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Data as representations: contextualizing qualitative and quantitative research strategies

Abstract. *The opposition between "quantitative" and "qualitative" perspectives in contemporary social science is an organizational limitation that directs discussions of the topic away from the main issue – the adequacy of any kind of data in respect to the phenomena they represent. This is particularly complicated if the phenomena are known to include inherent dynamics, are modifiable by the research encounter, or develop towards new states of existence. It is often assumed that qualitative and quantitative methods are mutually exclusive alternatives within a methodological process that is itself unified. The article shows that quantitative methods are derivatives of a qualitative process of investigation, which itself can lead to the construction of inadequate data. The issue of the representativeness of the data – qualitative or quantitative – remains the central unresolved question for the methodology of the social sciences. Errors in representation can be diminished by correction of methods through direct (experiential) access to the phenomena, guided by the researcher's educated intuition.*

Key words. *Data as representations – Development – Methodology – Quality – Quantity*

The methodology of any science entails the relating of theoretical, axiomatic and phenomenological aspects of knowing with the

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construction of methods – which leads to the emergence of data. The data are at the core of knowledge-construction – yet they are already themselves constructed entities. Constructed entities are not fictions, but constructed realities. The data in the social sciences are real (as bases for our knowledge-construction), yet they may represent their underlying social phenomena in different ways.

Data derivation can occur along two basic lines. One entails quantification of the phenomena: transforming selected qualities into numbers that are then assumed to represent those qualities. The resulting data are quantitative data. In the other, the qualitative data emerge as the translation of selected features of the phenomena into some form of structured depiction. The qualitative data take the form of some structure representing some aspect of the phenomena. Whether these representing structures are verbal descriptions (e.g. transcripts, narrative accounts of events), non-verbal symbols, or geometric shapes, all these forms of depiction of phenomena are qualitative data.

In this article, I refer to the quantitative and qualitative data simply as two kinds of representations of phenomena. Both are part of the general methodological scheme of research. Neither is preferable to the other, independently of the nature of the phenomena and theoretical presuppositions of the researchers. The adequacy of each depends upon how they represent the objects the researcher is interested in, and these are determined by the theoretical constructions.

The state of existing social practice

The distinction between “quantitative” and “qualitative” methods as the core of similar general research orientations in contemporary social sciences has become a topic of many heated (and unnecessary) disputes. These two kinds of methods/orientations are usually talked about as if they were opposing alternatives. There is even a tendency to view the two kinds as belonging to opposite warring “camps”. The “winner” of such a fight expects to gain all the privileges of fame, funding, and fascination of students and lay public. The “loser” is expected to vanish into the garbage bag of history. So the stakes are high for the methodological gladiators of the social sciences, and the notion of the “survival of the fitter” may even be

evoked in the evaluative practices by funding agencies and disciplinary departments in universities.

Science, of course, does not progress through institutional evaluation of its already existing results, but through the ingenuity of researchers who invent ways to obtain new results. When inventing new methods becomes replaced by a social drama of defenses and attacks on methods, science quietly exits from the scene of research. Such "methododrama" is of course a story that is perhaps scripted after modern action movies, or soap operas. Science, however, is neither an action movie nor a soap opera. Rhetorical efforts to suppress one of the two kinds of method as "soft" or "unscientific" are as futile as the reverse lament about the other being "mainstream" or "mechanistic". Rhetorical positioning does not solve problems for a science.

The rhetorical construction of relations between quantitative and qualitative approaches is situated within the history of social sciences of a given country. By and large, one can observe greater openness to qualitative (structural) data-derivation strategies in the social sciences of continental Europe, Russia, and South America than in the Anglo-Saxon-dominated countries. In the latter, quantification may have become a generalized sign that the rationality of science is asserting its dominance. Implicit meanings attributed to the notion of "qualitative" can act as effective barriers to its acceptance in science. Thus, when I described (in the late 1980s) my plan to establish a journal with an American psychologist-friend and mentioned that it could be tentatively titled *Journal of Qualitative Developmental Psychology*, he reacted against the insertion of the word "qualitative" on the grounds that it "smells of religion". That connection (situated in the ideological history of US society) was a complete surprise for me.

