

# **INTERDISCIPLINARY RESEARCH AND CRITICAL REALISM – THE EXAMPLE OF DISABILITY RESEARCH**

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# INTERDISCIPLINARY RESEARCH AND CRITICAL REALISM – THE EXAMPLE OF DISABILITY RESEARCH

Interdisciplinary research and its problem is an issue which is characterised by conceptual unclarity and mess. (Granberg, 1976:1)”

## ABSTRACT

The aim of the paper is to indicate a metatheoretical perspective on interdisciplinary research which includes some important ontological assumptions and its consequences for the interdisciplinary research practice. Interdisciplinary research can be characterised by its focusing on a complex problem and the aim of the research is to elaborate this problem. The presentation begins with a brief outline of critical realism. I will sketch five features of this approach and I will also try to show the implications of these features on how to look upon interdisciplinary research. The five features are (1) the stratified ontology, (2) the intransitive and intransitive dimension of reality, (3) causation in terms of generative mechanisms, (4) the importance of contextualisation, and (5) the empirical reality. The presentation is interfoliated with examples from disability research.

According to this ontological perspective, interdisciplinary research implies analysing a problem at different levels with different methods. Thereby the researcher uses different concepts, different theories, developed in order to explain and understand the phenomenon's manifestation at the respective level. This way of understanding interdisciplinary differs from that which emphasises integration in terms of unifying theories, concepts and methods. Such a unifying is not possible according to a critical realistic approach. The integrative part of the research process consists of *integration of knowledge* about a complex phenomenon.

## Introduction

Many of the problems that today are at the top of the research agenda presuppose that different areas of knowledge are involved. In these cases it is commonly spoken of the necessity of an interdisciplinary approach. In the report of the Gulbenkian Commission on the restructuring of the social science the commission argue for focusing on specific themes or certain problems instead of organising research along traditional disciplinary lines. With such a model for future research interdisciplinary research will by necessity brought to the fore. However, as the quotation in the ingress suggests there has been a great confusion in the scientific community regarding the scope and nature of such research. If you today (year 2000) pose the question “What actually is interdisciplinary research” or “What

does it mean to conduct interdisciplinary research” you would find that it is, despite of a substantial body of such research over the last decades, difficult to find explicit and comprehensive definitions of “interdisciplinary research”. Collins Cobuild *English Language Dictionary* says that it “means involving more than one academic subject”.

Efforts to pin down interdisciplinary research, we find among others in Edlund et al (1986:37) ”The most characteristic for the idea of interdisciplinary research today is ... approach a whole range of complicated problems ... and ... some kind of integration of data, general assumptions, techniques and methods from different disciplines. This attempt to define interdisciplinary research illustrates what many proponents seem to agree upon, namely the characteristics of such research is that it contains *combinations of knowledge* from different disciplines and/or area of knowledge, that it can provide us with a *deeper knowledge* and *new explanatory models*, and finally that interdisciplinary research often generate *new approaches* and *methods* (se also e.g. Allard, 1999:39, Svedin et al. 1999, Lind & Levin, 1985). To this could be added that interdisciplinary research also sometimes can generates that a new area of knowledge is established.

One common consequence, when researchers from different traditions and specialities gather in a scientific milieu, is that people with different, sometimes very different, perspectives on reality meet. In other words, very often they have different ontological perspectives. In the literature on interdisciplinary research this is seldom explicitly discussed. Sometimes the discussion focuses epistemological questions but more common are methodological discussions. Questions like “*How* is the reality constituted” and “*What* is possible to gain knowledge about” are seldom discussed while questions related to methodological issues are very often debated. In other words, it is more related to how you do research that under which premises you do it.

