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CHAPTER 4

Colligation

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Introduction

The core meaning of the word colligation is '*binding together through an idea*'; and what it binds together are facts.[1] The term is not very much used in contemporary social science, including sociology, but as I shall try to show, it can be quite helpful for one activity that is very important for those who are interested in theorizing, and that is concept construction. It can be of assistance both when you develop new social science concepts and when you want to make changes in existing ones.

The central idea of colligation is very flexible, something that makes it both useful and interesting to work with. While it is easy to sense the potential of colligation simply by thinking about the notion of 'binding together facts through an idea', this concept is also extra exciting today, precisely because it has been used so little. It has not been locked into a fixed formulation; and its full potential is not known. It is an open concept.

Social scientists use many different types of concepts. The ones that are best-known are those that have been created as part of an effort to analyze some important social phenomenon. 'Class', 'status' and 'norm' belong to this category. Social scientists sometimes also draw on the concepts that are used by the people they study, as exemplified by the way that ethnomethodologists and phenomenologists work. Alfred Schutz calls these everyday concepts *first-order constructs*, saving the term *second-order constructs* for the concepts that social scientists create on the basis of these everyday concepts (Schutz, 1954).

Colligation as a tool for concept construction does not fit either of Schutz's two categories, and is more similar to such concepts as the ideal type (Weber) or the sensitizing concept (Blumer). What these three concepts have in common is precisely that they contain prescriptions for how to construct and/or how to use concepts in empirical research. Using Schutz' terminology, we may call this type of concept *third-order constructs*.

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Besides the evocative notion that is at the core of colligation—the idea that scientific phenomena consist of facts that are bound together in an analytically useful manner through an idea—this concept is also attractive in that it has a practical dimension. As I will try to show, it can be of concrete help to the social scientist when she carries out an analysis. Note also that there are many different items that need to be bound together when you do research: facts into a concept; concepts into a theory; parts into a system; and so on.

The central concepts in sociology often have histories that are fairly well known. Many of these histories are exercises in intellectual history, while those that are more ambitious fall into what has been called the historical sociology of concept formation (Somers, 1995). Concepts that are less known, in contrast, may need to be handled a bit differently, precisely because they are marginal and have developed in a more accidental manner. Here you may want to draw on what Merton calls sociological semantics, since it is often necessary to trace the way that some word or phrase has changed meaning over time. A well-known example of this last type of analysis is the study of the term 'serendipity' (Merton and Barber, 2006; for a programmatic statement on sociological semantics, see Zuckerman, 2010).

The rest of this paper will first be devoted to a presentation of the history of the different meanings of colligation that I have been able to locate. I will then proceed to a more general discussion of colligation, in which I suggest how it can better serve both social science and sociology than it does today. As already mentioned, this means to focus on how colligation can help us to better understand the construction of concepts and how to do this in conjunction with empirical research.

The main uses of the term colligation are as follows. The first appearance of the word seems to have been in the 1500s and 1600s, at which time it meant 'material binding together', 'connection', 'conjunction', 'alliance' and 'union' (OED, 2014). In the 1700s and the early 1800s it seems to have been used very little—that is, until it was seized on by philosopher and scientist William Whewell (1794–1866), who assigned the term colligation a central place in his work. Whewell, who was an important academic figure in his time, argued that progress in the natural sciences comes about through a process called colligation, which he defined as *the binding together of facts through scientific conceptions*.

Whewell was a major intellectual figure in Victorian England, and his work was well known by people such as John Stuart Mill, Charles Darwin and Herbert Spencer, but the term colligation fell into oblivion after his death. It was not until a century later, in the 1950s and thanks to a work in the philosophy of history, that colligation again began to be used and discussed. Soon it became a well-known word in the circles of historians, who used it to describe the way that events and historical periods can be conceptualized.

A few decades later the term began to make its way into the works of sociologists as well. At first it was sociologists interested in history who came across the term and used it in their analyses. Lately, however, also cultural sociologists have incorporated it into their vocabulary. They mainly use it as a synonym for binding together facts, without any special reference to concepts.

