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The distinction between qualitative and quantitative research methods is problematic

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Abstract The distinction between qualitative and quantitative research is abstract, very general and its value is usually taken for granted. In contrast, this article attempts to show that the distinction between qualitative and quantitative research is unclear, poor and therefore of limited value and that its popularity risks leading to unfortunate consequences. Various arguments are presented for this conclusion. For example, it is argued that the heterogeneity of different stand-points on important issues among qualitative researchers (for example with respect to the use of quantification and causal analysis) makes the distinction as such unstable. Moreover, the presence of substantial overlap between many features of qualitative and quantitative research often makes it difficult to separate qualitative and quantitative research. It is also shown that three obvious ways of making the distinction between qualitative and quantitative research are unsatisfactory. Use of the distinction may restrict creativity in the development of new research methods and create confusion and unnecessary work. In general, it may be preferable not to conceptualize research approaches at such abstract levels as done in the context of qualitative or quantitative approaches. Instead, it is suggested that it is more fruitful to discuss the pros and cons of specific research methods, preferably in the context of specific research problems.

Keywords The qualitative–quantitative distinction · Qualitative approach · Quantitative approach · Research approach

The distinction between qualitative and quantitative research has had a remarkable breakthrough in the social sciences, including psychology. The contrast with quantitative research usually comes as part and parcel of the notion of qualitative research (e.g., Pope and Mays 1999). Since this distinction is usually taken for granted in the research literature it is of importance to scrutinize it critically. In this article I argue that the distinction is of limited value and attempt to explain why.

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Most researchers will probably agree that good distinctions separate their constituent parts well, i.e., there is no or little overlap between the parts of the distinction, and that good distinctions are clear and unambiguous. The last mentioned criterion will be difficult to achieve if the two parts of the distinction are not defined in a clear and unambiguous way. Below I will argue and attempt to show different ways that the distinction between qualitative and quantitative research does not live up to these criteria.

Bryman (1984) noted that in the literature on the distinction between qualitative and quantitative research most of the comments on this topic have been formulated by researchers writing from the perspective of qualitative research or by authors who at least are engaged in qualitative research. The same appears to be the case today and the present article foremost utilizes such literature. Furthermore, as a caveat, it should be noted that this paper is not intended to argue against any specific qualitative or quantitative method or, against qualitative or quantitative research as such. In line with the approach taken here, I think that the pros and cons of research methods should be argued in relation to the specific research context that they are used in (including the research question posed and the resources available for the research), and not on a general abstract level.

The history of the origins of qualitative research (under this label) can be, and has been, written in many ways (e.g., Denzin and Lincoln 1998; Flick 1998; Tesch 1990; Vidich and Lyman 1998). Under other labels there have been various philosophical precursors such as different schools of hermeneutics and of phenomenology and in the social sciences there have been precursors such as the participant observation research method in anthropology. Other early forerunners of the qualitative research approach occurred in the social sciences in the first half of the 20th century as a result of dissatisfaction of researchers in sociology with what they experienced as the prevailing dominance of research involving quantification of variables and statistical analyses. The researchers wanted to secure a legitimacy of the use of content analyses. Often labels such as "soft data" and "hard data" were used.

The concept *qualitative research* started to spread during the 1950s and 1960s and became widespread in large parts of the social sciences during the 1970s and 1980s but in some disciplines such as psychology it did not gain momentum until the 1980s and 1990s (Allwood 2002; Rennie et al. 2002). The spread of *the distinction* between qualitative and quantitative research appears to have followed as a consequence of this development, and earlier suggested contrasts, such as for example Wilhelm Dilthey's contrast between the Natural and the Human sciences, might have functioned as a thought-model.

1 Problems with the distinction between qualitative and quantitative research

There are different signs that the distinction between qualitative and quantitative research is problematic and of limited value. One such sign, dealt with in the next section (Sect. 2) of this article, is that different versions of the qualitative research approach, as such, include methodological and philosophical stances that appear to contradict one another. Different versions of the qualitative research approach also attempt to characterize the characteristic properties of the qualitative approach and these characterizations are also quite heterogeneous.[1] When the characterization of the *quantitative* approach, as further commented on below and as is often the case, is left undone or is taken to be the complement of the features of

[1] I will not, as such, discuss notions of quantitative research here except for its relation to the qualitative approach as this is depicted in the literature on, and from, the qualitative research approach.

