**Triangulation with diverse intentions**

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**Abstract**

This article explores the understanding and use of triangulation. I will discuss different conceptualisations of triangulation, as well as the underlying ontological notions of these conceptualisations. Triangulation of methods is one type of triangulation that is used to improve the quality of qualitative research, along with data triangulation, researcher triangulation and theory triangulation. These can all be seen as techniques for examining one specific point in a landscape from different angles, as when navigating at sea. Another way of understanding triangulation suggests the use of e.g. different methods to create various data, i.e. to shed light on different points in the same landscape. In this article I will discuss how I understand and use triangulation in my current project. That project investigates the phenomenon of eating disorder symptomatology among men and women in residential treatment for substance dependence, and triangulation is used to strengthen the quality of the project in various ways.

**Introduction**

**Background**

In substance dependence research there has been an increasing demand for natural science methods in general, and randomised controlled trials (RCT) in particular. In Norway, substance dependence treatment has been transferred from the Social Services to the Specialist Health Care Services, with a subsequently increased emphasis on medical aspects of substance dependence in both treatment and research. Still, as most will agree, along with the medical aspects, substance dependence has intertwined psychological, social and cultural aspects, which suggest a need for a broader approach in both treatment and research.
In this context, better arguments may be required in order for qualitative methods to be accepted and financed. A beneficial outcome of the development of these arguments would be a strengthened focus on the quality of qualitative methods. Although studies aiming for a deeper understanding of a complex phenomenon call for the use of an explorative, open approach, this does not oppose a rigorous methodology.

**Scientific quality**

One way of improving quality in qualitative research is by using triangulation – in one manner or other. The sociologist Clive Seale (1999), for instance, presents triangulation as one of four techniques contributing to the struggle for well supported claims and hence quality improvement. The quality lies, however, partly in the eyes of the beholder. Another sociologist, Michael Q. Patton (2002, p. 544), lists five alternative sets of criteria “for judging quality and credibility” resting on different ontological perspectives – and two of these include triangulation. A distinction can be made between triangulation within traditional scientific research and within social construction, in which the former looks for “consistency of findings across methods and data sources”, while the latter aims for “capturing and respecting multiple perspectives” (ibid).

The traditional scientists aspire to describe and explain phenomena accurately and objective and corresponding as closely as possible to reality. The constructivists believe that several understandings can exist side by side, depending on the viewer’s perspective. In this article I will discuss triangulation and different aspects of combining several methods and data sources in a research project. As I hope to show, the strategy of triangulation can strengthen the project’s quality, but the concept of quality rests on different grounds.

What are the scientific gains and what scientific problems occur when data generated by different methods are brought together, combined and compared? How is it possible to combine and compare data and findings from different methodological approaches, i.e. interviews, ethnographic observations and a survey? What kinds of triangulation and combination of data are possible with the methods used and the data gathered in my study? How can triangulation be understood from traditional objectivist scientific and ontological perspective, in which the researcher’s neutrality is seen as important to strive for? And how can triangulation be understood from subjectivist scientific and ontological perspective, in which objectivity and a neutral position for the researcher are not seen as possible? This article aims to discuss the two perspectives’
significance regarding the use and meaning of triangulation – in relation to a particular project. I will first present the project and the concept and forms of triangulation. Then I will show how different views of triangulation rest upon different ontological positions, before ending with a discussion of triangulation as a way of enhancing research quality in general and in my study in particular.

The current study

The focus of my project is eating disorder symptomatology among male and female patients in substance dependence treatment. Previous international research shows connections between eating disorders and use/abuse of substances, among both adolescents and adults (see reviews by e.g. Krahn, 1993; Holderness et al., 1994; Calero-Elvira et al, 2009; Courbasson et al. 2010; Harrop & Marlatt, 2010). This combined field of eating disorders and substance dependence is hardly explored in the Nordic countries, neither quantitatively or qualitatively. Qualitative studies have also been mostly absent internationally. Finally, there are relatively few studies focusing on substance abusing men and their disordered eating, which sometimes can take on other forms than the more traditional (female) disordered eating.

