On Massive Conflict: Macro-Micro Link

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Abstract

Micro and macro properties of social system should be taken as relative poles of a two dimensional continuum since every debate on social system will however shift to the discussion on the two levels of description. This is consistently used as perspective to see massive social conflict. We propose analysis of the emerging conflict on its micro-causations by using computer simulations. We construct a dynamical model based on some propositions on massive conflict based upon the individual's degree of membership to collective identity she has whether to mobilize or not. The simulations result the possibilities to see the linkage of the macro-micro properties in the case of massive conflict and suggestions on how to cope with massive conflict or even to resolve it. The paper is an endeavor to a more comprehensive methodology on how to cope with conflict on research and theory development.

There is a place, a village, somewhere in the country. The people were heterogeneous by ethnic, religion, political expectation, and even by traditional language. At one time they lived peacefully, some conflicts occurred though, but the self-organization character of the society can overcome. Everything seemed to be fine, until someday later on, suddenly the violence and anarchy began to sweep. Killings and much more harmful things became the daily vocabularies. The social control was still centered at the self-organization character of the society, but it was then driven by the disastrous anger of individuals aggregated as horrible nightmare of blood-shed. Too much speculative propositions uttered for the discussion on cause and effect, but still it is a mystery of our human-kind society. Was it caused by the role of some kind of provocateur? Was it genuinely of the culminated anger amongst? Was it an evil spirit brought by the wind-blow? Was it somewhere on the desk of some kind of designer? Was it caused by the transformation from the traditional to modern society? Was it something concerning the conspiracy theory? It is certain, an enigma of the macro-micro linkages in the social system and in most of natural system in the universe. A problem of centuries long in the history of social theory… it is the time to verify the conventional use of theory, then.

1. Introduction

Massive conflict is a complex problem that often happens in the society whose lack of socio-economic stability. The peaceful life of the people seamlessly happens to be a massive conflict all of the sudden. The harmony of interacting people can turn out to be a "catastrophe" mass violence and what we perceive is shocking and somehow cannot be predicted before. There are plenty of scientific literatures and even conferences about social conflict, mobilization, and mass violence. They are widespread from the conflict in the microstructure among individual behaviors, i.e.: statistical analysis of the civil violence (Gulden, 2002), to game-theoretic models (Myerson, 1999) with some more practical use on spatio-temporal problem (e.g. Woods, 2003), spatial analysis of conflict and its role-playing dynamics (Epstein, et.al., 2001) in crowds and the clustering behavior in return (Jager, et.al., 2001), simulation approach to social conflict as an outcome of the social mobilization (Srbljinovic, et.al., 2003), and even the possibilities of the breakdown of a social contract on dynamics of conflict (Situngkir & Hariadi, 2003). In fact, in the general definition of social conflict, most of human interaction can be seen as conflict. By this definition then, we can even see the investor's behavior in the stock market as conflict (Situngkir, 2004).

The definition of mass-conflict we use in the paper is not as general as those above. The terminology of mass-conflict we use here refers to certain intensity of social mobilization based upon the collective identity e.g.: ethnicity, religion, race, etc. Furthermore, we are going to analyze mass-conflict as a macro-factor emerging out of micro-interaction among individuals in society. We analyze the micro-factors, i.e.: individual's grievances, influence on one another, and some other micro-structure in society that emerges chaotic mass-conflict; the social structure as the collection of complex interactions among individuals, and conflict as emergent behavior in which the social system.

The point is the macro-micro linkage in sociological analysis. It is obvious that the problem we want to focus is how the micro-properties in social system gives us the face of the society – how the micro-social returns to massive conflict in the collective behavior. The paper is divided into five major sections: the first section elaborates some previous works and literatures on macro-micro linkage in sociology, the second section sees conflict as macro-factor that should be approached with its causes i.e.: micro-factors, the third section constructs the model we use to simulate and do some experiments on conflicts and its causes, and followed by the simulation results. The paper is ended with some outlines and theoretical explorations on macro-micro linkage concerning conflict as an interesting case of study, and some suggestions on further possible researches and implementation on sociological policies.

