# Longitudinal study

A longitudinal study, like a cross-sectional one, is observational. So, once again, researchers do not interfere with their subjects. However, in a longitudinal study, researchers conduct several observations of the same subjects over a period of time, sometimes lasting many years. The benefit of a longitudinal study is that researchers are able to detect developments or changes in the characteristics of the target population at both the group and the individual level. The key here is that longitudinal studies extend beyond a single moment in time. As a result, they can establish sequences of events.

To return to our example, we might choose to look at the change in cholesterol levels among women over 40 who walk daily for a period of 20 years. The longitudinal study design would account for cholesterol levels at the onset of a walking regime and as the walking behavior continued over time. Therefore, a longitudinal study is more likely to suggest cause-and-effect relationships than a cross-sectional study by virtue of its scope.

In general, the research should drive the design. But sometimes, the progression of the research helps determine which design is most appropriate. Cross-sectional studies can be done more quickly than longitudinal studies. That’s why researchers might start with a cross-sectional study to first establish whether there are links or associations between certain variables. Then they would set up a longitudinal study to study cause and effect.

One example of this progression can be found in an Institute for Work & Health (IWH) project on the links between computer work and musculoskeletal disorders (MSDs) at a large newspaper. This project began with a cross-sectional study, aimed at exploring the links between injuries and different characteristics of the job (e.g. work stress) or of the worker (e.g. the social support he or she had at work). Knowing which links were strongest helped the researchers develop theories to test. In the next study, a longitudinal one, they studied changes in workers’ MSD symptoms over time. That study gave the researchers a better understanding of the cause-and-effect relationship between MSD symptoms and work/worker characteristics, which in turn lay the groundwork for intervention studies down the line.

# Cross-sectional study

Both the cross-sectional and the longitudinal studies are observational studies. This means that researchers record information about their subjects without manipulating the study environment. In our study, we would simply measure the cholesterol levels of daily walkers and non-walkers along with any other characteristics that might be of interest to us. We would not influence non-walkers to take up that activity, or advise daily walkers to modify their behavior. In short, we’d try not to interfere.

The defining feature of a cross-sectional study is that it can compare different population groups at a single point in time. Think of it in terms of taking a snapshot. Findings are drawn from whatever fits into the frame.

To return to our example, we might choose to measure cholesterol levels in daily walkers across two age groups, over 40 and under 40, and compare these to cholesterol levels among non-walkers in the same age groups. We might even create subgroups for gender. However, we would not consider past or future cholesterol levels, for these would fall outside the frame. We would look only at cholesterol levels at one point in time.

The benefit of a cross-sectional study design is that it allows researchers to compare many different variables at the same time. We could, for example, look at age, gender, income and educational level in relation to walking and cholesterol levels, with little or no additional cost.

However, cross-sectional studies may not provide definite information about cause-and-effect relationships. This is because such studies offer a snapshot of a single moment in time; they do not consider what happens before or after the snapshot is taken. Therefore, we can’t know for sure if our daily walkers had low cholesterol levels before taking up their exercise regimes, or if the behavior of daily walking helped to reduce cholesterol levels that previously were high.

# Exploratory research

Exploratory research is research conducted for a problem that has not been clearly defined. It often occurs before we know enough to make conceptual distinctions or posit an explanatory relationship.[1] Exploratory research helps determine the best research design, data collection method and selection of subjects. It should draw definitive conclusions only with extreme caution. Given its fundamental nature, exploratory research often concludes that a perceived problem does not actually exist.

Exploratory research often relies on secondary research such as reviewing available literature and/or data, or qualitative approaches such as informal discussions with consumers, employees, management or competitors, and more formal approaches through in-depth interviews, focus groups, projective methods, case studies or pilot studies. The Internet allows for research methods that are more interactive in nature. For example, RSS feeds efficiently supply researchers with up-to-date information; major search engine search results may be sent by email to researchers by services such as Google Alerts; comprehensive search results are tracked over lengthy periods of time by services such as Google Trends; and websites may be created to attract worldwide feedback on any subject.