Table 1 Examples of the heterogeneity of qualitative research methods

Issue/dimension	Variation
Generalizability of results	Great/small possibilities to generalize results
Epistemological approach	Empirism/rationalism
Structure	Structured/holistic
Interest in regularities	Great interest/small interest (more interpretation oriented)
Use of quantification (e.g., numbers)	No quantification/quantification
Causal explanation	Legitimate (and possible)/Not legitimate
Characteristic properties of qualitative methods	Different suggestions (see Table 2)

the characterization of the qualitative approach, the heterogeneity of the qualitative approach tends to destabilize the distinction between qualitative and quantitative research.

A further indication that the distinction is problematic is that attempts to separate qualitative and quantitative research approaches by means of their phenomena, research methods or research philosophy are as I will try to show, when scrutinized, not very convincing. This is the focus of Sect. 3 of the article and in Sect. 4, before the conclusions, I critique the use of a split between the natural sciences and the human sciences as a way to legitimate the distinction between qualitative and quantitative research. Finally, in the conclusions, I give some further reasons as to why I think it is unfortunate that the distinction has received such great spread in the social sciences in many countries. Examples of other authors that previously have critically discussed problems with the distinction between qualitative and quantitative research are Bryman (1984, 1995) and Hammersley (1992, 1996).[2]

2 Heterogeneity of the qualitative approach

Some examples of the heterogeneity within the qualitative research approach are shown in Table 1. For example, qualitative methods differ with respect to their view on the possibility/desirability of generalizing the results of one's research to other places, times and categories of individuals. Some methods, for example the empirical phenomenological method of Giorgi, have large ambitions to generalize. The goal of this type of methods is to identify one, or a small number of, "essence gestalts" (fundamental gestalts) for a certain "phenomenon", for example a genuine learning experience in life (Giorgi 1975, see also e.g., Bullington and Karlsson 1984). Other approaches or authors advocate great caution or total rejection of the interest, or the possibility, to generalize research, for example Alvesson and Kärreman (2000) and Masters et al. (2006). Mason (1996) is an example of an author making the distinction between qualitative and quantitative research whose views appear to be located somewhere in the middle of the dimension concerning to what extent it is possible to generalize research results.

Qualitative researchers also differ with respect to their stance on epistemological rationalism and epistemological empiricism, that is, if one argues that the influence of the researcher on the research results is (and possibly thinks that it should be) large (rationalism) or small (empirism). Hermeneutically inspired research methods that tend to highlight the importance of the researcher's pre-understanding exemplify epistemological rationalism. An example of

[2] Other authors that have expressed criticism of the distinction are Pope and Mays (1999, p. 5) wrote "there is a growing recognition within sociology that the qualitative-quantitative distinction may not be helpful or even accurate".

Table 2 Different opinions about the characteristic properties of qualitative methods

(1) No statistics or other forms of quantification are/should be used (Strauss and Corbin 1998)
(2) The qualitative approach is emancipating (Hamilton 1998)
(3) The qualitative approach is a naturalistic (i.e., not laboratory based) interpretive approach (Denzin and Lincoln 1998)
(4) Words are data (Tesch 1990)
(5) Meaning contents are the study object (Pope and Mays 1999)
(6) The qualitative approach is radically interpretivist and constructivist (i.e., it assumes that there is no reality independent of the investigation (Sale et al. 2002, p. 45))

a clearly empirically oriented method is Grounded theory (Glazer and Strauss 1967) and another example is some versions of discourse and conversation analysis, for example, the discourse analysis approach that Alvesson and Kärreman (2000) call "discursivism", (i.e., detailed studies of verbal assertions in specific situations).

