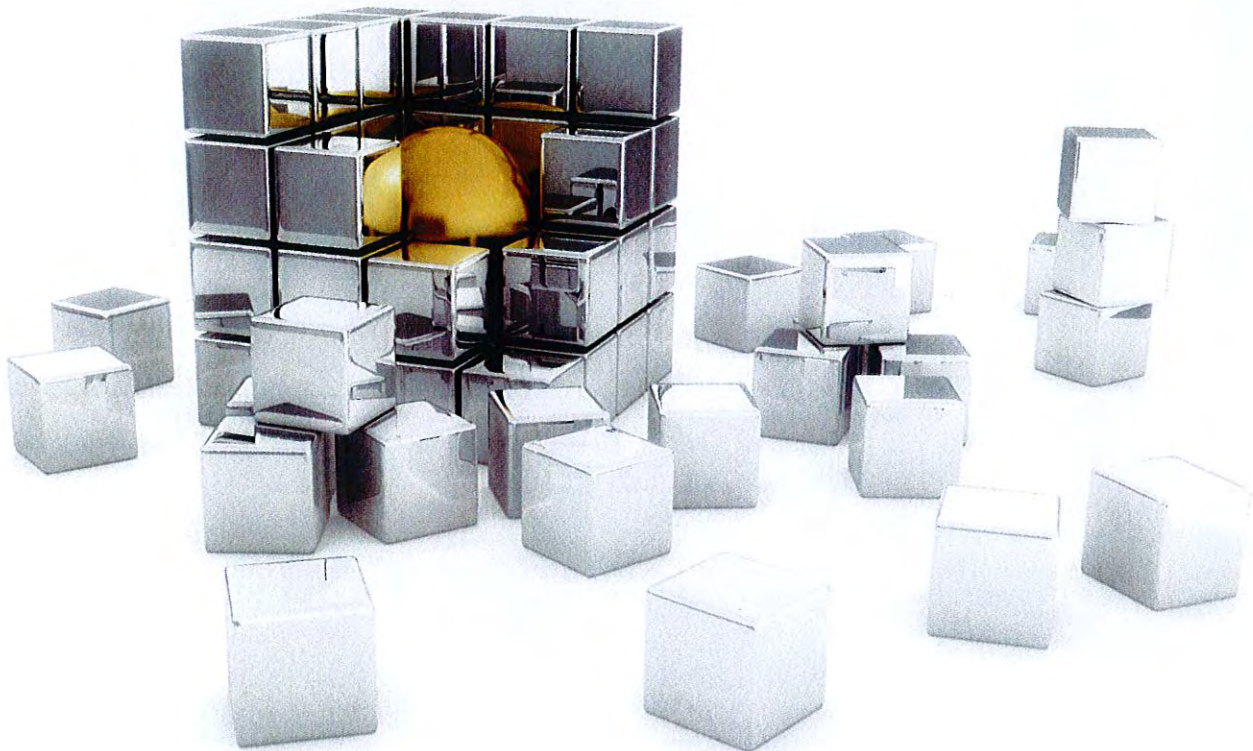


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EDITED BY
NEIL J. SALKIND

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See also Item Analysis; Item Response Theory

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DIRECTIONAL HYPOTHESIS

A directional hypothesis is a prediction made by a researcher regarding a positive or negative change, relationship, or difference between two variables of a population. This prediction is typically based on past research, accepted theory, extensive experience, or literature on the topic. Key words that distinguish a directional hypothesis are: *higher*, *lower*, *more*, *less*, *increase*, *decrease*, *positive*, and *negative*. A researcher typically develops a directional hypothesis from research questions and uses statistical methods to check the validity of the hypothesis.

Examples of Directional Hypotheses

A general format of a directional hypothesis would be the following: For (Population A), (Independent Variable 1) will be higher than (Independent Variable 2) in terms of (Dependent Variable). For example, "For ninth graders in Central High School, test scores of Group 1 will be higher than test scores of Group 2 in terms of Group 1 receiving a specified treatment." The following are other examples of directional hypotheses:

- There is a *positive* relationship between the number of books read by children and the children's scores on a reading test.
- Teenagers who attend tutoring sessions will make *higher* achievement test scores than comparable teenagers who do not attend tutoring sessions.