Beyond rhetorical fights – unity of methods within methodology

The "party politics" of viewing the quantitative and qualitative perspectives as irreconcilable opposites leads to overlooking the basic unity of knowledge-construction. Such opposition assumes that methods can be treated separately from the wider cycle of methodology. In the latter, it is the phenomena under investigation – and the general presuppositions of the researchers – which jointly

determine whether translation of the phenomena into data of quantitative form makes epistemological sense. Methods as such have no independent standing outside that circle. Rather they are constructed on the basis of co-ordination of the assumptions about the nature of the phenomena and available access to them.

Let us consider an example. In the case of asking questions (in interviews, questionnaires, or in the case of rating scales), different assumptions about the nature of the answers can lead to opposite interpretations of the same question (for the moment, it is assumed that the phenomenon in question is fully accessible to the interviewee):

INTERVIEWER: How satisfied are you with your X (where X can be anything: “life”, “job”, “sex life”, “steak”, “fillings in teeth”, “right knee”, etc., etc.)?

INTERVIEWEE: Hmm . . . I think I am very satisfied . . . but of course it is hard to say . . . I had not thought of X in terms of satisfaction . . .

Under the assumption that the interview encounter is a direct and unambiguous transfer of information, the data generated from the response might be viewed as “very satisfied” and entered as such into some larger data base (obviously in the world of virtual data reality). This can take the form of assigning arbitrary numbers (e.g. “very satisfied” = 5, “satisfied” = 4, etc.) which are then further analysed as though the numbers represented the phenomena. Alternatively, the answer can be entered into the data base in its categorical form (coded by some qualitative symbol).

In both cases, it is assumed that both the interviewer and interviewee share the meanings of “how satisfied” and X (whatever it is), and thus the interviewee’s answer is an answer to the question asked. The interviewee is assumed to reveal just his or her answer to the question. Such a situation of full intersubjectivity between the interviewer and interviewee is impossible, or rare. Human communication-processes operate with partial intersubjectivity, within which illusions of full intersubjectivity are but means for maintaining further communication, rather than depictions of the true nature of phenomena. This entails a *progressive constructionist* assumption in making sense of the interview fragment. The communicative message of the interviewer triggers a complex process of representation and presentation of the phenomena indicated

(X) from the position of the interviewee. That process may be indicated by the moments of uncertainty in the answer ("I think I am . . .", ". . . it is hard to say"). The *seemingly* precise part of the reply – "very satisfied" – is merely a locally generated answer to the interviewer's suggestion (of subjective qualification – "how satisfied?"). Hence that answer provides the researcher (who operates from a progressive constructionist standpoint) with no data, whereas the "naively realist" researcher would accept the "very satisfied" as a legitimate part of the data.

Of course it depends on the specific method whether the two opposite assumptions are visible in the phenomena or not. In the interview fragment, both can be mapped onto the phenomena so as to turn them into mutually opposite kinds of data. However, if the same question were to be asked on paper and with a ready-made rating scale for responses:

How satisfied are you with X?

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Very Moderately Not really Not at all

then the progressive constructionist assumption will not be visible. The method of data-generation – the rating task – eliminates access to the construction of answers. It leads to immediate transformation of subjective quality of the relation of the person with some object into recording of the subjective quantity of some properties. These properties are constructed by the subject through the instructions for subjective quantification (which any rating task is). Subjective quality becomes translated into subjective quantity. Yet the processes involved in such translation – intrapsychological decision-making about "how much" of a given quality the target object of rating "has" – remain out of focus in the rating task.

Secondly, the rater becomes constituted as the measuring instrument – ratings that are an externalized product of the speedy introspective processes within the rater become projected onto the target object as if these ratings were properties of that object. In reality, the ratings are a result of the transaction of the rater and the object – with the rater's subjective decision-making system being the site where the rating is made. That decision-making belongs to the realm of intrapersonal psychological phenomena that may proceed very quickly – once persons master the task of rating

objects whose meaning lays them open to the act of rating. Psychologically, any rating task is possible on condition of abbreviated introspection.

