Unit 2 Research Design and Data Collection

Once you have clarified your research question and objectives and developed a framework for your research, you need to consider what type of *research design* will help you answer your question.

What type of research? ***In pairs, match the 4 definitions with their meanings below:***

A - Deductive research

B - Quantitative research

C - Inductive research

D - Qualitative research

A formal, objective and systematic process in which numerical data is used to obtain information. It involves testing a hypothesis or trying to discover relationships. It is generally deductive research (this means that a scientist would start from a hypothesis and then begin observations to prove the hypothesis). It is designed to establish differences, relationships or causality (does one thing cause another?).

A generally subjective and involves words rather than numbers. It looks at feelings, opinions and emotions and is concerned with trying to explain *why* rather than *what* or *how many*. It tends to be inductive, which means a hypothesis can be developed through the research. It tries to explain differences, relationships or causality. Qualitative data can also produce quantitative data, for example, you may record how many people said that they like playing sport because they can spend time with their friends.

Involves the development of an idea, or hypothesis, from existing theory which can then be tested through the collection of data. A *hypothesis* is a statement of the relationship between two variables that can be tested, for example one could be that 'children with parents who participate regularly in sport are more likely to have positive attitudes towards sports participation themselves'.

More often associated with interpretative, qualitative studies. Here, the pattern is to collect and analyse data to develop a theory, or explanation. For example, you may be interested as to the sports participation patterns of immigrant groups. You may find that there is not enough existing evidence to develop a hypothesis. You could interview a sample of immigrant sport participants to collect data about their participation, which could then be used to develop an explanation. This theory can then be tested and refined later through further data collection.

Which approach is best for my research? ***Listen, then discuss with the group***

Which type of research you choose depends on your research question and objectives. Topics that are more associated with measurement of a particular phenomenon will be more suited for the collection of quantitative data. Projects that study the thoughts, attitudes or feelings of people are hard to quantify, and qualitative data will be more appropriate. If you are interested in describing what is happening in an area where there is a considerable amount of existing theory, then a deductive approach may be appropriate. If you are interested in explaining why something is happening, and the area is relatively new, or under- researched, then an inductive approach may be better. The type of project should be *dictated by the research question,* rather than the skills or preferences of the researcher. You should always choose the approach that is *best to try and meet the goals and objectives of the research project.*

(Adapted from Jones and Gratton, Research Methods for Sports Studies, 2004)

Research designs

A number of research designs are used within sport and exercise sciences. A research design is the overall structure of your research. Some of the common designs are described below:

**** Discuss in pairs, match the definition below with the type of research design.***

1. **Experimental** **2.Cross-sectional** **3.Case study**
4. **Longitudinal** **5.Comparative**

a) This research design is where you investigate a particular phenomenon (e.g. an individual or team) over a long period of time. It takes into account the development of the area of investigation over time and the environment in which the research resides.

b) In this type of research, the researcher compares two or more things with the aim of discovering something about one or all of them.

c) This research design involves using a range of participants with different backgrounds, ages and genders from the overall populations.

d) The aim of this research design is to look at the effects of an independent variable on a dependent variable. To use this research effectively, you need to understand the terms independent and dependent variable. The independent variable affects the dependent variable.

e) This type of research involves measuring the same variables over a long period of time and requires greater resources than other types of research. This type of investigation is useful if you want to examine the developmental characteristics of a group.

Which of the designs would you use to examine the following phenomena?

**** Discuss with the group***

a) if you wanted to examine factors associated with talent development in a particular sport.

b) if you wanted to investigate the psychological effects of injury at different stages of injury and recovery.

c) if you want to find out if a lower back flexibility training is benefiting athlete´s high jump performance.

d) if you wanted to study preferences for team sports or individual sports in people in the UK.

e) if you wanted to find out if there were any similarities between boys´ and girls´ opinions on hooliganism in football.

**** Work with a partner. Think of or create 1 - 2 more examples of studies that would fit under each heading, then discuss with the group:***

1. **Experimental**

2. **Cross-sectional**

3. **Case study**

4. **Longitudinal**

5. **Comparative**

Questions for your own research: **** Reflect and write a brief answer for each question.***

Can you clearly identify and justify the research design you are using?

Have you considered any alternative designs?

Academic language – useful language that relates to ideas:

Complete the table below, by adding in the appropriate academic word

concept framework model notion

perception stance viewpoint

Word	**Synonym / meaning**	**Example**
	way of thinking, often well known	He made his _____ on the issue very clear.
	principle, idea	The _____ of religion is practiced differently around the world.
	opinion, way of looking at an issue	The writer provides a different _____ on this controversial topic.
	belief, opinion	The news story had a powerful effect on the _____ of the problem by the readers.
	system of rules, beliefs or ideas	I'm working on the theoretical _____ for my research project.
	simple description, useful for describing an idea	The writer uses a Marxist _____ for the basis of his discussions on social history.
	belief, idea	I don't agree with the _____ that girls and boys should attend different schools.