Other aspects also differ within the qualitative research approach. I will here rely on the work by Tesch (1990) who compiled a list of 26 qualitative methods and arranged these methods on a dimension from *structured* to *holistic*. The structured methods tend to focus on delimited parts of the studied phenomenon and to be systematic and controlled. When using holistic methods the researcher tries to intuitively grip his or her whole experience and these methods are often unstructured and fantasy- and theory inspired.

Tesch (1990) also argued that qualitative methods vary in their interest in regularities and patterns, where some methods search for regularities and patterns in the data while the aim of other methods primarily is to interpret meaning and actions, often in their broader social and historical context.

Moreover, writers taking a qualitative approach also differ in their attitudes towards the use of numbers and other types of quantification. Strauss and Corbin (1998) argued that statistics or other forms of quantification should not be, and are not, used in qualitative research. In contrast, for example, Maxwell (2010) and Schwandt (1997) argued that qualitative research may well use different forms of quantification. Yet a further example of heterogeneity in the qualitative approach is the issue of causal analysis. Some authors in the qualitative approach think that causal explanation is inappropriate in the qualitative approach (e.g., Guba and Lincoln 1989 cited in Gelo et al. 2008), and others like Maxwell (2004a,b)) argue that causal analysis is legitimate and do-able in the qualitative approach.

There also exist great differences in opinion among qualitative approaches as to the important characteristics of qualitative research. Table 2 provides six examples of different views.

These different ideas as to the characteristic properties of the qualitative research approach are often conceptually independent of one another. Thus for example, an ambition to conduct emancipatory or naturalistic research is fully compatible with (and is often aided by) the use of statistics. Emancipatory and naturalistic research also does not presume one another. In addition, a researcher clearly does not need to adhere to all of these definitions, and so might not be classified as a qualitative researcher by some qualitative researchers although he or she subscribes to one of these definitions.

In spite of their difference, all the authors cited in Table 2 seem to assume that there is a quantitative approach that is not characterized by the suggested characteristic properties of the qualitative approach. Furthermore, all of the authors implicitly assume that there are no more than *two* approaches to research although this is not (to this author's knowledge)

explicitly discussed.[3] Again, the nature of the quantitative approach is not explicitly discussed, but it seems to be taken for granted that it is the complement of the qualitative approach and as a consequence, that its' nature depends on what is assumed to be characteristic of the qualitative approach. Thus, one of the problems with the distinction between a qualitative and a quantitative approach is that the distinction is unstable, since the characteristics of quantitative research is usually treated as a side effect of how one describes the qualitative approach. Furthermore, as described next, the indirect consequences for what is characteristic of the quantitative approach often seem unsatisfactory.

Accordingly, depending on which of the six suggestions for the important characteristics of the qualitative approach rendered above is favoured, it would imply that what is characteristic of the *quantitative* approach is that it, either (1) quantifies (but many authors, for example, Schwandt 1997, argue that this is also done in the qualitative approach, at least to some extent!), (2) is not emancipative (but this surely varies in all research and is presumably not a function of if the approach is qualitative or quantitative but rather of how the results are used!), (3) is not naturalistic or interpretative (but surely quantitative studies are often carried out outside of the laboratory and clearly research results and data, such as the participants' statements, are interpreted in much research that would not usually be classified as qualitative!), (4) can not use words as data (but this is obviously done also in much quantitative research!), (5) does not treat, or study, meaning contents (but this is often done, for example by help of multidimensional scaling or other more or less advanced statistical methods), or, (6) assumes that there is an independent reality irrespective of whether it is investigated (interpreted) or not.[4] One reason for the anomalous issues we encounter in this context may be that the distinction between qualitative and quantitative approaches is too simplistic and abstract to meaningfully capture what the properties of different research methods under the respective labels of "qualitative" and "quantitative" have in common.

3 Three general ways of making the distinction

The distinction between qualitative and quantitative approaches can be made in different ways. Three such ways are: (1) to focus on *one part of the research process* that is then called qualitative or quantitative, (2) to describe specific *research methods* as either qualitative or quantitative, and (3) to distinguish between a qualitative and a quantitative *research philosophy* (Allwood 1999). It is often unclear which of these three ways is used, and sometimes an author makes use of two or more of these within the same text without clarifying this. These three ways are next described in turn.