Phenomena as reality

The rating action is an example of personally constructed reality. Prior to the use of the rating-scale method, the phenomenon of a rating of the given object need not exist in the person's psychological system. Once the rating is made, however, the phenomenon becomes constructed by the research act itself. Ratings are constructed realities, while the phenomena on which they are based are experienced realities.

Here I am setting up the phenomena as a reality – even if that reality may be the result of a personal (subjective) construction. Undoubtedly some of such constructed phenomena are deeply subjective realities (e.g. personal feelings of love, hate, justice, etc. – all semiotically constructed, yet experienced with full pain and pleasure by the constructor's body), while others can have externally perceivable referents (e.g. realities of existence of the Himalaya mountains, or of McDonald's with its symbol). The specifics of the constructive actions by persons in different kinds of phenomena vary (e.g. nobody can claim to have "built" the Himalaya, some can claim to have built McDonald's chain, and everybody can claim this in respect to one's personal feelings and meanings) – yet all these phenomena are real for the persons who experience them.

Methods of measurement are derivations of experience. There is certainly a great need for elaborating the process of translation of qualities into quantities in the human psychological system. The history of measurement – of weights, distances, etc. – indicates the move from human body-based (or activity-based) measurement systems (e.g. feet, yards) towards abstracted ones (meters). In each of these, a particular aspect of the object – be it weight, length, or any other – becomes abstracted from the whole target of measurement through the mental activities of the person measuring. The standard meter-unit is abstracted from many objects whose length can be measured. Other, different qualities of these objects have been eliminated, leaving just the conventional meter standard to be applied independently of the qualities of the objects measured. The quality of length – abstracted and turned into a standard

unit – becomes a unifying quality that allows comparison of otherwise very different objects.

The nature of developmental phenomena

In the examples above, it was assumed that the phenomena were in a static state, and unchanged by the encounter with the procedure of measurement. If the phenomena themselves become transformed as a result of the data-derivation efforts, or if the phenomena are inherently changing towards previously unknown states, the issue of data-generation acquires a new feature.

The issue of how the data are derived from the phenomena is particularly crucial for developmental perspectives within the social sciences – psychology, anthropology and sociology – where the current state of a phenomenon may be qualitatively semi-differentiated. Thus, a developing person is, at any time, in a state of beyond what has already been mastered and what is about to be achieved. Societies and individuals are constantly involved in transforming themselves into new forms. In terms of the claims made above, this entails constant emergence of phenomena. All phenomena of a social and psychological kind can be viewed as being in a state of perpetual transition.

In such transition states, the individuals (or societies) are of some quasi-structured form. Thus, from a developmental standpoint, most of the phenomena can constantly combine features that are in the process of disappearing with those that are in the process of coming into existence. A person involved in mastering a skill is no longer lacking that skill, nor is the skill present in its fully-fledged form. The skill is coming into existence. The phenomenon here is quasi-structured. Rudiments of the skill can be detected in the flow of conduct, yet nobody can say for sure that the skill as such already exists.

Most psychological phenomena are quasi-structured. Yet when a researcher makes data out of the phenomena, that quasi-structured nature of the phenomena can easily be overlooked. This is especially likely as the researcher need not have a method-independent access to the phenomena, and may operate on the basis of assumptions about what the phenomena may be like. Thus the basic assumption that psychological phenomena are strictly categorical leads the researcher to superimpose upon them some strict categorization

system. The data generated by such an act would eliminate the nature of the phenomena (which can be described as “no longer A – not yet B”) by forcing the observer to strictly classify them as “either A or B”. The researcher’s assumptions about the quality of the phenomena lead to the elimination of information about emergence in the data.

Actual, perceived and uncertain qualities

Quality pertains to the inherent character of the phenomenon. Yet the observer is external to the phenomenon as an observer – and at times has no direct access to the qualities of the phenomena. Some qualities may be hidden from the investigator due to access limitations. Consider the example of two celestial objects – the sun and the moon – which are observable by all persons on earth. For the observers, both can be viewed as “providing light” – the sun during the day, the moon at night. That perceived quality may accurately represent the quality of the sun, but not that of the moon (which “provides” only the light that it reflects to the earth from the sun). Yet for the perceiver on earth, that difference is not immediately available.

