

## I Description

## Prescription

Deals with the question 'what is'.

Deals with the question 'what should be'.

Many research texts combine descriptive and prescriptive argumentation. But a solid text makes very clear distinctions between description and prescription. Prescription (or: design) is generally *preceded* by, and based on, description (or: problem definition and diagnosis; ⊕A2). 'Mere' description should be treated with suspicion. The suggestion is that a description is more less 'objective'. Each description, however, has an (implicit) framework of reference. Has the author made this framework of reference and the problem definition sufficiently explicit (⊕A3)? If description and prescription are mixed, the argumentation will be unconvincing. Be aware that such an argumentation structure could also indicate a poorly developed analytical framework.

**II Induction**

A number of specific observations are used to reach a general conclusion. Ask the following questions to figure out whether one could speak of 'proper' induction: Are the number of observations sufficient? Are they representative? Are the observations reliable and, in case of experiments, properly conducted? Has the conclusion been carefully formulated (that is: only that is concluded what can be proven from the observations)?

**Deduction**

A general observation is used to reach conclusions (or consequences) for a specific case. Ask yourself the following questions: Is the generalisation with which the argumentation starts (*premise major*: 'All men are mortal') valid? Does the specific observation (*premise minor*: 'Socrates is a man') that is elaborated fit into the category that is deduced from the general observation? Does the conclusion of the specific case only relate to the observation ('Socrates is mortal')? This kind of deductive reasoning is called Syllogism. (⊕C8)

Inductive reasoning is very common in statistical research. Problems often arise from the (re)presentation of the selection, and from the usefulness of the accumulated observations. Deductive reasoning is often found in more macro-oriented sciences or in longer established scientific disciplines, in which research is often meant to gain further acceptance or denial of previously established theories. In general, induction precedes deduction: from empirical observations general theories are/have been constructed, which are then tested on the basis of further specific observations. If the specific observations that inductively lead to generalised observations, are used to illustrate specific observations in the next phase of research, the argumentation runs in a circle and becomes *tautological*. It is always very important for a reader to assess the origins of the induction that lead to the generalisation, even if a research project explicitly uses a deductive argumentation structure. Check the empirical background of the induction. Especially in 'how to' texts, it is important to know the background of the generalisation (⊕C8). It is always important to check whether induction and deduction are based on clear and reliable principles.

**III Causes**

You are interested in ‘why’ you see particular phenomena appear. If x happens, z will have caused this. The argumentation is past and explanation-oriented.

**Consequences**

You are primarily interested in ‘what’ the outcome of particular observations is: if x happens, y will be the result. The argumentation focuses on the future and extrapolations.

Causal reasoning is a specification of inductive and deductive reasoning. A causal relationship in a deductive argumentation departs from a general statement and reaches two kinds of conclusions: (1) the anticipation of a consequence, (2) the reconstruction of a cause. A causal relationship, in an inductive argumentation, focuses on a number of individual observations and the way they relate in terms of causes and consequences. The generalisation of these observations constitutes the final causal relationship. For example, consider the following two observations: the sea is blue when the sky is blue, the sea turns grey when the sky is cloudy. Probable causality: the colour of the sea is caused by the condition of the sky. Always check closely which variables are included and which variables are excluded (*ceteris paribus* provision) from the argumentation. Also, decide whether the yardstick for assessing (*benchmarking*) the outcome of the comparison is appropriate. A normal sequence of argumentation first considers causes before going to consequences. Beware of argumentation structures in which the same causes are supposed to lead to the same consequences even under different circumstances. Also, be very critical when confronted with reasoning in *trends or paradigms*: they are presented as an ‘objective’ reality (which often they are not) that has comparable consequences for social actors under all circumstances.

## IV Analogies

The argumentation shows that there is a resemblance between what is observed and other observations. For example you look in the past ('history repeats itself') or in another country to find analogies.

## Metaphors

Relate an observation from a known phenomenon but from a completely different background. 'Economics is like a football match'.

An analogy can never really be proven, because the circumstances are never the same. Therefore, when reading analogies pay close attention to the indicators that are specified to make the analogy convincing. Argumentation which uses metaphors can also never be proven. The prime function of both metaphors and analogies is therefore to find additional observations and questions which may bring fresh insight into the topic (*heuristic function*). Analogies are generally more concrete than metaphors and are therefore easier to check. Scientific texts, with many analogies, are often more appropriate than texts with many metaphors (also in the style of writing). Neither metaphors nor analogies can substitute direct reasoning as the basis for observable phenomena (inductive and/or deductive causalities). Check whether the author has found a balance between illustrations and clarification (through analogies and metaphors) and direct argumentation.

## V In favour

What supports a particular observation? If an author aims primarily at supportive or explanatory observations the argumentation becomes *apologetic*.

## Against

What denies a particular observation? If an author only lists counter-arguments, the text is aimed at *criticism*.

If a text only reveals argumentation in favour or against a particular observation, the reader is faced with an unbalanced argumentation structure. If the author has only made superficial reference to counter-arguments, the argumentation remains weak. There is no particular sequence for presenting arguments in favour or against a theory. For example, it is not a good idea to begin a research text by stating what it is *not about*. It may even be a sign of either intellectual laziness, or of insecurity. It is a sign of good argumentation when a writer tries to take argumentation in favour and against seriously and is willing and capable of 'playing the devil's advocate' when necessary. The more convincing the representation of arguments in favour and against, the more convincing the ultimate conclusions will be. If the research methodology has not been well developed, implying that *ex-ante* (expectations) and *ex-post* (conclusions) are revealed and balanced, the danger of (*ex-post*) *rationalisation* increases: presenting something as reasonable which is not reasonable.

## VI Necessary conditions

## Sufficient conditions

To have outcome x, condition y should be favourable.

If condition y is favourable, outcome x will appear.

A common sequence of argumentation is first to look at 'necessary' conditions and then to consider whether they are also 'sufficient'. Balanced argumentation and research always considers both conditions (⊕E6, A7).