1 Colligation as Binding Together Facts Through Conceptions in the Natural Sciences (Whewell)

The ideas of William Whewell belong to a very different discourse than that of modern science, not to speak of modern social science and sociology. Whewell's main concern was to advance science in general, and whatever he thought of social science was part of this general ambition. The closest equivalent in the history of sociology to someone like Whewell is Auguste Comte (1798–1857), who was his contemporary and a disliked competitor. Both wanted to write a systematic history of all the sciences, and also to further the advancement of the sciences by figuring out what had made their progress possible.

Whewell (pronounced *weh-ell*) was a polymath and a very successful academic in his days (e.g. Snyder, 2006, 2011, 2012). He first became Professor of Mineralogy in 1828 and a decade later Professor of Moral Philosophy. Both appointments were at Cambridge University, where he also held the position of Master of Trinity College. Whewell was a prolific writer and author of two giant works: *History of the inductive sciences* (1837, 3 vols.) and *Philosophy of the inductive sciences* (1840, 2 vols.).

In Whewell's view, what accounted for the impressive progress of the natural sciences since the 1500s was *induction* based on solid facts. So far Whewell agreed with Francis Bacon, whose works he deeply admired. What Bacon had missed, however, Whewell insisted, was that induction was as much based on ideas as it was on facts. *'Ideas are necessary'*, as he put it (Whewell, 1860: 134).

Besides being a scientist and a historian of science, Whewell also had another talent that was much appreciated in his time. This was his capacity to come up with new and fitting words. His most famous accomplishment in this regard was his invention of the word 'scientist'. He also suggested to Faraday the use of the words 'cathode' and 'anode'. To cite Robert Merton, Whewell was a 'talented word-coiner' (Merton, 1997: 237).

Whewell believed strongly that a scientist should begin by studying a phenomenon in a penetrating manner, and first when this had been done, try to formulate a theory. This way of proceeding was also reflected in Whewell's own attempt to find out what accounted for the progress of the natural sciences. He first studied their history (in a 3-volume work of more than 1,600 pages); and

only when this had been done, did Whewell proceed to the task of drawing his conclusions (in a 2-volume work of more than 1,200 pages). The full title of the latter work describes the procedure: *The philosophy of the inductive sciences, founded upon their history* (1840).

In Whewell's view, two basic processes account for the progress of the natural sciences: *The colligation of facts* and *the explication of conceptions* (Whewell, 1847: 5). By colligation he meant the process 'by which the conceptions more strictly *bind together the facts*' (Whewell, 1840, 2: 170–171). The explication of conceptions referred to the gradual clarification, sharpening and generalization of these conceptions, through research.

Colligation did not come about just by summing up the facts and generalizing from them. It meant adding a new element that was different from the facts: ideas or conceptions. 'The facts are not only brought together, but seen in a new point of view. A new mental Element is *superinduced*' (Whewell, 1858: 71).

In an elegant metaphor Whewell likened the role of ideas in science to the thread in a pearl necklace:

> When the Greeks, after long observing the motions of the planets, saw that these motions might be rightly considered as produced by the motion of one wheel revolving in the inside of another wheel, these Wheels were Creations of their minds, added to the Facts which they perceived by sense ... The same is the case in all other discoveries. The facts are known, but they are insulated and unconnected, till the discoverer supplies from his own stores a Principle of Connexion. The pearls are there, but they will not hang together till some one provides the String.
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> WHEWELL, 1847: 48

In another metaphor Whewell likens the act of a successful induction to the making of a well-tasting pie from Devonshire. This type of pie got its unique flavor from the fact that the cook put into it every well-tasting morsel that was available. 'For the beauty of my induction' Whewell once wrote, 'is, that it is like the Devonshire man's pie, into which he puts everything which he catches' (Wheewell, 1835).