The project’s focus is multifaceted, as it aims to explore the phenomenon of eating disorder symptomatology among men and women in residential treatment for substance dependence. More specifically the project will concentrate on prevalence of disordered eating; the relations between disordered eating and substance dependence; the relevance of gender; and the interaction between disordered eating and treatment for substance dependence. These issues are approached by employing a quantitative survey among all patients, a participant observation in one unit and in-depth interviews with 15 patients.

The research setting is Tyrili Foundation, a Norwegian non-governmental and non-profit organisation offering residential treatment for individuals with substance dependence. At present, Tyrili accommodates approximately 150 patients in eight units located in Eastern Norway. The patients are between the ages of 16 and 50, around 70 percent of them are male, and they have been referred – almost all of them on a voluntary basis – to treatment due to serious substance dependence.
Three methods

My initial motive for employing three separate methods was to answer different aspects of the research questions. In short, the survey was to establish prevalence; the observation to illuminate culture, behavioural patterns and structure; and the interviews to provide individual experiences and thoughts. Embedded in all three were issues of gender. However, the four different research questions all descend from the overarching question what is it about drug addicts and disordered eating? Therefore, my motive was initially to “broaden, thicken and deepen” (Denzin, 1989, in Flick, 1997, p. 120) the understanding of the phenomenon of disordered eating amongst substance dependents.

It was also my belief that the three methodological pathways would strengthen each other’s findings. I am to see parts of the same group from three different angles, looking for the same issue, i.e. disordered eating and experiences of the body.

I use the three methods in a temporal sequence (ending with the interviews), but they still carry individual weight, i.e. the survey is not being employed only for providing an interview sample.

My project can be understood as being methodologically triangulated, as I employ a quantitative survey, ethnographic observation, and in-depth, semi-structured interviews. Still, the gain of using different methods and the way I combine and relate the data and findings may be perceived in different ways, depending on which scientific and ontological position one undertakes.

The concept of triangulation

According to Encyclopedia Britannica (2010) the term triangulation originates from the areas of shipping and construction and refers to the attributes of a triangle.

**Triangulation**, in navigation, surveying, and civil engineering, a technique for precise determination of a ship’s or aircraft’s position, and the direction of roads, tunnels, or other structures under construction. It is based on the laws of plane trigonometry, which state that, if one side
and two angles of a triangle are known, the other two sides and angle can be readily calculated. (Encyclopædia Britannica 2010)

The ability to locate a specific, unknown position with the use of other, known positions is essential when navigating at sea or surveying land. Triangulation in this context signifies a precise and indisputable technique. The first use of the term triangulation within science was by quantitative methodologists around 1960 (Campbell & Fiske, 1959 and Webb et al., 1966, in Seale, 1999), while the sociologist Norman K. Denzin is the first qualitative researcher to use and develop it. This shift from quantitative to qualitative methods also marks the beginning of a development towards a new understanding of the concept of triangulation as I will show in this article. In his book *The Research Act* from 1978, Denzin outlines four different forms of triangulation. These correspond to his arguments for the use of triangulation, which all dwell under the heading “the act of doing research is an act of symbolic interaction” (ibid: 294). He finds sociological research insufficiently aware of the changing of times and places, the researcher’s unique point of view, the limitations of a single theoretical approach, and the particular focus of one method as through binoculars. Denzin’s remedy was combination as a research strategy. The four basic types of triangulation are accordingly *data triangulation, investigator triangulation, theory triangulation* and *methodological triangulation* (Denzin 1978). These different types of triangulation will be described and discussed in the next section, highlighting their various scientific properties and qualities.

**Different forms of triangulation**

What are the characteristics of the different forms of triangulation? And what related examples can I give from my project?

**Data triangulation**

The first form of triangulation pointed out by Denzin is *data triangulation*, a method which involves approaching – by the same methodological approach – several sets of data, from different times, different places or different people. Various data sets can extend the understanding of the phenomena under study, as in Denzin’s example of studying the social meanings of death in different contexts. By using the same method applied in different settings, he studied various meanings of death in different parts of a hospital.
Within the analysis of persons, Denzin also suggests three different levels: The first is *aggregate analysis*, in which the researcher focuses on individuals without establishing any social links between those involved; the second type is *interactive analysis* in which the researcher examine people in units, for example, small groups; while the researcher in the third type, the *collectivity level*, analyses people in larger groups and focuses more on structures. In my research project I include both an aggregated analysis in which individuals are seen as separate units, and an interactive analysis in which I analyse the interactions in a group of patients in one unit in Tyrili (Denzin, 1978; Connell, 1995).