(Adapted from McCarthy and Odell, Academic Vocabulary in Use, 2008)

Data Collection

Your research design will help you guide and plan when and how you will collect your research data – data collection is based on this design. Therefore you should carefully consider your research question and possibilities for data collection as you decide on which research design to choose for your project. Whatever your research design, you will likely need to try and collect data from a limited number of a certain population – this is your research *sample.* The sample represents the population you are studying. You also need to think about the method you will use to collect data from the sample population.

Data collection should be well planned and organized, as the quality of data collection can be critical in the overall value of the research results.

(adapted from Haag, Research Methodology for Sport and Exercise Science, 2004).

Data Collection

**** Read about some different forms of data collection. Complete the gaps with the appropriate article, preposition or linking word.***

Some of the methods of data collection _____ Sports Science research include the following:

Questionnaires: are a very commonly used method in sport-related research. A questionnaire is simply ____ standardised set of questions used to gain information from ____ subject. They are often associated with quantitative research designs, when simple measurements are required from a large sample group. Questionnaires generally fall _____ one of three categories: postal, telephone or face ____ face questionnaires.

Research interviews: The principle of _____ research interview is simply _____ recording of data from subjects via ____ interview process by ____ researcher. The face to face interview is undoubtedly ____ most common method by which qualitative data is collected ____ sport research. Research interviews are quite different ____ the very structured form that a questionnaire will usually take. Whereas ____ questionnaire collects data and is usually completed without ____ presence of the researcher, the researcher is ____ key element of the interview process, and the skills, attributes and interviewing technique ____ the researcher forms an integral part of the success of this method ____ obtaining real qualitative data.

Observation: Observation is ____ appropriate method when the phenomenon _____ investigation can be directly observed. If you want to examine whether sports fans are more likely to wear their team's clothing after they've won, ____ observation is entirely appropriate and suitable. However, more complex questions such ____ why they are more likely ____ wear this clothing wouldn't be possible to answer with observation alone, and must incorporate other methods ____ data collection ____ as interviewing or questionnaires.

Ethnography: This form ____ data collection uses a variety of different methods to try and investigate a group ____ a significant period of time. The purpose is usually to study a group of people and their culture ____ their own environment, by examining behavior from the groups and not just from the researchers perspective. The researcher must take ____ the role of ____ 'insider' and spend significant periods of time within the group, _____ which time data is collected. (pg 176).

**** What type of data collection are the below examples? Read and discuss with the group.***

Photographs, films and video. It is not just words that can be analysed. Pictures can provide a wealth of descriptive data, and may be used in a similar manner to non-participant observation. Fishwick and Leach (1998) carried out a content analysis of BBC television commentaries of the 1994 Wimbledon Tennis Championships. They wanted to find out whether there was any gender bias within the commentaries, for example whether the male tennis players were perceived as powerful and important, whereas female players were seen as subordinate. ***What sort of data collection was used in this study?***

Andrew Sparkes (2000) was interested to find out the 'complex ways in which a strong athletic identity can act as an Achilles heel in terms of both shaping an individual's reactions to a disruptive life event, and the consequences of these reactions for personal long-term development' (p.15), that is how an elite sports person would react to the ending of their athletic career. The objective was not to generalise the findings to a wider population – rather to gain an understanding of the processes by which the athlete coped with the termination of their athletic identity. In this instance a *single subject* was chosen — Rachel. Through examining Rachel's reactions to the end of her sporting career, Sparkes was able to explain some of the issues, which could then be generalised to other athletes. By having a small (n = 1), non- random sample, Sparkes was able to discover a great deal of information, and demonstrated that, in qualitative research, it is the amount of *data* that is important, rather than the amount of subjects. ***What sort of data collection was used in this study?***

Thus, by a combination of immersion within the group for an extended period of time, and the use of different data collection methods whilst immersed, Sugden was able to both describe, and more importantly, explain the behaviours of members of the particular boxing subculture by collecting data that would – in all likelihood – be unavailable with an alternative method of data collection. ***What sort of data collection was used in this study?***

UK Sport (1999) has provided a set of guidelines for those conducting research into the economic impact of major sporting events. These studies are generally done through visitor surveys, and the additional expenditure generated within a city as a consequence of hosting an event can partially be evaluated through self-completion of these. The objectives of the research are as follows: *Objective 1*. To quantify the proportions of respondents who live in the host city and those who are from outside the host city. *Objective 2*. To determine the catchment area of the event by local, regional, national and international responses. ***What sort of data collection was used in this study?***

Hypotheses

**** What is a hypothesis? Discuss with the group.***

The basic idea of a hypothesis is that there is no pre-determined outcome. For a hypothesis to be termed a scientific hypothesis, it has to be something that can be supported or refuted through carefully crafted scientific testing.