As a famous example of a colligation Whewell cited the example of Kepler. In Kepler's time, it was believed that the orbits of the planets formed a circle. Kepler, however, questioned this; and his discovery was that Mars and other planets move in the shape of an ellipse. In Whewell's opinion, it was Kepler's training in geometry that had made it possible for him to suggest this solution, which in a stroke explained the facts that Tycho Brahe and he himself had observed but did not fit the earlier theory.

The emphasis on the mixture of facts *and* concepts that characterizes Whewell's notion of colligation probably originated in his reading of Kant, whose ideas he admired. As opposed to Kant, however, Whewell did not assume that reality was ultimately unknowable. In Whewell's view, the scientist can get to know reality with increasing clarity and precision, and should aim to do so.

A scientific concept, according to Whewell, is based on facts tied together by an idea. If either the facts or the ideas are given too much of a place in the work of the scientist, Whewell also argued, the result will be unsatisfactory. Both are needed:

> When Ideas and Fats are separated from each other, the neglect of Facts gives rise to empty speculations, idle subtleties, visionary inventions, false opinions concerning the laws of phenomena, disregard of the true aspect of nature: while the want of Ideas leaves the mind overwhelmed, bewildered, and stupefied by the particular sensations, with no means of connecting the past with the future, the absent with the present, the example with the rule; open to the impressions of all appearances, but capable of appropriating none. Ideas are the *Form*, facts the *Material* of our structure.
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> WHEWELL, 1847: 47

Whewell was also careful to point out that scientists do not make their discoveries by accident; these are the result of careful preparation in combination with talent. The scientist has first of all to be well trained. She also has to carefully observe what is going on. And finally, she has to single out those aspects of some phenomenon that are of interest to science ('the facts'). The last operation Whewell called the *Decomposition of facts*; and to him it primarily meant the kind of operations that make it possible for the scientist to measure, count and the like (Whewell, 1847: 33).

The way you go about colligation, according to Whewell, is very closely related to induction. This was the method that Bacon had advocated so strongly in *Novum organum* (1620); and it was also the best way to proceed according to Whewell. Whewell, however, felt that Bacon had failed to emphasize the elements of ideas that goes into the process of induction.

> Bacon has ... put prominently forwards the necessary dependence of all our knowledge upon Experience, and said little of its dependence, equally necessary, upon the Conceptions which the intellect itself supplies.
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> WHEWELL, 1860: 135

As a consequence of the importance that Whewell attributed to the element of ideas in induction, he wanted to add to and in this way improve Bacon's method. This is why he named the work in which he summed up his view of colligation and induction *Novum organon renovatum* (Whewell, 1858).

Science was mainly improved through the explication of conceptions; and this typically took place through debates between scientists., according to Whewell. As science progressed, what had once been facts tied together through ideas (colligation) were often treated as facts. Whewell, in other words, was a proponent of the view that facts are 'theory-laden' (Hanson, 1965).

It was earlier mentioned that Whewell had a special talent for coining words; and the role of naming a phenomenon should also be mentioned in relation to the process of colligation. In the more than hundred pages that Whewell devotes to this issue in one of his works, he does not explicitly state that colligation can be improved or facilitated through a good name (Whewell, 1858: 257–370). But this is where his argument is leading. A scientific term that is well chosen becomes for example *'a better instrument of thought'* (Whewell, 1858: 354). Besides making a scientific term easier to remember, the reader is told, a good name may also stimulate the imagination of the scientist.

Whewell's ideas about the role of definitions in science are also worth mentioning. Definitions, he argues, are of little value unless they are used in research. Many scientists, he notes, believe the opposite and seem possessed by a 'craving for definitions' (Whewell, 1858: 369). In Whewell's view, this obsession had its origin in the very successful way in which definitions had been used in geometry. Discussing definitions or working these out through discussion, however, does not advance science. The main reason for this is that all the terms in the definition have to be defined in their turn; and this makes the whole enterprise futile. Scientific progress can only come about through research, according to Whewell, not through definitions.

Whewell's ideas on colligation were well regarded in his time but also received their share of criticism. The most important criticism came from John Stuart Mill, with whom Whewell had an ongoing debate for many years. In *A system of logic* (first published in 1843) Mill states that Whewell had misunderstood the nature of induction. The scientist does not add ideas to the facts, as Whewell argues; she merely sums up what exists in reality (Mill, 1952: 192).

