Gove 1995). However, while sharing the same goal, *the means* to theoretical unification become radically different depending on whether the formalist or behavioral-realist route is chosen. Both formalist and behavioral-realists seek generalization and the development of explanatory theory in sociology.

Formalism attempts to *reduce* the ontological (and therefore empirical) content of the discipline to a minimum by outlawing or radically limiting reference to any sort of intrapsychic and/or intra-organismic motivational factor (Mayhew 1980, 1981). Formalists consider individual level factors as simply an epiphenomenon that can be “reduced” to pure structuralist processes (see for example Burt 1992: 251, on personality; Popielarz and McPherson 1995 on choice homophily; White 1992 on the notion of “the person”). Network theory in pursuing its “anti-categorical” imperative (Emirbayer and Goodwin 1994) is the most recent attempt to realize this sort of *top-down reduction* (DiTomaso 1982). Randall Collins’ early call for a “microtranslation” of all macrosociology into behavioral-realist microsociological language, in which allusions to such reified entities as the state, institutions and organizations are replaced with reference to “real” empirical individuals and individual-level microprocesses such as emotional energy and interaction rituals is the *bottom-up* behavioral-realist obverse of the formalist attempt at reduction.⁵

1.3 Cognition versus Biology

Behavioral-realists can be partitioned into two primary groups: on the one hand there are those who look toward *biology*. On the other hand, some behavioral-realists prefer concepts that originate in the *cognitive sciences*. Randall Collins (1994) for example, has concluded that the only way that sociology may become a “rapid discovery” science is to integrate traditional socio-cognitive and micro-interactionist

research programs with investigations from artificial intelligence (see also Bainbridge, Brent, Carley, Heise, Macy, Markovsky, and Skvoretz 1994 on the potential for a productive relationship between sociology and artificial intelligence). I propose that this represents a dramatic change in attitudes towards both psychology and biology on the part of mainstream sociology given the history of their initial differentiation in the 19th century academic field (Camic 1986; Camic and Xie 1994).⁶

In addition, behavioral realist-oriented researchers have begun to make inroads into traditional formalist ground. They have begun to offer arguments that claim to either solve or provide a superior account of theoretical problems and unresolved issues that have previously been the purview of formalist theories in particular network theory. This is a direct challenge to the ambitions of the “strong formalist program” of structuralist theory (Mayhew 1980, 1981) and network theory (Berkowitz 1982, Burt 1982) to explain social processes without references to individual level biophysical attributes (Mehra, Kilduff, and Brass 2001).⁷ Other behavioral-realist-inclined researchers have turned to primatology and evolutionary biology in order to study processes of societal evolution and stratification (Maryanski and Turner 1992) a topic of traditional concern to formalist theorists (e.g. Mayhew and Levinger 1976a; Mayhew and Schollaert 1980; McPherson and Ranger-Moore 1991; Skvoretz and Mayhew 1988).

Behavioral-realists who draw on biology, evolutionary psychology or sociobiology may seem more radical or controversial—and may be regarded as a qualitatively different group—than the “softer” behavioral-realists that look toward the cognitive sciences. However, it is important to keep in mind that this impression may simply be due to the historically combative—and politically sensitive—relationship between biology and sociology and not with any inherent difference between the underlying strategies of these two behavioral-realist subgroups. There might also not be any major *theoretical* incompatibility. In this respect it is important to note that the dominant version of biological behavioral-realism currently extant (evolutionary psychology) is nothing more than a cognitive model of the human agent (Carley 1989; Carley and Newell 1994) informed by Darwinian reasoning. Evolutionary psychology relies on a “massively modular” model of cognition, complete with information-processing, attentional and motivational/emotional biases produced by common selection pressures in the environment of evolutionary adaptedness (Barkow, Cosmides, and Tooby 1992; Buller 2005; Buss 1995).

In spite of the various substantive differences between these lines of inquiry, the key point to keep in mind here is that the common behavioral-realist turn to other disciplines is motivated by what are generally perceived as failures to achieve cognitive consensus within sociology (Ellis 1996). This is indirectly an indictment—or at least an implicit recognition of failure—of early formalist paradigms (Black 1979; Blau 1977b; Mayhew 1981) that promised a reconfiguration and unification of the field under the banner of the study of “pure” sociological processes and the prohibition of reference to intra-psychic processes or attribute-based explanations (Black 2000b; Mayhew 1981; Mayhew and Schollaert 1980).

2. ON REALISM AND SOCIOLOGICAL THEORY

2.1 Social Theory versus Sociological Theory

Before proceeding any further, a note on the conception of “sociological theory” that I will use in the rest of the paper is in order. This will serve to forestall any confusion as to the intent and scope of the argument that follows. First, I abide by an analytical distinction between “sociological theory” (e.g. Merton 1968; Parsons 1937) and “social theory” (e.g. Pels 2001). While the term “social theory” is a much more complex, loosely bounded, inter-disciplinary and wide-ranging (both in terms of time and geographically circumscribed traditions of thought) body of discourse, I conceive of “sociological theory”—following the work of Fararo (1989b) as involving a much narrower set of concerns and as being composed of a much stricter set of *disciplinary* lines of thinking specific to the sociological tradition. The specific intellectual boundaries of this theoretical tradition have been historically shaped primarily how the discipline of *sociology* was initially defined in the *American* academy (Camic 1987; Camic and Xie 1994) and how it has evolved through time (Alexander 1987).

In this respect, the present analysis is centered on a set of specific theoretical problems that have pervaded—and I argue continue to affect—theory construction and concept formation in *American* sociology. It is beyond the scope of this paper (and beyond my knowledge and abilities) to address either social theory broadly defined, and to address theoretical concerns outside of the American sociological field. It is therefore possible that a lot of the arguments that I make below simply do not apply to traditions of sociological theorizing outside of the United States (e.g. British or French Sociology).

Furthermore, even within the realm of American “sociological theory” in this paper, will be talking about social theory in exclusively in its *general explanatory* variant. I once again follow Fararo (1989a) here, who has proposed a useful classification scheme that distinguishes two other facets of sociological (and social) theory: *normative* (also known as critical theory) and *world historical*. The arguments that follow are meant to apply exclusively to the first type. These two restrictions mean that there will be a host of thinkers and theorists that will necessarily be left out of my account. For instance, when speaking of “network theory” below, I will restrict my discussion to *American* network theory (for a good sociological history of this line of thinking see Freeman 2004). I will not address broad “social theory” thinkers that use the term network as a loose, non-explanatory metaphor to characterize broad trends in modern society in a world-historical style of theorizing (e.g. Urry, Castells).

Finally, because this paper is concerned with a very specific and restricted notion of realism (as noted above) and not with the usual debate concerning the role of epistemological realism in social science, I will not deal with the relationship between my argument and the now burgeoning field of meta-theory and philosophy

of social science known as “critical realism” (CR) (Archer 1995; Bhaskar 1998). While this is an important omission, I believe that the argument offered above concerns matters that have not been adequately discussed within the constraints posed by this approach (but which are not necessarily irrelevant or disconnected from some of the issues raised by proponents and critics of CR). I leave for future consideration a more detailed treatment of the relationship of how the issues raised in this paper would be considered from a critical realist point of view.

2.2 Which Realism?

In what specific sense then are behavioral realists “realist”, and formalists “irrealists”? As we will see below above and beyond the usually considered issue of epistemic realism, behavioral realism is instead concerned with a relationship of fit or *verisimilitude* between *empirical reality* and the *models constructed to explain that reality* (Maki 2002; Niniluoto 2002). In this sense, the “realism” in behavioral realism is an attribute of *models* and *explanatory schemes*—especially at the levels of axioms, postulates and assumptions—not an attribute of world “out-there.”

Here I follow Rabin (2002: 661) in defining (behavioral) realism as “. . . trueness to the [relevant] behavioral and [neuro/bio/cognitive] psychological reality” and Maki (2002: 90) in noting that in the social sciences (like economics) in contrast to more abstract philosophical discussions, the key issue is “*realisticness* [sic] as a *property of theories*” (italics in the original). An important point to note is that in this context the realism of “behavioral realism” is not the same as the *epistemological* notion of “realism” as the term is used in the philosophy of science (e.g. Hacking 1983). This distinction is important, since most sociological formalists, especially those that draw from the Durkheimian (as opposed to the Simmelian) lines of formalism are realists in an epistemological sense. That is, they believe that there exist “real” (insofar as they are independent from human perception and cognition) supra-individual structures that serve to shape and constrain individual choice and action.

A behavioral-realist stance—because of its insistence on *actually existing* mechanisms and operations at multiple levels of analysis—also necessarily implies a form of epistemological realism. That is, the entities and processes alluded to in a given theory’s assumption set has to have some extension in the world (although some may be unobservable given the contemporary state of investigative technologies), and not be convenient mathematical fictions endowed with a purely semantic (intensional) or purely logical status. While the fact that some formalists make an ontological commitment to an obdurate—“intransitive” in Bhaskar’s (1998: 9–11) terms—reality independent of the experience of social agents would seem to imply that they also have to abide by a behavioral realist criteria of *verisimilitude*, they “save” themselves from this predicament by postulating that this intransitive reality is *inherently* (as opposed to incidentally) unobservable or abstract (usually by

relying on a “process” ontology), thus allowing their formal-theoretical representations of that reality to not be constrained by feedback from the external world, and only be constrained by the theorist’s imagination and the mathematical object’s representational capacity. In this sense, the realism of the formalist remains “transcendental” while that of the behavioral-realist is “empirical.”

