Discovery as Basic Methodology of Qualitative and Quantitative Research[1]

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Abstract: The paper argues 1. that methodologies of qualitative research in psychology and the social sciences should be directed toward *discoveries* rather than *reflexive interpretations*. It gives a critical account of *hermeneutics* and the "interpretative paradigm" pointing to three drawbacks: inherent *subjectivity* of interpretations, restriction to *Geisteswissenschaft* or the *qualitative* form of data and a recent tendency of *dissolution of rules* in what is said to be a *crisis of qualitative research* (DENZIN & LINCOLN 1994, pp.577f.). (2.) A number of classical studies in psychology and sociology show that problems associated with hermeneutics can be overcome using *discovery* or *explorative* research strategies. (3.) The authors present the Hamburg qualitative heuristic methodology which is in line with various classical studies but makes its methodological decisions explicit. It describes *four basic rules* of data collection and data analysis, the *process* of heuristic research and *verification* of its results. (4.) It gives an example of explorative research with *qualitative* data using the methods of the *qualitative experiment* and *group-controlled "dialogic" introspection* and evaluates these techniques. (5.) It shows how *quantitative* data can be handled in an explorative approach. An example is the exploration of the present structure of German society. (6.) It claims that there is no inherent relationship between the form of the data—qualitative or quantitative—and a certain research methodology—heuristic, deductive, hermeneutic—though heuristic research in psychology and the social sciences can be handled more easily with qualitative data as they carry meaning. (7.- 8.) After a look at discovering methods in the natural sciences the authors conclude that *discoveries* should be a basic guideline for psychological and social research in general, which could bridge the gap between qualitative and quantitative research methodologies and establish a new relationship toward the natural sciences which owe their success mainly to the development of their explorative capacities.

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1   In methodology textbooks, the type of research that will be presented here is usually described as "exploratory". We have, however, deliberately decided against this common usage and chosen the term "explorative" instead in order to characterize our approach as active and process-oriented.

1. A Critical Appraisal of Hermeneutics as a Research Methodology

Hermeneutics, according to Wilhelm DILTHEY, is "the art of interpretation of written documents" ["Die Kunstlehre der Auslegung von Schriftdenkmalen"] (1900, p.320). The name comes from Hermes, son of Zeus, otherwise known as the God of travellers, traders and thieves who because of his slyness was taken as competent to interpret intentions of the Gods to human beings. The art of interpretation became a major activity in literature, philosophy, theology and jurisprudence during a long and diverse development (GADAMER 1974) and may be seen as ranging from an abstract "philosophical hermeneutic" culminating in HEIDEGGER's belief in hermeneutics as the ontological foundation of human existence to empirical interpretations of a juridical paragraph, a biblical verse in a sermon or a poem. [1]

At the end of the nineteenth century hermeneutics had its most dramatic impact on the development of the sciences when Neo-Kantian philosophers Heinrich RICKERT and Wilhelm WINDELBAND emphasized the differences between sciences concerned with "nature" and "mind" and DILTHEY in his attempt to lay foundation to what he called "Geisteswissenschaften" (1883) named *hermeneutics* and *Verstehen* as its *basic method* ["Hauptbestandteil der Grundlegung der Geisteswissenschaften"] (1900, p.331). The final goal of the hermeneutic method would be to "understand the author better than he understood himself" (o.c., p.331). DILTHEY included *history* into "Geisteswissenschaften", a field which John Stuart MILL had not regarded as belonging to his "Moral Sciences". Their prominent representative was (positive) psychology. DILTHEY however suggested two types of psychology: "explaining psychology" based on concepts of the natural sciences and a "descriptive and analytic psychology" based on *Erleben* and *Verstehen* (1894). The new "descriptive psychology" could use a wide variety of methods e.g. experiencing the self, observation of other persons, experiments, comparative approaches, studies of abnormal behavior, of language, myths, literature, art, historical achievements—aiming at "Verstehen" by description and analysis ["zergliedern"]. [2]

The concept of "Verstehen" was highly successful in the scientific market during a period when "philosophy of life" was in vogue and there were many variations within the theoretical literature. Most influential was Max WEBER's "Verstehende Soziologie" accepting the split of "Verstehen" and "Erklären" for sociology and suggesting the method of the "ideal type"-construction for the analysis of "Verstehen". [3]

The present classification of the sciences—Natur- versus Geisteswissenschaften or physical sciences versus humanities/social sciences etc.—is more or less in line with DILTHEY's suggestion more than a hundred years ago and the present differentiation of "quantitative versus qualitative" research can be seen as a repetition of his methodological split under new headings. [4]

The second impact of hermeneutics upon the social sciences occurred during the last third of the twentieth century. In Germany Hans-Georg GADAMER's book on philosophical hermeneutics was published in 1960 and some years later initiated a controversial discourse on the "universality" of hermeneutics (Theorie-Diskussion 1971). In 1967 Jürgen HABERMAS presented a widely distributed publication on the status of methodology in the social sciences in which hermeneutics, together with phenomenology and linguistics, played the prominent part versus analytical approaches. This again acknowledged the dualism between natural sciences and Geisteswissenschaften. The publication of textbooks, of research work and teaching of research methodology at the universities during the following years gave access to two opposing methodologies now under the headings of "quantitative" versus "qualitative" research. Non-academic political and commercial research had used both approaches since the Thirties in the US and since 1945 in (West-) Germany in a more or less continuous way. Universalistic academic claims later came from both groups, analytic theorists defending their research methodology as Karl POPPER or Hans ALBERT (in ADORNO et al. 1969) but also "qualitative" researchers claiming universality of their topic and method ("The World as Text": GARZ & KRAIMER 1994. "The postmodern world can be read as a giant text", DENZIN & LINCOLN 1994, p.359; phrases which KELLNER 1995, p.354 sees as a "parody of a bon mot of DERRIDA"). As Jochen HÖRISCH states in a critical essay on hermeneutics, a concept only known to a few specialists in 1960 was used as a reference "to plainly everything: the world, life and death" in 1988. It did not stop then. The "fury ["Wut"] of Verstehen"—a metaphor Friedrich SCHLEIERMACHER coined (HÖRISCH 1988)—became "universal". [5]

The turn in Anglo-American social science literature is demonstrated by Thomas P. WILSON who invented the "interpretative paradigm" by reinterpreting Herbert BLUMER's Symbolic Interactionism in terms of interpretation (1970), disregarding BLUMER's own statement on his methodology which is based on "exploration" and "inspection" (description and analysis) within the "empirical world", which has to be carefully explored and related to analytic concepts (of the researcher) (BLUMER 1969, p.128). Another example is that of Anthony GIDDENS who sees sociology as a science which "reinterprets" the interpretation of social actors thus generating a "double hermeneutic" (1976, p.162). [6]

