**Ensembles**

Research indicates – and the possibility of sociology as a science requires – that certain kinds of collections of agents below the level of species are sociologically significant. ‘Class’, ‘group’, and ‘organization’, for example, are all terms used to name such collections – each of them with a slightly different intention and occupying a slightly different role in some sociological theory. To speak generally – but not too generally – of agents in the plural without presupposing the nature of those collections we will introduce the notion of an ensemble, which is intended to be a minimally defined collection of agents that is sociologically significant.

***Ensembles***

An ensemble is clearly a type of category set, but a category set may be arbitrarily defined and is thus not necessarily sociologically significant. In order for a category set to be sociologically significant it must have some effect upon members of the society (agents) which is a consequence of actions of the members of the category set where those actions are a consequence of their membership in the category set.

In order to make this notion more precise it is necessary that some preliminary items be defined.

Let *x* = {*P*: *Px*} be the Complete Description of *x*; the set of all properties which may be applied truly to *x*. If ** is a CX and *X* is a set of agents for which **(*X*) (i.e. *X* is a category set characterized by **), and *x**X*, then **  *x*.

Now define the set of maximal possible descriptions of *x* in the case that *x* is just as before but without the characteristics described by **. Thus

*E* = {*j*: *j* = {*ei*}},

where for each *j*

*e0* = 

*ei* = *ei-1* *Pi* for some *Pi* *x*\*ei-1* for which (*P***)[~(*ei-1* *Pi* [⊢](https://en.wikipedia.org/wiki/Turnstile_(symbol)) *P*)]

» *Each ei is the result of adding to ei-1 one more property in the complete description of x that is not in or ei-1 and from which no property in can be derived. This process carried to its end produces a maximal set of properties from the complete description of x from which no property in can be derived. E is the set of all such maximal sets of properties (the maximal sets may be path-dependent.)*

* *E* above is the set of Proximal Possible Descriptions of *x* Without **, written **(*x*,**)
* By **(*x*) we mean (*Pi***) *Pix*
* By **(*X*) we mean (*x**X*)**(*x*)

An Ensemble Characterization (EX), **, is a category characterization for which:

**(*X*)  (*x**X*)(*Cx,applies**x*)(*cx**Cx,applies*)(*y*)(****(*x*,**))[**(*y*) (*Ax*(*cx*, *qx*) *Ay*(*cx*, *qy*))]

» *For any agent (as we may suppose it is) which is not in the category described there are circumstances in which it will behave differently from any agent which differs from it only in not belonging to the category.*

*Briefly: the category characterization is a set of properties that is significant wrt the actions of the agent.*

Let *X* be a set of agents and ** an EX. If **(*X*) then *X* is an Ensemble characterized by **.

* There may be many ensembles identically characterized
* *Ax* and *Ay* in the definition of the ensemble characterization above are assumed to be identical in all respects other than those actually dependent upon **, which is justifiable if we claim that the definition of *Ax* is included in *x*.
* Let *X* be an ensemble characterized by the EX *1*, *2* an EX such that *1*  *2*, *Y* an ensemble characterized by *2*, and Y *X*; then *Y* is a Subensemble of *X*.

Using the notation presented just above, and by analogy with government by norms,   
we say that *cx* is a Context Governed By ** and write *g*(**, *cx*) iff

*cx*  *Cx,applies*,

We say *ax* is an Action Governed in *cx* By ** for context *cx* and the EX ** and write *g*(**, *cx*, *ax*) iff

*cx*  *Cx,applies* & *ax* = *Ax*(*qx*, *cx*)

» *The context is governed by  and the action is produced in that context.*

* Note that the contexts of several EX may govern any action

Several observations may be made here.

* Very many category sets will be ensembles to some degree, but are unlikely to ever feature in sociological theories. For example, people who like ice cream will react differently from those who don’t like ice cream when asked whether they like ice cream. The fact of sociological significance for an ensemble (rather than its potential) depends upon whether these altered reactions have a wider significance, and in which HLST they are to appear.
* The most obvious content for ** is *K*(*N*) for some norm formation, *N*, and we have seen how norms change the behaviour of an agent in the circumstances governed by those norms.
* It is possible to define also a collective in terms of it being the patient rather than the agent, so to speak. For example, red haired people do nothing as an ensemble, yet they are universally hated and affect the actions of those around them by inspiring aggression towards themselves. They might therefore be considered a sociologically significant category set. Nevertheless, we will make no such definition since it is not clear that any examples of patienthood really exist; or that if they do they have any real significance before they become agents. To extend the notion of oppression; red heads, who may be an oppressed category set in some society, are irrelevant considered collectively until they develop the characteristics of an ensemble – and the oppression is likely to do that.