The example that Mill used to illustrate the difference between his own view of induction and that of Whewell, was the discovery by Kepler of the elliptical shape of the orbits of the planets. According to Mill, Kepler first made his observations of how the planet Mars moved, and then summed these up, saying

that they have the form of an ellipse. The ellipse exists in reality and is not something that was added by Kepler. In Whewell's view, in contrast, the facts of how Mars moved had been known for a long time *before* Kepler through the work of Tycho Brahe. But it was Kepler who succeeded in making sense of them, and he did so by conceptualizing them in the form of an ellipse, a figure that he was familiar with through his training in geometry.

One commentator who was very positive to Whewell's notion of colligation was Charles Sanders Peirce (1839–1914), another polymath as well as an accomplished historian of science. In Peirce's mind, 'Whewell was a most admirable reasoner, who is underestimated simply because he stands detached both from the main current of philosophy and from that of science' (Peirce, 1998: 46).

In Peirce's view, the idea that scientists make their discoveries by tying together facts with the help of a new concept or idea was an important insight. Whewell, according to Peirce, was 'the only man of philosophical power conjoined with scientific training who had made a comprehensive survey of the whole course of science'. Whewell had also confirmed Peirce's own view 'that progress in science depends on observation of the right facts by minds *furnished with appropriate ideas*' (Peirce, 1935: 604).

In fact, Peirce at times used the term colligation more or less as synonymous with his own famous notion of abduction, by which he meant the only kind of a mental operation through which something truly new is created in science. Induction and deduction were indispensable in their own right, according to Peirce. But their main tasks were to flesh out and prove the insight that could only come about through abduction.

It should finally be pointed out that Whewell's ideas about colligation were only applicable to the natural sciences. While Comte extended his ideas about positivism, which had its origin in his work on the natural sciences, to '*physique sociale*' or '*sociologie*' (as he later called it), Whewell did not. The term sociology cannot be found in Whewell's work nor did he address the kind of topics that modern social scientists associate with this term. Whewell felt that a different approach from that of the natural sciences was needed to deal with the social sciences.

Some of what Whewell thought of the social sciences can be read out of his view of political economy, a topic he was very interested in and also devoted quite a bit of study to (e.g. Snyder, 2006: Ch. 5). The main thrust of his views on this topic was that Ricardo was wrong in suggesting that deduction was the way to proceed. You have to work very closely with the facts, and go from there, in Whewell's view; and this was also true for political economy.

2 Colligation as Binding Together Events into Historical Wholes (Walsh)

Even though Whewell was a major figure in his time, the term colligation did not survive his death. One reason for this, as already noted, is that John Stuart Mill severely criticized Whewell in *A system of logic*. Mill attacked Whewell's notion of induction, which is closely related to his concept of colligation; and Mill's work was very popular, going through eight editions during the author's lifetime (e.g. Strong, 1955).

The term colligation did not reappear until about a century after Whewell's death; and when it did so, it was in a very different academic context than its original one. Colligation became popular in the 1950s and 1960s primarily among students of the philosophy of history. According to its new advocates, colligation could be applied to a different set of facts than it had originally been intended for, namely historical actions and events. As it turns out, the argument as now made that colligation should be used on historical facts *precisely* because these are different from scientific facts.

The person who singlehandedly revived (and reinterpreted) the notion of colligation was a British philosopher at Oxford University by the name of W.S. Walsh (1913–1986). Over a period of some twenty-five years, Walsh wrote on colligation and its role in historical analysis, as part of his interest in the philosophy of history. Altogether he produced three major statements on colligation (Pompa, 2004).

Walsh's argument can be summarized as follows. While in the natural sciences you link facts together based on their 'outer' features, in history you also have an 'inner' side to take into account. When human beings act, there is some kind of thought or intention involved; and this means that the resulting events are linked together in ways that are different from the way they are linked together in the natural sciences.