Following these examples, we can distinguish between *actual* and *perceived* qualities. The latter are dependent upon the knowledge the observer brings to the process of investigation. The perceived quality can approach its actual counterpart. It can also deviate from the actual quality when the observer constructs the perceived quality in ways that do not represent the actual quality. Last (but not least), the actual quality can emerge from new encounters, including those with the researcher.

The situation in the social sciences entails a further complexity. The interview example (above) indicates that quality itself may be constructed jointly by the interviewer and the interviewee. It is not inherent in the phenomenon. This is therefore a quality that emerges in the process of research, and constitutes an *uncertain quality* as far as the phenomenon is concerned. Hence the research method (interview) is inherently connected with the making of the quality it is supposed to reveal.

How is the quality of an object created? In any detection of qualities, some previous experiential background is in use. In human cases, this involves meaningful interpretations.

Interpretations – fielding of terminologies

If we consider the vague self-feeling about X (in the interview excerpt, above) as an example of a phenomenon, and each interviewer-triggered mumbling by the interviewee as the data, we can see how the data are constructed – or derived (rather than collected) – entities. Their construction entails the researcher's linking the observed phenomenon with some field of meanings – or, in the terms of sematology, "fielding the sign". *The data are signs that represent selected features of the phenomena.*¹ Like all signs, they represent aspects of their referent phenomena, and they pre-present these aspects for further thinking and use. The pre-presentational function of signs makes them ideologically non-neutral. Thus, the interview- (and rating-)based result "I am very satisfied with X" is simultaneously a constructed representation and an ideologically flavored pre-presentation (which may entail interpretative directions, like ". . . but I should not" or ". . . that is what I want").

Treating the data as signs makes it possible to describe the multiple meanings involved. Each sign is situated within a field of meanings, to the exclusion of other fields. The representational role of social science data may be situated within a field of meanings of "objectivity". Thus, the neglect of intrapsychological introspection in the interview or rating-scale answer (above) is not occasional. By way of the historical construction of the meaning field of "objective data" in the social sciences, introspective phenomena are left beyond the boundaries of that field.

The same sign can simultaneously be situated within another field of meanings. The data can be viewed within a field of meanings of "social value", or "social usefulness". In the interview example, the specific meanings included as X in the discourse (e.g. "right knee" versus "job") are easily evaluated within the field of data as social value. Last (but not least), the field of meanings of "scientific data" is an example of fielding of the data as signs.

The sign-field boundaries of the derived data are constantly involved in social boundary defenses. The major constraint on the fielding of scientific data is its distinction from mythical-religious meaning fields. Thus, claims like "human intelligence is determined by genes" may be accepted as scientific; its possible counterpart "human intelligence is determined by ancestor spirits", however, would be vehemently eliminated from the field of scientific thinking.

In psychology, the struggle over the last century has revolved around the acceptance of notions of intentionality as scientifically legitimate. In the human psychological world (and its development), the orientation towards future desired states, and actions towards them, can be phenomenologically obvious. Yet it has been a very difficult – in fact as yet unachieved – task to accept the notion of personal intentionality as a legitimate scientific term. Most of the nearly successful efforts have made use of terminologies that imply intentionality (e.g. “goal-directedness”, “goal-orientation”), but they do not attribute the intention fully and elaborately to the person.

How does our interpretation of an object’s qualities allow us to construct quantitative measurement? The notions of ordering (which leads to ordinal scales), or of measurement intervals as equal in size (leading to interval-scale construction), and finally the creation of ratio scales are all based on specific qualities of the phenomena projected onto the reality. Data may be created in line with any of those scale types, while the phenomena – existing or emerging – are qualitative complexes.

Thus, quantification of any psychological or social phenomenon – turning those into quantitative data – is itself a form of qualitative analysis. Once this is recognized, it becomes no longer possible to consider qualitative and quantitative methods as mutually irreconcilable. Instead, these methods become different routes to the creation of data, both leading to data that then become treated by researchers (as well as by lay public) as if those were solid facts – independent of the history of how they were actually constructed. The popular notion of “data” is that of something given, rather than something constructed. The scientific notion of data is that of something constructed – which still would adequately present some features of the phenomena under study.