2.3 Formalism and the Micro/Macro Divide

It is important to note that formalist theorizing, while primarily espoused by those who reject the individual or the person as a proper unit of analysis or as a pre-scientific fiction *cannot* be equated with the holist side of the holism/individualism debate. Mathematically oriented methodological individualists such as Coleman or Homans can be considered as having made use of a formalist strategy no less than “pure” structuralists that enshrine exclusively relational or macrolevel processes as the proper object of social analysis. This is because the model of the individual that microlevel formalists uphold is nothing but a mathematically expedient fiction not expected to conform to real persons (White 1997). Both methodological individualists and “relational” theorists are equally prone to reject behavioral realism and the theoretical integrity of natural persons and *thus can be classified as deploying the same mode of theorizing* (in a broad, but useful sense), in spite of the “anti-individualist” rhetoric that can sometimes emanate from the formalist group (Mayhew 1981). None other than Harrison White (1997: 61–62)—an analyst sometimes criticized for his anti-individualism and “reductive” formalism (Brint 1992)—has detected this seldom acknowledged commonality between the strong structuralists and formal methodological individualists in their common denial of behavioral realism as a desirable property of socio-theoretical discourse:

I think there is a hidden reason for the suddenly growing importance of the (new) linguistics. This reason is the disappearance of the person as a useful construct in this era of scientific theory of social action . . . The recent resurgence of “rational actor” models is not inconsistent with my view since *there is little that is specifically human about rational actors. Without persons being presupposed as actors, attention necessarily shifts to confluences of observable processes-in-relations. Out of these emerge actors and locations of social action* (italics in the original).

Whitmeyer (1998: 404), in a recent call for the usage and development of “Human Actor Models” in sociology appears to support White’s diagnosis. He states that his perspective is not realist because

There are no foundational assumptions that anything in the model is real, that is, that the existence of any element of the model is anything more than a pragmatic assumption, used because it is useful. Indeed there is no basic assumption that human beings really exist as actors. *Rather, along with many others I treat human beings as actors because it seems scientifically productive, that is, useful, to do so* (italics in the original).

In this manner the conflict inherent in the formalist and behavioral realist strategies can be considered as partially orthogonal to the micro/macro debate (Lawler, Ridgeway, and Markovsky 1993; Whitmeyer 1994). However, this does not mean that the *style* of explanation does not differ between the two theoretical strategies. While formalists prefer abstract model building and (sometimes) a nomothetic style of explanation, behavioral realists are much more concerned with specifying micro and macro *mechanisms* around which large scale behavioral regularities can be explained (Kanazawa 2002). These mechanisms (be they neuro-cognitive, ecological or physiological) are not merely formal or analytic constructions (such as group algebras, abstract ecologies or multidimensional spaces) but “real” in a materialist sense (mental modules, resource shortages, neurophysiological structures). Formalists, on the other hand, are much more likely to endorse modes of explanation that can at least in principle dispense with lower-level accounts of sociological processes.

2.4 The Classical Legacy

In 20th century American sociology, formalism can be said to begin with Talcott Parsons’ adaptation of Whitehead’s “analytical realism” (Fararo 1989a, 2001) as a theory construction strategy. This is a misleadingly named philosophical standpoint, because the primary consequence of adopting this approach is to end up with an analytical “irrealism” regarding the fundamental entities, substances and capacities that should be the core concern of the discipline. Something that is not very often noted is that Parsons’ approach in his classic *Structure of Social Action* (1937) was basically the same as that followed by neoclassical economists in separating an *analytically* definable realm (“the economy”) from messy reality thus making it the exclusive object of study of a single discipline. As Marshall and Pareto understood, this required mathematical formalization (Breslau 2003), and the postulation of a “pure” abstract realm of economic activity, estranged from the multidimensional complexity of the real world (Boettke 1997). Parsons’ attempt to do the same for sociology by postulating an irreducibly (but only abstractly defined) realm of exclusively “social” processes, culminated in his own version of a formalist human actor model for sociology (Parsons and Shils 1951) and an abstract analytical representation of the social system (Parsons 1951) summarized in the AGIL schema.

Simmel’s attempt to establish an abstract science of pure social forms (Simmel 1971) and his contention that the unique scientific contribution of sociology resided on that basis (Simmel 1909) can be considered the second strand of classical theory responsible for the formalist dream of pure sociology. This is supported by the fact that most American network theorists trace back their lineage to Simmel’s work (Boorman and White 1976; Breiger 1990; Breiger and Ennis 1979: 263, n. 264; Emirbayer and Goodwin 1994: 1415; Pescosolido and

Rubin 2000; White, Boorman, and Breiger 1976: 730, n. 731), and that they see themselves as fostering a radical paradigm shift through which the formal classical tradition of Simmel will finally be realized (Berkowitz 1982, 1988; Wellman 1988).

3. VARIETIES OF FORMALISM IN AMERICAN SOCIOLOGICAL THEORY

In this section, I consider the two of the most influential deployments of the formalist strategy that have been introduced into American sociology since the middle of the 20th century. This exercise establishes the point that the varieties of formalist theorizing cut cross across levels of analysis and that ambitious and reductionist formalist programs have been offered that either deny the ontological status of individuals in favor of formalized conceptualizations of social structure or that reject the independent integrity of social aggregates in favor of formalized conceptions of individual actors. I begin by discussing the original—and to this day most influential version—of formalism in sociology: *systems theory*, and by considering the “unacknowledged offspring” of systems formalism at the micro-level which I term *micro-formalism*. I follow by considering two important features of contemporary versions of formalism: *top-down eliminativism* (sociological reductionism) and their appeal to a *non-mechanistic* version of causation and explanation.

3.1 Systems Theory: the Original Macro-Formalism

Systems theory is the precursor of all formalisms in the social sciences, and all formalist variants (except the network variety of formalism which draws on the algebra of group theory and developed its formal shape through graph theory) owe their existence to it. The versions that have had the most impact on sociology can be traced back to the systems theory of von Bertalanffy and Norbert Wiener’s cybernetics and even further back to Marshall and Pareto’s pioneering formalization of turn of the 19th century neo-classical economics. One source of confusion in this respect concerns the tendency to treat “systems theory” as somehow distinct from the conception of a *dynamical system* (Fararo 1989a), specified as a set of differential equations with a specific number of parameters and starting values which over time displays some sort of either stable (e.g. cyclical) or complex (e.g. chaotic) behavior.

“Verbal” systems theory (e.g. the Parsons of *The Social System* [1951] or Niklas Luhmann’s [1995] autopoietic theory) is usually thought of as abstract theorizing regarding a set of entities in interaction with their environment whose primary purpose is to maintain some sort of internal homeostatic balance in the face of constant environmental disruption away from their “desired” state or as interacting and exchanging inputs and outputs with and adjacent system. What is usually not recognized is that both of these conceptions of system, one as a mathematical

“model object” capable of representing complex patterns of the behavior of some structure over time or as abstract theorizing about purposive entities which interact with their environment in order to sustain some sort internal coherence in the face of environmental disruption are inherently related and come from 19th century work in the Physics of fluids and engineering (although Luhmann’s version owes a lot to the application of these formalisms to problems in meta-biology [Maturana and Varela 1980]). This is shown by Fararo (1989a) who utilizes both of these meanings of “system” in his attempt to unify classic Parsonian theory and more recent structural conceptions of social dynamics.

In systems formalism individuals, societies, and all social entities are reduced to parameters, variables and starting conditions in a dynamic system of equations. In many respects, this is the most radical of all formalisms in that it “cleans the ontological house” of the discipline and replaces all postulated entities with variables, fixed parameters and their mathematical interrelations, a move similar to Walras’ general equilibrium formalization of market behavior in neoclassical economics. Simon’s (1952) translation of Homan’s micro-formalism into a dynamical systems formalism stands as an early and one of the few exemplars of this type of formalism in sociology (Fararo 2001). Today, strong versions of systems formalism have gone from being a potential hegemonic force with the hope of unifying social science and putting it at the same level of mathematical and theoretical sophistication as the “advanced” sciences (as Parsons once hoped) to a mostly forgotten phase in the history of social thought. However, debates derived from extending the *ontology* implied by systems formalism to the study of social phenomena continue unabated to this day (Abbott 1988).

3.2 The Foundational Denial of Realism: Micro-Level Formalism

Through this type of formalism we enter the realms of operant learning theory (Hull 1940), game theory (Nash 1950) and expected utility theory (von Neumann and Morgenstern 1944). Here the “real” individual is rejected in favor of some formal model of the *individual’s behavior* or internal processes that are prior or mediate subsequent behavior; a “human actor model” (HAM) in Whitmeyer’s (1998) terms or a “model of the human agent” in Carley and Newell’s (Carley and Newell 1994) rendering. Micro-formalism is closer to the “rational” pole of the social/rational distinction made by Simon (1957) between two competing models of man. By “social”, in our terms, Simon was referring to a more behavioral-realist model of the human agent (Carley and Newell 1994). Thus human actor models can be arranged in a continuum from the “simplest” (and therefore closer to formalism) to the most “complex” (and thus “realist” in our sense). The “rational” model is simply one type of micro-formalism. There can be other types that do not necessarily look like the classic expected utility model of the agent dominant in economics. The key characteristic of micro-formalism is *the rejection*

of “realisticness” (Maki 2002) as a desirable property of the actor model (Kanazawa 1998) in favor of the instrumentalist principle of predictive success or what Whitmeyer (1998) refers—unintendedly echoing Friedman’s (1953) classic statement in the methodology of economics—to as the “pragmatist” criterion.