[3] The same authors are presumably well aware of the multitude of philosophical traditions in the social sciences but they do not appear to consider this in the present context.

[4] A final example of attempts to find characteristics of qualitative and quantitative approaches is that of Maxwell (2004a,b) who, following the lead of other authors, distinguished between "variance theory" which he links to the quantitative approach, and "process theory" (qualitative approach). "Variance theory deals with variables and the correlations among them, it is based on the analysis of the contribution of differences in values of particular variables to differences in other variables." and "Process theory, in contrast, deals with events and processes that connect them; it is based on an analysis of the causal processes by which some events influence others. Process explanation, since it deals with specific events and processes, is less amenable to statistical approaches." (2004b, p. 248). This suggestion for how to understand the distinction between qualitative and quantitative approaches may be controversial to many authors who see themselves as working in the quantitative approach and longitudinal research (for example in developmental and life-span psychology) using sophisticated statistical methods. Such research illustrates why making the distinction in this way may not be unproblematic.

3.1 The distinction as relating to *a part* of the research process

Some important components of the research process are the phenomenon researched, the data- collection methods used, the results of the data collection (the data), and the data analysis methods used. These are sometimes seen as either qualitative or quantitative. A problem with seeing a *specific part of the research process* as either qualitative or quantitative is that this does not seem to fill the meaning of what is usually meant with qualitative or quantitative research. Furthermore, it is often not clear with respect to the specific part of the research process whether it is reasonable to see it as either qualitative or quantitative. This is illustrated below. In this paper I, as the elementary default, fall-back meaning of *qualitative* assume the term qualitative to mean that a studied phenomenon is related to (associated with) one or more categories (for example as done in content analysis) and the default meaning of *quantitative* to be that entities are dealt with in terms of an ordinal, interval or quote scale level of analysis.[5] Next each of the mentioned components of the research process is discussed more specifically.

Any *phenomenon* has both a qualitative and a quantitative aspect in the sense that it can be categorized and that it has some degree of 'much-ness' (see e.g., Sandelowski et al. 2009). The identity of any phenomenon (including e.g., attributes and components) is qualitative, but it always has a quantitative aspect (how much of it is there). It is odd to imagine that a phenomenon can be purely quantitative, that is, that it is not *something*.

One and the same *data-collection method* can usually be used to collect both qualitative and quantitative data. For example, *questionnaires* can contain both open-ended questions and numerical scales and questions in *interviews* can concern both numerical aspects (e.g., frequency of visits to the health care center) and qualitative aspects (e.g., how an informant felt when receiving the news that his or her operation had been delayed for three weeks).[6] Of course, numbers are quantitative in the elementary default sense of quantitative noted above, but it is also worth considering that numbers are representations of content and that they in this respect can be seen as having a qualitative aspect. Thus, data-collection methods are for various reasons usually not clearly quantitative or qualitative.

With respect to the *results of data collection*, these take many forms, for example, tape recordings, observational records, interview protocols, video-recordings, graphs from galvanic skin response measurements, brain-scan imagery pictures, text or numerical files. As such, there does not seem to be anything especially quantitative about any of these examples.

The same type of observation can be made for *data analysis methods*. The suggestion by Bogdan and Biklen in 1982 that qualitative data analysis may be defined as "working with data, organizing it, breaking it into manageable units, synthesizing it, searching for patterns, discovering what is important and what is to be learned, and deciding what you will tell others" (cited by Hoepfl 1997, p. 54) would appear to be just as applicable to quantitative data analysis. However, with respect to data analysis the elementary default senses of qualitative and quantitative, noted above, come to the fore. It is perfectly understandable to speak about qualitative data analysis in the sense of content analysis and of quantitative data analysis in the sense of numerical statistics. However, this, although unproblematic, does not at all fill up what tends to be meant by for example qualitative research (see Table 2).

[5] That this is in fact more complicated than described here is shown and discussed by Sandelowski et al. (2009).

[6] As a further example, the difference between a *qualitative interview* and an *interview* is not clear.