I have in the present study three different but interconnected samples. In the survey, in which the purpose was mainly to get a picture of prevalence, all the patients in Tyrili were included. This survey has given data on *what kinds of* eating disorder symptomatology the patients present, that is the group that shows these symptoms. The observation, which required a smaller group, was done in only one of the eight Tyrili units. The interview sample was recruited from both the survey sample and the observation sample, with the intention of getting variation and breadth.

**Investigator triangulation**

The second triangulation form mentioned by Denzin is *investigator triangulation* which indicates the use of more than one researcher. Different researchers, e.g. observers or interviewers, will note different things, and they will be able to discuss the findings among themselves, and support or contrast each others’ findings. This is linked to, and attempts to provide a partial remedy for, the understanding of the individual researcher as a non-neutral recorder, a situation which is seen as not the ideal from an objectivist scientific perspective. In my project I have been the only researcher.

**Theory triangulation**

Theory triangulation, Denzin's third form of triangulation, is described as “approaching data with multiple perspectives and hypotheses in mind” (Denzin, 1978, p. 297). When explaining empirical data, rather than using a well-known and suitable – and favourite – theory, or just letting data speak for themselves, Denzin advocates a strategy that employs different theoretical analyses onto the same set of data. Testing and discussing the findings in different lights, new theories may also emerge
Methodological triangulation

According to Denzin methodological triangulation is probably the most acknowledged form of triangulation. He notes two variations: within-method and between-method triangulation (1978, p. 301). Within-method triangulation refers to different ways of finding data contained in one method. For instance, within a survey, various subscales can be used in one questionnaire, assessing different aspects of a phenomenon; or some items can be included in order to check up on other items. The psychologist and sociologist Uwe Flick (2007) offers an example more applicable to qualitative methodology: Within the context of an interview, the researcher can ask for both narratives and semantic knowledge, i.e. both “tell me about the first time” and “what do you mean by the term…”. Flick suggests that within-method triangulation “is given when different approaches in one method are used systematically and are theoretically well founded” (Flick 2007, p.73). In my interviews I have included both narratives, “tell me about first time you used drugs”; and ideals, “what is a perfect body to you?”. This highlights different parts of the terrain, with reference to the subjectivist perspective on triangulation.

Denzin finds that within-method triangulation falls short because it is really only method being used, and suggests between-method as the real methodological triangulation, as it combines different methodological approaches, with different strengths and weaknesses. One example is the combination of interviews and observation as in my project, or the use of single interviews together with focus group interviews.

Several researchers (e.g. Flick, 2007, Brannen; 2007; Patton 2002) present triangulation of qualitative and quantitative methods as a separate form or category of methodological triangulation. This category, also known as mixed methods, has been given increased attention in several research fields in recent years. Many studies apply the methods sequentially, using one method in order to develop the other, for instance carrying out interviews in order to find topics for a survey, or carrying out a survey in order to find topics for exploration in interviews later. In my project mixed methods are employed concurrently. The aim has been to look at both prevalence of a defined symptomatology (in the quantitative survey), and subjective experiences concerning the issue of drug use and eating disorder symptoms (in the qualitative ethnography and interviews).
Triangulation of perspectives

Flick extends the list of ways to triangulate by adding another form, *systematic triangulation of perspectives*, at the end of a chain in which Denzin’s four forms belong (Flick, 2007). This triangulation of perspectives implies approaching the study with several perspectives, for instance conversation analysis looking for description of social practices and interpretive analysis looking for subjective sense of meaning. This form of triangulation is not merely a combination of different methods, but a combination that takes into account the methods’ theoretical backgrounds (ibid).

Multiple triangulation

Ultimately, the triangulation form that Denzin sees as superior is *multiple triangulation*, i.e. employing the different triangulation types within a single research project (Denzin, 1978). This is, however, very resource-demanding.

But what then is to be gained by triangulation? Why should one strive to triangulate methods or data sources, researchers or theories – or all of the above? What is the scientific gain of triangulation in all the different forms I have outlined above? In the next section the main arguments will be shortly presented as highlighting triangulation with the goal of validation or exploration.

