The proposed publication delivers substantially less than it promises. The author begins by informing the reader that Boolean networks will be "presented in detail and then linked to the Semantic View of Theories … in which models are construed as mediators creatively negotiating between theory and reality" so as to resolve recently recognized limitations of neoclassical economics. However, the paper ends by simply asserting that what is at issue is the axiomatic approach of neoclassical economics and that this can be resolved by "the deployment of today's powerful computational platforms to initiate the interactions of semi-autonomous partial models," but neither providing a detailed account, nor an example of what is meant by "semi-autonomous partial models," nor how this would resolve the issues associated with the axiomatic approach used in neoclassical economics.

The modeling approach that the author proposes for circumventing the problems that have been identified with neoclassical economics is only presented in general terms as his text primarily discusses what researchers have written about the virtues of binary modeling without informing the reader as to what, precisely, is involved. Boolean variables, the author suggests, could replace quantitative variables in a model otherwise expressed through a system of ordinary differential equations, which would, he asserts, be a way to resolve the fact that a model based on ordinary differential equations assumes both an unrealistic level of data accuracy for the quantitative variables and a deterministic model with fixed parameter values. In reality, variables likely to be of interest with regard to economic outcomes may relate, as indicated by the author, to cultural and religious factors that are not measured (or are even not measurable) quantitatively. The suggested solution to this problem is to reduce variables like this to binary variables representing whether a posited factor occurs (on = 1) or not (off = 0) and to replace a deterministic model using ordinary differential equations by a logical network of interaction among Boolean variables expressed through Boolean operators such as AND, OR or NOT. In short, the author seems to consider that what is at issue is a data problem regarding the extent to which the variables of interest can be adequately quantified and the form of a model -- a system of ordinary differential equations versus a Boolean network. Lacking, though, is a case study or example that illustrates, in detail, how the proposed modeling using Boolean variables and Boolean networks would be implemented.

Though he mentions briefly the logical positivist argument regarding the sharp separation between theory terms and observation terms, with the former presumed to be definable through what are assumed to be non-problematic data terms, the reasons he discusses for the rejection of the logical positivist account of scientific theories deals only with a portion of the problems that account. His discussion suggests that the problem with the logical positivist account lies primarily in not taking into account the interplay that models, as actually formulated by scientists, have with both data and theory. Though valid as an observation about many models presented in scientific accounts, more problematic is the presumption by logical positivists that "their idea of logical integration [of data and theory] as the imposition of an absolutely general logical scheme rather than as what arises from close and critical analysis of interconnected experiments would never lead to integration in any really powerful sense" (Leaf and Read 2012:xiv). Further, the attempt to formulate a social science based on the logical positivists view of science as involving "rejection of the observability of ideas and insistence on physicalistic reductionism" was "particularly destructive for ethnology" (Leaf and Read 2012:xiv) since ethnology is centered on the study of idea systems that we refer to as culture and makes ideas observable through analysis of the accounts elicited from culture bearers.

In addition, the author makes the mistake of assuming that the axiomatization employed in neoclassic economics needs to be replaced with a different modeling approach without recognizing that it is not axiomatization, *per se*, that is at fault, but axiomatization based on *a priori* imposition of a formal theory that is not obtained through abductive inference from empirical observation. The cultural idea systems that ethnographers have worked out empirically may be axiomatized effectively when the axioms are based on the concepts and ideas of cultural idea systems (Read 2011). To give a simple example, the

Arabic proverbs stating, in effect, that (1) a friend of a friend is a friend, (2) a friend of an enemy is an enemy, (3) an enemy of a friend is an enemy is an enemy and (4) an enemy of an enemy is a friend, may be taken as the axiomatic basis (see Leaf and Read 2012:124-125) for a cultural theory about the concepts of friend and enemy, and the implications this theory has for how a society will be structured when culture bearers act in accordance with this theory about the relationship between friend and enemy may be derived deductively from those axioms. Quantitative variables only come into play when one want to know the extent to which the actual behavior in a group, already ethnographically determined to have the axiomatic belief system in question as part of their cultural idea systems, can be characterized as friendly-like or enemy-like (or neither) through a statistical model. Validation of the conceptual system and validation of a statistical model of actual behavior depend on different criteria: the former on what culture bearers say about the concepts of friend and enemy and the latter the extent to which friendly-like, enemy-like, or other behavior can be successfully quantified. In addition, exactly the same, formal axiomatic account is found to occur in other idea systems such as the formation of factions in village level politics in India (Leaf and Read 2012:120-126), the concept of positive and negative numbers, Boolean addition with 0 and 1, and, for kinship terminologies, the concept of cross-relations (the kinship relation involves a brother-sister connection) versus parallel-relations (the kinship relation involves a brother-brother or a sister-sister relation) (Read 2011).