3.2 The distinction as relating to complete research methods

Sometimes whole empirical *research methods* are classified as either qualitative or quantitative. A full fledged research method can be seen to consist of the whole chain of activities from the initial formulations of the research problem to data collection, data analyses in different steps and sometimes even the writing of the research report. In a more narrow sense research methods can be taken to include at least data collection and data analyses.

The notion that it is reasonable to classify research methods as either qualitative or quantitative is problematic for different reasons. One reason is that it seems self-evident that all research *at least* is *qualitative* (see also e.g., Sandelowski et al. 2009). This is so, most obviously, because the researcher always has a (qualitative) description of his or her data, that is, the data are classified as *something*; they do not just exist as unclassified numbers. Other qualitative components of all research methods are the verbally formulated research problem and the interpretation of the research results.

A further general reason as to why it is problematic to classify research methods as qualitative or quantitative is that it is difficult to show that a certain research method *necessarily* has to be linked to a certain research philosophy (for example "quantitative"). This observation has been made by many authors making, or not making, the distinction between qualitative and quantitative research (e.g., Guba and Lincoln 1998; Hammersley 1992; Long et al. 2000; Pope and Mays 1999; Wardekker 2000). For example, Guba and Lincoln (1998) asserted, more in general, that both qualitative or quantitative methods, in principle can be used with any research philosophy (their label here is "inquiry paradigm", for example positivism, post-positivism, critical theory and constructivism). Pope and Mays (1999) suggested that this holds particularly within applied research areas such as the care and health sciences. Wardekker (2000), assuming that there are at least *three* approaches to research (the qualitative and the quantitative approaches and the approach of cultural historical activity theory), argued that "There is then no necessary connection between paradigms and methods […] It is not the character of the methods themselves that define a paradigmatic difference, but the way in which the results are interpreted and used" (p. 261).[7] Similarly, Long et al. (2000, p. 195) argued "research tools are not wedded to particular methodology".

Take, for instance, the so called diary method (generally speaking, this method is that the participants on a number of occasions report about events in their lives) that sometimes is described as a qualitative method but that in many applications involve that the participants note down times and numerical values on rating scales that the researcher later analyses statistically. In addition, diaries may be used to measure the effect of some specific treatment in an experimental design. According to some descriptions the qualitative approach (compare Table 2) the method will then not be qualitative.

Likewise, the so-called think-aloud method where the participants are asked to verbalize their thoughts aloud (usually when they solve some task), can be classified as belonging to one or the other research philosophy depending on how the method is applied more specifically.[8] In brief, a certain research method can reasonably (but loosely) be linked to many different research philosophies. Occasionally the originator of the method has attempted to link the method to a certain research philosophy by making a stipulative definition (compare

[7] The same assertion has also been denied, for example by Sale et al. (2002), who however did not supply any arguments for their position.

[8] It can be noted that the think-aloud method was not included in Tesch (1990) list of qualitative research methods.

for example Grounded theory, Glazer and Strauss 1967) but this is hardly an answer to the more general issue in this context.

3.3 The distinction as relating to research philosophy

There are many attempts to show how the distinction between qualitative and quantitative research approach can be made in terms of research philosophy (see e.g., Allwood 2002). A fairly common device in the literature in this area is to present tables containing two columns, one column representing important features of research in the qualitative approach and one representing important features of research in the quantitative approach (e.g., Bryman 1995, 2001; Masters et al. 2006; Merriam 1988; Starrin 1994).[9]

In the context of this type of setting up of contrasts between the qualitative and the quantitative research approach Hammersley (1996) pointed out that most of the positions that are ascribed to researchers in for example the qualitative approach have been taken by researchers who have (probably for some other reason) been categorized as *quantitative*. Moreover, in general, the properties found in one or the other of the two columns of lists like this often do not appear to have any necessary connection to one another and it is not difficult to find examples of research methods or approaches of both qualitative and quantitative labeling that include properties from both columns. These general statements will next be illustrated by specific examples from such lists.