Nondirectional and Null Hypotheses

In order to fully understand a directional hypothesis, there must also be a clear understanding of a nondirectional hypothesis and null hypothesis.

Nondirectional Hypothesis

A nondirectional hypothesis differs from a directional hypothesis in that it predicts a change, relationship, or difference between two variables but does not specifically designate the change, relationship, or difference as being positive or negative. Another difference is the type of statistical test that is used. An example of a nondirectional hypothesis would be the following: For (Population A), there will be a difference between (Independent Variable 1) and (Independent Variable 2) in terms of (Dependent Variable 1). The following are other examples of nondirectional hypotheses:

- There is a relationship between the number of books read by children and the children's scores on a reading test.
- Teenagers who attend tutoring sessions will have achievement test scores that are *significantly different* from the scores of comparable teenagers who do not attend tutoring sessions.

Null Hypothesis

Statistical tests are not designed to test a directional hypothesis or nondirectional hypothesis, but rather a null hypothesis. A null hypothesis is a prediction that there will be no change, relationship, or difference between two variables. A null hypothesis is designated by H_0 . An example of a null hypothesis would be the following: for (Population A), (Independent Variable 1) will not be different from (Independent Variable 2) in terms of (Dependent Variable). The following are other examples of null hypotheses:

- There is *no* relationship between the number of books read by children and the children's scores on a reading test.
- Teenagers who attend tutoring sessions will make achievement test scores that are *equivalent* to those of comparable teenagers who do not attend tutoring sessions.

Statistical Testing of Directional Hypothesis

A researcher starting with a directional hypothesis will have to develop a null hypothesis for the purpose for running statistical tests. The null hypothesis predicts that there will not be a change or relationship between variables of the two groups or populations. The null hypothesis is designated by H_0 , and a null hypothesis statement could be written as $H_0 : \mu_1 = \mu_2$ (Population or Group 1 equals Population or Group 2 in terms of the dependent variable). A directional hypothesis or nondirectional hypothesis would then be considered to be an *alternative hypothesis* to the null hypothesis and would be designated as H_1 . Since the directional hypothesis is predicting a direction of change or difference, it is designated as $H_1 : \mu_1 > \mu_2$ or $H_1 : \mu_1 < \mu_2$ (Population or Group 1 is greater than or less than Population or Group 2 in terms of the dependent variable). In the case of a nondirectional hypothesis, there would be no specified direction, and it could be designated as $H_1 : \mu_1 \neq \mu_2$ (Population or Group 1 does not equal Population or Group 2 in terms of the dependent variable).

When one is performing a statistical test for significance, the null hypothesis is tested to determine whether there is any significant amount of change, difference, or relationship between the two variables. Before the test is administered, the researcher chooses a significance level, known as an alpha level, designated by α . In studies of education, the alpha level is often set at .05 or $\alpha = .05$. A statistical test of the appropriate variable will then produce a p value, which can be understood as the probability a value as large as or larger than the statistical value produced by the statistical test would have been found by chance if the null hypothesis were true. The p value must be smaller than the predetermined alpha level to be considered statistically significant. If no significance is found, then the null hypothesis is accepted. If there is a significant amount of change according to the p value between two variables which cannot be explained by chance, then the null hypothesis is rejected, and the alternative hypothesis is accepted, whether it is a directional or a nondirectional hypothesis.

The type of alternative hypothesis, directional or nondirectional, makes a considerable difference in the type of significance test that is run. A nondirectional hypothesis is used when a two-tailed test of significance is run, and a directional hypothesis when a one-tailed test of significance is run. The reason for the different types of testing becomes apparent when examining a graph of a normalized curve, as shown in Figure 1.