A historian typically analyzes a period, such as the Industrial Revolution or the Enlightenment; and this period, in its turn, consists of many events that must be pulled together or colligated in some fashion. There exist leading ideas during these periods; and it is these ideas that shape the events as well as link them together.

After having summarized his view on how to use colligation in history, Walsh asks the practical question, 'How does he [the historian] set about doing this?' (Walsh, 1942: 133). This question shows clearly that Walsh saw colligation as a practical tool. His answer to the question was that a historian should proceed in three steps. 'He first of all surveys the events of the period he has chosen and tries to connect them together under certain leading ideas' (Walsh, 1942: 133).

When this has been done, she should try to determine the way that the leading ideas or the dominant concepts, as he also calls them, are interrelated. The third and last step consists of constructing a narrative of the individual events, in such a way that the analysis becomes a whole. In doing so, it is important to show that the dominant concepts make the individual events intelligible.

Walsh's argument in the 1942 article is suggestive but also quite abstract. It is especially hard to see what practical consequences this approach will have for the historian. In short, how does the binding together of facts in history (colligation) differ from the way in which you bind together facts in the sciences? How exactly do you go about constructing a historical analysis?

Some answers to this question can be found in Walsh's second writing on colligation, *An introduction to philosophy of history*. Walsh starts out his discussion of this concept by suggesting that the idea of explanation through deduction—that is, along the lines of Hempel's covering laws—does not always work in history. Historians do not necessarily try to explain some phenomenon by looking at other phenomena that are similar; instead they often see it as part of some larger whole. When Hitler occupied the Rhineland in 1936, for example, you may explain this as part of his general plan to dominate the world. This example, according to Walsh, points to the fact that it is important to include the element of intention in the analysis. 'Every action has a thought-side, which makes the whole thing possible' (Walsh, 1967: 59).

In the case just mentioned, the intention operates from behind the action, so to speak, propelling it onwards. But the interrelatedness of events can also take other expressions, according to Walsh. There also exist factors *in the future* that may pull events onwards and towards them. Hitler had an overall goal for his actions; and what he did at one point in time was linked to this goal and to what he intended to do in the future.

In Walsh's last writing on colligation, 'Colligatory concepts in history' (1967), he backtracks a bit and states that his earlier arguments about colligation had been 'defective in various ways' (Walsh, 1974: 134). He especially felt that he had emphasized the role of purposive action far too much in his earlier arguments. It may well be true, for example, that events can be pursued and are pursued in a purposive manner, as exemplified by the creation of the state of Israel in 1948. But this is an exception rather than the rule. History is usually messy; and this makes it hard to follow the way intentions work, and for actions to work out as their authors want.

Walsh also suggested that colligation may be more important for the *interpretation* of historical events rather than for their *explanation*. We mainly link together events, he now said, to get a sense for what they are all about. People have ideas in common; and these ideas (and their accompanying actions)

come together in what we may describe as a period, e.g. the Greek Age of Enlightenment or the rise of the bourgeoisie in England. Colligatory concepts, Walsh now argued, have to fulfill two important conditions they have to '*fit the facts*' and '*illuminate the facts*' (Walsh, 1974: 140).

In the literature on colligation that was inspired by the writings of Walsh, his ideas have been added to as well as criticized. There exist, for example, studies of the relationship between colligation and classification; attempts to develop a typology of different kinds of (historical) colligation; and also an attempt to show that the idea of colligation can make the teaching of history more interesting for students (e.g. Thompson, 1967; Cebik, 1969; McCullagh, 1978). One of Walsh's students also made a direct attack on Hempel and his theory of the deductive-nomological model (Dray, 1959). Hempel's response was that Walsh's argument about the role of intention does not contradict the idea of a covering law; in fact, it confirms it (Hempel, 1965: 470–471).

