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On the reality of socio-economic aggregates : a Bohrian perspective

Christophe Brochier¹

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The description of social phenomena is usually made with the help of quantified data allowing the sociologist to measure some of their detailed aspects. For example, crime is measured by the homicide rate per 100,000 inhabitants, fertility by the number of children born alive to women aged 49 and over, etc. The idea behind these procedures is that social statistics describe social realities as well (or as precariously) as they can. The limit would come from the (relative) precision of the classifications which produce the figures and from the width of the field of observation. Thus, the exact number of individuals infected with influenza is almost impossible to determine with precision, and therefore the fatality rate of this disease. But the production of these figures generally induces practitioners to forget that the realities they are supposed to describe have sometimes (and even often) only a purely nominal reality. By that I mean that the social realities in question are theoretical conceptions whose supposed reality is only imposed on us by aggregating figures produced from the observation of individual cases. It is the measure which gives substance to the ideas materialized by the concepts. Thus, crime is only a theoretical idea (the number of criminal acts committed) and it becomes a social phenomenon when associated with figures. Likewise, the extension of an epidemic is only a concept which takes shape when one offers a measure of the number of infected people. To develop these ideas I would like to review several classic works likely to support my reasoning.

1-Eliot Freidson and the theory of illness

In *Profession of medicine* (1970), Freidson makes some crucial remarks on the difference between the concept of illness or disease and its observation by physicians. The concept of disease refers to a moral evaluation : this is what "goes wrong" in the body (just as social deviance can be what "goes wrong" in the "social body"). Illness is therefore not an observable reality. What we observe are chemical and physiological processes. "Illness" is the theoretical object created by associating these manifestations with their cause, identified at a given moment in the development of our knowledge (bacteria, viruses, but also psychological trauma, etc.). It is therefore produced by a double process of observations and associations. Different cultures have different ways to conceive and handle physical problematic events. Basically, however, the concept of illness is an evaluation. Thus one can wonder if old age is a disease, as permanent jealousy, the tendency to gain weight, etc. Freidson therefore helps us to make the distinction between individual physical states, their biological causes and the way in which society uncovers a human phenomenon from the aggregation of cases. Thus influenza or COVID 19 are generic terms applied to an aggregation of individual cases of manifestation of " problems" in the body. Freidson's analysis is a precious step toward the analytic separation of concepts and concrete manifestations of events at the individual

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level. Obviously those manifestations are appreciated by means of mental and technical operations. Examinations, comparisons, discussions, transmissions of informations and file recordings are necessary to improve our knowledge of diseases.

2-Cicourel, Kitsuse and official statistics

In their famous 1963 article, Aaron Cicourel and John Kitsuse criticize the conventional way of considering delinquency. This conventional way argues that delinquency is a social phenomenon which exists independently of the observer and which one must strive to measure correctly in order to be able to explain it. It would be important, in particular, to determine why individuals are breaking the law. The idea of Cicourel and Kitsuse is to shift attention from the process of creating acts to that of producing statistics and files. They go against the idea that when we have explained the former we have *de facto* explained the latter. According to them, the rates are produced by agents of the social system who define, classify and record deviant behavior. The important thing would therefore be to determine how they proceed and in what ways these acts produce the delinquency rates. So we would no longer look at the statistics as good or bad descriptions. They are, in this line of idea, above all, indices of the processes of organization which produce them more than descriptions of the phenomena of interest. These ideas from Kitsuse and Cicourel lead to questioning the existence of phenomena as elements of reality independent from observations, classification and aggregation processes. So crime is just a word (as a social element of collective life) that becomes reality when we produce figures supposed to measure it. This constructivist point of view holds that it is the measure which produces the phenomenon (not the isolated acts which are classified, but the phenomenon as a collective reality). The same can of course be said of other "phenomena" that take shape when we have figures: the income of a population, the average number of children, etc.

3-The Copenhagen interpretation of quantum mechanics

The ideas of Freidson, Kitsuse and Cicourel were preceded by Niels Bohr's interpretation of quantum phenomena (which may have been a source of inspiration for the two sociologists). Obviously electrons are not human beings but the reasoning used by the Danish physicist presents some analogies. According to Bohr, the idea of an electron (or photon) with a defined position or momentum is meaningless before observation. It is thus the experiment which will determine the properties and the behavior of the electron which behaves like a particle or a wave according to the device one uses. Why ? Because the interaction between the particles and the experimental apparatus "forms an inseparable part of the phenomenon" (Bohr, 1963, p.4). As summarized by Lurçat (2001): quantum objects are "adherent to the conditions of their manifestation". Quantum phenomena are not phenomena before measurement and recording within the framework of a given experimental device. This means that different experiments will give different results (even if the device is almost the same). Bohr makes very clear that this idea should not be confused with that of "disturbance of the phenomenon by observation" (idem, p.5). The phenomenon simply integrates the device. Quantum theory therefore does not describe physical reality (Peres, 1995) if by this we mean a microscopic reality which has invariant properties regardless of the way of observing it materially. The equations give probabilities of results and the "transition from the possible to the real" (Heisenberg, 1962) takes place through the act of observation. This means concretely that the