2. Macro-Micro Link in Sociological Theory

Without trying to dismiss many interesting and useful sociological theories in our classics shelf, we must admit that we often discover a lot of inconsistencies the way social theorists construct theory on social phenomena. The utmost is on the perceived aggregated

social phenomena – the collective behavior of the social. There are often propositions in sociological theory that does not concern about the level of description: whether a social object to be approached in its micro-structure or in macro-phenomenon. It is obvious that this misleading approach will remain confusing sociological suggestions in its *ceteris paribus* generalizations.

Sociologist J. S. Coleman (1990) stated that it is important to distinguish clearly the description level of social analysis. In return, theoretical explanation based upon internal analysis of system behavior in terms of actions and orientations of lower-level units is likely to be more stable and general than an explanation which remains at the system level (1990:3). Social system is then a complex system in which interacting and coupled agents (elements of the social) emerging the collective behavior of the system (Goldspink, 2000:4.18). The social system itself is a system that the (quantitatively) measured and (qualitatively) interpreted properties are emerged "upward" from the micro-social (Kemper & Collins, 1990).

Things that seem obvious are by no mean uncontroversial among the social theorists (Saam, 1999). For example, it is common to explain the increasing divorce rates by the growing individualization, election outcomes by declining economic growth rates and the emergence of massive conflict by the role of provocation. But it is certain; individuals are the only to marry each other, go to the polls and interact each other in massive conflict – this is the reason on the fact that every social debate must shift to the relation between the both levels. In other words, micro and macro properties should be taken as relative poles of the two dimensional continuum in social science (Situngkir, 2003). In this case, the social structure has no independent existence of the knowledge that individuals (social agents) have about what they do in their daily life (see Giddens, 1984:24-28).

The distinguished objective description level is then a must on the development of sociological theories. The problem is then how we do theoretical explorations with the macro-micro linkages. Hanneman, et.al., (1995) proposed computational simulations to have them. When we study the social theory that delivered verbally, there are many alternatives of interpretations left. We do not know what is implied in a theory as along as it is left on the level of separate general principles and abstracted by history. But we must remember that the theory has consistencies that can be tested and verified based on the reality faced by sociologists. In this case, computer simulation is employed in order to bridge the gap between theory and history. We must see social system as a dynamical system rather than static. Social phenomena are about the social processes (dynamics) rather than co-variation (comparative static).

That is why the endeavor to find apriori equation on social phenomena is quite hardly to receive. Social process is much more like evolutionary process; the only thing we have to analyze is the structure of the process. Algorithm that computes the social process is then a good tool for social theorists in this century. Technically, it is computer simulations that are designed to discover how theoretical principles behave in their dynamic nature. Simulations that employed to capture the structure of social process for advanced theoretical exploration can be seen now as a hybrid form between conventional quantitative and qualitative styles. Recently, some social theorists (Epstein & Axtell, 1996) called the method as "artificial societies" (as inspired by the artificial intelligent technology) – the computational structure where we can verify and even develop new social theories (Sawyer, 2003). The social complexity focused upon the macro-micro link of social phenomena and computational analysis is one of the primary tools (Macy & Willer, 2002).

3. Massive-Conflict as Macro-Micro Link

Massive conflict in social system is fascinating and also important since too many victims and loses if it is about to occur. Father of social simulation, T. C. Schelling (1978), elaborated the behavior characteristics of the individuals that comprise social aggregate and the characteristics of the aggregate itself. As many other social behaviors, massive-conflict and social mobilization that drives it must be understood from the motives at the micro-level of the evolved society.

In the rest of the paper, we will approach massive conflict caused by the social mobilization that grows from the micro-properties of the society: the conflict based upon the membership degree of individual to certain collective (societal) identity, e.g.: ethnicity, religion, *et cetera*. As an impact of the macro-micro acknowledgement, social complexity sees social system as a living organism that evolve, changes, and adapt its behavior dynamically hence

cannot be modeled statically. Unlike other aspects of social system (e.g.: population growth, wealth distribution, etc.), by working on mass conflict and social mobilization, we are dealing with many immeasurable data – and even if they are, most of the useful data are not documented or written during the occurrences.