When the purpose of research is to gain familiarity with a phenomenon or acquire new insight into it in order to formulate a more precise problem or develop hypothesis, the exploratory studies (also known as formulative research) come in handy. If the theory happens to be too general or too specific, a hypothesis cannot be formulated. Therefore a need for an exploratory research is felt to gain experience that will be helpful in formulative relevant hypothesis for more definite investigation.

The results of exploratory research are not usually useful for decision-making by themselves, but they can provide significant insight into a given situation. Although the results of qualitative research can give some indication as to the "why", "how" and "when" something occurs, it cannot tell us "how often" or "how many".

Exploratory research is not typically generalizable to the population at large.

Social exploratory research "seeks to find out how people get along in the setting under question, what meanings they give to their actions, and what issues concern them. The goal is to learn 'what is going on here?' and to investigate social phenomena without explicit expectations." (Russell K. Schutt, "Investigating the Social World," 5th ed.). This methodology is also at times referred to as a grounded theory approach to qualitative research or interpretive research, and is an attempt to unearth a theory from the data itself rather than from a predisposed hypothesis.

Earl Babbie identifies three purposes of social science research. The purposes are exploratory, descriptive and explanatory. Exploratory research is used when problems are in a preliminary stage.[3] Exploratory research is used when the topic or issue is new and when data is difficult to collect. Exploratory research is flexible and can address research questions of all types (what, why, how). Exploratory research is often used to generate formal hypotheses. Shields and Tajalli link exploratory research with the conceptual framework working hypothesis.

# Demography Research

Demography (prefix, Demo-) is the statistical study of populations, including of human beings. As a very general science, it can analyze any kind of dynamic living population, i.e., one that changes over time or space (see population dynamics). Demography encompasses the study of the size, structure, and distribution of these populations, and spatial and/or temporal changes in them in response to birth, migration, ageing, and death. Based on the demographic research of the earth, earth’s population up to the year 2050 and 2100 can be estimated by the demographers. Demographics are quantifiable characteristics of a given population.

Demographic analysis can cover whole societies, or groups defined by criteria such as education, nationality, religion and ethnicity. Educational institutions] usually treat demography as a field of sociology, though there are a number of independent demography departments.[3]

Formal demography limits its object of study to the measurement of population processes, while the broader field of social demography or population studies also analyzes the relationships between economic, social, cultural and biological processes influencing a population

There are two types of data collection demographic: direct and indirect—with several different methods of each type.

Direct methods

Direct data comes from vital statistics registries that track all births and deaths as well as certain changes in legal status such as marriage, divorce, and migration (registration of place of residence). In developed countries with good registration systems (such as the United States and much of Europe), registry statistics are the best method for estimating the number of births and deaths.

A census is the other common direct method of collecting demographic data. A census is usually conducted by a national government and attempts to enumerate every person in a country. However, in contrast to vital statistics data, which are typically collected continuously and summarized on an annual basis, censuses typically, occur only every 10 years or so, and thus are not usually the best source of data on births and deaths. Analyses are conducted after a census to estimate how much over or undercounting took place. These compare the sex ratios from the census data to those estimated from natural values and mortality data.

Censuses do more than just count people. They typically collect information about families or households in addition to individual characteristics such as age, sex, marital status, literacy/education, employment status, and occupation, and geographical location. They may also collect data on migration (or place of birth or of previous residence), language, religion, nationality (or ethnicity or race), and citizenship. In countries in which the vital registration system may be incomplete, the censuses are also used as a direct source of information about fertility and mortality; for example the censuses of the People's Republic of China gather information on births and deaths that occurred in the 18 months immediately preceding the census.

Indirect methods

Indirect methods of collecting data are required in countries and periods where full data are not available, such as is the case in much of the developing world, and most of historical demography. One of these techniques in contemporary demography is the sister method, where survey researchers ask women how many of their sisters have died or had children and at what age. With these surveys, researchers can then indirectly estimate birth or death rates for the entire population. Other indirect methods in contemporary demography include asking people about siblings, parents, and children. Other indirect methods are necessary in historical demography.

