

ten

QUANTITATIVE RESEARCH DESIGN

There are three main ideas I want students to master and to take from this chapter.

First, as with qualitative research, it is research design which connects quantitative research questions with quantitative data (Figure 10.1). And as with qualitative research, quantitative designs are driven by strategies. The concept of strategy here means exactly the same as earlier – a set of logically connected steps by which the data (in this case quantitative) will be used to answer the research questions. Thus, experiments, quasi-experiments and correlational surveys – the three main quantitative designs described in this chapter – each have a clear strategy behind them, and it is important for students to understand these strategies. We know a strategy is understood when it can be described in a short paragraph, using clear, non-technical language.

Second, in addition to what has just been said, it is especially important to understand the logic of the experiment. This is because experimental logic is central to all three of the quantitative designs discussed. The fact that experimental design is not able to be used very much in many social science research situations does not diminish the importance of its logic. Because of its importance, I spend as much class time as is available discussing experimental design logic, giving examples of it and asking students to think up examples of it. I then discuss barriers to the use of experiments in social science, and show how it is that the same logic has been applied to non-experimental situations.

Third, it is equally important to understand both the concept and the logic of accounting for variance and the multiple linear regression analysis which gives expression to it and implements it. To me, this is one of the most powerful and widely applicable quantitative research strategies. Whole research programmes can be organised around this strategy. Central to teaching and understanding it are the following:

- The concepts of independent and dependent variables. Again, the more class time spent on illustrating this way of thinking, the better. It is not difficult to grasp, and it is not long before students are easily able to conceptualise relationships in this way.
- The concepts first of covariance and then of correlation and regression. The essential point to stress here is that showing that variables vary together – that is, showing that they share common variance – is the way we operationalise the idea of accounting for variance. These ideas come up more fully in Chapter 11 and, depending on time, it might be wise at this point to go ahead to Chapter 11 (section 11.4) and discuss this.

- While the relationship between two variables is a useful simplification in explaining and discussing these ideas, everything generalises to more than two variables, as in the conceptual framework for MLR.
- The conceptual framework for MLR, showing several independent variables and one dependent variable – see Figures 10.3 and 10.4. I stress that MLR can be seen both as a design strategy and as a statistical technique for the analysis of data. At this stage, I am stressing its role as a design strategy and as a widely applicable, powerful and useful framework for planning and designing research.

There is an interesting and logical story about the development and evolution of quantitative research design, which I have sketched in section 10.2 ('Some background'). I have tried to show how the early emphasis on experimental design has had to be modified over time, in view of practical and ethical constraints, and has led to the development of non-experimental approximations. It is good if students can understand this development, but in itself it is not the main objective of the chapter. Rather, I see the main objective as stated in the three points above.

One qualification, which will apply differentially depending on the specific teaching situation, is that the move from experimental design to non-experimental designs and correlational surveys will apply unevenly across different social sciences. Thus, some research areas in psychology, for example, may still be able to employ classic experimental design quite widely. Sociology, on the other hand, has seldom been able to experiment. Despite this, I still think it is important for all students to understand the basic ideas of this chapter.

There are two final points I want to stress about the material in this chapter:

1. **Survey:** the term 'survey' often needs attention and clarification. A survey is simply a general research strategy, in which some information (to be defined) is to be collected from some people (to be defined) in order to answer some questions (to be defined). There can be different types of survey – a quantitative survey collects quantitative data, a qualitative survey collects qualitative data and a mixed methods survey collects data of both types. Thus, survey is not necessarily a quantitative research strategy, though it very often is quantitative. In general, a survey will need a survey questionnaire (or some equivalent 'instrument') and a target sample of people. Note that this means that the often-used phrase 'distribute (or administer) a survey' is incorrect. We cannot administer a survey – we can only administer a survey questionnaire.
I use the term 'correlational survey' to try to stress that the best surveys are those which study the relationships between variables. This of course goes back to the design of the study, the research questions and the design of the survey questionnaire. 'Correlational survey' – a clumsy term, but I couldn't think of a better one – is obviously a type of quantitative survey.
2. **Controlling variables:** again, this is a much-used phrase, which can easily be misused and misunderstood. Therefore, I think time spent discussing and clarifying what 'control' means in this context is time well spent. Fundamentally, it comes down to two main ideas or strategies. One is to control a variable by not letting it vary (this can be done either 'physically' in the study design or 'statistically' in the analysis of data). The other is to let the variable vary but control the way it varies – this lies behind randomisation, and matching, as strategies for controlling variables. These ideas are presented more fully in section 10.9.