To develop theories that explore massive conflict and social mobilization we capture structural logic upon our understanding about the macro-micro link in social process. However, some formalism is unavoidable but although we realize that formalism does not guarantee the construction of useful and good theory, it is obvious that formalism facilitates the avoidance of inconsistencies (Srbljinovic, et.al., 2003). Our formalization aims to portray the structure of individual's behavior that computable as multi-agent system. As a matter of fact, there are plenty of model that can be employed as artificial society in computer simulation, but in the case of the massive-conflict tried to analyze in the paper, we choose the specific multi-agent model.

There are at least four micro-properties of individuals regarding the emergence of massive-conflict beyond social mobilization are elaborated as follows:

Firstly, the membership degree of some-people on her collective identity. The bigger it is the more individuals attached to the identity. A comprehensive work on the dynamics of the collective identity can be seen in (Lustick, 2000).

Secondly, the individual grievance of the social system she belongs to. Here, individual grievance can be defined as individual dissatisfaction of her life. It is obvious that if a person becomes involved in a conflict, his or her behaviour is not only influenced by the conclusions of a rational analysis of the situation and of the interests involved, but also by how the person handles the emotions of frustration, fear, anger, confusion that appear in the conflict situation (Jordan, 1998). The magnitude of someone's grievance however concerns her trust on the society where she belongs to and the social hardship she must face that influence her emotional behaviours (Epstein, et.al., 2001). The social hardship perceived by individuals can be the minimum availability of economic resources, *et cetera*.

Thirdly, it is important also to concern the influence of others to her. It is apparent that this factor concern with her social network or the network of relationships. It is clear that human decisions are rarely free of affective influences. The composition of this factor to the second one can be identified as societal climate for change in the society perceived by individuals. Other composition is between the first and the third perceived by individuals as high-profile triggering events.

Fourthly, externalities are also a certain factors happen to someone concerning massive conflict. In fact, this fact comes from the consequence of the macro-micro link realization. Micro-properties correlate with the macro-properties causation (Sawyer, 2003).

In the other hand, there are some macro-properties inducting the micro-properties to determining the probability of massive-conflict (Srbljinovic,et.al., 2003), *viz*:

First, the level of democracy. In this case, transitional states are most conflict-prone.

Second, the previous violence that increases the probability of violent response.