At its present state of development hermeneutics or interpretative social research seems to dispense with all former restrictions of topics, methods and research strategies. DENZIN and LINCOLN refer to two recent forms: *first* "the qualitative researcher as *Bricoleur*" (German "Bastler" but also "Pfuscher"), who does and uses whatever he finds helpful and *second* "qualitative research as a site of multiple methodologies and research practices" or "as a set of interpretative

practices (which) privileges no single methodology over any other" (1994, pp.2f.). There is a certain similarity between DILTHEY's hermeneutic explainer and the present state of hermeneutic development: interpretations depend on the nature, capacity and genius of the interpreter. DILTHEY's investigator-interpreter masters the "art of *Verstehen*" as his "personal art and virtuosity" (1900, p.319) and has the "interpreter's genius" ["Genialität des Auslegers"] (o.c., p.332). A present-day hermeneutical interpreter has—or should have—the capacity to select whatever he/she thinks to be appropriate from a multitude of techniques and theories. However, if he/she ends up being a *bricoleur* instead of an artist/expert/scientist in DILTHEY's sense *something must have gone wrong*. Indeed DENZIN and LINCOLN diagnose a *double crisis* of present-day qualitative research, a *representational* and a *legitimation* crisis, the first referring to the problematic use of the researcher's own experience and the second to ways of proving his results (1994, pp.10f., pp.577f.). DENZIN sees the "art of interpretation" as being in an "interpretative crisis" (DENZIN 1994, pp.500-515). [7]

The crisis of "qualitative research" in fact is a crisis of *hermeneutics.* The problems which now emerge have been part of hermeneutics since its beginning but stayed latent as long as hermeneutics were regarded as an expression of slyness or a work of art and the ability to interpret as a gift—all personal ('subjective") characteristics. Now its basic problem of *subjectivity of results* becomes obvious. Subjectivity is not a new accusation and there were several attempts to cope with it. In philosophy they rank under the heading of "truth theories" ["Wahrheitstheorien"]. Important for empirical research was HABERMAS' *consensus of experts* as an indication of truth. To find "real" experts may be difficult but possible. The second demand is an "authority-free group" which should permit a free exchange of rational arguments. This is a utopia. In real life there is no authority-free discussion. Agreement of experts may be better than the judgements of laymen in many fields but is no certain criterion of truth for which the history of the natural sciences has many examples. (By the way HABERMAS himself did not reach agreement of fellow philosophers to his suggestion). [8]

The three most profound problems *of hermeneutics* are:

1. the inherent *subjectivity* of interpretations. Subjectivity probably also is responsible for the "double crisis" mentioned above;
2. the institutionalization of a method which used to be an art as a *particular method for Geisteswissenschaften* thus separating its research intentions and methods from research within the natural sciences during a period when its success was obvious (though not as overwhelming and threatening as today). Legitimation of this separation was based on three reasons:
    *   *different topics* as Natur- versus Geisteswissenschaften, physical sciences versus humanities, physical objects versus cultural manifestations etc.,

- *different intentions of research* as Erklären versus Verstehen, Erklären versus Beschreiben, causality versus hermeneutics, measurement versus interpretation etc.,
- *different forms of data* as quantitative versus qualitative, physical objects versus text etc.;

3. the *dissolution of any particular rules* for doing research in these fields. [9]

Our suggestions to deal with those problems are:

1. to consider subjective interpretations as an everyday technique of orientation within a lifeworld and a starting point of research. But rather than adding another interpretation, to apply research methodologies to *discover* the patterns, structures and functions of it at the level of *intersubjectivity*. This implies the abandonment of universalistic claims—intersubjectivity always refers to a certain societal and historical situation;

2. to disregard any need to separate methodologies on the grounds of topics of research, supposed alternatives of intentions and/or forms of data. It can be shown that discovery methodologies have been successfully applied not only in the natural sciences but also within psychology and the social sciences without accepting any of DILTHEY's limitations and that their methodology has become particularly successful and their results and authors famous;

3. to avoid falling back to a pre-methodological stage or a "trial-and-error" method and/or to give up any rules in collecting research data or dealing with it. If research aims at discovery there are always better and less suitable procedures. [10]

In sum: to replace hermeneutic and/or interpretative research by research aiming at *exploration and discoveries*. The change would be from hermeneutic to *heuristic* methodologies. [11]

2. Heuristics as a Method of Discovery in Psychology and the Social Sciences

Similar to hermeneutics, heuristics have a somewhat mystical origin. The Greek mathematician ARCHIMEDES, entering his bathtub and causing a little catastrophe by spilling part of the water is said to have had a sudden insight into what was happening. He exclaimed "eureka!"- "I found it!"- (from Greek heuriskein—to discover, to find). It is said he was the first to discover what then was named after him, ARCHIMEDES' Principle. Unlike hermeneutics associated with a God of somewhat questionable character heuristics received its name in honour of a real person, commemorates a quite human event and a discovery which proved to be valid over centuries. [12]

The modern history of heuristics starts with the re-establishment of the concept attributed to Joachim JUNGIUS (Heuretica, 1622) who placed heuristic activities at the top of all sciences because of its capacity "to solve unsolved problems, find new paradigms and introduce new methods into science." Heuristics became a

topic of philosophy; considered and written about by DESCARTES, LEIBNIZ, KANT, WOLFF, BAUMGARTEN, LAMBERT, FRIES, BOLZANO and others who studied the conditions under which scientific discoveries were made and identified rules to be followed. There are several branches and fields of applications which are discussed in Gerhard KLEINING (1995, pp.329-354) and its history more generally in Heinrich SCHEPERS (1974). [13]

Heuristic techniques are refinements or variations of everyday procedures. *Quantitative* methods range from LULLUS' discs in the thirteenth century, which could be moved against each other and suggested uncommon combinations of given concepts up to the "General Problem Solver" of the late twentieth century and "artificial intelligence" using computers. Studies of mental processes encouraged *qualitative* techniques and brought contributions from several schools of psychology in particular the Würzburg cognitive psychology, Gestalt psychology, and PIAGET's developmental psychology. FREUDian psychoanalysis also may be seen as an activity to discover (and treat) emotional conditions. [14]

An example is Karl BÜHLER's early work. He developed an explorative technique to study the process of recalling everyday knowledge and problem solving administering *qualitative experiments* to his professor and his colleagues at Würzburg Psychological Institute which got him into a controversy with Wilhelm WUNDT, the originator of (quantitative) experiments in psychology and founder of "experimental psychology" (BÜHLER 1907, also in ZICHE 1999). BÜHLER's "Aha-Erlebnis" reproduces "eureka". Other members of the group also were experimenting exploratively with considerable findings about cognitive processes (Oswald KÜLPE, Karl MARBE, Narziss ACH). [15]