Scientific rationale for triangulation

As presented earlier, triangulation can be used for different purposes and with different scientific rationales. From an objectivist scientific perspective triangulation may be justified as a means of *validation*, to make the findings more well-founded and convincing. From a subjectivist scientific perspective, triangulation is seen as a way of *exploring* the data, creating different data. Some critical aspects are highlighted at the end of this section, pointing at some particular problems regarding the concept of triangulation.

Validation

In methodology literature triangulation has often been presented as a method for validation. Denzin’s point of departure was that sociological research – and social sciences in general as we can read it today – involves humans, that is,
researchers that will see, hear and interpret differently (Denzin, 1978). Personal biases will therefore probably interfere on the scientific result in various ways. The scientific ideal here is looking for an objective reality, striving to capture it as closely and correctly as possible. Denzin thought that by acknowledging that humans are diverse subjects, and, in turn, employing several different researchers and/or methods, bias could be reduced, resulting in better science. His idea was that different methods could “cover” for each other, that the flaws and shortcomings of one method could be compensated by another method.

Denzin claimed that triangulation could increase both internal and external validity. *Internal validity* refers to causal relationships between variables, dismissing other explanations. In this scientific perspective triangulation could add empirical support for claiming such relationships. In my research I am interested in the relations between substance abuse and disordered eating and how these two phenomena affect each other. By studying different aspects of these relations through different methodological approaches, I believe I will acquire more knowledge on that issue, than I would have done if I had used only one method. *External validity* refers to the generalizability of findings onto a larger population. Combining data, methods or researchers, studying the object from different angles, would strengthen the assertion that the findings can be applied to other people, other places, other times. The question of generalizability is challenging, but including the survey in my study I wanted to be able to say something about a larger population.

Patton sees triangulation as based on the premise that “no single method ever adequately solves the problem of rival explanations” (2002, s. 555). He emphasises that studies using only one method are vulnerable to errors linked to that specific method, and that multiple methods can contribute to verification and validation of analysis. By examining the consistency of findings related to different data, methods, researchers or theories/perspectives, triangulation adds credibility to the conclusions that are drawn. The point is, however, to test the consistency. When for instance observational data gives us other results that e.g. interview data, it does not have to – but can – be because some of the data are invalid, Patton argues. The credibility of a study will be strengthened from “either consistency in overall patterns of data from different sources, or from reasonable explanations for differences in data from divergent sources” (ibid:p. 560). Rather than deciding whether the different kinds of data
converge or not, the researcher should be focusing on the degree of convergence, according to Patton (2002).

**Exploration**

Ethnomethodologically informed researchers and researchers taking their points of departure from a poststructural ontology have claimed that triangulation as a method for validating and securing scientific results as presented above, often relies on a positivist notion and builds on the ontological assumption that an objective truth can be reached by using multiple methods (e.g. Blaikie, 1991; in Seale, 1999). As pointed out by the sociologist Anne Murcott (2009) triangulation and the use of different methods can also be understood as a way to create and get different data. Taking this perspective, triangulation becomes less navigation, in which you locate the very same point in the landscape from different angles, and more exploration, in which you illuminate different points in the same landscape.

Supporting the use of multiple methods, for instance using interviews, participant observation and document reading in an ethnographic study, as a reminder of the partiality of data, the sociologist David Silverman (2001) defies the idea of triangulation as making the picture complete. He undertakes a more social constructivist position and stresses the need for situating the empirical findings. In other words, two halves do not necessarily give us a whole, just two pieces of the picture, and hence the combination of different methods is not the way to obtain validity (Silverman 2001).

According to the theoretical physicist and feminist theorist Karen Barad (2007) will matters always be entangled with meaning, implying that science is not merely a discovery of something, the scientist himself/herself is always a part of it. Humans are forever intertwined with nature – and vice versa. Barad and other poststructuralist researchers therefore argue that scientific work is about “meeting the universe halfway” (ibid). This means that researchers will bring with them their subjectivity when studying the world and the knowledge we acquire will be characterised by that. The media scholars Marita Sturken & Lisa Cartwright (2001) emphasise the subjective gaze of the viewer, even regarding so-called authentic material as a video recording of actual events. In her example the filming of the beating of Rodney King in Los Angeles in 1992 was used in the trial by both the prosecutor and the defence as a piece of evidence. “Scientific looking is as culturally dependent as […] other practices of
looking…” (Sturken & Cartwright, 2001, p.279). Looking for a “truth” is therefore irrelevant.