Various micro-behavioral models of action currently popular in sociology are primarily a hybrid of some micro-formalism—either based on the “forward looking” notion of expected utility (Coleman 1990) or the “backward looking” learning-theoretic formalism (Macy 1990)—coupled with an equally formalist network representation of structure; beginning with the path-breaking work of Emerson (1972) and the early (1982) and recent (1992) theoretical and empirical work of Ronald Burt. In a similar way, James Coleman’s (1990) idea of grand sociology was precisely a generalization of the expected utility behavioral-formalist model of the human agent popular in economics coupled with its integration into network formalism. An actor-level micro-formalism coupled with systems formalism leads to the grand theory of Talcott Parsons (if we dump the flirtations with Freudian psychoanalysis—a (bio-cognitive) behavioral realism—and replace the behavioral part with a *learning theory* formalism as shown in Martin [2001]).⁸ Micro-formalist *control models* of the individual agent in social psychology (Heise 1979; Powers 1973) also fall in this category and by combining systems formalism at the macro level and a control model at the micro-level it is possible to get right back to Parsons model of social institutions as cybernetic control systems of human behavior once again (Fararo 2001).⁹

4. SOME TENDENCIES OF FORMALIST REASON(ING)

4.1 Sociological Reductionism

One of the primary features of formalism is its tendency to deny the need for *microfoundations* in sociological theory. This is done by conceiving of the traditional lower-level entities postulated in “naïve” (or “pre-scientific) versions of sociology (personality, individuals, etc.) as a *by-product* (or epiphenomenon) of the functioning of some more fundamental set of higher or “inter-level” structures and processes (Abbott 2001b: 266; Collins 2004: 4–5; White 1992). This is what DiTomaso (1982) refers to as *sociological reductionism*. Thus, some formalists attempt to deny *both* the casual efficacy and the *ontological status* (that is the existence) of individuals or persons. A useful term from the philosophy of mind that can be utilized to refer to this feature of formalism is *eliminativism* (Churchland 1986).

In the philosophy of mind, *bottom-up eliminativists* attempt to legislate against the usage of “mentalist” language and concepts (usually derided as “folk psychology”) and advocate their replacement or the exclusive usage of material or neurobiological concepts (Churchland 1981). The basic ontological postulate is that mental states are equivalent to brain states. In sociology, formalists—(e.g. Black 2000a;

Mayhew 1980)—proceed in a similar manner. The basic argument is that taking “the individual” as an foundational ontological or scientific object is useless, since individuals (as fundamental foundational entities) do not exist, and in fact can be decomposed into some other set of more fundamental processes. Thus talk about individuals (as “folk sociology”), can in principle be replaced with talk about some other sort of unit from which individuals are derived (“scientific sociology”). In this sense individuals are *derived* from this other entity (White 1997), usually a macrolevel or relational process and/or reduced to it, in the very same way that the older conception of the atom as a substantialist building block of matter is desubstantialized as a bundle of forces and relations between forces in contemporary high-energy physics.

Prominent Examples of top-down eliminativism can be found in the work of Harrison White (White 1992; White 1997)—especially his early work out of Harvard (Boorman and White 1976; White, Boorman, and Breiger 1976)—Niklas Luhmann and Stephan Fuchs (2005), this last two somewhat softened by cultural-constructivist tendencies. The classical inspiration for this kind of theorizing comes from the formalist portion of the work of Georg Simmel. The latter was of course a behavioral-realist in other facets of his work as exemplified in his classic essay “The Metropolis and Mental Life”, where cognition, emotion and a “realist” ecology figure prominently. For ontological formalists identified with the network analysis tradition of research some mathematical object (e.g. a graph, a multidimensional space) becomes the ontological basis for subsequent theorizing. Strong statements of the *structural-selectionist* formalism (a hybrid of network theory and formalist ecological theory) also fall in this category, with the formalization of the n-dimensional niche and the reduction of individuals as passive resources on this niche on which higher level aggregate entities feed (McPherson 2004).¹⁰

An important early proponent of top-down eliminativism in sociology is Mayhew (1980, 1981). Mayhew displayed all of the usual symptoms of a “pure” formalist. For Mayhew, the “individual” was mere mythology and attitudes and other intrapsychic phenomena were nothing but pre-scientific prejudices and metaphysical chimera echoing an older Comtean stance (Hayek 1943; 1942). Thus, Sociology would not be a true scientific enterprise until those entities were banished from our descriptions and explanations of social phenomena. Not surprisingly given the “elective affinity” between this stance and a preference for certain styles of mathematical formalization Mayhew was a strong advocate of graph theory and combinatorics (Mayhew and Levinger 1976b: 87) as the primary formalist tools with which pure structuralist processes (distribution of resources, occupational differentiation, etc.) could be represented.

For instance, Mayhew attempted to derive a theory of the origins of inequality that made no reference to individual differences whether psychological or biological and criticized Pareto and Sorokin on this account (Mayhew and Schollaert 1980: 36) because the latter viewed inequality and societal stratification as founded upon individual differences both psychological and biological. Tellingly, this

“outdated” Paretian hypothesis, is now one of the primary lines of attack on formalism by the new behavioral-realism emerging out of evolutionary psychology (e.g. Kanazawa 2002) and cognitive and personality psychology (Caplan 2003; Kilduff and Krackhardt 1994; Kilduff and Tsai 2005; Kilduff, Tsai, and Hanke 2006; Mehra, Kilduff, and Brass 2001).

A similar set of theoretical strategies can be seen in the work of Niklas Luhmann (1995). In Luhmann’s work a set of disembodied socio-cognitive processes (e.g. communication and observation) takes the place of the irreducible building blocks of social theory. Individuals, and other sort of entities, figure as either interfaces and specialized channels regulating the flow of communications, or are in fact simply bundles of communications that are reified when talked about and referred to (by other observers relaying communications from within or without the system being referred to) as if frozen in time and space. In a manner comparable to that of Luhmann certain formulations of “meta-biological” autopoietic theory (which greatly influenced Luhmann’s thinking), point to other fleeting processes, such as boundaries and communicatively accomplished minimal distinctions between “an inside and an outside” (Fuchs 2005) which may also come to play the role of foundational (quasi)entities. As is customary in this type of theorizing, the actual “wetware” on which this set of processes is actually *implemented* (such as the human bio-cognitive system) recedes into the background and does not figure as part of—or as a constraint on—the theoretical structure.

Donald Black’s (1976; 1979; 1995; 2000a; 2000b) turn toward the “qualitative” mathematics of geometrical spaces (with their various distances and proximities) and functional forms (linearity, curvilinearity, monotonicity, etc.), which he uses to develop theories about the “behavior” of macro-level entities (law, science, art, terrorism, etc.) can also be regarded as a form of top-down eliminativism. While Black (2000a) claims that his interdictions against the usage of psychological, mentalist or voluntaristic (all combined under the rubric of “teleological”) language is simply a “methodological holist” move, some his stronger assertions regardless the “behavior” of this or that superordinate entity *independently of individual activity* can be considered a form of top-down eliminativism, where macrolevel entities “do their thing” in apparent independence from lower level units.

Other versions of top-down reductionism include some strong formulations of Marxist historical materialism, especially as formulated in the work of Althusser. This latter was a systems formalist in the (late) Parsonian sense (DiTomaso 1982), but Althusser can also be interpreted as a formalist in the stronger (eliminativist) sense exemplified in Mayhew (1981) and Black (2000a). For Althusser the “individual” or “the person” was not a coherent scientific category but simply a historical “bourgeois” invention and “structures” (both ideological and economic) were primary and constitutive of individuality in the strong sense as subjectivity itself arose out the imaginary identification with (or “interpellation” into) an overarching (material and semiotic) structural order. In this sense Althusser was a “relational” theorist through and through (DiTomaso 1982: 18).