An example of a representative list is that by Masters et al. (2006, p. 383) where major features of qualitative research are (using the words used by the authors) listed as: Goal/purpose: understanding/meaning from the participants—explanation/prediction from the data; Theory: generation—testing; Sample: participants—subjects; Researcher/sample relationship: direct involvement—external involvement; Instrument: researcher is 'tool'—established pretested tool; Findings: narrative/inclusive for depth—data/exclusive and limited to narrowed focus; Analysis: meaning from findings—numerical interpretation and significance; and finally Significance: applicable only to the sample—maybe generalizable to the population.

Most of these contrasts appear to me to be quite arbitrary. For example, it would seem that quantitative researchers may, in many contexts, just as well focus on understanding the meaning contents of the participants, feel directly involved in their study, and in many parts of the research process use themselves as "a tool". In fact, the researcher him- or herself can be said to function as an "*instrument*" in all research.

Another list is reported by Starrin (1994) who attempted to report what he saw as a summary of the stance taken in the qualitative research literature on the qualitative/quantitative distinction. One of his items was *subjective* (qualitative research) and *objective* (quantitative research). However, in general, as argued by for example Vidich and Lyman (1998), all research can be seen to contain both objective and subjective elements. Vidich and Lyman expressed this as follows:

> Lurking behind each method of research is the personal equation supplied to the setting by the individual observer (Clifford 1986). In this fundamental sense all research methods are at bottom qualitative and are for that matter, equally objective; the use of quantitative data or mathematical procedures does not eliminate the intersubjective element that underlies social research. (p. 44)

Examples of somewhat subjective aspects in all research are the choice of research question, and whether the researcher prefers to relate the data to this or that theory. Such aspects

[9] Allwood (1999) and Hammersley (1996) provide more complete discussions of these issues.

are heavily determined by the researcher's interest, his or her knowledge and also by preferences for the different theories formed in the research community at large. Furthermore, it appears quite difficult to show in a strict way that on average the research conducted in one of the two approaches is more subjective or objective than in the other approach. An example of an author who identifies herself as qualitative is Mason (1996) who argued that that systematic and well controlled studies should be the hallmark of all qualitative research, "Qualitative research should be *systematically and rigorously conducted*. I do not think that there are any excuses for a casual or ad hoc approach to qualitative research" (p. 5, Mason's italics).

As noted above, Masters et al. (2006), suggested that research in the qualitative approach is characterized by that the results are *applicable only to the sample*, whereas results from the quantitative approach may be *generalizable* to the population. Likewise, Bryman's list (2001) contains the corresponding items "contextual understanding" and "generalization". However, as noted above, researchers identifying themselves as working in a qualitative approach vary with respect to their attitude to generalisation. Also, it should be noted that poor practice (that reasonably should be changed) occurs in both approaches, but more generally and normatively speaking it seems reasonable to claim that the extent to which a result generalizes does not depend on the research approach taken as such, but rather is an empirical question that depends on features of reality. A reasonable stance with respect to the issue of generalization seems to me to be to consider generalization as a question of degrees. In this context, the researcher would do well to take the phenomenon and the contexts to which the result might generalize into consideration (see Shadish et al. 2002). To decide a priori that the results can never generalize outside of the sample seems simply to be inappropriate and a poor use of the tax payers' money.

An example taken from the list provided by Merriam (1988) is the idea that researchers in the qualitative research approach, have an interest in the *nature of the phenomenon*, in contrast to researchers in the quantitative approach who only ask *"how many", "how much"*.[10] However, it seems foolish to believe that "quantitative researchers" are simple-minded enough to limit their inquiries to "how many?" or "how much?"! Quantitative information is searched in order to find out about *the nature* of a phenomenon.