Data as abstracted representations

Data as signs are *abstracted* entities. The abstraction of data from the phenomena can be based on the golden rule that data have to adequately represent the nature of the phenomena. Yet what “adequate” means is dependent upon external evaluation of the relations of the data and the phenomena.

In this claim, access to the phenomena in parallel with the data is crucial for determining the adequacy of the data to the phenomena. The intuitive encounter by the researcher – who needs to know the phenomena well before getting into method- (and data-)construction – is necessarily central here. In this sense, a researcher does not differ from a fiction writer in the need to penetrate the phenomena prior to turning them into either data (researchers) or novels (writers). I refer here to the futility of claims that writers are better psychologists than research psychologists. It may merely be that research traditions in the social sciences have handicapped the intuitive encounters of researchers with the phenomena. What for writers or artists may be recognized as a *via regia* for understanding – intuitive grasping of issues – has been largely distrusted in the social sciences.

However, referral to intuition does not create clarity. Instead, the researcher's intuition becomes a new "black box" in the methodological discourse. In this context the researcher's intuition amounts to the comparison of a perception of the phenomena (however those are accessible to the researcher prior to the research effort itself) with the kinds of data the constructed (or selected) method can provide. In effect, what is compared is two kinds of access to the phenomena – access unmediated by specially constructed methods (but relying on the researcher's perceptual and conceptual intuitions) and access mediated by the methods of scientific inquiry.

Errors of representation

The quasi-structured nature of the phenomena creates a situation for the researcher in which it is not easy to decide which kind of data-derivation strategy is appropriate in a given case. Necessarily, then, the researcher plays a hypergame with the phenomena. The researcher may assume the phenomena are in a well-organized, actually existing state. If that assumption is adequate, the use of methods – qualitative or quantitative – that provide data of a similar well-formed kind is appropriate. Yet the researcher may not know the phenomena directly – or may misinterpret the part of the phenomena that are observable. Hence it is possible that the

assumption of the strict organization of the phenomena is wrong – the phenomena may be in a state of chaos, or of some kind of quasi-structure. In this case, efforts to represent these phenomena in terms of well-formed kinds of data (e.g. strict categorization schemes superimposed on fuzzy, quasi-structured phenomena) would introduce an irreparable error.

Most of the efforts to elicit categorical data about quasi-categorical phenomena suffer from this error. The “discovery” (since the 1960s, in fuzzy set theory) that human mental categories are not strict but fuzzy sets effectively reveals the error made in previous efforts to treat categorizations produced by human minds as adequate representations of mental phenomena. The fuzziness of human mental phenomena is most adequately represented by fuzzy categories. This eliminates the error mentioned above.

There can, of course, be the converse error – that of representing clearly formed phenomena in terms of quasi-structured forms of data. This error of representation is unlikely in the social sciences (where the phenomena are dynamic and complex), but can occur in areas (such as psychoanalysis) where the manifest clarity of form (e.g. oblong objects of a clearly perceivable kind) may be given interpretations that are projected onto various mythical interpretations (e.g. “penis envy”). The representativeness of the data – interpretations of the clearly perceivable objects – here also fails to be corrected by alternative channels of access to the phenomena. A vegetable-seller in a market sells cucumbers as cucumbers, while a psychoanalyst buying a cucumber may field the cucumber as a substitute for a penis. To the market seller, an interpretation of his activity as “selling penises” would seem perfectly absurd.

Thus, in general, *data that are derived from phenomena are adequate representations of the phenomena if (and only if) the qualities to be studied in the phenomena remain preserved within the data.* In case of either kind of error – replacing fuzzy phenomena by strict data, or replacing strict (clearly perceivable) phenomena by fuzzy data – that criterion of adequacy is not fulfilled.

I can now return to the issue of relativity of quantification in the social sciences. From the perspective outlined here, both psychoanalytic interpretations and standardized quantitative-measurement systems (such as IQ tests, etc.) fail to fulfil the criterion of adequacy of representation by the data.