4.2 Anti-Mechanismic Explanation

Various formalists, as exemplified in the work of Bruce Mayhew, Donald Black, The late Peter Blau of *Inequality and Heterogeneity* (1977), and (some formulations of) the macro-side of Jonathan Turner (e.g. Turner 1995, but *not* Turner 2000a), promote a non-mechanismic model of explanation (Bechtel and Abrahamsen 2005; Bunge 1997).¹¹ This formulation of formalism—in contrast to top-down reductionism—does not deny the *existence* of individuals only their *casual efficacy*, which if we follow Hacking (1983), constitutes its own form of ontological irrealism regarding individuals. The basic postulate is that social facts cause other social facts in a regular law-like fashion. These types of formalists are concerned with the discovery and formulation of general relationships and propositions phrased in covering-law style (Hempel 1965). Black's classic *The Behavior of Law* (1976) is still the best exemplar of this formalist approach.¹² The inspiration comes from a particularly narrow interpretation of the methodological proposals of Durkheim (especially as articulated in *Suicide* and *The Rules of the Sociological Method*) and the foundational disciplinary directives of August Comte.¹³

These theorists are like other formalists in that they radically aspire to an ontologically *pure* sociology (Black 1979), devoid of reference to any lower-level processes, and entities (such as beliefs, desires, individuals, or even action). Social phenomena are described as forces acting upon other social forces (Turner 1995). Causation is seen as “direct” that is, occurring by way of a social fact or aggregate entity or process impinging upon another social fact located at the same scale and level of abstraction. This leads toward the advocacy of the explanatory “covering law” model proposed in Hempel (1965)—even while allowing for probabilistic relaxations of the stipulation of universal co-occurrence.¹⁴ This is the reason why an advocate of “pure” sociology such as Mayhew, prescribed a Hempelian model of explanation (Mayhew and Levinger 1976a: 1033; Mayhew and Levinger 1976b: 86) in which the formulation of a purely predictive model connecting the covariation between two types of phenomena (without specification of intervening mechanisms) was synonymous with having “explained” the phenomenon of interest. In their allegiance to this form of deductive-nomological explanation with no reference to lower level mechanisms, most formalists—e.g. Blau, Black, Mayhew, etc.—while erroneously claiming allegiance to the Durkheimian tradition, can be more accurately said to belong to the *Comtean* legacy (which forbade theorists from referring to lower-level unobservables) that was criticized and actually *rejected* by Durkheim (Schmaus 1985).

4.3 Verisimilitude, Protected Properties and Substrate-Independence

Above and beyond the reductionist and anti-mechanismic tendencies of formalism the three most important features of formalism that produce friction *vis a vis*

behavioral realism are 1) The *denial of verisimilitude* a necessary property of formal models (Maki 2002). That is, the lack of concern that the formal apparatus of the theory bears any *analogical* (or intuitive) resemblance to the real world capabilities of the human agent in models of social behavior for instance (Friedman 1953). 2) the associated concern with predictive power as explanation rather than the discovery of the true principles of functioning and structure of the intervening lower levels mechanisms (Friedman 1953), and finally 3) *The principle of substrate-independence* (Abbott 2001a; Laughlin and Pines 2000; Simmel 1910; White 1992): or the claim that the task of science is to discover abstract, isomorphic structural patterns that apply to the organization of phenomena *at any level of analysis and regardless of the intrinsic attributes of the entities concerned*, which leads to a denial of level-specific properties and features of reality and even more importantly which denies the realist intuition that empirical world constitutes *a stratified order* (Archer 1995; Bhaskar 1998; Whitmeyer 1994) whereby the properties and features of higher level entities depend on some fundamental—e.g. casual—way on the properties and features of—potentially unobservable—lower level entities, and that the primary task of science is to “keep digging down” in order to discover the structure of the fundamental constituents of reality and their laws of functioning.¹⁵

The discipline where the substrate-independence debate has achieved the most sophistication is Physics, where the matter has pitted solid state physicists (playing the role of the formalists) against particle physicists (here of course the use of mathematical formalism does not serve to distinguish between the two theorizing styles). The first salvo was an influential paper by Anderson (1972), entitled “More is Different,” where he argued for the empirical and theoretical autonomy of higher level processes in physical chemistry, and against the reductionist and “constructivist” (i.e. the idea that only knowledge of the lower level parts is necessary to reconstruct the whole) hubris of particle physicists. More recently in a series of papers, Laughlin, Pines and colleagues (Laughlin and Pines 2000; Laughlin, Pines, Schmalian, Stojkovic, and Wolynes 2000) following Anderson’s lead, have proposed the ideas of “protectorates” and called for physics to reorient itself to the study of “protected properties of matter” as a counterpoint to the obsessive search for fundamental laws of matter and energy in particle physics. For Laughlin, Pines et al. (2000: 32) protected properties are “actually caused by collective organizing principles that *formally* grow out of the microscopic rules but are in a real sense *independent* of them” and as such, “ferromagnetism, metallic conduction, hydrodynamics, and so forth are ‘protected’ properties of matter—generic behavior that is reliably the same in one system to the next, *regardless of details*” (italics added). The basic idea here is that there may be principles of organization in matter (e.g. superconductivity) that show up everywhere certain material complexes are allowed to be organized in the same way, regardless of the lower level properties of the system (i.e. details about quantum mechanical processes) and in partial independence from the level (micro, meso macro) or aggregation. This is a clear example of the (formalist) principle of substrate independence.

4.4 Protected Social Properties in Sociology

In sociology, various potential candidates for “protected social properties” have been proposed in the literature (even if there is little awareness of the paradigmatic wars between high-energy and condensed matter physicists): with variations of the power-dependence network exchange formalism (Willer 1987, 1999; Willer and Anderson 1981) being the most empirically successful contender. It is also no accident that advocates of protected social properties are all sociological formalists of one stripe or another. Just like in Physics, protected social properties should explain regularities at different levels of aggregation, and should arise everywhere reasonably complex systems of social interaction can be found, regardless of the lower-levels features of their constituents.

Thus, Burt has applied his structural theory of action to entities ranging from individuals (Burt 1982, 1992), to firms in competitive markets, which would make *structural autonomy* a possible protected social property. In a similar way advocates of the “elementary theory” (Willer 1999) research program claim that their basic principles can explain the behavior of all types of entities, ranging from individuals, to countries and empires in the world system. Therefore, features such as the types of power (strong, weak, etc.) that appear as a result of exchange (see the review in Walker, Thye, Simpson, Lovaglia, Willer, and Markovsky 2000: 325–327), can be considered protected social properties that appear at multiple levels of analysis and independently of more detailed contextual factors. Thus, another way to interpret Coleman’s (1990) monumental *Foundations* is to see it as one very sophisticated attempt to reconceptualize some of the most basic concepts of social theory, (i.e. power, interest and control) as protectorates, which can then be used to explain the behavior of a wide range of entities at different levels of aggregation and complexity, including natural persons, groups or “legal”, corporate persons (e.g. corporations), allowing the analyst to speak of aggregates as having “interests” for instance.

While the substrate-independence principle is a hallmark of formalist theorizing (White 1997), and the most powerful and convincing claim to the power and promise of the approach it gets into trouble precisely because as a formalist offshoot, it runs roughshod over concerns regarding verisimilitude and realism at the level of the human agent (Carley and Newell 1994). It is thus not surprising that Burt (1982) has flirted with, and Willer (1999) actively recommends as a useful scientific device, nothing other than the expected utility version of the human agent (clinging White’s [1997] intuition that irrationalism is the basis of all formalism); the very same model that is now under attack by behavioral economists.

The reason for this is that by assuming the substrate independence (and the ontological “non-substantiality”) of protected properties the analyst is led to deny that they depend on (or are substantively constrained by) in any meaningful way on “lower level” (material, psychological, biological) processes (Laughlin et al.

2000). In the case of the social and behavioral sciences these properties would be the body, cognition and neurophysiology, while in physics they are quantum processes. This explains why formalists in physics hail from condensed matter physics and portray high-energy (particle) physicists as “reductionist” but do not realize that they are engaging in their own kind of “top-down” reductionism (DiTomaso 1982). In this way they deny the singular claim of a view of the world that depends on a stratified ontology or that we need realistic models of those lower level entities in order to move forward with the business of explaining the world (Laughlin and Pines 2000).

Formalists in structural social psychology (e.g. Lawler, Ridgeway, and Markovsky 1993) for instance, put forth the “Colemanian” viewpoint that the application of the substrate-independence principle (anchored to generic findings of interaction dynamics in laboratory settings) to different levels of social organization may be the key to micro-macro problem because it eliminates the issue of aggregation. From a behavioral realist perspective however, this “interactor” (Whitmeyer 1994) formalism is not a solution, because it violates the (behavioral realist) ontological principle that social reality consists of stratified realms, the principles of functioning of which are (at least partially) level-specific because they are generated from the characteristic form of functioning and organization of their lower-level constituents elements and depend in a non-trivial way on the inherent properties of those elements.

5. FORMALISM IN SOCIOLOGICAL THEORIZING: AN ASSESSMENT

If unification and theoretical integration are the ultimate goals of both formalists and behavioral realists, why then do formalist sociologists insist on rejecting insights derived from what should be sociology’s lower-level adjunct disciplines such as psychology, cognitive science, or neuroscience? I submit that the formalist mistake comes from thinking that a scientific ontology can consist of *inherently unobservable processes*, instead of *potentially observable entities*, with processes derived from fundamental units or building blocks as opposed to the other way around.

In this respect Fararo (1989a, 1989b) is, to my limited knowledge, unique among formalists in that due to the philosophical sophistication of his approach he is actually well aware of this very problematic and incisively argues, drawing on the work of Alfred North Whitehead, for the suitability of a *process ontology* (1989a: chap 1) for the social sciences as a substitution for what he perceives to be the dominant *entity-based ontology* of the discipline. In this sense the argument below is a direct challenge to this plea for a process-based ontology for sociology. I argue instead that entities must be empirically and logically *prior* to processes. To put it bluntly, you can derive processes from entities but not the other way around. This boils down to a battle between a “*processes-all-the-way-down*” metatheoretical stance

versus one that still retains a (scientific) conviction on the existence of ultimate foundational building blocks of (social) reality, which we can refer to as “*the-processes-stop-here*” point of view. The only other coherent statement of a self-conscious process ontological viewpoint is that of Andrew Abott (1988) whose work is difficult to classify with the schema proposed here, but who becomes a formalist by default in his rejection of an entity-based ontology in favor of a view of social reality as primarily composed of free-floating boundaries and relations and not substances.