4. Model Description

Now it is the time to construct the formal model of massive-conflict by means of the social-mobility level. This is done by employing the macro and micro properties as described in the previous section. Figure 1 shows the role of our multi-agent model. For the sake of simplicity we use only two possible groups within interacting individual agents. The mobility of the collective identity is an emergent factor to be aggregated from the interacting agents. It is the degree of the collective mobility pointing out the probabilities of mass-conflict. The bigger the mobility intensity is, the bigger the mass-conflict possibly occurs.
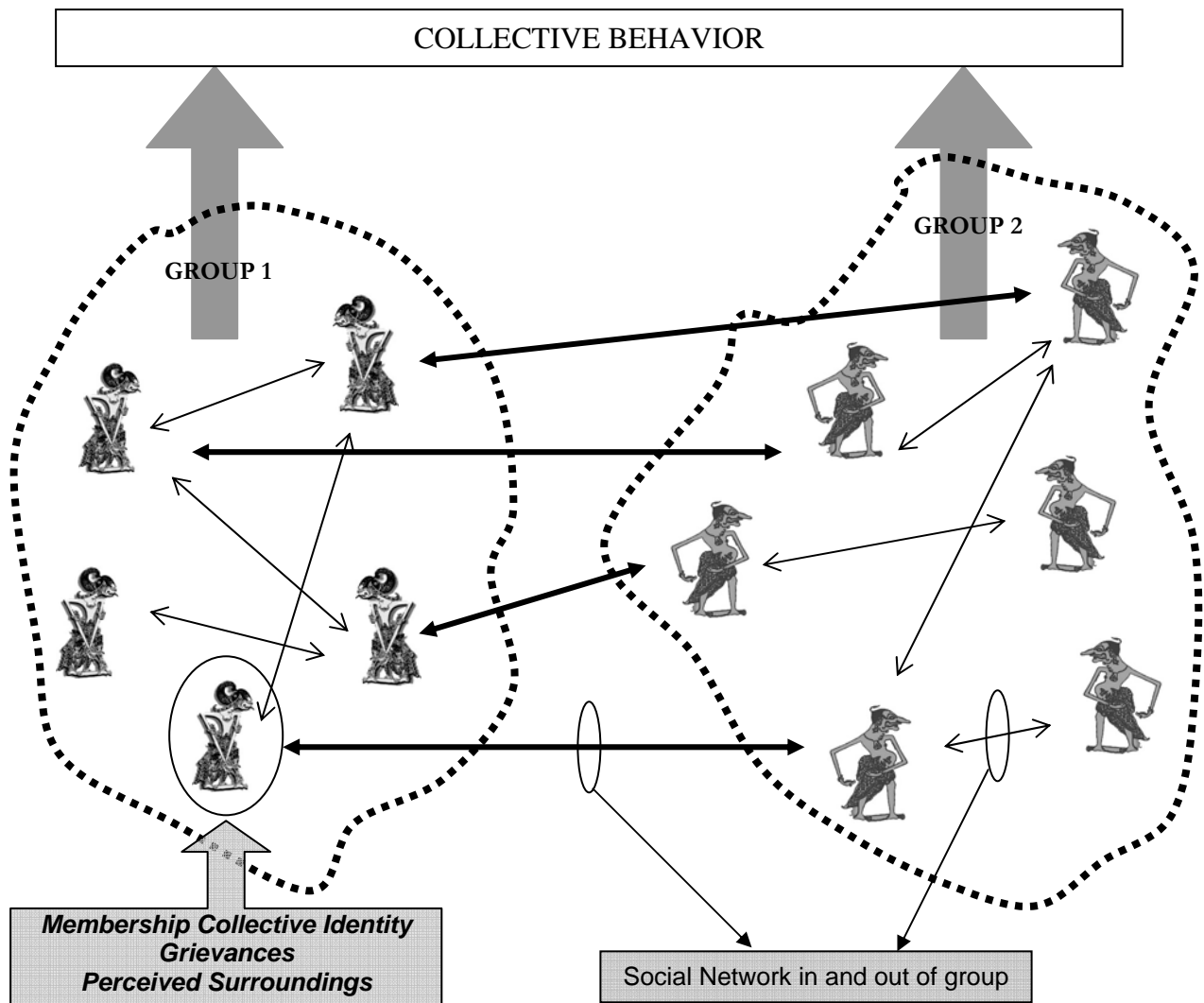
Figure 1
The role of the model to be simulated

Micro Properties Specification

$E = [0,1]$, the membership degree of each agent to the social identity she belongs to. The value of E is uniformly distributed among the agents; the bigger its value, the more fanaticism of the agent to her social identity. This variable is correlated to the social identity to which the agent attach to. The agent's identity is uniformly and randomly selected in the array of agents $\{0,1\}$. The tendency to join the mobility on each agent *i* can be formalized as:

$G = [0,1]$, the grievance factor of each agent in the whole social system. This factor reflects individual dissatisfaction of life. Somehow, the grievance factor is determined by the uniformly distributed value of variable $L = [0,1]$, the perceived legitimacy of the state and $H = [0,1]$, the social and economic hardship she perceived in life by product (Epstein, et.al., 2001). However, the value of exogenous hardship factor H is monotonically rising through time and affected by the level of social mobility; the more social mobility the more hardship perceived. The individual grievance factor changes by following:

$$G_i(t+1) = (1 - L_i)H_i(t) \qquad \dots (1)$$

The simple expression can be accepted since the high legitimacy perceived will never induce the individual grievance irrationally. While someone is very fanatic to a sovereign political leader, her grievance is not related to individual social and economic hardship.

$F = [0,1]$, the influence strength index of individual to affect other's behavior in the circumstances of her social network. The bigger the value of influence strength, the more she can affect others to join the mobilization or to keep silent.