A key function in this step of the scientific method is deriving predictions from the hypotheses about the results of future experiments, and then performing those experiments to see whether they support the predictions.

Examples of hypotheses:

- If sugar causes cavities, then people who eat a lot of candy may be more prone to cavities.
- If UV light can damage the eyes, then maybe UV light is a cause of blindness.
- Is bacterial growth affected by moisture levels in the air?

Notice that all of the statements, above, are testable. The primary trait of a hypothesis is that something *can be tested* and that those *tests can be replicated*, according to Midwestern State University.

(Adapted from: Livescience.com: https://www.livescience.com/21490-what-is-a-scientific-hypothesis-definition-of-hypothesis.html?utm_source=scoopinion)

In statistics, a hypothesis is usually notated as H. Ho = null hypothesis – there is no difference between variables (EQUALITY). The alternative, H1 infers INEQUALITY (i.e. differences) between the variables.

E.g. Ho: Athletes and non-athletes have a similar basic metabolic heart rate.

H1: ……..

**** Comment on the criteria for judging hypotheses: Do you agree with the statements below? Are they true or false?***

A. Hypotheses should be stated clearly, in correct terminology and operationally.

B. Hypotheses should be testable.

C. Hypotheses should state relationships between variables.

D. Hypotheses should be limited in scope.

E. Hypotheses should not be inconsistent with most known facts.

(Burns, R.B. *Introduction to Research Methods.* Pearson Education, 2000.)

More Important Research Language

**** Work with a partner and write down a definition for the following terms:***

-Reliability:

-Validity:

- Recruit:

- Bias:

- Blindness:

- Double-blindness:

- Drop-out:

- Extrapolation of findings:

Integration of literature review and personal intentions

Once the researcher has selected the appropriate information and scientific resources, the next stage in the research process is to summarise and integrate the information with their personal intentions (objectives). Reading the literature will often result in new ideas and/or directions to be investigated.

A literature review integrated with the researcher´s personal intention may result in a theoretical foundation of a study, see the example below.

**** Read through the text below and with a partner, answer the following questions:***

- Which lines/paragraphs outline the topic as a relevant research area, and describe what previous studies have revealed?

- Which lines/paragraphs establish where the gap in the research is, paving the way for the current study?

- Which lines/paragraphs outline how the current study will move to answer the gap in the research and why this is relevant.

1. Research has indicated that a relationship exists between psychological, physiologic, and health variables. This was documented in relations between personality types and coronary artery disease (18, 21), blood pressure and personality (15,16, 20), vascular reaction and personality traits (41) and anxiety and injury proneness (28).

2. The type A behaviour pattern has been established as an independent cluster of behaviours and attitudes (called an action-emotion complex) that relates to the risk of developing coronary heart disease (36). Type A individuals are said to be hard driving and competitive, feel pressured by time, aggressive, impatient, hostile (22).

3. Physiologic responses to similar physical stress may vary among individuals. A notable example is the systolic blood pressure (SBP) response to an exercise task. Several authors have shown that the BP response to exercise may be useful in prediction of future hypertension (6, 19, 43).

4. Weingarten et al. (42) examined the relationship between SBP response to exercise and anxiety in elite water polo players. They found a significantly higher resting SBP in the group scoring higher on anxiety, with a trend to higher SBP during exercise.

5. Competitive athletes have been shown to have a higher SBP response to exercise than non-trained individuals in the same age range. This was true for adolescents (4,7,) as well as for adults (5). Due to the various components of the type A personality, it could be assumed that competitive athletes have more tendencies towards A personality. This, however, was not measured in the above studies.

6. Whether this holds true for specific sports groups is unknown. There is some evidence that certain psychological characteristics are common to successful sportsmen participating in a specific sport (33,34). This gives rise to the question of whether a relationship exists between the psychological make-up and the SBP response to exercise.

7. While some data are available on the influence of psychological status (anxiety, extraversion, motivation) on performance (9), there are no studies examining the relationships between type A personality and objective physiologic parameters during exercise and more specifically SBP response to exercise.

8. This paper attempts to examine some of the relationships between type A personality traits and SBP response to an exercise task.

(adapted from Tenenbaum, G; Driscoll, M.P. (2005) *Methods of Research in Sport Sciences*).

*** Homework - in preparation for the next seminar:**

- Think about your research question and objectives and how the research articles you have found and evaluated fit in with your question and research objectives.

- Prepare a short 2-3 minute presentation on your research topic, what you aim to investigate, what previous studies have found, why the research question is relevant, what your hypothesis and predictions for the study findings are. (Don't worry about power-point slides etc)

** We will listen to and peer review the presentations at the start of the next seminar.*