**Critical questions**

Various critical aspects are raised towards the idea of triangulation as means of validation. Hammersley & Atkinson see triangulation as “an attempt to relate different sorts of data in such a way as to counteract various possible threats to the validity of our analysis” (2007, p.184), but remark that several accounts can also be incorrect, that is, bring with them systematic or random errors.

A similar objection raised in methodology literature on the use of triangulation as a method of validation is how the researcher that use a combination of different methods in their search for “the truth” can know that the approaches they have chosen are sufficient (e.g. Bloor, 1997, in Seale, 1999)? Could there not be that just one more researcher, or one more data set, would suggest a different result?

A rather different sort of critique is brought up by Silverman (2001). He points out that triangulation used as a scientific method for validating research data and results can be understood as a way of “checking up on” the respondents, looking at them from another angle to see if what they say is “true”, and thereby also implying that this way of applying triangulation is unethical (ibid).

As time has gone by, Denzin has altered his previous argumentation and removed the emphasis on validation found in his earlier works. He maintains the value of triangulation, but claims that it should be used to build interpretations and deepen understanding, rather than to test hypotheses (Denzin, 1989, in Flick, 2007). He writes: “The goal of multiple triangulation is a fully grounded interpretive research approach. Objective reality will never be captured. In-depth understanding, not validity, is sought in any interpretive study” (ibid, p. 48).

### Different positions and strategies for scientific quality

As Flick points out, the idea of triangulation in a traditional scientific sense, understanding research as a search for objective, neutral and “true” positions, data and findings, is “an equivalent to correlation – [allowing] validating
methods in results in a traditional sense” (2007, p. 47). In Flick’s description of triangulation, the combination and use of different methods are presented and conceptualised as an approach that highlights complementary or *converging* results, rather than congruence. He states: “Triangulation does not produce congruent or contradictory representations of an object, but shows different constructions of a phenomenon” (ibid, p. 52). However, referring to his own research, Flick later talks about “validation of [...] results” (ibid, p. 67) as one goal, the other being exploration of a complex phenomenon.

As shown by Flick’s definition of triangulation and his goal of applying it as a research tool for increasing scientific quality, the two scientific positions portrayed in this article often intersect. The two ontological positions, and the two different ways of discussing science and the use of triangulation, cannot so easily be separated and neatly divided from each other as might be the impression of the discussion presented above.

Seale does not hide his scepticism towards triangulation as a means of finding the truth, but embraces triangulation in the endeavour to strengthen the quality of qualitative research. Other gains can also be reason for employing triangulation, for example, using multiple methods to deepen understanding of different aspects of an issue (Seale, 1999).

As Flick (2007) and Seale (1999) point out, most scholars presenting and discussing science, scientific research practices and the use of triangulation – independent of ontological position – agree on the value of critical and on-going reflections on the research process, on data, methods and results in order to improve quality in qualitative methods. However, Flick and Seale are also concerned about the quality of studies using triangulation. They advise researchers to thoroughly reflect on the use of each single approach, data set, method and theoretical perspective in the research project, as well as on the particular combinations of the above and the assumptions the combinations are built on. What connects the different research positions, ontological assumptions and research practices presented above, is that the selection, use and application of different methods, data and perspectives is done and written in a transparent manner (Flick, 2007).
My understanding and use of triangulation

As shown by the above discussion and critique of the different forms and applications of triangulation, methodological triangulation can be seen as a way of promoting quality; helping to capture a bigger part of the picture:

Methodological triangulation makes different contributions to quality promotions. It can provide a fuller picture of one issue (what do people think of something and how do they act referring to it), it allows comparing the results of different approaches (do people act as they say they do or as one think one should do?) and it can extend the levels at which an issue is studied (knowledge, practice, institutional background) (Flick, 2007, p. 73).