Each agent is connected or interacted with other agent in her social network. In the model we represent social network as randomly selected prior to the numbered position of the agents in the circular order as in figure 2. If an agent meet agent with the same membership group, then they will share their individual mobility index, in the other hand if she meet other belongs to opposite collective identity, both of them compare their individual mobility index. The rule in the social network can be stated as follows:

$$m_i^{SN}(t+1) = \begin{cases} F_j m_j(t) & \text{if the neighbor } j \text{ has same collective identity} \\ (F_j - F_i)m_i(t) & \text{if the neighbor } j \text{ has different collective identity} \end{cases} \quad \dots(2)$$
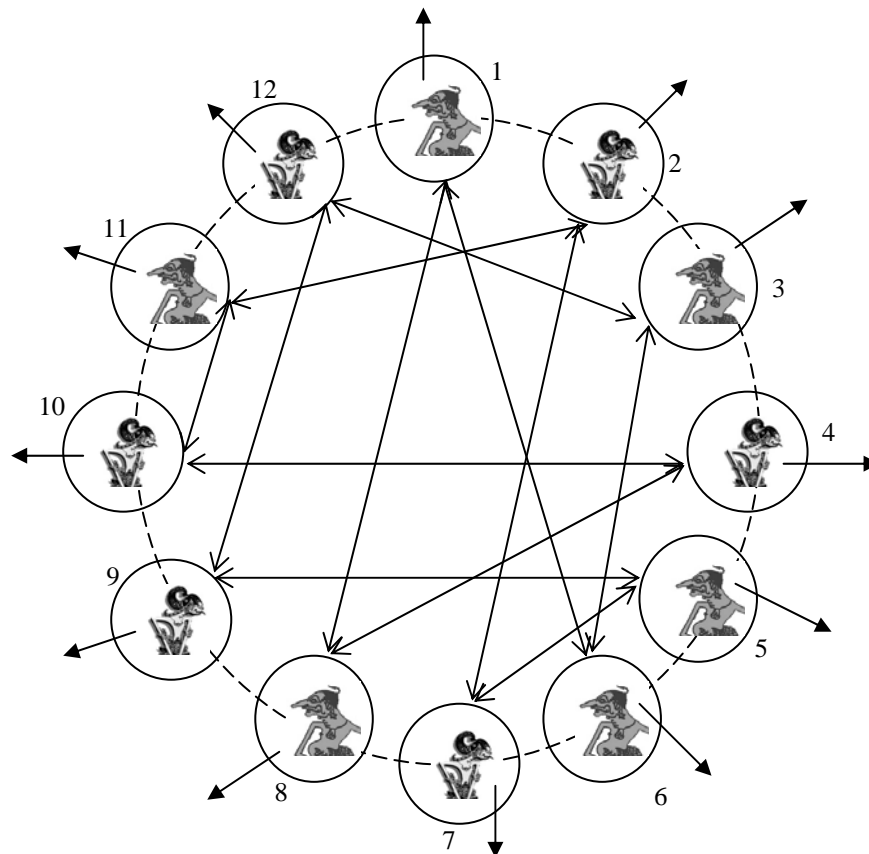

Figure 2
The Neighborhood Concept Used in Simulation

The change of the individual mobility index is obviously changed also by the intensity the agents attached to her collective identity. This factor is also influenced by the individual grievance factor and the previous mass mobility and how a collective perceived the mobility of the opposite.

$$m_i^{col}(t+1) \approx (G_i(t) + M_{opposite}(t) - M_{same}(t) + E_i)m_i(t) \quad \dots(3)$$

Every time collective mobility index gets bigger, there will always be the 'cooling effect' on each agent. The effect increases exponentially with the intensity of the mobilization. This assumption can be accepted since the intensity if mass mobility will prevail mass conflict on some degree; little and big intensity of mobility cannot be treated equally. Formally, the cooling factor can be stated as:

$$m_i^{cooling}(t+1) \approx -\exp(M_{same}(t)) \qquad \dots(4)$$

Macro Properties Specification

Eventually, the mass-conflict will sweep by the dynamic of the intensity of mobilization. On some certain high intensity of mobilization, the mass-conflict will be unavoidable. Formally, the collective intensity of mobility can be stated as:

$$M(t+1) = m(t) + \left[m_i^{col}(t) + m_i^{SN}(t) + m_i^{cool} \right] \Delta t \qquad \dots(5)$$

In the simulation to be described in the next section, the intensity of mobilization is adjusted on the interval of $[0,1]$, and the more the value close to *1* the more the possibility of mass-conflict occurs.