Lee Freese, after considering the standard microsociological processual theories of interaction (e.g. Blumer 1986; Mead 1934) realizes that ontology of processes will always fail to solve the basic conceptual problems of the discipline. He puts the matter in this way (1988: 95–96):

An alternative interpretation of social interaction is needed if biophysical ecosystems and human social systems satisfy an identical evolutionary process. Moreover, to argue that they do, we shall have to identify in theory the parts of which social systems are assembled, *the irreducible entities that compose into their structure and function. In other words, we shall have to theoretically discover what social systems are made of. . . Finding that social systems are composed of their interpersonal interactions, presumed to aggregate somehow into various patterns of institutionalized normative culture, would lead us to the wrong irreducible entities-wrong in that they are not the parts whose change can cause the system to evolve* (emphasis mine).

The concern with finding the right “irreducible entities” has not been salient in contemporary sociological theory, possibly because of the wide appeal of suspiciously convenient formalist solutions to the problem. John Levi Martin (2003) has recently put forth a sophisticated argument *against* the notion that the specification and usage of mechanisms should be a priority in social theory, in favor of more provisional field theoretic accounts (the only theoretical position that can be considered a true hybrid of both formalism and behavioral-realism currently extant). He puts the matter thus:

Accordingly, I will admit the necessarily provisional nature of all field theories . . . while arguing for their utility, and I admit that the absence of mechanisms may be a theoretical weakness in a number of respects. However, in the case of sociological analysis, there are extremely good reasons not to automatically privilege a theory that can be linked to mechanisms. *Because individuals (or at least individual acts) are frequently though not inevitably the level below those units described by sociological theories, mechanisms tend to involve action by individuals. While we all must appreciate the robust realism of appealing to the nature of individuals, who certainly do exist, great dangers lurk here for theorizing. This is because social science is the unique case in which the lower level appealed to by mechanistic accounts is ourselves, and we have a great number of prejudices about our own constitutions that we cannot rid ourselves of, because we do not know what all of them are.*¹³

But notice that Martin’s reticence against the usage of mechanisms in social science has to do with the special self-reflexive status of humans as being simultaneously the primary mechanisms *and* the authors of scientific accounts of how those mechanism work (this is analogous to the “folk psychology” problematic in the philosophy of mind [Churchland 1981]). But this viewpoint assumes the

impossibility of ever moving beyond those “prejudices” that we have regarding our “self-constitutions.”

But this is precisely the role that cognitive psychology should play in sociology: the problem with most social theory is that it is both naïve as to the motivational, emotive and cognitive constraints of both the member of the collectivities theorized about or empirically observed and the motivational, emotive and cognitive constraints of the theorizer or observer. A true scientific/empirical epistemology as an aid to production of better scientific knowledge in the social sciences can only be put to work in conjunction with increasing integration of social theory with systematic knowledge of the constraints and capabilities of the human bio-cognitive architecture, and the role that it may play in the unique process of scientific self-observation.

This is directly related to an underappreciated argument put forth Frederick Bates and Walter Peacock on the reasons why *classificatory* aggregations of individuals *cannot* be the building blocks of structural models of society in the tradition of Blau (1977). This the way that they put it (1989: 575–576):

Sociologists misconceive the nature of social structure when they treat abstract mental categories used to summarize the similarities and differences among social units or actors as building blocks to construct structural models of society. This is simply wrong, because it is inconsistent with the assumptions upon which classification as a logical procedure is based. Classes in a classification schemes result form particular mental operations, and because of this they cannot, by any definition that remains faithful to the meaning of classification as a procedure, be treated as objective phenomena occurring outside the mind of the classifier.

While Bates and Peacock exclude *relations* from their argument because they consider them to be more concrete than categories, there is no reason to think of relations as less of a cognitive construct and or as less subject to cultural and classificatory mediation than other cognitive schemata, as is becoming increasingly clear from recent advances in structural theory itself (Krackhardt 1987). Contrast this stance to White’s (1997) formalist claim that

Interactions, ties in sociocultural context, are coming to supplant persons as building blocks-and a person may come to be seen as a knotted vortex among social networks. As mentioned earlier, multiple sorts of spaces, even nonintegral dimensionalities, are now recognized in several natural sciences, and surely this and related viewpoints on temporality that can also be found in social science . . . should encourage analogous development for sociocultural processes (White 1997: 64).

However, networks and spaces like other forms of socio-scientific conceptualization are a heuristic cognitive device (“thought constructs” in Schutz’s [1954] terms) and cannot for this reason be thought of as the *building blocks* of social structure, nor can sociology be defined as the *exclusive* study of these formal relational processes. This is not to say that relational processes (or any other kind of process for that matter) are to be excluded from sociological study, but that they must be anchored to non-processual foundational entities which enact the process

as part of their *activity* (Machamer, Darden, and Craver 2000); and I am suggesting that the most plausible (but not necessarily the only possible ones) such entities available are *bio-cognitive individuals* as traditionally conceived in the behavioral sciences (Gintis 2007).¹⁶

This is the case by virtue of sociology's subject matter (collective behavior), not because individuals are metaphysically irreducible to lower level processes. The relevant sciences that should be more closely coupled with sociology (psychology, neurophysiology, cognitive science) are in charge of doing just that. In other words, sociologists concerned with deconstructing the person (e.g. White 1992) are akin to cosmologists trying to deconstruct the atom (instead of nebula, solar systems and other material aggregates): first, they are the wrong thing to deconstruct (because sociologists are seldom interested in persons *per se*) and second, there are already people working on the matter in other disciplines.

Further, their insights are usable to sociologists both metatheoretically (as a way of checking our biases) and substantively what is metatheoretical for sociology is "theoretical" for lower-level disciplines (Dimaggio 1997); instead of reinventing the wheel (or denying that we need any wheels), sociologists should attempt to integrate their insights across disciplines. Economists have already gone through the formalist self-sufficiency path and all that they sowed was a theoretically impoverished science (Mirowski 2001). Pure formalism is in danger of leading American sociology in a similar direction; just because the formal apparatus brought to bear by these sociologists involves graph theory or some other form of non-standard mathematics, it does not imply that this metatheoretical move is not stylistically *equivalent* to the attempt to boil everything down to the expected utility calculus. Both theoretical strategies are *reductionistic* (just because we are used to thinking about reductionism in bottom-up terms does not mean that the top-down imperialism of network analysis is not reduction), and both lead to (logically and empirically) *closed* systems: that is they are capable of being used for knowledge production without reference to constructs, mechanisms and processes from other sciences.

5.1 Pragmatist Irrealism as a Consequence of the Formalist Strategy

Those who deploy the formalist strategy are generally committed to form of epistemological realism. However, by making use of formalism, they end up advocating a form of pragmatic irrealism when it comes to the properties and qualities of formal models. This tension becomes readily apparent in recent attempts to combine behavioral-realist and formalist model construction strategies on the part of the same theorist.

Take for instance Whitmeyer's (1998: 404) simultaneous claims that he is not concerned with realism, while at the same time being attentive to the compatibility between his Human Actor Model (HAM) and the micromechanisms of motivation

and cognition being discovered in other fields (1998: 410), (not to mention his earlier [1994] rejection of the substrate-independence principle in favor a stratified ontology). These positions are in conflicting tension and reveal Whitmeyer as much more committed to behavioral realism than he claims to be, especially because of his attention to issues related to the compatibility of his HAM with cognitive science, anthropology and symbolic interactionist sociology. For Whitmeyer (1998: 427–428), one the virtues of his proposed HAM is precisely that “. . . it unifies many diverse approaches to individual behavior” and that “. . . it clearly acknowledges the link between human behavior and its physical and evolutionary bases,” which “. . . lends the social scientist the support of lower-level scientific models.” However, notice that this is hardly the “pragmatist” criterion of model selection (which concentrates on “usefulness” and) which dispenses with realism (Whitmeyer 1998: 405), but it is closer to a concern for “realisticness” (Maki 2002) and verisimilitude characteristic of the behavioral realist theoretical strategy. Whitmeyer’s HAM because of the formalist mathematics involved (which involve minimization of quantities—the obverse of *homo economicus*—and the usage of a multidimensional space), however is a classic example of a *generalized* micro-formalism in the vein of Becker and Coleman.

A similar conflict plagues Kanazawa’s (1998) simultaneous approval of Friedman’s endorsement of unrealism as a desirable property of the assumption set of general theoretical models and his more recent espousal (2001; 2002) of the evolutionary psychological behavioral realism. The conflict remains even under Kanazawa’s much weaker definition of the term unrealistic as implying “incompleteness” but not falsity. The reason for this is that the truth or falsity of a given theory’s assumptions cannot be determined individually for each separate assumption as Kanazawa believes but instead applies to the whole *set* of assumptions as an integrated whole (Quine 1953). A *set* of incomplete assumptions is therefore perforce both unrealistic *and* false and the task of theory building is to build more complex *and* realist assumption sets that have accuracy (realism), depth (verisimilitude) and external consistency (consilience) as initially proposed by Bunge (1961).