Gestalt psychologists made important contributions to analyze mental processes applying *variation* as a heuristic principle, finding *common aspects* within *varied perspectives* (Karl DUNCKER 1935) or discovering the reorganization of *Gestalten* in problem solutions (Max WERTHEIMER 1956). Exploration of cognition supplemented earlier work on perception where they also used qualitative experiments to discover "Laws of Seeing" (Wolfgang METZGER 1936). [16]

Jean PIAGET's "clinical examination" is a *variation* and *combination* of experiments, observation and questioning adapting "diagnostic" methods used by psychiatrists in child psychology and applied in many of the famous studies by PIAGET and Barbara INHELDER for example in PIAGET's "Child's Conception of the World" (1929, pp.7-32). [17]

Another splendid example of *discovery* was the investigation of Paul LAZARSFELD's and his students' research on unemployment in a village near Vienna (Maria JAHODA, Paul LAZARSFELD & Hans ZEISEL 1933) in the Thirties. The investigation used a wide variety of techniques to collect information on individuals and families such as individual biographies, time usage sheets, official complaints and declarations, essays from school-children, an open

competition, inventories of meals, protocols about nearly everything observable from themes discussed in pubs to Christmas presents to small children, all sorts of statistics, official and private, present and historical, demographic and personal such as illnesses, all sorts of documents etc. The researchers started initiatives such as a free consultation by an M.D., a free course of gymnastics for girls, free educational consultation, distribution of second-hand clothing which had been collected in Vienna for this particular purpose. The result of the analysis of this most diverse material was the diagnosis of a "tired, exhausted community" ["Müde Gemeinschaft"] showing continuing stages of destruction of individual's identities as a result of long lasting unemployment—a finding which has been confirmed in many unemployment studies to follow. [18]

The authors acknowledge the influence of American ethnographic research, that of the LYND's in particular and it is quite clear that the encouragement to collect as many different sorts of data and analyze its totality to discover its pattern has been the strategy of many of the classical sociological and ethnological investigations. We would name as examples Friedrich ENGELS' "Die Lage der arbeitenden Klasse in England" (1845), THOMAS and ZNANIETZKI's work on the Polish Peasant (1919-21), William Foote WHYTE's research on lower class gangs (1943), a number of investigations famous under the heading of the "Chicago School", W. Lloyd WARNER's community research, that of the LYNDs' of course. We also would include empirical research by Anselm STRAUSS, Barney GLASER and Erving GOFFMAN without excluding others which have not been mentioned. [19]

The common denomination of these research activities which all are *explorative* or carry strong elements of exploration are:

1. The research findings show a rather *complex* picture of the psychic or social topics under investigation and even seen from a today's somewhat remote position, the findings seem to be valid over a considerable time-span. The status of analysis moves away from individual or *subjective interpretations,* e. g. unemployment as a personal fault or offering a chance of personal freedom and interesting selfdefined activities (the romantic idea of marginality) to a more general *intersubjective* pattern of the results of prolonged unemployment.

2. Psychological and sociological topics as different as problem solving and social organization of street gangs were treated with the same research strategies of discovery. Both studies used *variation* and the search for *common patterns*. Methodologies were not narrowed by *predefined alternatives—"*Erklären" versus "Verstehen", "measurement" versus "hermeneutic interpretation". They were open to learn from the "empirical world" (BLUMER 1969). There is a unity of both effects: if the overall situation is cleared up one might as well "understand" it or experience that it "explains itself" or "explains it to me" or whatever metaphor may be used to name the good figuration of the data or the relationship between the data and myself. Finally methodologies are not different for qualitative and quantitative data—

ENGELS or LAZARSFELD analyse both qualitative and quantitative information. There also is no indication of how to put them into a hierarchy of more or less scientific character or into a sequence from exploration to confirmation. What makes these classical research pieces different from many others is their capacity to *discover* and *explore* a field which up to then had not been investigated in such a form and with such results.

3. All studies mentioned follow certain rules of investigation—none is just proceeding by chance or collecting "anything" on their way. This is not saying that they follow a strict and narrow scheme decided at the beginning. All of them collect *varied data* about their subjects and in their analysis *discover their relationship* and internal order. In many—if not all—investigations it is clear that the investigators themselves had to adjust their thinking and evaluation to the situation they found entering the field—among the studies mentioned WHYTE (in an appendix to the second edition enlarged for the third) gives a more full account of the changes of his preconceptions of a slum and the research techniques appropriate to study it. [20]

Such famous studies, realizing discovery, should be studied as examples that and how an explorative approach within psychological and sociological empirical research can be executed to overcome problems associated with *hermeneutic interpretations*. [21]

3. The Hamburg Approach to Qualitative Heuristic Research

Our own heuristic research methodology is based on extensive research experience, both qualitative and quantitative, commercial and academic, mainly in (Western) European and (Latin) American countries and on academic teaching. It has been developed by one of the authors (KLEINING 1982; for additional literature see paragraph 38 of the present paper). Originally it has been used in social research and empirical Humanities, e. g. in criminology, literature, popular music, theology, education, sick nursing and the study of national identities. Since 1996 the research fields have been extended to studies of psychological problems which resulted in an attempt to explore and re-establish the method of introspection as a modern research technique. A number of psychologists and sociologists have been involved in this project at the University of Hamburg (Hamburger Tagung zur Introspektion und Selbstbeobachtung 1999). [22]

The Hamburg approach tries to *optimize* the explorative potential which various research methodologies also contain. It is not a unique activity but related to those which have been mentioned in section 2 above, among others. But rather than copying certain research methodologies or condensing several methodologies it is based on the study of explorative experience in *everyday life*. For instance it makes use of the methods of observation and experiment in qualitative research—not as a reference to the natural sciences but as a means of *everyday* orientation and exploration. It *systematizes* such everyday practices, and in this respect the methodology offers a *particular* approach to the scientific study of social and psychological topics and those in related fields. [23]

The qualitative heuristic methodology applies *four rules* which refer to the situation of the researcher, the topic of research, data collection and data analysis. It also describes the research process and methods of verification and testing results.