5. Results of Simulation & Discussion

We do some experiment with the model we have constructed in the previous section to understand how the massive conflict possibly emerges and changes dynamically. Our first simulation is by using the basic specification of micro-properties how mobilization emerged from the agent's interaction. We use 200 agents interacts each other and divided them into two collective identities 100 each.

1st Simulation: The Dynamics of Mass-Mobilization

In the first simulation we do experiment with micro-properties as:

- Uniformly distributed membership degree, influence strength, and the perceived legitimating state, with eight randomly selected agents in each social network.
- For the initial condition, every agent is submitted with randomly distributed individual mobilization.
- In the case of perceived hardship, we submit the first group to have higher coefficient of hardship than the second one. The intuition for this is clear. The massive conflict based on membership on certain collective identity is often triggered and initiated by social and economic inequality between two collective identities.

As the simulation is run by using algorithm based on the model described in the previous section, it results figure 3. From the picture, we see that the mobilization is mostly high on the side of the first collective identity consequently with their high collective perceived hardships. As the fluctuation of the mobility of the first group, the second group cannot stand for that and collectively risen their mobility against after the round 100th.

In order to easier look at the fluctuation, we map the mobility of each group to the Poincare Map that shows the direction of the fluctuating intensities of mobility in chaotic region. Poincare Map used in the simulation plots the intensity of mobility at time *t* to the one in time *t+1*, or formally *M(t)* vs *M(t+1)*. In the figure 1 (right), we can see that the intensity of mobility is attracted to some value (high enough close to unity) presented the conflict-prone situation. On every initial condition we made, the fluctuation of mobility intensities will always attracted "strangely" to the attractor value. In this artificial and simple microstructure of the model we construct and with only two collective identities, we have two attractor values drive the collective intensity of mobility. In reality, it is certain that there are many strange attractors of social identities play the role in social dynamics brings hard to predict mass conflict.
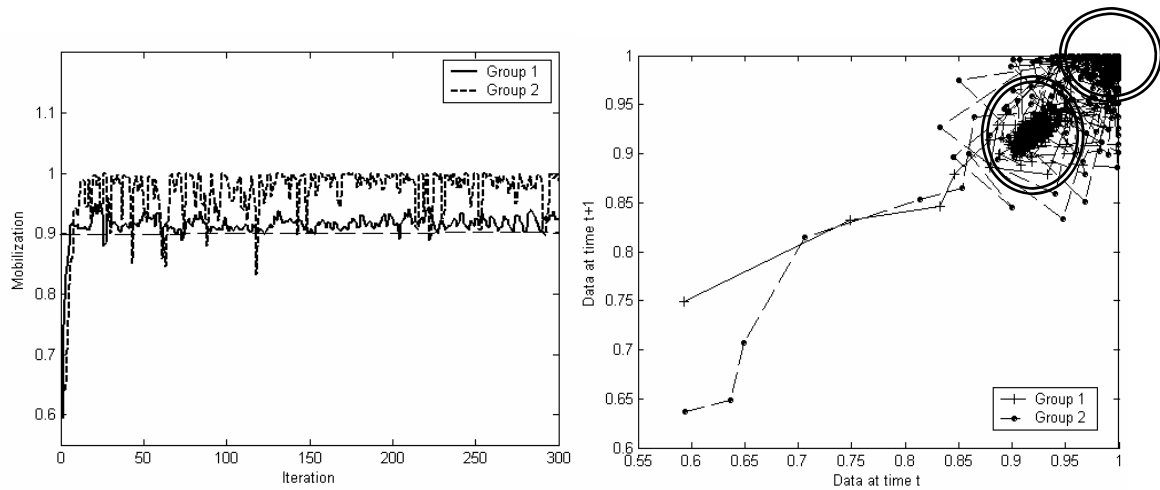
Figure 3

