Encyclopedia of Survey Research Methods

Level of Analysis

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A social science study using survey data can be set at the micro level when individuals are analyzed, or it can be set at a higher, more macro level when aggregates of individuals such as households, wards, precincts, firms, neighborhoods, communities, counties, provinces, states, or nations become the unit of analysis. This structural level, spanning the range from most micro to the most macro, at which a social scientific investigation is carried out is called *level of analysis*. A particular study may also cut across several levels of aggregation. For example, a multi-level study of the educational effectiveness of a certain education program may include pupil-specific, classroom-specific, school-specific, and school-district-specific information and analyze the data at each and all of the levels.

The choice of level of analysis should be driven by researchers' theory and, subsequently, their research questions. There are two large, contrasting issues of concern over why the level of an analysis must be carefully chosen and specified. The first is the famous issue, or the infamous problem, of the *ecological fallacy*, popularized by William S. Robinson in 1950. Simply stated, the ecological fallacy is an incorrect inference about individual or micro-level effects or relationships drawn by analyzing aggregate or macro-level data. Many theories are set at the individual level. However, it is easy to overlook the possible fallacy and study social relations in the aggregate because data are more widely available at that level.

The second issue is that of *emergent property*, which may appear when a number of simple entities (or individual actors or agents) operate in an environment, social or otherwise, forming more complex behaviors as a collective. Emergent properties are not reducible to the properties of the individual agents. This idea is attributed to Emile Durkheim in *The Rules of the Sociological Method*, initially published in French in 1895. The idea of emergent property is a potent and power one, and its influence can be found outside of the social sciences today. For example, researchers of artificial intelligence study the so-called emergent functionality. Put another way, a component has a particular functionality, which is not recognizable as a subfunction of the global functionality. For survey researchers, data collected at the individual level should not be aggregate in order to draw inference for a particular behavior at a higher level, which may be emergent.

Both the ecological fallacy and emergent property are important issues for survey researchers because the (primary) sampling unit of a survey sets a limit for the level of analysis a researcher wants to use. A sampling unit is the elementary unit that is sampled or selected for detailed examination, and valid statistical sampling requires that each sampling unit have a deter-minable nonzero chance of selection and that each be selected randomly. Statistical properties aside, sampling unit gives the level at which detailed information is acquired. For example, the General Social Survey (GSS) in the United States samples English-speaking individuals 18 years or older living in noninstitutional arrangements in the United States. Naturally, the GSS is most appropriate for analysis at the individual level.

All surveys on which individuals are interviewed are not at the individual level. For example, the Panel Survey of Income Dynamics (PSID) has household as the sampling unit. Even though it is the individuals who are interviewed, detailed information is available at both the individual and the household level. Similar **[p. 421 ↓]** surveys include the British Household Panel Survey (BHPS) and the European Community and Household Panel (ECHP). An analysis of the BHPS, ECHP, or PSID households should be as straightforward as an analysis of individuals using the GSS. An analysis of individuals from the BHPS, ECHP, or PSID, however, becomes trickier than one may think even though there is detailed information available for these individuals who are drawn from the households sampled by certain statistical principles because these individuals in the same household are no longer independent observations; they form clusters that deserve special statistical treatment.

Another example of surveys where the level is not set at the individual is the National Organizations Study (NOS). Even though the eligible establishments (or organizations) were initially identified through the 1991 GSS, the NOS sampled work organizations, with establishment as the sampling unit. Obviously, researchers analyzing the NOS data set the level of analysis at the organizational level. Clearly, the questions that get asked on a survey like the NOS will not be the same as those directed toward individual solo entrepreneurs because of emergent property in work organizations.

Finally, it is worth reiterating that the level of one's theory and that of the analysis must be consistent with each other. The proliferation of household-level surveys, together with the frequency in which data from such surveys are analyzed to answer

individual-level questions, poses an interesting challenge for the survey researcher: Can household surveys be used to answer individual questions? The answer is a qualified "yes." The qualification comes in two ways: To the extent that dependence among members of the same household is recognized and handled properly, and to the extent that individuals' representation of the population is appropriate (if necessary, weighted), household surveys can answer individual questions because individuals are the ones who are interviewed individually, not collectively as a household. The last point also raises another question for survey researchers: How well can individuals represent households of which they are a member? That is a question for survey designers, and as such, it is beyond the issue of level of analysis.

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See also

- Ecological Fallacy

Further Readings

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