> *Rule One:* "The researcher should be *open to new concepts* and change his/her preconceptions if the data are not in agreement with them".
> Label: *Openness of the research person* [24]

The researcher should be aware that his/her ideas about the topic might have to be changed during the research process. Obviously we do not start with a *tabula rasa*, are never free of preoccupations and don't have to be. Ideas and concepts however should be open for correction if data are inconsistent with them. This is not as easy as it appears, as we usually have psychic if not emotional "vested interests" and try to stick to what we believe and take for granted. The rule asks the researchers to keep their position flexible. How do we learn that the data do not fit our ideas and concepts? Most frequently and unfortunately for the researcher by an *emotional* irritation or even crisis. The data looks very different from what had been expected or doesn't seem relevant at all. If the data are *consistently* different we should think about changing our position, even if we have to give up a pet idea. We will not be the first and only ones to be confronted with this problem and may have the gratification that the history of discoveries in the sciences was—and still is?—full of wrong assumptions and changes of concepts, some of which have long been taken for granted in cosmology, physics or biology.

> *Rule Two:* "The *topic* of research is preliminary and *may change* during the research process." It is only fully known after being successfully explored.
> Label: *Openness of the research topic* [25]

In explorative research neither the nature nor the dimensions of the topic are well known. Its definition therefore will be preliminary. The more "open" the demarcation, the better. We should be aware that there may be all kinds of changes of the topic during the research process but of course it also could stay as it was at the beginning only to be better explored. We may learn from physics: *Ether* as a topic of research changed its function several times and finally turned out not to exist at all. (EINSTEIN & INFELD 1938, p.112, pp.151f.)

> *Rule Three:* "Data should be collected under the paradigm of *maximum structural variation of perspectives*". There should be a multitude of *different* points of view, as different as possible: methods, respondents, data, time, situation, researchers etc.
> Label: *Maximum variation of perspectives* [26]

Investigating and trying out objects from different angles is what children do with new toys, young animals do with their bodies, we all do with new things which we inspect. In serious journalism one-sided reports are held in low esteem—counter-investigation and "giving the other side" are part of professional concern. The alternative to a one-sided approach is not the *one* opposite or the negation of a

particular item or statement to form a dimension (yes-no, good-bad, black-white etc.), but are *several different* positions (maybe yes, maybe no, depending on ..., tending to ..., if ..., cannot decide etc. or: both good and bad; not only referring to black versus white but also to colours, or forms or sounds etc. which might be of importance) thus opening up a "closed" dimension which is so cherished in quantitative research. At the start of the research the topic is not known, and neither are the possible aspects of the topic. We therefore try to gather aspects which are as different as possible. How do we do it? By experimenting based on our judgement. If it is suspected that a particular factor may have an influence upon the results, that factor should be varied. Take *observation* as an example. It is clear that results of observation are influenced by the observing person, therefore different observers may be helpful. If gender, age, race, nationality, religion, attitudes etc. of the observers may play a role in the observation, these attributes should be varied among observers. If observational categories may exert an influence, observational modes would be varied, e.g. site, time, seasonal conditions etc. *Samples* may influence results. They should be made up by respondents which differ in their relationship to the topic—if possible representing extreme groupings. This doesn't imply we should use random samples. They repeat the distribution of characteristics of the population from which they are selected and may not sufficiently reflect extreme positions in relation to the topic under study. Also *methods* influence data to a certain degree and it follows that they should be varied under rule three trying to reach maximum differences of data. [27]

We prefer to use the phrase *variation* which is a common concept in science and in experimental psychology and do not see a need to invent a special term such as "triangulation". This term is borrowed from trigonometry and describes improvement of measurement from two different geographical points, which has little in common with variation in qualitative research. If a two-sided approach is replaced by a multi-sided one, as we suggest, the term "variation" is a better description. *In sum*: the heterogeneity of data should be increased as much as possible but always related to the topic under study and the particular research conditions.

> *Rule Four:* "The analysis directs itself toward discovery of *similarities*". It looks for correspondence similarities, accordance, analogies or homologies within these most varied sets of data and ends up discovering its pattern or structure. Completeness of analysis is required.
> Label: *Discovering similarities and integrating all data* [28]

This activity also may not be easy for social scientists as scientific training emphasizes the observation of differences and not similarities or patterns. The wood may not be seen for the trees. But in everyday life similarities are easily understood. We would not recognize people, things or situations, if we did not have the ability to see the similarities in our differentiated and quickly changing experience and could not comprehend stability and constancy. Again there is a process. When starting the analysis we might find some data homogeneous or coherent, other parts heterogeneous or incoherent. We ask a question directed to

the data—maybe which people interact and in which way we can group "answers" or coherent "parts" and try to grasp what it is which makes them similar. Further data can show different similarities. In this way several "batches" of data may become visible. The next step will be to find the common similarities in different groups of data. It may become necessary to re-organize the preliminary *clusters* i.e. allow data brought forward by a particular approach to become part of another cluster or to belong to several of them. Finally an overall pattern will emerge, integrating all details into the total. Going back to the example: different plants, bushes, trees and different animals under and above the ground and different insects etc. may be seen as parts of a certain ecological milieu. The different milieus may turn out also to be related to each other in a specific way and in total will form what is experienced as a "forest". A particular and real forest has to be studied, not an ideal one, not the forest per se. We will find that it has certain characteristics and is in a certain stage of its development and will also be related to certain outside factors etc. Rule four demands the full *one hundred percent*: *all data* from different stages of the research and different views of the topic must have a place in the structural coherence of the total. There should be no observation or test result related to the topic which does not fit as part of a whole. The rule is not weakened when data are incomplete or fragmentary, or when not all questions are answered, then *no information* in the set of data should *contradict* the analysis. [29]

The rule is in line with Georg SIMMEL's way of analysis discussed in the methodological chapter of his "Sociology" which has influenced early American sociology: The "equality (homology) will be abstracted from the complex phenomena as by a cross-cut, the differences (disparities) ... mutually paralyzed ["Aus den komplexen Erscheinungen wird das Gleichmäßige wie mit einem Querschnitt herausgehoben, das Ungleichmäßige an ihnen ... gegenseitig paralysiert"]" (1908, p.11).

> The *research process* itself is executed as a *dialogue* between the research person and the topic of research respectively the data; it is transformed into a dialogic (or dialectic) process of question and answer and new question based on the answer etc. until all aspects are explored and all data structurally incorporated.
> Label: *Dialectical approach* [30]

The *question-and answer-process* is the means of organizing and re-organizing the data by "interrogating" the text and grouping it according to the "answers" it will give, in particular which aspects belong together and which headings will be appropriate. The effect of this procedure will be a gradual move from a one-sided *subjective* view or evaluation of the topic toward a multi-sided complex representation of many different aspects but analysis searching for and finding homologies might show a rather simple basic structure of homologies as in WHYTE's diagrams of the social structure of particular groups of Corner Boys (1981, p.49, p.95, p.156).