The Result of the First Simulation. The dynamics of mass mobilization (*left*) and the Poincare Map to see the fluctuation in chaotic region (*right*)

2nd Simulation: The Totally Resolved Mass Conflict

One important aspect on the usage of computer simulation in social analysis is that after we construct model to be computed in simulation from the interpretative and descriptive work of conventional sociological research method, we can try some micro-social properties and see the emerging aggregated result. In this case we want to see what kind of micro-properties that can lower the intensity of mobilization.
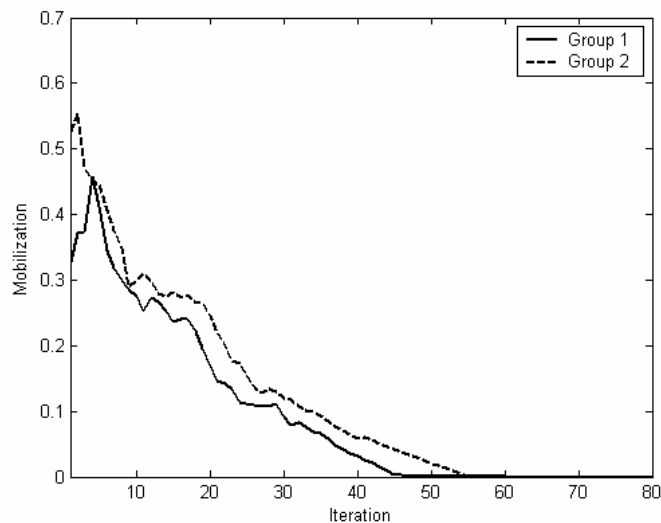

Figure 4

2nd Simulation Result: The extinction of mass-conflict

In the simulation resulted in figure 4, we dramatically lower the socio-economic grievances by assuming no significant individual grievance to the emerging mass conflict. In addition, we also lower the size of the social network among agents. In the experiment, we see the mass mobilization vanishes prior to the significant limited social network. In some time steps of simulations the massive conflict is totally disappeared. This extreme experiment however reflected the importance of the size of social network and grievances in the micro-social.

3rd Simulation: Managing the Collective Identity to Manage Conflict

In the previous experiment, we find out extreme situations in micro-social: the enforcement of individualization by means the low size of the social network and the insignificant grievances. It is true (by simulation result) that the use of such micro-properties can extinct totally the massive conflict. But it is obviously not worth comparing to the limitation of the social network (the extremely rise of individualization and individual isolation) and the disappearance of the social identity. However such social engineering harms the harmony of social system and social identity (Dimitrov, 2003:89-90).

The way to cope with conflict based on social identity is however to manage the explosion of social identity in such conflict-prone massive mobilization. In the next experiment we use the micro-properties that are not lower the size the social network. The important thing to do with such massive conflict is by implode the possibility of individual tendencies to mobilization. This can be done by optimizing the use of cooling effect on the rise of massive-mobilization to each agent during the simulation and simultaneously lower the hardship perceived by agents. The cooling effect in this case can be any kind of cooling propositions perceived by agents from the broadcasting media or any publications to make individual understanding on avoiding conflict. Figure 5 describes the simulation result.
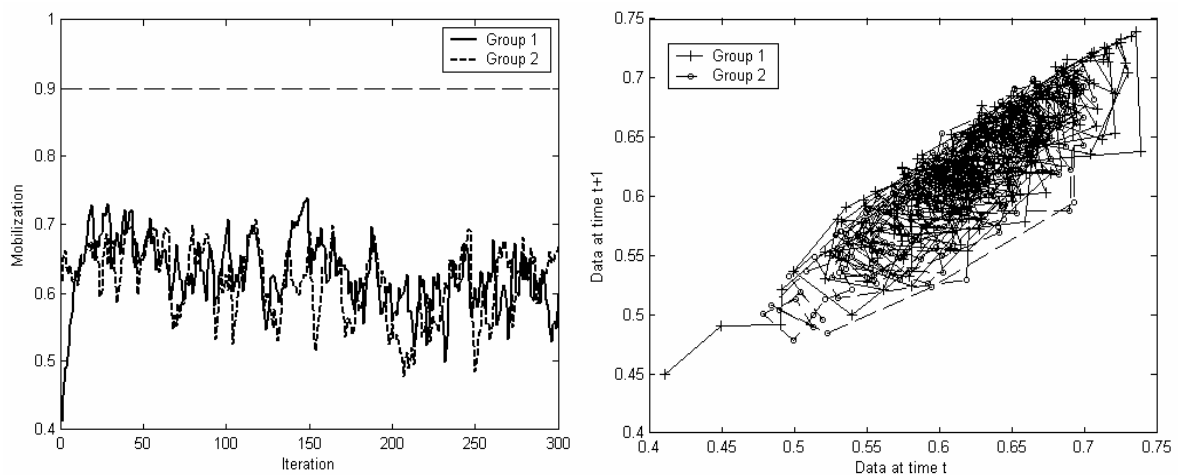