particle has no intrinsic properties before observation. (D'espagnat, 2015). It acquires them through experimentation and the order of observations is therefore important, since there is no quantum reality, neutral and independent of the actions that we perform to know it.

Bohr insists on this point : the electron is not a precise reality that we observe badly. We just don't know what it is. The idea that the particle can have "existence" and "behavior" between two observations is virtually meaningless. A remark from Bohr quoted by John Wheeler (1988) is quite illustrative:

" Where can the photon be said to be in its passage from the slit to the photographic plate ?
- 'To be ' ? Bohr replied. To be ? What does it mean 'to be' ? ".

4- Crimes, income, birth rate and other sociological concepts

Bohr's interpretation matches quite obviously that of ethnomethodologists like Cicourel if one presents it in the following way : many sociological phenomena only exist when they are measured thanks to technical and social devices more or less designed for this purpose. Thus the average income of a given population is only a theoretical idea. If we measure income from tax returns, we give substance to this reality. This means, in this line of thought, not that the figures can be wrong (or true), but that it creates the reality that it is supposed to simply describe. Each individual could in theory add up the sums which went into his pocket during the previous year, but he will not necessarily succeed in counting everything. His "income" is just an abstraction. If the individual gives a figure, the abstraction takes shape. The same goes for the aggregate made from several thousand cases: it is an abstraction reified by measures.

This can be seen more easily if we use the case of delinquency studied by Cicourel and Kitsuse. For an event (occurring at the level of a few individuals) to become a case of delinquency, it must be registered by an institution; usually someone has to make a complaint. The complaint must be recorded, kept, transmitted, categorized and filed. If a criminal act is not registered, a case does not acquire the social existence (through transmission and formalization) that it might have had. Ethnomethodologists are therefore interested in these processes of transforming isolated acts into official cases. So, lived behaviors only become social phenomena through the action of these devices. As in quantum mechanics, the social phenomenon is made up of : behaviors + devices.

In the same way as in quantum physics, this statement implies that one cannot say anything about the aggregate (income, birth rate, crime, etc.) outside of a situation of measurement. It is not a question of the effect of the device on the phenomenon, but simply : the idea of phenomenon must be broadened. A phenomenon is made up of all the acts and devices involved. Since we cannot speak of the phenomenon independently of the acts which make its very existence, by measuring it, we cannot predict it quantitatively by an equation. The only results that one would obtain by forecasting equations would be of a probabilistic nature. The measure would reduce the range of possibilities to one. Another kind of measurement would change it.

Let us recall once again the essential distinction : denying the reality of crime outside of a situation of social treatment does not mean that there is no crime committed. There are people who kill others (or steal, etc.), but to constitute "delinquency" (which is a concept and not an act), a series of operations is needed. The same holds true for the birth rate (or unemployment rate, etc.). People do have children, but the "birth rate" is not made of supposed children, it is made of counted children.

5-Procedures, indeterminacy and Chekhov's investigation

Another achievement of quantum mechanics concerns the correlated indeterminacy of measurements. Werner Heisenberg has shown that if we measure with precision, by a suitable device, a property of the electron (its speed for example), we will lose accuracy in determining its

position (which does not mean, in accordance with Bohr's interpretation, that the electron has a given speed and position, without a procedure of measurement). This idea has, of course, no exact equivalent in the social sciences, but in certain cases, one notes, for social analyzes, that the operations allowing to measure some characteristics of the phenomenon impair the precision of the measurement of other aspects. Thus surveys which serves to determine the place and time of living of individuals, do not adapt well to people who do not have a fixed residence. Income determination procedures that are appropriate for a population with stable paid employment, reduce the precision regarding populations with irregular, unofficial or overlapping activities. Recording the age of a population is difficult when you study people who do not use written documents. Thus, until the 1970s, in Brazil, there was an abnormally high rate of men and women above 100 years old, among the black and poor populations : many of these people, often illiterate, tended to call themselves centenarians as soon as they had reached an advanced age. The social characteristics of populations, as they exist in official registers or researchers' publications, are therefore dependent on collection and registration systems. The example of a borderline case, given by the Russian writer Chekhov, will illustrate our argument.