In the above examples, explanation does not lie with models that incorporate both empirical and theoretical observations, but stems from formulating a data model for the phenomena in question that can be compares with a theory model, and determining, the degree of fit between the structure of the data model and the structure of a theory model derived from the axioms of the theory (Read 2008). Thus, if the friend-enemy example is a valid cultural model, then these four axioms should be derivable from what culture bearers say about proper behavior in the context of friends and enemies. and these data imply that there is a cultural model for proper behavior with regard to friends and enemies can be formulated using the methods of cultural consensus modeling (Romney *et al*. 1986). Assuming the cultural model is validated, yet another data model would be a statistical model of actual behavior, as a way to assess the extent to which individuals structure their behavior in accordance with their cultural model. Thus, what people actually do may not be in accord with what they say is proper behavior even through the latter is determined through instantiation of a cultural idea system that is part of their cultural framework. As can be seen in this example, an explanatory account is not derived from models that integrate both data terms and theory terms, but first distinguishing the analytical level at which a formal, even axiomatized, theory is appropriate, second deriving a data model for the phenomena addressed by the theory model, and then determining whether the theory model implies a structure for the phenomena in question that matches the structure of the data model (see Read 2008).

This examples suggests that the issues raised regarding the axiomatic approach of neoclassic economics will not be resolved by replacing quantitative variables with Boolean variables and replacing deterministic, ordinary differential equation models with Boolean networks, or, as the author also suggests, by models that integrate both data observations and theory concepts, but by first determining the cultural models that guide economic decision making in a particular cultural context, rather than imposing assumptions such as perfect information, absolutely rational actors, and the like. The assumptions of neoclassical economics make it possible to ignore the cultural context in which economic systems operate by imposing a formal framework that excludes consideration of the cultural context for economic behavior of culture bearers (and all of us are culture bearers). As the author notes, Simons recognized the need to frame economic models and theory through the factors that direct economic behavior, such as his notion of satisficing, as discussed by the author, but this is only a step in the right direction. Does the concept of satisficing capture fully the way culture bearers make economic decisions, or are there other criteria that also come into play, depending on the cultural context? For example, the fundamental assumption of neoclassical economics is that price is determined by demand, but (to just provide one anecdotal example), there is a Michelin one-star restaurant in Paris with meal prices well below what

might be expected for a meal at a one-star restaurant. As a result, it only serves those who have made a reservation in advance and reservations can be made at most 3 weeks in advance. Their list of reservations for three weeks in advance is filled quickly the same day that reservations open for 3 weeks in advance. Yet the restaurant does not raise its prices in response to demand, hence they are pricing meals by a criterion other than demand. Rather than assuming that demand determines prices, we need ethnographic information from examples like this that establish the criterion being used for prices. Is this restaurant just an example of satisficing? Or is more going on? If the latter, is this restaurant an anomaly, or is the "demand determines price" assumption only applicable to certain cultural contexts, and if so, in what contexts? Questions like this will not be answered by the modeling approach advocated by the author.

In addition, the author takes at face value the notion that what is needed to correct the issues identified with neoclassic economics is (1) a shift to models based on quantitative variables reduce to binary values, (2) the inclusion of "externalities" such as cultural or religious variables (though why these should be considered as externalities is not clear), and (3) the replacement of models built using standard differential equations by Boolean Networks. However, the problem is not just with the analytical level at which variables are measured and models formulated, but the fact that the economic context is composed of numerous agents and the actions of agents change the parameter values for the economic context, whether or not that is their intention (see Read 1990). In his discussion of fast trading as a potential domain for the kind of modeling that he discusses in his article, the way in which parameter values are affected by past and future agent action is not taken into consideration. Consider what would happen if all agents used exactly the same algorithm for fast trading decisions, rather than a variety of algorithms, each based on slightly different assumptions. Massive concordance among traders would lead to massive spikes or crashes in the price of the stocks being traded in this manner. Economic markets, then, are dependent on heterogeneity among agents so that the market changes largely on the basis of the average behavior of heterogeneous agents, rather through the behavior of homogeneous agents all acting in the same way at the same time. In addition, though the author mentions cultural and religious factors, it is evident that the stock marked varies on the basis of psychological factors relating to a wide variety of factors. The Dow Jones index responds to current political events through subjective impressions investors may have about those events and how this affects their decisions to buy or sell. These impressions range from guesses about the effect of political events on the profitability of a company in the future to more immediate decisions to sell by multiple agents acting in a similar manner due to subjective responses to what is perceived to be a negative political event on one day (e.g., the Dow Jones Index drops, by, say 200 points in a single day) and a day or two later rises by the same amount when the political event has lost its news worthiness. Obvously, the economic well-being of companies do not vary in their value, in an objective sense, on the scale of days in lockstep with political events. Or, with large drops in the stock market such as the 2008 crash, many sold stocks on the fear of what they believed might occur rather than responding in accordance with the objective criterion that even with the Great Depression stocks regained their value in a relatively short period of time. Since the 2008 crash, the Dow Jones has just about tripled from its low point in 2008 to its present value. Yet many lost retirement funds invested in the stock market out of fear, not objective, rational calculation. In brief, both neoclassical modeling and the modeling approach proposed by the author ignore the fact that modeling is generally made by using values averaged over the behavior of individual agents under the assumption that individual agent behavior can be replaced by statistical values averaged over large cohorts, rather than considering whether the statistical values are driven by individual agents whose heterogeneous behavior is, incorrectly, erased by the assumptions of neoclassic economics. This insufficiency of neoclassic economics is not resolved by the "autonomous model" approach discussed by the author.

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