An example of representational error: intelligence-testing

Quantification of complex psychological functions – such as intelligence – is an example of how psychology has created a bogus sub-field (called “intelligence-testing”) which has been based on uncritical acceptance of the operation of quantification as guaranteeing scientific precision. Criticisms of intelligence-testing in psychology have been recurrent (yet the practice of such testing continues in its established role), and I do not intend to add to the number. I am only using this as an example of how from the same – complex, fuzzy, dynamic – phenomena two different kinds of research traditions have emerged. Thus, the field of phenomena that can be labeled “intelligence” includes the entire multitude of human mental actions in the contexts of everyday-life demands – ranging from solving a little addition problem of buying/selling practices to finding solutions to complex scientific problems. From that complexity of phenomena, we obtain two directions in research on that topic:

“INTELLIGENCE-TESTING” “PROBLEM-SOLVING”

Assumption: Intelligence can be quantified by summing up the number of correct solutions to different tasks

Constructed theory: intelligence becomes posited as a “property of persons” that varies in quantity as a capacity which is assumed to be present (and functional) within the mind

Assumption: Intelligence, in order to be translated into quantities, requires a task that needs solution, and can be studied by observing the tactics of reaching a solution (whether correct or incorrect)

Constructed theory: basic mental processes of synthesis

The intelligence-testing tradition is a good example of an ideological practice of quantification (which includes the error of representation as defined above), which is subsequently defended by constructing a theoretical model of matching kind (“amount” of intelligence as a quality within a person). The (quantitative) model supports the quantified measurement practices, and vice versa. The whole intelligence-testing domain becomes an encapsulated

domain in which no new conceptual development is possible, while replications of quantitative measurements are constantly created.

In contrast, the problem-solving orientation in the study of intelligence is not based on the assumption of obligatory quantification. Instead, the realm of problem-solving includes a great variety of empirical studies where qualitative and quantitative methods can be used as it befits the theoretical aims (different models of concrete mental functioning) and the phenomena.

General conclusions: data as ambiguous representations

We can thus identify a major obstacle for the methodology of social sciences: error of representation of the phenomena by the data. The error is the depiction of the phenomena in terms of well-organized structures (or their quantified derivations) in the data, while in reality the phenomena are fuzzy, dynamically changing and semi-structured. In this case, data are “mutants” that do not represent anything, and are thus irrelevant (or counterproductive) for science.

There is no inherent benefit from the use of qualitative methods which are as vulnerable to inadequate representativeness as quantitative techniques are. The issue is a general one: how can adequate knowledge be created on the basis of dynamic phenomena? Neither quantitative nor qualitative methods enjoy an automatic privilege in answering that question. The adequacy of either depends upon the consistency within the chain THEORY – METHODS – PHENOMENA, where the researcher needs to verify the adequacy of the methods by alternative analysis of the nature of the phenomena. That analysis is often an intuitive “feeling about” the phenomena. The role of researcher subjectivity in research is hence substantial, and needs to be explicated rather than concealed.

The issue of data as representations becomes crucial in any area of the social sciences where development within the phenomena is assumed. In lieu of that assumption, it is not possible to view the phenomena as existing independently of the researcher, in a stable form. The act of using a method (see the interview example, above) can be seen as triggering further development within the phenomena. The data act in relation to the phenomena as Achilles in the famous paradox in which Achilles can catch up with the tortoise, but not pass it.

If this image of data as time-lagged semiotic representations of constantly changing phenomena is adequate, then the methodology of the social sciences is faced with the need to use the abstracted (generalized) nature of the data-as-signs to extrapolate basic knowledge to capture the immediate possible transformations in the phenomena. The data need not only to represent the selected sides of the phenomena at the time of the research encounter, but also to pre-present the expected state of the phenomena after the research encounter. This is possible if the meanings in the sign (data) are made explicit, and projected back (or further) onto the phenomena of interest.

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Note

1. In contemporary psychology, sign-processes are increasingly being studied within cultural psychology. In our context here, the idea that data are signs amounts to the acceptance that science is a form of social order that operates through the construction and use of signs.