As a further example, *small, non-random, samples* are taken to be characteristic for qualitative research and *large, random and representative* samples as representative for quantitative research (e.g., Merriam 1988). The view that "large, random and representative" samples are typical in quantitative research appears to be common in the literature. For example, Hoepfl (1997) stated that "In quantitative inquiry, the dominant sampling strategy is probability sampling, which depends on the selection of a random and representative sample from the larger population" (p. 51). However, I would argue that, for example, most or many laboratory experiments do not use samples of the kind described here, at least this is clearly the case in psychology. In fact, many sampling strategies that are similar to those described in the qualitative research literature are recommended for use in experimental and quasi-experimental research (Shadish et al. 2002). For example, strategic sampling may be used in neuropsychological research. In general, small and non-random samples are often used in research aiming at *control* or *hypothesis testing*. In the other direction, Mays and Pope (1999) argued

[10] The same idea may, for example, be rendered in the item for the quantitative research approach expressed by Masters et al. (2006) as "numerical interpretation and significance" contrasted with "meaning from findings" (qualitative research) and by Gelo et al. (2008, p. 267).

that probability sampling, such as stratified sampling, might well be used in connection with qualitative research in the health sciences.[11]

Finally, (from the lists presented by Merriam (1988) and Bryman (1995, 2001)) qualitative research is taken to be *unstructured* and quantitative research to be *structured*. However, as reviewed above, qualitative research includes both structured and unstructured methods. In fact, it is clear that there are structured and unstructured aspects to all research. For example, the naming of the factors computed in factor analysis can be seen as an unstructured aspect of research using statistical methods. Possibly as an effect of the 'unstructured' feature often assumed to characterize qualitative research, it is often taken to be exploratory or theory generating and quantitative research to be theory testing, hypothesis testing etc. (e.g., Bryman 1995, 2001; Merriam 1988). However, quantitative research often takes an exploratory approach; as a small example, there are both exploratory and confirmatory types of factor analysis.

4 Using the difference between the natural sciences and the human sciences as a way to legitimate the distinction

A further, in my opinion, problematic way to distinguish between the qualitative and quantitative approach assumes that there are decisive, relevant differences between the natural sciences and the human sciences and that these can be used as an argument for making a distinction between qualitative and quantitative approaches to research.[12] The qualitative approach is linked to human science and the quantitative approach is linked to the natural sciences.

This line of argumentation usually takes as its starting point the hermeneutic philosophy of Wilhelm Dilthey in the 19th century. Dilthey argued that the natural and the human sciences make up two separate, equally valid, moods of scientific knowing. In this context he distinguished between *explanation* and *understanding* (where understanding, minimally, means descriptions of meaning contents). Here authors writing on this issue tend to link explanation to the quantitative approach and understanding to the qualitative approach.

One difficulty with this reasoning is that qualitative and quantitative approaches, generally speaking, often both want to explain and describe meaning contents and other aspects of reality. Furthermore, the use of the link to the natural and the human sciences is in itself problematic since both today are very different from what they were in the 19th century. The phenomenologist Ihde (2006) in this context gives both Einstein's theory of relativity and the insight that the measurement of a phenomenon influences how that phenomenon appears (quantum mechanical probabilistic theory) as examples of developments in physics that has the implication that assuming that 19th century natural sciences are the same today as then is a risky enterprise that endangers conclusions based on fundamental differences between the natural and the human sciences.

In the area of Science Studies it is today quite well studied how research is conducted in the natural sciences (e.g., Ziman 2000) but this literature often does not appear to have

[11] In this context the following conclusion by Thorne (2001) is of relevance "On the other hand, although qualitative studies involving large numbers of participants may inherently survey the phenomenon in a rather superficial manner, smaller studies designed to access depth may systematically exclude important aspects of the phenomenon that only becomes visible when a wider cross-section of the phenomenon is considered. (p. 154).

[12] Bryman (1984, p. 78) noted "The contrast with what is variously called positivism and a natural science approach is ever present among these writers [writers in the qualitative tradition].

been attended to by the adherents of the now discussed argument and by the adherents of the distinction between qualitative and quantitative research more in general. Still many texts in those philosophies of science that assume the distinction do not seem to heed that today's natural and human sciences are very much different from what they were in the 19th century.