Under Kanazawa’s original anti-realist stance for instance, it would be hard to explain why he felt a need to turn to Evolutionary Psychology (Kanazawa 2001) as a solution to the origins of preferences problems in the constrained maximization model of choice if he did not think that the unrealism of the Stigler-Becker *assumption* that preferences are exogenous and consistent is a roadblock to theoretical and explanatory progress in the social sciences. Notice that this argument does not entail a denial of the fact that all theories are false (because incomplete) in some fundamental sense. What is argued from the behavioral realist viewpoint is that the formalist presumption that theoretical assumption sets must be minimal and simplistic should be a *desirable* property of theoretical assumption sets instead of something that should be attempted to be *remedied* by continuing theoretical development and empirical research.

This behavioral realist stance also denies that some assumptions can be “kept” in an unrealistic state for purposes of mathematical convenience even in the presence of corroborating evidence from other disciplines that that particular assumption simply does not correspond with empirical reality. While incompleteness—and thus irrealism—in theoretical assumptions can never be overcome, theoretical progress entails the *constrained elaboration* of assumptions of a theory if that elaboration furthers depth and consilience (Bunge 1961). As Rabin (2002: 672) puts it: “the realization that many details of human behavior must be ignored does not justify blanket complacency about the behavioral validity of our assumptions. It is plainly and patently bad social science to say we do not care how realistic our assumptions are.”

Another problem with the championing of unrealism as desirable criterion of assumption sets—as a way to better play the “theoretical fruitfulness” game under the mistaken assumption that “deductive fertility” defined in the narrowest of terms (as the “number” of new implications derived) should be more important than the establishment of sound premises from which to commence the deduction—is that it inevitably leads to the treatment of theoretical assumptions as a radically *arbitrary* mathematico-logical game of axiomatics (e.g. Arrow and Debreu 1954). Here the researcher is only constrained by her *imagination* in the postulation of this or that capacity or entity in the world. This I argue, inevitably leads to an instrumentalist notion of theories as *algorithms for the production of predictions* (e.g. Jasso 1988) and not as *representational* attempts to *model* the underlying structure of the “slice of the world” with which each discipline is concerned (Bechtel and Abrahamsen 2005; Morrison and Morgan 1999). Ultimately, Friedman’s pragmatist criterion for model selection is incompatible with the “verisimilitude imperative” of behavioral realism, because as pointed out by Joel Levine (1993: 9)—in the context of a critique of the network-theoretic penchant for formalist excursions into graph theoretical representations of structure—“. . . we are not entirely free to construct methods according to the mathematical possibilities. *Reality must be heard from*” (italics added).

6. BEHAVIORAL-REALIST INCURSIONS INTO FORMALIST GROUND

6.1 Considering Gender

The current incompatibility between pure formalist and behavioral-realist approaches can be most clearly appreciated through a juxtaposition of formalist accounts of categorical individual differences such as gender differences. Formalists (McPherson 2004) emphasize structural patterns of relations and their role in creating cumulative differences across individuals that later on congeal into the discrete categories of man and woman. Behavioral-realists that draw on neuro-endocrinology on the other hand (e.g. Udry 2000) or evolutionary psychology (Kanazawa 2002), highlight the role of physiological and developmental factors along with enduring

cognitive-emotive and information processing biases of ultimate evolutionary origin that are not reducible to socio-relational processes. They conclude that gender constructivism (whether cultural-cognitive or structural-relational) must in the end face limits best described in biopsychological terms (Udry 2000).

Analogous calls can be heard from those behavioral-realists that prefer a closer dialogue between sociology and the cognitive sciences, especially cognitive psychology (DiMaggio 2002). Cultural sociologists have begun to realize that in order to study how cultural systems are produced, developed and transmitted in human collectivities (Carley 1989, 1995) it is imperative to begin to pay attention to the information processing and communicative capabilities of individuals and how these interact with and are affected by the socio-relational and structural contexts characteristic of certain groups (Carley 1989).¹⁷ For DiMaggio (2002: 275) this implies abandoning the hope of a cognitive sociology that is “autochthonous” in relation to psychological research and theory on cognitive processes, and one that instead builds on those psychological foundations. For DiMaggio, insights from “. . . cognitive and [psychological] social psychology have become indispensable for sociologists who are interested both in how cultural processes enter into individual lives and how such processes enter into some kinds of collective behavior”, in addition to being of prime importance for those who are interested in “micro-foundational theories of action.”

6.2 Personality and Social Networks

An important debate that has to this point been internal to the network analytic tradition and that is exemplary of the type of formalist/behavioral-realist ideal-typical distinction that I am trying to establish is that currently brought to the fore by researchers who study the relationship between categorical and psychological attributes such as personality types or membership and identification with racial and gender groups and the composition of ego networks. This specific dispute is particularly informative because in contrast to the biology versus constructivism controversy in the sociology of gender this debate is internal to the social networks literature and cannot be considered simply an example of defensive cross-disciplinary turf warfare.

In a revealing review of the literature, Martin Kilduff and David Krackhardt (1994) criticize (formalist) structuralist minded researchers for ignoring and dismissing the role of cognition and individual level processes of categorization in the formation and perception of relational ties. Kilduff and Krackhardt conclude that cognitive processes have to be reintegrated into the analysis of social network composition and other structural outcomes, and completely reject the top-down “sociological reductionism” (DiTomaso 1982), of an earlier generation of network researchers. They note (1994: 87–88) that networks researchers have “. . . tended to overlook the importance of individual cognition” due to the fact that it has

been a constant thesis in network theory that “students of social structure need not be concerned with individual or individual-level variables.” In the radical eliminativist perspectives of Mayhew for instance it is argued that the individual is nothing but a “dead end” the study of which has been “superseded” by the “analysis of the structure of relations” a situation which renders structure and individual as “ostensibly incommensurable” entities.

But Kilduff and Krackhardt detect an important incongruity in this dismissive attitude toward individual-level cognitive factors by the structuralist group given that social network analysis is itself an offspring of psychological approaches to the analysis of human behavior. They point out (p. 88) that it is an “irony” that social network analysts repeatedly tend to portray their research as a alternative paradigm completely unrelated to individual psychology since “. . . social network research has been heavily dependent on the very psychology it has purported to reject.” In contrast they propose that psychology and structuralism “. . . have much to offer to each other” and note such notable interdisciplinary contributors to network analysis and theory such as Kurt Lewin, Fritz Heider and Leon Festinger. Thus rather than eliminating the psychological and cognitive domain thus ignoring the role of the individual in network research they propose that “. . . *the individual must be brought back in to acknowledge and account for the microfoundations of structural research*” (1994: 88, emphasis mine).

In a more recent article on the role of personality differences on network composition and workplace performance Ajay Mehra, Martin Kilduff and David J. Brass (2002) reach a similar conclusion regarding the heretofore dismissive stance that structuralist theorists have displayed toward factors related to variation in personality characteristics and their impact on the dynamics and structure of personal networks. They note (2002: 121) that organizational research on structural position has “. . . neglected . . . the possibility that the network positions occupied by individuals might be influenced by their psychology.” They also point out that neglected factors in network theorizing such as personality differences, in combination with the structural context of opportunity, might in the end influence important networks outcomes. Kilduff and Tsai (2005: 36), conclude that “there is no doubt that the individual is back in network analysis despite the efforts of some structuralists to reduce the individual to an epiphenomenal residue of network processes.” This recent attention to intrapersonal processes in network theory is strictly parallel to a renewed appreciation of individual personality differences as providing a renewed tool with which to break away from traditional rational actor formalisms in economics (Caplan 2003).

6.3 The Origins of Social Networks and Mental Modules

Satoshi Kanazawa (2002) criticizes structural network theory for smuggling crypto-individualist assumptions about the actors tastes and preferences. At the

same time these theorists deny that there is any need to refer to these or to theorize about their structure. Even more importantly they make the stronger claim that all that matters are relational patterns at the expense of durable cognitive or biophysical attributes of individuals. Kanazawa also takes the cultural transmission theories developed by ecological structuralists (Mark 1998) to task precisely because they focus exclusively on relational patterns of transmission while denying that inherent individual biases and preferences may sometimes be more important than relations conduits in determining patterns of taste.

In essence, Kanazawa suggests that while structuralist theories are good at putting forth explanations for static distributions of relations or contents that flow through those relations they are unable to answer to question as to the *genesis* of the relations themselves and whether individuals have differential propensities to accept or reject certain contents that flow through those relations (e.g. cultural tastes) regardless of whether they are available via certain relational pathways. For Kanazawa, the network theory formalism faces an enduring challenge from evolutionary psychological behavioral realisms that attempt to get at the ultimate cognitive and biophysical origins of all sorts of preferences and tendencies including preferences associated with who to relate to and who to avoid (Kanazawa 2001). Further the top-down reductionist way in which network theorists handle the origins of attitudes, practices and tastes (as “products” of network exposure) must be revised in order to accommodate insights from lower level sciences.

The common theme running through this emerging critique of formalist eliminativism in network theory can be considered a behavioral realist rejection of pure formalism. Furthermore, this is a realization that the inability of the formalist approach to accommodate the scientific ontology of neighboring disciplines—which partially overlap with sociology in the analysis of certain behavioral processes—does more harm than good since these disciplines may offer useful conceptual tools with which to attain the elusive goal of a unified theory of human social behavior (Gintis 2007).