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| **Example:**  An important example of an ensemble is ‘class’ as it occurs in, for example, Marxist or Weberian sociological theories. It is common however to decry the lack of a well-accepted definition for class. Regard, for example, the definitions offered by those two theorists. Weber writes ([1924] 1978 (eds Roth, G & C. Wittich) *Economy and Society*, Berkeley: University of California Press, p. 927:)  We may speak of a “class” when (1) a number of people have in common a specific causal component of their life chances, insofar as (2) this component is represented exclusively by economic interests in the possession of goods and opportunities for income, and (3) is represented under the conditions of the commodity or labor markets  Marx, on the other hand, has no very precise definition to offer for this most basic element of his system. In general, we may understand what he has in mind by the use he makes of the concept. The closest thing to a definition might be his statement (1971 *Capital: A Critique of Political Economy* Vol. 3, Moscow, p. 886) that  There are three great social groups, whose members... live on wages, profit and ground rent respectively.  In both cases, as can be seen, class is taken to be essentially determined by the economic status of the class members. However, in order for these to count as ensembles it has to be argued that the economic status gives rises to regularities in action. Only in the case that that is reasonably established would a CX rise to the status of an EX as defined.  In both cases, it is reasonable to argue that such regularities may occur, and that the regularities may be distinctive for the category sets that are typically defined. The experiences of the industrial workers of XIXth C England are uniform enough – if considered in sufficient generality – to distinguish their regularities of action from those of the landed gentry of the same time and place, for example. On the other hand, it is not obvious that all such definitions will give rise to appropriate EX – there are few non-trivial regularities of action to be found in ‘wage-earners’ in XXIst C Australia, for example. |

*Characteristics*

The following characteristics of an ensemble that are of sociological interest can be defined in terms of the material presented above.

* *NO*(*X*) = {*n*: *X*  *K*(*n*)} – the Outer Norm Formation of *X.*
* *NI*(*X*) = {*n*: *K*(*n*)  *X* } – the Inner Norm Formation of *X.*
* *Z*(*X*2, *t*) – the Action Diagram for *X* With Probability  *t*
* *ZNI*(*X*) (*X*2, *t*) – the Inner Normative Action Diagram for *X* With Probability  *t*
* *ZZ*(*X*2, *t*) – the Communication Diagram for *X* With Probability  *t*
* *ZZNI*(*X*) (*X*2, *t*) – the Inner Normative Communication Diagram for *X* With Probability  *t*
* *ACD*(*X*) = {(*x*, *y*): *x*, *y*  *X*, *x*/*y*} – the Agent Constraint Diagram of *X*.
* *ADD*(*X*) = {(*x*, *y*): *x*, *y*  *X*, *x*>*y*} – the Agent Dominance Diagram of *X*.
* *ANCD*(*X*) = {(*x*, *y*): *x*, *y*  *X*, *x* /*NI*(*X*) *y*} – the Agent Normative Constraint Diagram of *X*.
* *ANDD*(*X*) = {(*x*, *y*): *x*, *y*  *X*, *x* >*NI*(*X*) *y*} – the Agent Normative Dominance Diagram of *X*.

*Partitions*

Let *X* be an ensemble. *P*(*X*) = {*p1*, …, *pn*}  2*X* is a Partition of *X*, when

1. (*x*  *X*)(*p*  *P*(*X*)) [*x*  *p*]
2. (*x*  *X*)(*pi, pj*  *P*(*X*)) [*x*  *pi* & *x*  *pj*  *pi* = *pj*]

* We call the elements of *P*(*X*) the Parts of the partition of *X*.
* According to 1, every member is in a part in *P*(*X*).
* According to 2, each member is in just one part in *P*(*X*).
* There may be a use for a subset of 2*2*exp*X* too. Consider the case where we wish to speak of the management of a company being the upper echelons of the financial, operational, etc. sectors of the company; or the heads of departments being a special organizational set within the company. For the purposes of simplicity, let us for now disregard this possibility.