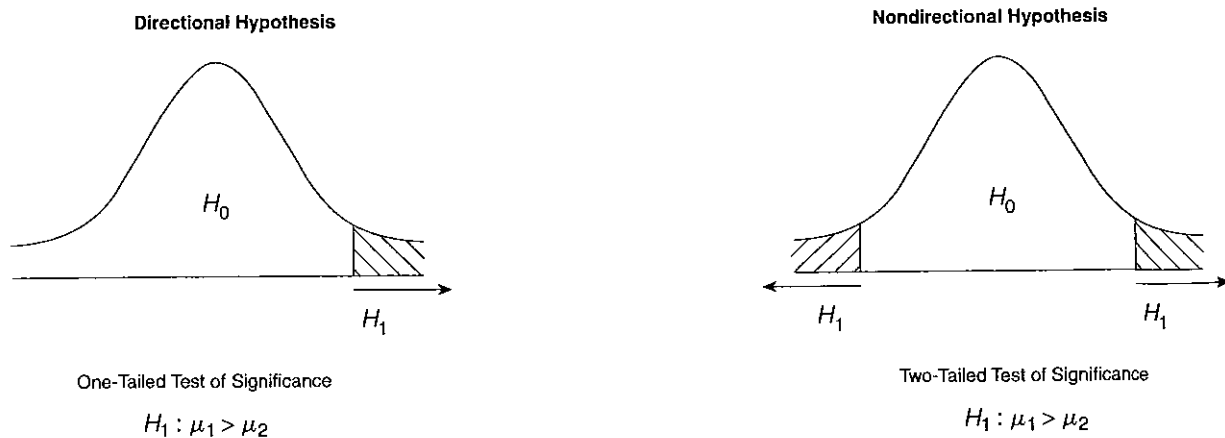


Figure 1 Comparison of Directional and Nondirectional Hypothesis Test

The nondirectional hypothesis, since it predicts that the change can be greater or lesser than the null value, requires a two-tailed test of significance. On the other hand, the directional hypothesis in Figure 1 predicts that there will be a significant change greater than the null value; therefore, the negative area of significance of the curve is not considered. A one-tailed test of significance is then used to test a directional hypothesis.

Summary Examples of Hypothesis Type

The following is a back-to-back example of the directional, nondirectional, and null hypothesis. In reading professional articles and test hypotheses, one can determine the type of hypothesis as an exercise to reinforce basic knowledge of research.

Directional Hypothesis: Women will have higher scores than men will on Hudson's self-esteem scale.

Nondirectional Hypothesis: There will be a difference by gender in Hudson's self-esteem scale scores.

Null Hypothesis: There will be no difference between men's scores and women's scores on Hudson's self-esteem scale.

Ernest W. Brewer and Stephen Stockton

See also Alternative Hypotheses; Nondirectional Hypotheses; Null Hypothesis; One-Tailed Test; *p* Value; Research Question; Two-Tailed Test

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DISCOURSE ANALYSIS

Discourse is a broadly used and abstract term that is used to refer to a range of topics in various disciplines. For the sake of this discussion, *discourse analysis* is used to describe a number of approaches to analyzing written and spoken language use beyond the technical pieces of language, such as words and sentences. Therefore, discourse analysis focuses on the use of language within a social context. Embedded in the constructivism-structuralism traditions, discourse analysis's key emphasis is on the use of language in social context. Language in this case refers to either text or talk, and context refers to the social situation or forum in which the text or talk occurs. Language and context are the two essential elements that help distinguish the two major approaches employed by discourse analysts. This entry discusses the background and major approaches of discourse analysis and frameworks associated with sociopolitical discourse analysis.

Background

In the past several years social and applied or professional sciences in academia have seen a tremendous increase in the number of discourse analysis studies. The history of discourse analysis is long and embedded in the origins of a philosophical tradition of hermeneutics and phenomenology. These traditions emphasize the issue of *Verstehen*, or lifeworld, and the social interaction within the lifeworld. A few major theorists in this tradition are Martin Heidegger, Maurice Merleau-Ponty, Edmund Husserl, Wilhelm Dilthey, and Alfred Schutz. Early applications of discourse analysis in social and applied

and professional sciences can be found in psychology, sociology, cultural studies, and linguistics. The tradition of discourse analysis is often listed under interpretive qualitative methods and is categorized by Thomas A. Schwandt with hermeneutics and social construction under the constructivist paradigm. Jaber F. Gubrium and James A. Holstein place phenomenology in the same vein as naturalistic inquiry and ethnomethodology. The strong influence of the German and French philosophical traditions in psychology, sociology, and linguistics has made this a common method in the social and applied and professional sciences. Paradigmatically, discourse analysis assumes that there are multiple constructed realities and that the goal of researchers working within this perspective is to understand the interplay between language and social context. Discourse analysis is hermeneutic and phenomenological in nature, emphasizing the lifeworld and meaning making through the use of language. This method typically involves an analytical process of deconstructing and critiquing language use and the social context of language usage.