> *Testing the results* uses "*inner validity*" and differentiates *validity, reliability,* and *range* of applicability ("Geltungsbereich") [31]

Discussions on validating qualitative research reveal the "dilemmata" of the *interpretative* or *hermeneutic* paradigm (ALTHEIDE & JOHNSON 1994, p.485). In postmodernity, the authors say, "research is no longer coupled with knowledge, but has been given multiple choice (such as liberation, emancipation, programmatic politics, expressive 'art')" (o.c., p.487) and

> all knowledge and claims to knowledge are reflexive of the process, assumptions, location, history, and context of knowing and the knower. From this point of view validation depends on the 'interpretative communities', or the audiences ... and the goals of the research (o.c., p.488). [32]

ALTHEIDE and JOHNSON discuss a long list of various types of validity and, according to their own judgement, suggest "interpretative validity" based on "reflexive accounting for substance" (p.491) directed toward "researcher/design/academic audience(s)"(p.499). We would like to mention that WHYTE had a hard time having his dissertation passed by such an academic audience (1955, pp.355f.). The basic problem with testing interpretative research, again, seems to be the *subjectivity* of interpretation which actually cannot be tackled by reflection of the researcher. [33]

Explorative research also demands the verification of findings but the results would be tested against existing (or new) data and not against audiences or goals. Is there a social organization within the particular slum which had been studied or, as Louis WIRTH, who was one of the academic examiners of WHYTE and was himself a student of social life in slums believed, is its character that of "social disorganization" (WHYTE 1955, p.356)? In terms of verification theory: is the description of the slum *valid,* is there social structure among Street Corner gangs, college boys, racketeers, politicians? In which way? Disorganized? Is the information which WHYTE collected, *reliable*, can it be repeated, will additional research find the same? And: are the findings restricted to this particular slum and what is their *range of applicability?* The concepts validity, reliability and range of applicability in heuristic research are linked to the four rules mentioned above. [34]

Validity is "inner validity" and will be achieved during the research process. The analysis starts by grouping similar information units, e. g. meaningful sectors of a text (*rule four*). The simplest form is that of two related units. They will *confirm each other* as two different observers or observations of an event producing comparable descriptions will confirm each other. This is the qualitative pattern of validation. *Rule three* requests the collection of additional data and if similar will confirm the existing analysis. Proceeding in this manner and changing the pattern if necessary will add further data confirming each other, e. g. the behaviour of group members or their picking order or their way of talking etc. confirming what is seen as their group structure. Finally there will be no further information from new data, a "saturation" will be reached—we borrow the term from STRAUSS' and GLASER's work (1967, p.61). If data collection and integrative analysis is at its end, *all data* in one way or another will be interrelated or all "parts" to the whole. This is what we call *inner validity*. [35]

Reliability is established the same way. In *quantitative* research it means for instance that a repeated or different measurement will produce similar results. *Qualitative heuristic* analysis groups different data according to their similarities and thus starts establishing reliability right from the beginning of the analysis. The more varied the perspectives will be which can be integrated into the finding, the higher its reliability. The method demands maximum variation as well as complete integration of the data. An analysis which can reach this status will be reliable. During the process of analysis there will be a step by step integration and thus a continuous increase of reliability. Saturation of the data again will end the process. [36]

Range of applicability ("Geltungsbereich") corresponds to *range* ("Reichweite") in deductive quantitative research but is established via a reverse movement. Deductive survey research defines the universe from which the sample is drawn which then represents the presumed applicability. It is the researcher who decides the range. Contrary to that explorative qualitative research *inductively* finds out which range of applicability might exist for a particular topic. It starts with a preliminary idea about the area in which the topic might exist or has been found (or in a situation, field, pattern, system, organization, group, society, time-span etc.). It will "test the limits" by trying to establish if the results may also be applicable beyond the primary field of study. WHYTE's or LAZARSFELD's studies might be repeated in other slums or villages with high unemployment rates—but also in different areas, different stages of their developments and at different times. LYND and LYND repeated their research in "Middletown" and found the city had changed. WHYTE again visited the former slum area which now is enjoying gentrification. Boston North Ender's social organization certainly has changed. [37]

For further information about section three in German see: KLEINING 1982; 1991; 1994; 1995; 1999; in English: KLEINING and WITT 2000 and a translation of KLEINING's paper from 1982 (KLEINING 2001). [38]

4. An Example of Qualitative Heuristic Research: Introspection

The following discussion presents some results of a research program which concerns itself with the investigation of a particular method—introspection—and its possible improvements under the heading of the heuristic research methodology. [39]

4.1 Methodology, methods and design

The *topic* was the study of very short stimuli upon respondents mainly using the method of introspection. Our questions were, among others: which internal processes are induced by a short and sudden disturbing event? Can we manage to study these inner processes or are they too elusive and inconsistent? (A suspicion which DILTHEY already had). Which words and concepts are used describing inner processes, which psychic and physical dimensions are important, in which way relate reactions to the stimuli which are causing the

irritation? Which differences and similarities exist between different persons? In sum: we wanted *to explore* the effect of short but strong personal irritations as fully as possible. [40]

Background: The study of brief stimulation has been of mayor interest in psycho-physical research during the nineteenth century and one of the topics which brought experimental psychology into existence (Gustav Theodor FECHNER, Georg Elias MÜLLER, WUNDT's laboratory). Theory was the stimulus-response dependence, the research focused on reaction time excluding inner processes. The data were mainly quantitative. Ernst MACH was studying psycho-physiological relations (1886). [41]

Methods: The research combines *qualitative experiments* and *introspection*.

- *Qualitative experiments* are those predominantly used for *the exploration* of a topic. Together with qualitative observation they are a prominent explorative technique and may be applied to all sorts of data including text. Its methodology differs from deductive testing of a particular and well defined hypothesis. Qualitative experiments may be started with a rather vague assumption of its outcome. They confront respondents with a certain task or stimulus and observe what happens. Operations of this sort, if varied, are used in combination with other techniques of data collection and may be very effective explorative tools. In psychology qualitative experimentation was a basic method of the Würzburg School (e.g. MARBE 1901) and also with the Gestalt psychologists as has been mentioned. PIAGET made extensive and highly creative use of them. The method fell out of fashion under the influence of deductionism with few exceptions (Harold GARFINKEL 1959; for a more full discussion see KLEINING 1986). Qualitative experiments mainly in the form of thought experiments have been and still are highly important for research in the sciences (MACH 1905; EINSTEIN & INFELD 1938; GENZ 1999).