3 Sociologists on Colligation: Explanation, Sequence Analysis and More

The term colligation has never been a common term in sociology; and there are no entries for it in the many sociological dictionaries that exist. Still, from the 1980s and onwards you can find a scattering of references to colligation in the work of sociologists (e.g. Abbott, 1984; Griffin, 1993; Spillman, 2004, 2014; Wagner-Pacifici, 2010; Abel, 2011; Lichterman and Reed, forthcoming). What is clear from these is that the term colligation entered sociology through the discussion of this concept in philosophy of history in the 1950s and 1960s, and not through a reading of Whewell. This is why it has mainly been used to better understand what is meant by 'events' and to improve the way that causality is understood in sociology. In cultural sociology, for example, colligation has been put forward as part of an attempt to challenge the conventional cause-effect type of explanation. It has, for example, been argued that colligation can be used as an alternative to the covering law idea (Spillman, 2004: 224–229; see also Spillman, 2014).

Another attempt by a sociologist to use the concept of colligation can be found in an article from 1984 by Andrew Abbott, 'Event sequence and event duration: colligation and measurement'. This article can be described as part of the author's effort to develop a narrative positivism in the form of sequence analysis. It represents a very ambitious attempt, not only to show the limits of mainstream sociology but also to outline an alternative approach (e.g. Abbott, 2001).

How is it possible, Abbott asks, to both have a stringent theory of narratives and at the same time be able to effectively deal with the concrete details of empirical reality? In mainstream sociology, he argues, this problem is handled through the idea that there are concepts that are linked to social reality via indicators. What Abbott suggests in his 1984 article, is to replace concepts and indicators with *events* and *occurrences*. The former is general, while the latter is close to reality.

What Abbott tried to accomplish, in other words, was to translate colligation into a workable empirical tool for a new type of sociological analysis. In this sense, it is clear that he contributed something new to the discussion of colligation. He especially tried to make the idea of colligation considerably more empirical than it was in Walsh's version; and he did so by arguing that it is not enough to have good ideas, these ideas also have to make contact with reality in a serious way.

In my view, Abbott and other sociologists make a much too limited use of the concept of colligation, which they basically interpret along the lines of Walsh. As I see it, colligation should primarily be used for a different task in sociology than causality and the construction of events. Its main task is to *construct concepts*; and this is also in accordance with Whewell's original use of the term. As such, colligation can be of strategic assistance for the sociologist when she theorizes. It can especially help her to better handle what comes *before* the final formulation of a concept and its presentation to the world.

The approach to colligation I advocate differs on one important point from Whewell's version. This is that colligation should primarily be seen as *a process*, and that this process to a certain extent can be analyzed and understood. Whewell's notion of colligation is more along the lines of an aha-experience that takes place when you come up with a great idea that binds together all the relevant facts in some brilliant way. There is always an element of creativity to successful theorizing, but it also consists of a series of separate actions or practices that can be taught and learned.

As a process, colligation broadly consists of two distinct parts: *de-colligation* and *re-colligation*. The reason for the de-colligation is that social actors typically already have concepts of what is going on around them, as a result of living in society. These preconceptions, as Durkheim calls them, must be broken up or de-colligated. What people mean by, say, suicide, crime or happiness, have to be unscrambled since they have emerged for very different purposes than social science analysis. It should be noted that there is no need for de-colligation when you carry out an analysis in the natural sciences. The reason for this is that ordinary people's concepts are not part of what is being studied.

Once the facts have been de-colligated they need to be re-assembled in a new way or re-colligated. At this stage the researcher has to select those facts that are relevant for a sociological analysis and bind them together in such a way that they form a sociological concept. If the result of tying the facts together is simply to recreate a concept that already exists—say, the concept of role—there is no novelty to the colligation (or no colligation period, to use the term in its literal meaning). It is of course very seldom that a totally new and valuable sociological concept is created. Some minor innovation is more common and it comes about by adding to an already existing concept. The concept of role, for example, has been added to over the years, resulting in such concepts as role-set, role distance and role release.