7. CONCLUSION: TOWARDS SELF-REFLEXIVITY IN THEORY BUILDING STRATEGIES

One of the main advantages of adopting a new theory or classification system consists precisely of the way that this new way of organizing experience leads to a “reshuffling” of our usual categories allowing us to see things that were previously thought of as unlike as similar and things that we use to consider alike as radically different (Hayek 1942). However, this is not the only advantage of adopting a new conceptual system. The value of the new classification should also be gauged by the way that this new organization of experience synthesizes empirical data in a new or powerful way (for instance, when it leads to the unification of previously disparate empirical domains) or by the way that it opens up new avenues of thinking either by way of pointing to new solutions to old problems, by highlighting

the existence of problems we did not know existed, or by suggesting that we look to solutions to existing problems in places where we would not otherwise have thought of looking.

I am not proposing that looking at contemporary sociological theory from the vantage point of the formalism/realism problematic does all of these things. Rather, I think that at this point the biggest advantage of the scheme proposed here consists of its somewhat unusual (but I think productive) reorganization of the standard theoretical landscape, so that we are able to observe that no inherent conflict may exist between what many think are irreconcilable positions (such as structural relationism and certain micro-formalisms such as rational actor theory). In the same manner, new conflicts can now be detected which would otherwise remain hidden or muddled (e.g. Harrison White's formalist theory of action and the search for bio-cognitive microfoundations for social behavior).

For instance, one unintended consequence of holding on to the formalist cognitive value commitments (Fararo 2000) of *internal* disciplinary unification and *internal* ontological autonomy—which the importation and local development of mathematical formalisms aimed at unifying the discipline of sociology (under the banner of network structuralism for instance) was supposed to further—while also advocating the associated behavioral realist cognitive value commitment to the *unity of the behavioral sciences* (Gintis 2007) leads to the appreciation of the limits of formalist simplifications and a break with the associated “pragmatic” anti-realism (Friedman 1953; Kanazawa 1998; Whitmeyer 1998) to which the formalist strategy inevitably leads in favor of a recognition that scientific development in sociology cannot proceed in isolation from behavioral-realist concerns. In the present intellectual context an inherent conflict exists between these two sets of cognitive value commitments the resolution of which will do much to further progress in general sociological theorizing. In this way, intellectual energies can be focused on true problems and challenges instead of being spent on merely apparent incompatibilities which dissolve once we adopt the proper stance toward them.

It is important to note that the purpose of the preceding exploration of the issues is not to stage some over-simplistic “new theoretical war” between formalism and behavioral realism (or even to suggest that these terms *refer* to actually existing “camps” or “theory groups” in sociology today; they certainly do not) but to foster an appreciation of the importance of the issues raised and a recognition of both the tensions and the possible avenues of integration across these widely different ways of building explanatory theory in sociology. This is especially important as we move farther away from the mid twentieth century disciplinary strictures laid out by the Parsonian legacy—legislating an ultimately spurious “analytical” autonomy of sociology from her sister disciplines—and look toward an increasingly post and transdisciplinary landscape populated by such hybrids as artificial intelligence, cognitive linguistics, evolutionary psychology, neuroeconomics, cognitive anthropology, among a large variety of others. In this sense, the increasingly apt behavioral-realist penchant for untrammelled interdisciplinary borrowing makes

the formalist concern with intradisciplinary purity look more like old relic of the mid-twentieth century than a sensible twenty-first century intellectual strategy.

It may serve as little consolation, but the fact is that this same challenge is now being faced by our colleagues in all the other “social and behavioral sciences” (Gintis 2007)—the divisions between which are themselves an artificial product of the intellectual strategies mobilized and institutionalized in the 19th century Euro-American academic field (Wallerstein 1995)—especially economics and to a lesser extent in political science. The rational actor model in these other disciplines serves as the functional equivalent of the network formalism in sociology: it is “the” central formal representation of process and structure around which each discipline is organized, and the metatheoretical systems built around their supremacy are now beginning to feel the pressure to “conform” and transform themselves in accordance to what we know from other “lower level” disciplines.

As we have seen, formalist reductionism and other forms of abstract eliminativism cannot provide the answer, because they buy disciplinary unification at the cost of sacrificing interdisciplinary coherence (a “tribal” view of science which violates the postulate of unity) and fostering the development of pragmatic anti-realism, a conceptual stopgap and purveyor of illusory coherence if there ever was one. The post-war history of economics should serve as a cautionary tale in this respect (Blaug 1999; Mirowski 2001). What the above analysis reveals is that theorists must be careful to not import incompatible meta-theoretical strictures produced by formalist (i.e. mathematical and logical) commitments into what otherwise appear to be behavioral realist projects or the result will certainly be conceptual incoherence.

Behavioral realism entails the striving for what E.O. Wilson referred to as “consilience” (Glimcher and Rustichini 2004) as the unity of all behavioral sciences (Gintis 2007). This requires that models reflect the reality of our bio-cognitive architecture and the constraints laid-out by ontogenetic development and phylogenetic inheritance, and that they be compatible with knowledge procured in other scientific fields (Whitmeyer 1998). The move toward qualifying the expected utility model of the actor in economics is in part driven by the *realist* (not “pragmatic” by any means, since this was Samuelson’s defense of the original rational actor model) that there be no contradictions between neuro-psychological models and economic models of the social agent (Camerer, Loewenstein, and Prelec 2004; Gintis 2007; Rabin 2002; Whitmeyer 1998) so that psychology, economics, biology and sociology can rest on compatible micro-foundations.

The anti-realist pragmatism of the formalists is opposed to the realist drive to produce models of the human actor and social processes that are compatible with what is known in other sciences and that incorporate mechanisms and insights from them. This makes it exceedingly difficult to pursue the goal of *transdisciplinary* unification, and instead tends to lead to *intradisciplinary* unification around mutually incompatible (across disciplines) models and ontological commitments, producing balkanization and a “tower of Babel” effect in the social and behavioral sciences. From a behavioral-realist viewpoint, the pragmatist criterion of predictive success

must be subordinate to the realist criterion of producing scientific models that have some a relationship of verisimilitude with the underlying structure of the social and physical worlds (thus a theory can have predictive validity and yet be “false” from the point of view of the verisimilitude criterion).

By the same token formalisms and formal representations cannot be abandoned since they are the primary tool of scientific progress by way of their ability to transform our view of reality by transcending pure sense impressions—“denying the data” by going beyond them in Leifer’s (1992) sense—and the key to the synthetic and transformative power of scientific explanations (Hayek 1943). Accordingly, current theoretical efforts in sociology cannot completely dispense with formal representations of empirical phenomena. However the formal model building *habitus* of most practitioners of mathematical social science—inherited from applied mathematicians (Weintraub and Mirowski 1994) who care more about logical possibility than actual possibility (Levine 1993)—should be radically reconfigured in order for any accommodation with the behavioral-realist strategy to take place. In particular the ease with which the realist cognitive value of verisimilitude is dismissed as subordinate to parsimony, simplicity, and other “aesthetic” Pythagorean and instrumentalist values ultimately imported from the mathematical field (Weintraub and Mirowski 1994) will have to be rethought.

The move toward more sophisticated actor models afforded by computer simulation techniques (Macy and Willer 2002) may provide one avenue of progress in respect. Further, the role of substrate-independence versus level-specific processes of social systems (in many ways an empirical question) will have to be addressed. Rather than following Simmel’s (1910) strategy of assuming the postulate of substrate-independence from the beginning. Last but not least, avenues of dialogue must open between sociology and other social, biological and cognitive sciences in which the insights of these other disciplines are incorporated into sociological theorizing while keeping at bay the specter of bottom-up reductionism.

This latter issue is perhaps the most difficult of challenges. Prejudices and habits of thought bred by decades of disciplinary institutionalization, fears of imperialist reduction (themselves produced by imperialistic formalist incursions from other fields such as the failed attempt by Gary Becker and his students to generalize the rational actor formalism to all social behavior), mutual misunderstanding of basic disciplinary traditions, parochial disciplinary hubris, and reservations associated with historical realities that touch on important and sensitive political and ethical issues stand on the way. However it seems undeniable that “progress” (cognitive and practical) in sociological theory will become increasingly tied to whatever success sociologists can garner in the challenge to move beyond “pure” sociology. The basic cognitive commitment that drives this move should be the same as the one that moves all of us to produce increasingly powerful schemes to explain social reality. While “purity” may seem desirable and even aesthetically pleasing in the abstract, it may not be the best path toward sociology advancing as an explanatory science of human behavior.

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NOTES

¹ It is important to distinguish formalism from the mere use of formal methods, or from the subjection of empirical data to some sort of data reduction technique that has a formal-mathematical basis such as regression analysis or correspondence analysis. Formalism, as I use the term here consists on the added step of postulating that the intrinsic *nature* of social (or physical) reality is such that it is isomorphic with, or in fact *demand*s the particular formal method used because other methods would radically miss the most crucial aspect of this reality (i.e. relational methods for a relational reality [Berkowitz 1982, 1988; Emirbayer 1997; Wellman 1988], processual methods for a processual reality [Fararo 1989a] or narrative or sequential methods for a time-bound social world [Abbott 2001b]). Thus, in formalism a substantive ontology (or lack thereof, since formalists tend to be skeptics of the existence of “entities” and “substances”) precedes and dictates methodology (and for some formalists alternative methods *presume* an underlying ontology [Abbott 1988]), as opposed to the more pragmatic manner with which most social scientists treat formal methods (e.g. Tilly 2005). In addition, formalism entails the denial of the existence of certain entities or processes which are then reduced to some more basic substrate conceived in “formalist” terms.