- *Introspection* has been *the main* psychological method at the end of the nineteenth and the beginning of the twentieth century but has been ruled out as a scientific method as subjective by behaviourism. We are using the technique again at an advanced methodological level (Hamburger Tagung 1999; KLEINING & WITT 2000). In our particular case introspection was both a means of data collection and a means to study inner processes. The application of the method differs strongly from the classical setting. We use introspection *in groups* which includes the presentation of private notes about personal experience and their presentation to other participants to stimulate their recall to broaden and supplement the information ("dialogic introspection"). The setting also should inform us about the suitability and applicability of the method of introspection as a qualitative heuristic procedure and assist the rehabilitation of the method. [42]

Design: We reformulated the abstract 'stimulus" into a brief *everyday* event: the sudden ringing of an alarm clock in a class of students and in a meeting of

experts which just happened to discuss qualitative methodology. Immediately after the ringing participants were told to introspect and write down what came to their minds. This period lasted about five minutes. Participants were requested to read their protocols to the audience and everybody could add whatever he/she had forgotten or not taken seriously enough to make a note (verbal reports in later studies were recorded). Respondents said that they could more easily and more fully recall what was in their own minds after listening to the experiences of other participants. [43]

We were very aware of unwanted small-group effects and tried to reduce them. We adopted the opposite strategy of ASCH's and FESTINGER's cognitive experiments which showed that such influences, under social pressure and with false information, can be produced. We avoided social pressure and gave correct information. Of course the ringing of the alarm clock was surprising for all and in this respect it was similar to some experiments in social psychology intentionally misleading respondents. But the following phases—documentation of the introspective experience and exchange in the group—were transparent for all participants, everybody knew what it was all about and what would happen to the data. Regarding the group's structure we tried to have it as "democratic" as possible, avoided evaluation or critique, even discussion of the reports, all of them were welcome and accepted. [44]

Analysis was executed separately from data collection, based on the protocols and outside the group. [45]

The *methodology* followed heuristic rules. The same stimulus (ringing) was experienced by *different* subjects, *differently* recorded (written, verbal), during *different* periods (immediately, during the presentation), in *different* situations (class, experts) (*rule three* on variation of perspectives). The analysis was looking for *similarities* (*rule four*). During the research process the *topic changed* (*rule two*—openness to change) and we think we *learned something* about it (*rule one*, openness to data). Findings were of two kinds: regarding the topic and regarding methodology. [46]

4.2 Findings concerning the topic

- Although participants gave the impression of keenly following the lesson, they were contemplating their own problems. For the lecturer this was a rather irritating experience though not completely unknown to him. [47]
- The sudden sound was unexpected, frightening, scaring, alarming causing strong emotional reactions. [48]
- Reactions immediately started to cope with the irritation. Techniques were: handling of shock / evaluating the situation / thinking about immediate action / identifying the cause / naming it / locating the alarm clock (behind a curtain) / recalling former experience of clocks at school / recalling fire alarm / speculating about the effects of the alarm / asking the lecturer what to do / observing how other people reacted / evaluating the experiment itself. [49]

- Techniques of orientation and coping were both physiologic and mental, psychic and social, behavioural and verbal, involving the present situation, past experience and future action. All participants tried to re-evaluate the situation, decide on action, reduce the emotional shock and reconstruct equilibrium and self-determination after it turned out to be "just an experiment". [50]

- The techniques contained a rather *active* and *explorative* factor oriented toward finding out and reflecting about necessary actions and were not only "reactions" following a given or simple pattern. [51]

- We observed strong personal differences in reactions ranging from free expressions of emotional impact and feelings to different coping techniques. [52]

- There are similarities between behaviour in the experiment and the presentation of catastrophic events in *mass media*: naming the event, putting it into a certain context, naming the (probable) cause, naming the (probable) originator, ascribing responsibility, showing control of the event or its results, describing emotions, evaluating the event. These similarities offer a chance to study media effects in a new way. [53]

- The topic of the research broadened. At the start we were mostly concerned with the question whether such a short event could be studied at all via introspection and which content would be perceived. The findings presented plenty of personal experience covering a wide range of psychological dimensions also including sociological and cultural aspects. If the research had been continued we might as well have ended up with a general model of interaction in a changing environment indicating coping, the process of forming and stabilizing identities, the process of exploration etc.—a much wider range than ever thought about before. [54]

4.3 Findings concerning methodology

- Qualitative heuristic methodology did help to find out what may be behind such stimuli. The results are considerably more complex and rich in content than the analysis of reaction time or the observation of behaviour as a single method. [55]

- Qualitative experiments were useful in combination with observation, written and verbal recording. [56]

- Individual introspection was highly useful and is very suitable to study inner processes. The particular methodological approach of introspection in a group ("dialogic introspection") if carefully arranged and supervised may stimulate recall and can make reporting of individual experience more complete and realistic ("objective"). [57]

- Psychological methods as introspection and small-group experiments can be of general use for the social sciences if placed into a heuristic context. [58]

5. An Example of Heuristic Research with Quantitative Data: Social Structure

Explorative techniques also can be applied at the more abstract level of quantitative data. An example is research on *lifeworlds* in Germany 1990-2000 (KROTZ 1990; KLEINING & PRESTER 1999; KLEINING 2001). [59]

5.1 Methodology, methods and design

The *topic* was the study of societal organization. [60]

Background: In German sociology there has been a long lasting discussion on the structure of the society and the state of its development in general and the divisions or groupings within society in particular. Since the end of World War II leading questions have been shifting—in post-war Germany re-organization of pre-war patterns of stratification versus a melting-pot dissolution, during the "Wirtschaftswunder" the upgrading of the society versus re-establishment of social classes and during the past 25 years its complete transformation into a patchwork- or whirlpool-society weakening traditional bindings, dissociated and segmented into temporary life-styles and milieus, characterized by individualization and pluralization under the rule of "postmodernity". The "reflexive elite" (SCHELSKY 1975, pp.98f.) offered hermeneutic interpretations with strong ideological components as a "risk-society", following Chernobyl (BECK 1986; BECK & BECK-GERNSHEIM 1994), "reflexive modernity" (BECK, GIDDENS, LASCH & RANG 1996), "fun-society" (commercial suggestion), "knowledge society" ["Wissensgesellschaft"] (government ideology). Census data or large-scale surveys could not or maybe cannot confirm such interpretations. Is there a new type of society? [61]