Concluding Remarks on How to Use Colligation as a Practical Tool When You Theorize and Construct Sociological Concepts

> Those who theorize rightly are in the end lords of the earth.
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> —WILLIAM WHEWELL[2]

In the beginning of this article it was noted that colligation is not a fully established concept in modern sociology. Hopefully, what has been said so far will convince the reader that colligation merits more attention and discussion. In my view, it is Whewell's notion of colligation that we should use and work with, rather than that of Walsh. According to Whewell, colligation should be used to *construct concepts*; and it is to this task that I want to return in these concluding remarks.

More precisely, I would like to discuss colligation as *a practical tool for theorizing*, as part of the empirical research process. Whewell is particularly valuable for what he has to say on three points in my view, none of which Weber or Blumer address with their concepts of the ideal type and the sensitizing concept.

The first of these points or steps is the process that Whewell calls *the decomposition of facts.* You start the research process, he says, through *observation.* Weber and Blumer would agree: it is only through careful and detailed observation that you can learn about the phenomenon you want to study. What Whewell then adds with his notion of the decomposition of facts, is that you do not only observe, and then analyze what you have observed. You now

2 (Whewell, 1836 as cited in Snyder, 2006: 33).

also have to transform what you see, hear and so on, into facts that can be used in the analysis. People in Science and Technology Studies refer to this process as the creation of 'representations' and have shown how microscopes and other instruments are often used for this purpose (e.g. Coopmans, Vertesi and Lynch, 2014).

Step 2 for Whewell is what constitutes colligation in a more narrow sense. This is where you look at the facts and try to bind some of these together through an idea, so that you then can analyze them in a meaningful way. What is involved at this stage, according to Whewell, is not only induction, in the sense of generalizing from particular instances. At this stage you first of all have to come up with an idea; and it is with the help of this idea that you can tie some facts together and show what they have in common.

Say that you are observing some individuals who are staying home with their children. These persons typically have to cook, clean and take care of the children in a million ways. What exactly are these activities like, from a sociological perspective; how should they be viewed? For a long time sociologists cast them as part of the role of the housewife. They were tied together, in other words, through the idea of *role*.

Since a few decades, however, some of these activities have been understood to constitute *work*; and today there exist a number of studies of household work. This latter concept has, for example, made it possible to compare work in the market place to work in the household; the hour of work that males put in, to those of women; and so on.

Step 3 for Whewell is to come up with a good name for the idea that ties together the facts. A really good name, he says, should express the idea in a very clear way. Ideally, it should also inspire other researchers and fire their scientific imagination. The name 'household work', for example, makes it clear that some activities in the household are directly comparable, in terms of efforts and skills, to the activities that go on in the factories and offices. 'Work' is also a classical term in sociology and gives associations to other kinds of work (emotional work, relational work, market work, and so on).

Whewell's three steps that have been discussed so far can be seen as part of a research practice that that is associated with theorizing. This research practice can in my view also be understood as a process that is broadly centered around the two concepts of *de-colligation* and *re-colligation.*

To what Whewell says about the need to transform what we observe into facts, should be added that existing folk-concepts must be broken up before any colligation can take place. This is something that natural scientists do not have to do, even if also they have to de-colligate scientific concepts, once these are no longer useful and have turned into obstacles.

Talking about de-colligation means that we also need to talk about re-colligation. And to Whewell's argument about the need to come up with some great idea that can bind together the facts, you need to add that there is more to colligation than so. Unless a concept is simply reconstituted, the typical situation can better be described as an amendment of some existing concept, than as the discovery of a new and major concept.

Cast along these lines, the concept of colligation can be very useful in sociological theorizing, more precisely in that part of theorizing process that deals with the creation of concepts. It nicely complements the ideal type and the sensitizing concept. Colligation differs from the sensitizing concept in that it discusses the process through which a concept comes into being. And it differs from the ideal type by providing the researcher with an alternative way for how to create a useful scientific concept. This alternative way singles out two aspects Weber does not address in his theory of the ideal type: de-colligation and the decomposition of facts.

Finally, the reformulated concept of colligation that is suggested in this article moves away from Whewell's view that concept creation is basically the result of an aha-experience. It suggests instead that colligation, as well as concept formation more generally, is a skill that can be learned as well as taught.

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