Two Major Approaches

Discourse analysis can be divided into two major approaches: *language-in-use* (or socially situated text and talk) and *sociopolitical*. The language-in-use approach is concerned with the micro dimensions of language, grammatical structures, and how these features interplay within a social context. Language-in-use discourse analysis focuses on the rules and conventions of talk and text within a certain a context. This approach emphasizes various aspects of language within social context. Language-in-use methodologists focus on language and the interplay between language and social context. Language-in-use is often found in the disciplines of linguistics and literature studies and is rarely used in social and human sciences.

The second major approach, sociopolitical, is the focus of the rest of this entry because it is most commonly used within the social and human sciences. This approach is concerned with how language forms and influences the social context. Sociopolitical discourse analysis focuses on the

social construction of discursive practices that maintain the social context. This approach emphasizes social context as influenced by language. Sociopolitical methodologists focus on social context and the interplay between social context and language. This approach is most often found in the social and professional and applied sciences, where researchers using sociopolitical discourse analysis often employ one of two specific frameworks: Foucauldian discourse analysis and critical discourse analysis (CDA).

Sociopolitical Discourse Analysis Frameworks

Foucauldian Discourse Analysis

Michel Foucault is often identified as the key figure in moving discourse analysis beyond linguistics and into the social sciences. The works of Foucault emphasize the sociopolitical approach to discourse analysis. Foucault emphasizes the role of discourse as power, which shifted the way discourse is critically analyzed. Foucault initially identified the concept of archeology as his methodology for analyzing discourse. Archeology is the investigation of unconsciously organized artifacts of ideas. It is a challenge to the present-day conception of history, which is a history of ideas. Archeology is not interested in establishing a timeline or Hegelian principles of history as progressive. One who applies archeology is interested in discourses, not as signs of a truth, but as the discursive practices that construct objects of knowledge. Archeology identifies *how* discourses of knowledge objects, separated from a historical-linear progressive structure, are formed. Therefore, archeology becomes the method of investigation, contradictory to the history of ideas, used when looking at an object of knowledge; archeology locates the artifacts that are associated with the discourses that form objects of knowledge. Archeology is the *how* of Foucauldian discourse analysis of the formation of an object of knowledge. Archeology consists of three key elements: *delimitation of authority* (who gets to speak about the object of knowledge?), *surface of emergence* (when does discourse about an object of knowledge begin?),

and *grids of specification* (how the object of knowledge is described, defined, and labeled).

However, Foucault's archeology then suggests a power struggle within the emergence of one or more discourses, via the identification of *authorities of delimitation*. Archeology's target is to deconstruct the history of ideas. The only way to fully deconstruct the history of an idea is to critique these issues of power. Hence, the creation of genealogy, which allows for this critique of power, with use of archeology, becomes the method of analysis for Foucault. Foucault had to create a concept like genealogy, since archeology's implied power dynamic and hints of a critique of power are in a form of hidden power. The term *genealogy* refers to the power relations rooted in the construction of a discourse. Genealogy focuses on the emergence of a discourse and identifies where power and politics surface in the discourse. Genealogy refers to the union of erudite knowledge and local memories, which allows us to establish a historical knowledge of struggles and to make use of this knowledge tactically today. Genealogy focuses on local, discontinuous, disqualified, illegitimate knowledge opposed to the assertions of the tyranny of totalizing discourses. Genealogy becomes the way we analyze the power that exists in the subjugated discourses that we find through the use of archeology. So genealogy is the exploration of the power that develops the discourse, which constructs an object of knowledge. The three key elements of genealogy include *subjugated discourses* (whose voices were minimized or hidden in the formation of the object of knowledge?), *local beliefs and understandings* (how is the object of knowledge perceived in the social context?), and *conflict and power relations* (where are the discursive disruptions and the enactments of power in the discourse?). Archeology suggests that there is a type of objectivity that indicates a positivistic concept of neutrality to be maintained when analyzing data. While genealogy has suggestions of subjectivity, localisms, and critique, much like postmodernist or critical theory, archeology focuses on *how* discourses form an object of knowledge. Genealogy becomes focused on *why* certain discourses are dominant in constructing an object of knowledge. Therefore, archeology is the method of

data collection, and genealogy is the critical analysis of the data. These two concepts are not fully distinguishable, and a genealogy as Foucault defines it cannot exist without the method of archeology. Foucault's work is the foundation of much of the sociopolitical discourse analysis used in contemporary social and applied and professional sciences. Many discourse studies cite Foucault as a methodological influence or use specific techniques or strategies employed by Foucault.