Design and methods: Effects of the social organization of a society should somehow or other be present in the behaviour and the minds of its members and they should be able to talk about it. There are many different ways to study social organization, but this was the possibility the researchers had. The basic techniques were person-to-person interviews with questionnaires collecting quantitative information on demographics, social environment, behaviour and values with "closed questions", lists, scales) and multivariate analysis of the data. In a *pretest* more than 600 items possibly related to *lifestyles* were designed, tested with several smaller samples (up to 60 respondents each) and reduced to 436 variables by factor analyses excluding highly correlated or redundant items. Thus we selected those items which were least correlated or statistically most different from other items also describing a certain manifestation of lifestyle, e. g. emotional status or social and media contacts or leisure time activities. Cluster analyses of those variables based on their ratings by a national random sample of 602 respondents age 16 to 64 years could identify *eight* clusters. They turned out to be rather complex combinations of many different items and characteristics and were re-named *"lifeworlds"*—a more meaningful label than behavioural *"lifestyles"* and more dynamic than "*milieus*". This part of the research is documented in KROTZ (1990). For the investigations to follow those variables

were selected which statistically had the greatest effect on the formation of the clusters. They turned out to be *demographic* and *socio-economic* ones. Fortunately these measurements are part of the statistical section of nearly all larger surveys and therefore the statistical information could be combined in a way to *reproduce* the segmentation established via cluster analysis. Cluster analysis was repeated to check the formation of clusters and measurements were taken to define their discriminative effect. We happened to have access to quite a number of (commercial) surveys, different in size and sample units, all national and all probability selection. The samples were (a) panel of individuals, n = 10.000/year, (b) panel of households or families, n = 12.000/year, (c) survey of individuals, n = 14.000/year, (d) survey of individuals n = 55.000 in 1999/2000 . The surveys were executed during the years 1997-2000. A further "historical" random sample collected in 1978, n = 7.800 was analyzed. Additionally two qualitative studies (n = 80 each, quota samples) were done. Sponsors for the second part of the research were GfK Gesellschaft für Konsumforschung Nürnberg, Panel Services and TdW Intermedia / Burda Offenburg. [62]

The *methodology* followed heuristic rules. The rules are the same for qualitative and quantitative data. *Maximum variation of perspectives* was reached by (a) very extended *variation* of items and dimensions, the items and dimensions tested to be different from the ones we already had, the technique was factor analysis, (b) *variation* of samples and time, the research covering several years and included small quota and large probability samples, (c) *variation* of cluster techniques and number of cluster solutions (*rule three* on variation). Cluster analysis is a heuristic technique, it groups persons or families according to the *similarity* of their profiles (*rule four* on similarities). We started testing *individual lifestyles* expressed in leisure time, consumption and social activities and ended up with the organization of complex *lifeworlds* both for individuals and families and their relationship to each other (*rule two,* change of topic). During the research the team learned that we had a number of preconceptions which we had to give up and a number of ideas which we had to change. As an example: it turned out that demographic and economic variables were much better at differentiating individual behavior than *constructs* we had developed at the level of values or behavioral and consumption styles and also better than had been suggested in mainstream *lifestyle* research (*rule one*). This also implied the change of the assumption that demographics are of rather little importance in a "postmodern society". The research procedure overall is well described as a *dialogue* as preliminary results were taken into account in later phases and a constant testing and retesting of our data was performed in order to get our thinking in line with the data. The research process was very similar to the one described by MACH in 1905: "Adjustment of thoughts to facts and to each other ["Anpassung der Gedanken an die Tatsachen und aneinander"]" (p.164). [63]

5.2 Results

- The clusters could be plotted in a two dimensional diagram: the "horizontal" dimension reflects life-course or phases of the individual biography, or, for families, the family cycle. The "vertical" dimension shows different levels of social status or social class. [64]

- The *phases* of the *individual life-course* have not yet been systematically investigated and represent a new classification. *Family phases* are in line with *family cycles,* a concept of family research which goes back to the nineteenth century but was re-animated after World War II in US demography (GLICK 1947; 1955). The grouping in their sizes as well as their dynamics of change also have not been discussed in social research. They are characteristic of particular societies and the most interesting part of the research. [65]

- As an example the *Family Life Worlds* in 2000 are the following (% of total German households)
  - Students and apprentices, living on their own (3%)
  - Young singles and double income households (12%)
  - Middle class families with children (16%)
  - Working class families with children (16%)
  - Middle aged employed persons, living on their own (5%)
  - Unemployed, out of work families (5%)
  - Middle class families, no children in household (5%)
  - Working class families, no children in household (4%)
  - Middle class retired families (12%)
  - Working class retired families (9%)
  - Elderly, living on their own (13%)

  It can be seen that the clusters represent a time sequence from training to various modes of work and family associations in middle years to various forms of living in retirement, all at different levels of prestige, social and economic gratification, privileges or deprivations. [66]

- Qualitative research showed that respondents are very aware of the different phases of family life and can report on their own and other people's experience with these life worlds. Family life worlds have "normal" sequence and changes from one to another are celebrated as happy events—e. g. first own household, final school examination, first job, marriage, children born, end of work career—but there are also uncommon changes of life worlds caused by failing exams, unemployment, divorce, illness or legal problems— also socially acknowledged but not to be celebrated. [67]

- Changing family life worlds results in changing patterns of everyday responsibilities and behavioural patterns and is also visible in different leisure time activities, different political preferences, different consumption habits and media contacts even different value systems. [68]

We found *strong changes* of lifeworlds over time particularly regarding family forms. However *we did not find proof of a dissolution* of family or work institutions or a reduction of the importance of employment or of social privileges and deprivations or signs of the disappearance of social classes. On the contrary we discovered the *existence and continuing importance of societal institutions as family and work for the organization of life and of vertical stratification ("social class") for the life-patterns of individuals and families.* [69]

6. The Heuristic Potential of Qualitative and Quantitative Research

Our two examples of explorative research showed how heuristic methodology can employ both types of data, *qualitative and quantitative*. Discoveries primarily depend on *methodology—to search and to find.* There is no inherent relationship between data form and a certain research methodology. The *data form* defines the *level of abstraction* in which the data is received. It *screens* social reality and might blur or impede information as a pair of unadjusted eyeglasses would not produce "good" sight. But this applies to both forms—qualitative data lack abstraction, quantitative meaning. [70]

Both kinds of data also can be used in a deductive methodology. POPPER (1934) in his Critical Rationalistic theory proposed the application of hypothesis-testing to test knowledge. His concept has been widely adopted by textbooks about psychological and social research and always has been is associated with quantitative data. But proof or disproof of a hypothesis also may be achieved qualitatively. Popper himself gives an example. The hypothesis that "swans are always white" is rejected as soon as the first black swan is found—no counting of numbers is necessary. [71]