With regards to disordered eating, I hope to gain a fuller picture by the combination of interviews/survey and observation (thoughts and acts), even though there is a lot about this issue I will not be able to observe (e.g. how people exercise in their rooms, what they eat in secrecy, whether they throw up or use other forms of concealed compensatory behaviour, how they act and talk to each other when I am not there, etc.). Of course, striving for a fuller picture is not equivalent to attaining the whole picture. I do not aim for the “truth”. On the basis of the critique presented in this article, I still think there are things to be gained by the combination of methods I have chosen to use in this particular study. I support Flick’s view that “every method constitutes its issue in a specific way” (2007, p. 51), and that these different constructions of a phenomenon may complement or contradict each other. This could suggest a moderate social constructivist position.

There could be other reasons for contrasting results as well, as has been emphasised in my discussion of different forms of and reasons for triangulation. Comparing different types of data may help the researcher become aware of shortcomings of one or several of the methods. For example, through interviews I have discovered aspects of male patients' disordered eating that were not captured by the survey. In addition, the survey indicated (by regression analysis) how the female patients' excessive pursuit of thinness was connected to other symptoms of eating disorders, connections that were not evident in the interviews.
An important thing to remember with regard to triangulation as well as my use and combination of three different methods, is that the scientific gain and quality of the study depends on the quality of the separate methodological interventions. Was the survey conducted in a way that makes the results valid and reliable? Was the observation carried out in the best possible manner, searching for the relevant findings to a saturation point? Were the interviews completed in a mode that brings forth different aspects, as I wanted them to? The quality of the selections and choices made, the data sampling, the researcher’s ability to reflect on the design and the research process and findings, all influence the study’s quality.

From a poststructuralist perspective Barad (2007) challenges the idea of a neutral knowledge and discovery. In line with this position, the researcher and the instruments and methods used for data sampling and analysis will always be co-creators of data. Hence, comparisons and the search for “true” positions and answers become less meaningful. Silverman emphasises the necessity to contextualise the findings from the different methodological approaches. Various paths may yield dissimilar results because they are produced in dissimilar settings (Silverman, 2001). Talking to me as a researcher with all my individual traits can elicit certain responses; filling out a questionnaire with lots of strange items can divulge other responses; while interacting with fellow patients can elicit still others. And, if taken from the same perspective on science and data as Sturken & Cartwright (2001), who emphasise how cultural aspects shape and structure our way of looking, all the responses and stories can be authentic and “true”.

The triangulation of methods presented and discussed in this article offers researchers information on different levels. For example, individual opinions and feelings can be captured and described by surveys and interviews; and individual and collective practice can be described and explored by observations and interviews. Further, the institutional structure can be captured, analysed and described with observations and interviews. These are all relevant levels in my research.

**Conclusion**

In this article, I have outlined the general concept of triangulation and several of its forms, in the context of their application to the social sciences. The
researchers’ view of triangulation and how it might increase the quality of their work is informed by their ontological position. An objectivist position highlights a validation perspective, while a subjectivist position accentuates the unbreakable links between what we study and the surroundings. There has been a general movement away from a pure positivist perspective, toward a more social constructivist perspective.

Following a discussion of the diverse conceptualisations of triangulation, I end up looking at triangulation not as a navigational tool, but as a significant strategy in order to strengthen the findings, because it adds and explores several perspectives and thereby illuminates various constructions of a phenomenon.

I have shown how I use various kinds of triangulation in my own project, with the intention of quality improvement. It requires a careful attention to what is triangulated and why, but when done properly I think triangulation can strengthen the conclusions in a mainly qualitative study and “broaden, thicken and deepen” understanding of a complex phenomenon.

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Noter

1. The other three being member validation, analytic induction and the search for negative instances.
2. Diagnostic eating disorders include Anorexia nervosa, Bulimia nervosa, Binge eating disorder, and Eating Disorders Not Otherwise Specified (EDNOS), as described in the psychiatric manuals DSM-IV and ICD-10. The less severe eating disorder symptomatology – or ‘disordered eating’ – includes e.g. overeating, extreme dieting, troublesome weight concern, or extreme/troublesome exercising
3. As Flick (2007) shows, several (famous) studies have used idea of triangulation prior to that, not using the term.


References