Figure 5
3rd Simulation Result: The Social Identity Management to manage the possible outburst of massive conflict

The simulation result of the 3rd experiment shows the fluctuated social mobilization below points in which high enough to bring massive conflict. In this case the social identity is not pushed down directly but managed not to achieve beyond the outburst of conflict. In this simulation, it is pictured the region of strange attractor reflects the dynamical social mobility on the acceptable intervals. When one agent perceives high value of hardship she can still mobilize but not to mobilize on bringing conflict. However, there are so many interpretative propositions on this term but the most important is the way we manage the massive mobilization on the cooling effect, and the raise of the quality of social and economic micro-properties.

How to manage the massive mobilization based on the collective identity is one aspect that we can learn from the experiments. But other important thing to be discussed lay upon the research methodology on the perspective of macro-micro link. Most of the data we processed in the experiment is generated randomly but it is certainly important however to use any possible data gathered in the real massive conflict. Some important data on some narrative on single case studies of massive mobilization and the conflict emerging is certainly important to be documented and then simulated to verify our simulation result above. Eventually, by using the real data it is possible for us to make more complex micro-properties and see the effect on the macro-properties that in return to arrange some strategic policies on managing the massive mobilization. It is awful that unfortunately some developing countries

e.g.: Indonesia, Angola, Rwanda, Liberia, *et cetera* still impose fragile and intuitive solutions rather than truly contribute to long-term peace-building (Baharvar, 2001).

6. Concluding Remarks

Social theories must lay upon clear understanding on the macro-micro links in order to be able to capture the reality. In some cases, it is important also to use formalism to approach social process at its dynamics. Formalism will be very important to interpret the structural dynamics into computational algorithm. Other importance and usefulness of employing computer simulation into the development of social theory is its ability to consistently verified social theory that bounded in the history where the social theory explored.

In the case of macro-micro link in sociological analysis, we can see social system and social process as a black box – that is why it is naïve to develop social theory based on comparative static arguments that comparing some aggregated parameters gathered in social system. Macro to macro properties must concern with the dynamical social process from which the aggregated data attained. The social theory, especially on coping with massive conflict, should realize this in order to have the understanding *par excellence* on the conflicts and how to resolve it.

From the simulation experiment, we show how the micro-properties emerging conflict-prone massive mobilization. Some important micro-properties in the case are the social network, the individual grievances, and the cooling effect perceived by the individuals. To cope with conflict however is to cope with these properties. One important note should be added here is that the three properties are micro-properties. There are nowadays a lot of aggregated data trying to describe the properties, e.g.: inflation and GNP to describe the economical hardship, polls on government achievement to describe the legitimacy of government, *et cetera*. In the case of analyzing massive conflict, we must understand the ability of the conventionally aggregated data on representing the variables growing out in the micro-social.

In general we can say that we need a social theory that epistemologically and methodologically grows from the bottom up, which realizes the macro-micro link. Social theory that analyzes, interprets, and suggests based on aggregated data without considering the micro properties ought to be transformed. In general, it remains us an important discussion to evaluate the way we mine data for our research and theory development: aggregation upon the macro-micro link realization.

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