Also hermeneutic interpretations are not subject to one particular form of data. Though DILTHEY and many followers thought that *texts* or *qualitative* information would be best suitable for interpretation, *quantitative* data also tend to be interpreted. For example: political researchers interpret figures on voting behaviour. Whether they are "high" or "low" may already be controversial. The same is true for figures on the economic status of a society or of changes in unemployment rates, not to mention interpretations inherent in the *definition* of "unemployment" itself. Figures from the stock exchange are even more open to interpretation and speculation. [72]

That both forms are rather independent of methodology does not say that they are equally useful for any topics or intentions of research. For psychological, social and cultural exploration *qualitative* data, in general, are *particularly suitable* as they reproduce complex relations and communicate meaning. This is also why they are so successful in everyday communication. [73]

Two possible *restrictions* may reduce their explorative capacities: *First:* qualitative approaches might be better suited for smaller samples, case-studies or ethnographic observations within a limited area but not for large-scale representative research. They also would tend to be time consuming and

expensive. *Second:* being more or less *subjective* their findings may be taken as suggestive but would have to be validated by more *objective quantification.* [74]

We consider both reservations as unfounded. Regarding the *first:* both qualitative and quantitative data may deal with an individual, a single family or a limited number of people, the range of applicability will be restricted by their respective samples. In both cases its range can be extended by using larger samples. Quantitative research in deductive theory is combined with probability samples of a predefined population but also may be a carrier of heuristic research as mentioned above. Qualitative research might also use national samples but it may be more sensible to rely on quota or extreme group sampling if dominant structures of the topic have already been explored. The strength of explorative qualitative sampling however is the variation of samples and the design of more diverse "theoretical" samples (STRAUSS). Cost in general is lower than that of large-scale random surveys of sufficient sample size. Concerning the second restriction, qualitative-heuristic methodology aims at transformation of *subjective* into *intersubjective* findings and employs techniques for verification of results. Findings are developed to a stage where they reach inner validity. There is no need for another form of data to validate qualitative heuristic research and indeed it would not make sense to compare complex qualitative findings with a more restricted and abstracted quantitative data form. But qualitative research of course can be repeated and validated by further qualitative projects. [75]

Quantitative data operate at a higher level of abstraction than qualitative or everyday information. In empirical research quantification has many advantages, most prominent is the reduction of complex data to aspects which are regarded as important for a particular purpose and an easier processing of larger volumes of data as a result of it. However selection may also cause problems for exploration. *First*: Reduction restricts data and excludes access to further relations and characteristics of them. This difficulty can be counteracted by adding a multitude of further variables, perspectives, methods and approaches as has been done in our research on social structure. The more different these dimensions will be the better the chance for a successful exploration (*Rule tree* on variation). *Second:* Reduction results in reduction of meaning or in its disappearance. This problem is more difficult to tackle. Within the sciences *similarities* and *analogies* are an important support for discoveries transforming some of its abstract problems into concrete and meaningful relations (MACH 1905, pp.220f.). In psychological and social research adding meaning to data which have lost their meaning during the research process is difficult and speculative, as anybody should know who has "interpreted" results from factor- or cluster analysis. [76]

7. A Look at Discoveries in the Sciences

Investigating research methodologies in the *sciences* shows that contrary to
deductive-nomological theory most important discoveries were not achieved by
deduction but by exploration. Neither the discovery of America nor of china
pottery were the results of hypothesis-testing—if there were "hypotheses" they
were falsified by the findings. COLUMBUS did not find the western sea passage
to India and the alchemist Johann Friedrich BÖTTGER did not find gold. MACH
gives ample examples of the explorative techniques in the development of
mechanics (1883), thermodynamics (1896), optics (1921) and physics (1905)
over centuries. EINSTEIN and INFELD (1938) explicitly described the explorative
use of cognitive experiments, another qualitative method in the sciences, as did
other scientists. A more recent example is the research process which led to the
discovery of the Double Helix by James D. WATSON (1968), Francis CRICK and
others. Many activities reported by WATSON favoured a discovery. There was,
for instance, a *strong variation of perspectives:* of scientific fields—biology,
chemistry, physics—of individual experts and research groups, of research
designs, of observing and experimental methods with changes over time.
Analysis was able to *discover the overall pattern* which even could be reproduced
as a general model in a three-dimensional artefact of wire and plastics—
demonstrating the relationship of everything to everything else. *Change of
subject*—Watson was a physicist and started with X-ray-research. *Change of
preconceptions*—the researchers had to change their initial ideas and as a result
changed the preconceptions of the scientific community. Most important was a
constant *dialogue* among the researchers and with the data. [77]

In critical essays on method Paul FEYERABEND (1983) discusses discovery
processes which were used by eminent scientists and their methodological
reflection in philosophy with the intention of opening up the narrow definition of
research. His famous phrase "anything goes" is an ironical comment (... "and not
my principle": p.12, more in detail: pp.376f.). *Openness* and *adjustment to new
situations* of course is a pre-requisite to exploration and discoveries.

> Again I stress that the concepts ... are not new—they were self evident for physicists
> as Mach, Boltzmann, Einstein, Bohr. But the ideas of those great thinkers were
> distorted past recognition by the gnawers of the Wiener Kreis and the re-gnawing of
> critical-rationalistic gnawers. ["Aber die Ideen dieser großen Denker wurden von den
> Nagetieren des Wiener Kreises und den sie wieder benagenden kritisch-
> rationalistischen Nagetieren bis zur Unkenntlichkeit entstellt."]" (FEYERABEND 1983,
> p.12). [78]

8. An Appeal to Use Heuristic Methodology in Qualitative and Quantitative Research

Explorative techniques common in the sciences are refinements of everyday exploration techniques: experiment and observation. Everyday practice is even more easily accessible to psychological and social research as these sciences operates at a more concrete level than, say, theoretical physics. [79]

Explorations can be executed both with *qualitative* and with *quantitative* data though qualitative data are more easily accessible and more substantial in their content. Their explorative potential can be improved by extending the range of methods—*qualitative experiments*, real and cognitive, *introspective techniques*, *larger qualitative samples*, new methods to analyse texts as the use of *qualitative experiments* and *qualitative observation* in addition to the more common methods such as observation, interviewing, analysis of objects, artefact and documents. [80]

Exploration as a basic methodology of qualitative *as well as* quantitative psychological and social research would narrow the gap between different approaches and methodologies in both disciplines and reduce the tendency to divide its methodologies into behaviouristic, deductive, "quantitative" activities on the one hand and interpretative "qualitative" approaches on the other. It also could establish a new relationship toward the research methodology of discovery within the sciences which has been and still is so successfully applied. The split between "Natur-" and "Geisteswissenschaften" which DILTHEY and the Neo-Kantians executed on the basis of methodology—the basic technique of "Geisteswissenschaften" being hermeneutics—should be obsolete. [81]

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