In 1890, Chekhov went to the island of Sakhalin, in the Siberian Far East, in order to study social organization and living conditions of convicts and former convicts. For this, he decided to carry out a census. The list of questions he wanted to ask was made of those which spontaneously come to the mind of any researcher with this type of intention : age, place of birth, marital status, etc. But in the field, things did not turn out as he had foreseen, because the list of questions was ill adapted to this peculiar population made up of convicts who had turned out into colonists. First, the status of each individual was a problem : instead of declaring themselves convicts, relegated men, proscribed peasants, free citizens, according to the logic of official categories, the convicts rather declared themselves "workers", the forced colonists preferred to say that they were "free citizens", the "proscribed peasants" omitted the term "proscribed". So the status, as soon as it had to be verbalized, received an ennobling interpretation according to social uses. The registration of the names, as well, was not an easy task since many inhabitants used a first name (and sometimes even a name) that they had chosen themselves during their wanderings. The relationships between the occupants of a home were also not clearly recorded because "many of those who share a farmer's isba see themselves as co-owners or co-tenants" (Chekhov, 2001, p. 71).

Likewise, children were often illegitimate or adopted (and there were also "adopted fathers"). Age, of course, was something that could hardly ever be ascertained with precision. Some said, "Maybe thirty or even fifty". Young people generally claimed that they were under 15 to allow their parents to receive social assistance. The place of birth posed little problem except for "vagrants", who generally said they did not know. The date of arrival on the island required the respondents to make big efforts to remember. Many answered "who knows? ", or " the same year as ... ", etc. The level of education was even more difficult to determine because the concept did not mean much for the majority of the inhabitants, so Chekhov asked : "Do you know how to read? (the ability to read being more decisive than that of writing). But those with poor eyesight also claimed to be illiterate. Finally, Chekhov found it difficult to know who was receiving social aid and for what amounts, because this assistance could take very varied forms. Finally, the only category that the people had no real problem with was religion.

The case of Sakhalin obviously stands as a borderline case which corresponds to the ethnocentric application of a survey. The administrative logic of the researcher does not adapt well to populations living according to standards and codes other than those of the cities (or the regions with a less peculiar organization). The question of marital life, for example, couldn't be well studied in Sakhalin using the concept of wedding. The degree of precision that one would have had in the city with this question was lost in this island where the forms of family life were different and had another meaning. But this example allows us to understand that social surveys, which are generally conducted by members of the middle and upper classes, based on a certain vision of "normality" (in the moral as well as in the statistical sense), lose accuracy when they must apply to the lower classes or to the "fringes" of society.

Conclusion

For the past twenty years, reasoning drawn from quantum mechanics has been applied to the human and social sciences, in particular psychology and economics (Bitbol, 2009; Haven & Khrennikov, 2013). Some of this work reformulates already known analyzes, based on the ideas of physicists. This is also what I propose here by combining the ideas of interactionist sociologists and ethnomethodologists with those of Niels Bohr. What should be remembered is that the concepts that allow sociologists to describe certain socioeconomic or demographic characteristics of populations are :

- 1) concepts that should not be reified. Unemployment, for example, like the illness envisioned by Freidson, is a concept and not a natural property of social life. Individuals are in different (sometimes complex) situations with respect to employment and job search, and become "sociological cases" through registration procedures that simplify reality, code, and give it a macrosociological meaning.
- 2) Dependent on the means of producing the data.
- 3) Likely to give a biased view (because incomplete according to certain parameters) of things by preventing the same degree of precision from being obtained according to the segments of the population studied.

The second point is the most important. As a consequence, the data produced on society by means of surveys or official files cannot be seen as more or less faithful descriptions of reality. Bohr's idea, applied in this way to a certain practice of sociology, means that one does not "know" what one is talking about, concerning collective life, outside of moments of data collection. For example, if I measure unemployment in a certain way at one moment and measure it in another way a little later, I bring into existence an aspect of reality called "unemployment". The idea that "unemployment" may have varied in one way or another between the two measurement operations does not really make sense. People have indeed lost their jobs or carried out research to find one, but "unemployment" has not had any "behavior". The same goes for many other social data, which I will not try to list here. The question, as in Bohr's theory, is therefore not only that of a distortion of social reality by method. It goes further : the behavior of individuals, plus the method and its operations (mental and material), plus the presentation of the results, form all together the social reality that we want to study. Agents have many behaviors, but the ways of objectifying them (which are many) produce materials, linked to concepts, which create each time they are applied, a vision of "what is happening". "What is happening" does not "happen" alone.

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