5 Discussion

Above I have attempted to show that the distinction between qualitative and quantitative research does not fulfil the criteria for a felicitous distinction of separating its constituent parts in a fairly non-overlapping, clear and unambiguous way. For example, above it was shown that at least one of its constituent parts, qualitative research, contains a great deal of potentially contradictory tendencies that makes the concept of qualitative research instable. If one (or both) of the parts of a distinction is unstable this will contribute to make the distinction unstable which is likely to impact negatively on the possibility to make the distinction in a clear and unambiguous way. Moreover, as also shown above, the distinction does not appear to fulfil the criterion of separating its parts in an uncontroversial and fairly non-overlapping way. In fact, the qualitative and qualitative research approaches was found to overlap to a considerable degree. Given that the distinction is unclear and made in different ways, many of which are controversial, it seems that the distinction risks contributing to the spread of confusion rather than better understanding.

Moreover, the distinction between qualitative and quantitative approaches is problematic not just because it has given raise to the problematic and confusing standpoints discussed in the main part of the article, but also because it may prove to be limiting for the development of new research methods. For example, researchers who believe that it is only allowable to develop new methods *within* the assumed reference frames of each of the qualitative and quantitative approaches will miss opportunities for fruitful combinations of features belonging to both of the approaches.

The distinction also contributes to making the discourse on research methodology more shallow since the research methods used are sometimes described simply as "qualitative methods" (or similar for "quantitative methods"). Given the heterogeneity in qualitative methods (and the corresponding for quantitative methods) such statements are unhelpful indeed!

The message in the now quite popular "Mixed methods"—school is that it is legitimate to mix qualitative and quantitative approaches (sometimes adding "if it is done in the right way"), thus assuming that it is meaningful to distinguish qualitative and quantitative approaches.[13] In addition, authors discussing the mixing of qualitative and quantitative methods, in contrast to the authors reviewed above on this issue, also appear to assume that research philosophies and research methods are strongly linked. For example, Gelo et al. (2008, p. 274) suggested different forms for mixing qualitative and quantitative methods and noted "quantitative and qualitative approaches differ in the methods they apply".

If one abandoned the distinction between qualitative and quantitative research one would not have to apologize for mixing methods classified into the two approaches. It seems clear that it is possible to use and combine different types of research methods without subscribing either to the distinction between qualitative and quantitative research or the "Mixed methods" school. However, in too many methodology courses at the university level and other school forms students are told that qualitative or quantitative approaches and specific research

[13] See for example, two special issues of the journals "*Qualitative Research"* (2005, no. 1) and *"The International Journal of Social Research Methodology* (2005, no. 3).

methods are linked together without being told that this assumption is problematic (often even without the assumption being made explicit). This I think is grossly misleading.

In brief, the distinction between qualitative and quantitative approaches appears unclear, and problematic. Contributing to this is that what is taken as features of qualitative and quantitative research overlap to a great extent (see Allwood 2002). A better alternative to classifying research and research methods in terms of qualitative and quantitative is, I submit, to discuss the pro and cons of various research methods at a more concrete and specific level, maybe best in the context of specific types of research problems. Moreover, it would be better not to define qualitative research in contrast to a general notion of "quantitative research". Instead it may be more constructive to try to identify and then give labels to different versions of qualitative and quantitative research.

One reason why the distinction still is used by people responsible for methodology courses and at publishing houses responsible for book series may be that the binary thinking implied by the distinction between qualitative and quantitative research gives the impression that the distinction is easy to understand. However, as I have attempted to show in this paper this impression is quite misleading. There are many possible and interesting ways to divide research approaches, none of which necessarily needs to be seen as more fundamental than the others.[14] The separation of research approaches into qualitative and quantitative in fact constitutes an invitation to simplistic thinking about complicated issues and thus may hinder the development of understanding of research philosophical and methodological issues.

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[14] Some examples are; Structured–Non-structured, Relativism–Objectivism, Interpretation–Directly presented meaning, Holistic–Analytic, Meaning phenomena–Not meaning phenomena, Historically oriented–Not historically oriented, Direct methods–Indirect methods, Descriptive–Causal methods, High in details–Over-all patterns, Reactive–Non-reactive, Explorative–Hypothesis testing, and Directed/manipulated situation–Spontaneous/natural situation.

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