There are a variety of demographic methods for modeling population processes. They include models of mortality (including the life table, Gompertz models, hazards models, Cox proportional hazards models, multiple decrement life tables, Brass relational logits), fertility (Hernes model, Coale-Trussell models, parity progression ratios), marriage (Singulate Mean at Marriage, Page model), disability (Sullivan's method, multistate life tables), population projections (Lee Carter, the Leslie Matrix), and population momentum (Keyfitz).

The United Kingdom has a series of four national birth cohort studies, the first three spaced apart by 12 years: the 1946 National Survey of Health and Development, the 1958 National Child Development Study,[11] the 1970 British Cohort Study,[12] and the Millennium Cohort Study, begun much more recently in 2000. These have followed the lives of samples of people (typically beginning with around 17,000 in each study) for many years, and are still continuing. As the samples have been drawn in a nationally representative way, inferences can be drawn from these studies about the differences between four distinct generations of British people in terms of their health, education, attitudes, childbearing and employment patterns

3.methodological approach to research problem identification

Advocacy/participatory approach to research (emancipatory)

To some degree, researchers adopting an advocacy/participatory approach feel that the approaches to research described so far do not respond to the needs or situation of people from marginalised or vulnerable groups. As they aim to bring about positive change in the lives of the research subjects, their approach is sometimes described as emancipatory. It is not a neutral stance. The researchers are likely to have a political agenda and to try to give the groups they are studying a voice. As they want their research to directly or indirectly result in some kind of reform, it is important that they involve the group being studied in the research, preferably at all stages, so as to avoid further marginalising them.

Pragmatic approach to research (mixed methods)

The pragmatic approach to science involves using the method which appears best suited to the research problem and not getting caught up in philosophical debates about which is the best approach. Pragmatic researchers therefore grant themselves the freedom to use any of the methods, techniques and procedures typically associated with quantitative or qualitative research. They recognise that every method has its limitations and that the different approaches can be complementary.

Deductions from Theory

This relates to deductions made from social philosophy or generalizations embodied in life in society that the researcher is familiar with. These deductions from human behavior are then fitted within an empirical frame of reference through research. From a theory, the researcher can formulate a research problem or hypothesis stating the expected findings in certain empirical situations. The research asks the question: “What relationship between variables will be observed if theory aptly summarizes the state of affairs?” One can then design and carry out a systematic investigation to assess whether empirical data confirm or reject the hypothesis, and hence, the theory.

Interdisciplinary Perspectives

Identifying a problem that forms the basis for a research study can come from academic movements and scholarship originating in disciplines outside of your primary area of study. A review of pertinent literature should include examining research from related disciplines that can reveal new avenues of exploration and analysis. An interdisciplinary approach to selecting a research problem offers an opportunity to construct a more comprehensive understanding of a very complex issue that any single discipline may be able to provide.

Interviewing Practitioners

The identification of research problems about particular topics can arise from formal or informal discussions with practitioners who provide insight into new directions for future research and how to make research findings more relevant to practice. Discussions with experts in the field, such as, teachers, social workers, health care providers, lawyers, business leaders, etc., offers the chance to identify practical, “real world” problems that may be understudied or ignored within academic circles. This approach also provides some practical knowledge which may help in the process of designing and conducting your study.

Personal Experience

Your everyday experiences can give rise to worthwhile problems for investigation. Think critically about your own experiences and/or frustrations with an issue facing society, your community, your neighborhood, your family, or your personal life. This can be derived, for example, from deliberate observations of certain relationships for which there is no clear explanation or witnessing an event that appears harmful to a person or group or that is out of the ordinary.

Relevant Literature

The selection of a research problem can be derived from an extensive and thorough review of pertinent research associated with your overall area of interest. This may reveal where gaps exist in our understanding of a topic. Research may be conducted to: 1) fill such gaps in knowledge; 2) evaluate if the methodologies employed in prior studies can be adapted to solve other problems; or, 3) determine if a similar study could be conducted in a different subject area or applied to different study sample [i.e., different groups of people]. Also, authors frequently conclude their studies by noting implications for further research; this can also be a valuable source of new problems to investigate.