² A variety of programmatic statements and expositions of this particular approach have appeared recently. Some have called for an integration of sociological theorizing with versions of evolutionary biology (Maryanski 1998) while others have proposed stronger sociobiological versions that verge on outright reductionism (Ellis 1996); see also Udry (1995) for a more conciliatory—but radically anti-Durkheimian—take.

³ I borrow the terms “formalism” and “behavioral realism” from an ongoing meta-theoretical debate in economics between those who think that there general timeless principles or laws of economic behavior that can be gotten at through formal simplifying assumptions—“formalists”—versus those who favor the use of biologically and psychologically realistic models of economic motivation and reject what they consider to

be naïve and farfetched assumptions usually found in traditional models of the economic actor in mathematical economics (Boettke 1997, 1998; Rabin 2002).

⁴ The term “biophysical individual” is meant to differentiate this type of conception of the individual from the more stylized and abstract conceptualization that formal methodological individualists utilize such as that found in Coleman (1990). Another way of thinking about the distinction is to consider it roughly isomorphic to the *methodological* versus *ontological* individualism distinction. By “socioecological setting” I mean environments that are conceptualized as possessing real world features that constrain social action in a substantive sense. Formalist theorizing usually sets its social actors in simplified “environments” that are exclusively composed of other formalized individuals, as in standard game-theoretic approaches (e.g. Macy and Skvoretz 1998).

⁵ In this paper, when speaking of reductionist tendencies in formalist theorizing, I do not use the term “reduction” in the more familiar but also more restrictive sense of explaining “higher” level processes by way of showing how there are produced and can be derived from *lower-level* constituents. I follow DiTomaso (1982: 14, n. 1) in thinking of reduction not only in a “spatial” form as connoting “something larger being reduced to something smaller” but in the more general sense of *substituting* talk about one sort of substance or entity (at either a higher or lower level or analysis) for talk about some other sort of substance or entity (i.e. instead of talking about individuals formalists prefer to talk about structures, processes and situations). As DiTomaso notes, “The frequent practice of many sociologists to claim that all social phenomena can be explained by ‘structural influences,’ . . . is also a form of reductionism because it arbitrarily eliminates [certain] aspects of social reality . . . Whereas psychological reductionism may be charged with dissolving structure, sociological reductionism may be charged with defining all social phenomena as part of structure.” Reduction in this sense is closer to “reduction of ontological complexity” independent of levels.

⁶ It could be said that as late as a decade ago advocates of a reconsideration of the relationship between sociology and either biology or cognitive psychology were isolated voices in the periphery of the sociological discipline. More recently high-profile mainstream sociologists have produced calls to at least partially integrate—within a non-reductionist critical framework—insights and processes derived from both cognitive psychology (Dimaggio 1997) and biology (Massey 2000); with a recent American Sociological Association presidential address (Massey 2002) and a winner of the ASA best dissertation award (Freese 2001) dedicated to this latter issue.

⁷ While the scientific performance of evolutionary psychological theories in sociology remains spotty at best (Buller 2005; Freese 2001; Freese, Li, and Wade 2003), the fact that even critics of the paradigm (e.g. Freese and Powell 1999) are beginning to recommend a more open ended dialogue between sociology and evolutionary psychology (as opposed to an outright dismissal), represents a significant development in its own right.

⁸ That Parsons was an avowed formalist, and that his “analytical realism” was a direct outgrowth of the mathematical formalism of neo-classical economics (especially that associated with the usage of systems of differential equations) is shown in Camic (1987: 431, and Fararo (1989). Furthermore, as Camic (1987: 435–436) shows, this Parsonian concern for formalism put Parsons very far away from Weber’s behavioral-realism (Campbell 1996), a fact that counts more than any other for Parsons selective appropriation of the Weberian legacy (Pope, Cohen, and Hazelrigg 1975). Homan’s opposition to late Parsonian macro-formalist systems-theory and micro-formalist action theory leads right back to a learning-theoretic micro-formalism. With 20/20 hindsight, we can consider it ironic that Homans (1964) framed his work as “bringing men [sic] back in” by relying on operant learning theory, since eliminating “real men” or interacting biophysical individuals from the picture in favor of some simplified formal model of their

behavior, is precisely one of the most distinctive features of the operant-conditioning micro-formalism (Hull 1940).

⁹ It may seem a curious feature of this typology to classify learning theory and expected utility theory as employing similar theory building strategies. In this respect it is important to remember that Samuelson's influential notion of "revealed preferences"—first formulated in his classic article (1938), which was appropriately titled "a note on the *pure* theory of consumer behavior"—was primarily developed in order to do away with nagging suspicion that preferences and utilities were some sort of (realist) psychological process—forever unverifiable—in a person's head. This is an idea that goes all the way back to Bentham, and which has recently been resuscitated in psychology and sociology (Gilbert and Wilson 2000; Kanazawa 2001). The basic point is that this formulation is in effect a learning-theoretic micro-formalism: economists do not have to worry about what's inside a consumer's head (her needs, wants or desires), because the very (observable) act of consumption "reveals" the preference.

¹⁰ The ecological formalism (with its attendant concepts of population, competition and the n-dimensional niche) which, while initially developed for the study of the dynamics of growth and decline of biotic populations by Hutchinson (1957), has been extended and generalized in sociology for the study of the dynamics of organizational growth and decline (Hannan and Freeman 1977), niche-based competition among organizations (Hannan, Carroll, and Pólos 2003), patterns of joining and leaving organizations (McPherson and Ranger-Moore 1991) and even cultural dynamics (Mark 1998, 2003). One important source of confusion when it comes to the formalist version of ecological evolutionary theory is that it tends to be associated with its behavioral-realist variant. However, human ecology, as first developed in the Chicago School tradition of the study of growth and decline of cities, and later generalized to the study of human societies in the work of Hawley (1986) and Duncan, Schnore and Rossi (1959) is not concerned with the abstract (timeless and spaceless) tool of the n-dimensional niche conceptualized as an abstract space with some arbitrary metric, but with the actual organization of flows of matter and energy in real physical socio-ecological settings (Freese 1988), and how "brute" (realist) forces such as demography and the transformations of space and natural resources via technology and exploitation of resources by human societies affect these settings (Nolan 1984).

¹¹ Early Blau was an exchange theorist, and he freely mixed behavioral formalist (learning theory) and behavioral realist components—emotion and attachment processes—in his formulation. Micro-Turner (Turner 1999, 2000a) is of course a behavioral-realist, whose work deals with emotion, neurophysiology and cognition. He does keep his alter egos distinct and separate, denying that there is any need for bridging laws in sociology.

¹² It is hard to resist the temptation to examine "pure" sociology from a Durkheimian sociology of science perspective (Bloor 1982). Thus the fixation with "purity" can be interpreted as a way to regulate the moral and ontological boundaries of sociology by way of restricting the circulation of other ontologies and by imposing taboos and restrictions (e.g. Black 1999; Mayhew, 1980) against the usage of certain concepts especially those that originate from the threatening "outside" (Douglas 1978). Black (1999) is the best example (because he is the most candid) in this regard, as he "dreams" of a sociology that is "... entirely *uncontaminated by psychology or other sciences*" (347, italics added).

¹³ For a definitive critique of this style of theorizing in sociology, see Porpora (1989).

¹⁴ Behavioral formalists in economics and sociology (e.g. Homans 1950) also abide by a covering law style of explanation: the difference is that they tend to postulate a set of interrelated propositions usually ordered by the "level" of the entities being related and working downwards toward "smaller" and finer grained mechanisms. This is the reason why Homans' (1974) late work verged on a "psychological" reductionism, since propositions at the level of human psychology were for him the lowest level processes were

the chain of logical implications naturally came to a stop. Macro-structural formalists wedded to the nomothetic model of explanation on the other hand (e.g. Black 1979, 1995; Blau 1977b; Turner 1995) tend to produce lists of propositions not arranged in a deductive-hierarchical but in a more horizontal way: that is they all involve entities and processes located at the same “macro” level of analysis.

¹⁵ The obvious analogue to “fundamental entities” in sociology are of course individuals or some form of starting point rooted in individual experience which leads to the problematic of individualism in all of its forms (Udehn 2002).

¹⁶ This is not an argument against *representing* individuals through the use of some formal modeling tool, (i.e. graphs, agent based models, n-person games, etc), but that the processes that are derived from those formal tools should always be conceived as strictly derivative from bio-physical individuals, and consequently as formal oversimplifications thereof.

¹⁷ This is a hybrid variant of primarily formalist theorizing that combines a focus on abstraction and mathematization—usually by way of computer simulation—with the behavioral-realist concern to provide concrete physiological and cognitive micro-mechanisms related either to information processing and dynamics of cultural transmission (Macy and Skvoretz 1998; Mark 2002).

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