CDA

CDA builds on the critique of power highlighted by Foucault and takes it a step further. Teun A. van Dijk has suggested that the central focus of CDA is the role of discourse in the (re)production and challenge of dominance. CDA's emphasis on the role of discourse in dominance specifically refers to social power enacted by elites and institutions' social and political inequality through discursive forms. The production and (re)production of discursive formation of power may come in various forms of discourse and power relations, both subtle and obvious. Therefore, critical discourse analysts focus on social structures and discursive strategies that play a role in the (re)production of power. CDA's critical perspective is influenced not only by the work of Foucault but also by the philosophical traditions of critical theorists, specifically Jurgen Habermas.

Norman Fairclough has stated that discourse is shaped and constrained by social structure and culture. Therefore he proposes three central tenets of CDA: social structure (class, social status, age, ethnic identity, and gender); culture (accepted norms and behaviors of a society); and discourse (the words and language we use). Discourse (the words and language we use) shapes our role and engagement with power within a social structure. CDA emphasizes when looking at discourse three levels of analysis: the text, the discursive practice, and the sociocultural practice. The text is a record of a communicated event that reproduces social power. Discursive practices are *ways of being in the world* that signify accepted social roles and identities. Finally, the sociocultural comprises the distinct context

where discourse occurs. The CDA approach attempts to link text and talk with the underlying power structures in society at a sociopolitical level through discursive practices. Text and talk are the description of communication that occurs within a social context that is loaded with power dynamics and structured rules and practices of power enactment. When text is not critically analyzed, oppressive discursive practices, such as marginalization and oppression, are taken as accepted norms. Therefore, CDA is intended to shine a light on such oppressive discursive practices. Discourse always involves power, and the role of power in a social context is connected to the past and the current context, and can be interpreted differently by different people due to various personal backgrounds, knowledge, and power positions. Therefore there is not one correct interpretation, but a range of appropriate and possible interpretations. The correct critique of power is not the vital point of CDA, but the process of critique and its ability to raise consciousness about power in social context is the foundation of CDA.

Bart Miles

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DISCRIMINANT ANALYSIS

Discriminant analysis is a multivariate statistical technique that can be used to predict group membership from a set of predictor variables. The goal

of discriminant analysis is to find optimal combinations of predictor variables, called *discriminant functions*, to maximally separate previously defined groups and make the best possible predictions about group membership. Discriminant analysis has become a valuable tool in social sciences as discriminant functions provide a means to classify a case into the group that it mostly resembles and help investigators understand the nature of differences between groups. For example, a college admissions officer might be interested in predicting whether an applicant, if admitted, is more likely to succeed (graduate from the college) or fail (drop out or fail) based on a set of predictor variables such as high school grade point average, scores on the Scholastic Aptitude Test, age, and so forth. A sample of students whose college outcomes are known can be used to create a discriminant function by finding a linear combination of predictor variables that best separates Groups 1 (students who succeed) and 2 (students who fail). This discriminant function can be used to predict the college outcome of a new applicant whose actual group membership is unknown. In addition, discriminant functions can be used to study the nature of group differences by examining which predictor variables best predict group membership. For example, which variables are the most powerful predictors of group membership? Or what pattern of scores on the predictor variables best describes the differences between groups? This entry discusses the data considerations involved in discriminant analysis, the derivation and interpretation of discriminant functions, and the process of classifying a case into a group.

Data Considerations of Discriminant Analysis

First of all, the predictor variables used to create discriminant functions must be measured at the interval or ratio level of measurement. The shape of the distribution of each predictor variable should correspond to a univariate normal distribution. That is, the frequency distribution of each predictor variable should be approximately bell shaped. In addition, *multivariate normality* of predictor variables is assumed in testing the significance of discriminant functions and calculating probabilities of group membership. The assumption of multivariate normality is met when each