The rationale for such an attitude could be a pragmatic perspective on the issue. If experience shows that interdisciplinary research can be constructively applied, why discuss such metatheoretical aspects. Doing so implicate a risk to expose differences among the researchers that could violate the interdisciplinary project at stake. Against such a way of arguing could be posed that in order to integrate knowledge one have to be very clear about the fundamental perspective on that reality. Is it possible to integrate knowledge without an explicit discussion about how the reality is constituted? I am sure that bringing such questions to the fore would facilitate and develop interdisciplinary research. With Archer (1998:194) I would argue that the ontological perspective determine the methodologies used in the research which in turn guide us to explanatory theories about the phenomenon the research is focusing. The implication is that a discussion about these issues is both necessary and fruitful. However, a precondition for this is that the discussion is conducted in a respectful manner and with tolerance for different ontological,

epistemological and methodological perspectives. The latter is an important issue to which I will return later in this paper.

## Aim and disposition

The aim is to indicate a metatheoretical perspective on interdisciplinary research which includes some important ontological assumptions and its consequences for the interdisciplinary research practice.

However, it is worth emphasising that I am thereby *not* claiming that the research fellows need to embrace the perspective presented in this paper. My suggestions should be understood as a contribution to the discussion about the conditions under which interdisciplinary research have to practice and it is a urge invitation to other researcher to reflect over and explicitly formulate their point of departure regarding these issues. Hence, the aim is to show how the relation between reality and science could be understood from a certain perspective. My approach can be called a critical realist perspective and the consequences of such a perspective will be outlined below (se *critical realism. Essential readings*, 1999). According to my opinion critical realism is a perspective which in a very fruitful way lay the foundation for interdisciplinary research.

Interdisciplinary research can be characterised by its focusing on a complex problem and the aim of the research is to elaborate this problem. In my presentation of my perspective I will relate and illustrate the theoretical discussion to an area of research in which many different disciplines are involved, disability research. The presentation begins with a brief outline of critical realism. I will sketch five features of this approach and I will also try to show the implications of these features on how to look upon interdisciplinary research. The five features are (1) the stratified ontology, (2) the intransitive and intransitive dimension of reality, (3) causation in terms of generative mechanisms, (4) the importance of contextualisation, and (5) the empirical reality. The presentation is interfolied with examples from disability research.

In the last part of the paper I try to apply the perspective in a discussion about research about impairment, reduction in functions and disability<sup>1</sup>. There I discuss the relation between scientific research vs. practical clinical work and I also argue that anti reductionism and methodological pluralism are two logical consequences of such perspective.

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<sup>1</sup> The concept "disability" is an equivocal concept. In this paper it is used in two different meanings. The first, and most common, is referring to the all three dimension impairment, function and disability. Research focusing all three dimensions is hence referred to as "disability research". The second is to let it be restricted only to the consequences of an individuals confrontation with his or hers environment.

# Reality – Science – Interdisciplinary research

## **The stratification of reality and emergence**

The first assumption I will discuss is that the reality is stratified. This assumption has two dimensions. First we have to do a distinction between three ontological domains: the empirical, the actual and the real. The first constitutes of our experiences of what actually happens, i.e. it is the domain of experiences. The second domain is constituted by the all the things which happens independently whether they are observed or not and the latter and deepest level of reality constitutes of mechanisms with generative power (Bhaskar, 1978:56). This assumption of reality is often expressed in terms of the deep structure of reality (see e.g. Bunge, 1979).

The second dimension of stratification is that reality is assumed to consists of hierarchical ordered levels were a lower level creates the conditions for a higher level. However, this higher level is not determined by the lower level. Each level has it own generative mechanisms. It is the existence of such level specific mechanisms that constitute a level. An important implication of this is that the causes to what occurs on one level is not possible to reduce to another level (neither a lower nor a higher level). To this I will return later.

There are many attempts to describe which levels exist. There is an ongoing discussion which they are and in which relation to each other the are (se e.g. Collier 1989, 1994, Brante 1997). A very simplified but for the purpose of this paper sufficient way of describing the relations between some of the more important levels are as follows:

Social sciences  
Psychological sciences  
Biological sciences  
Molecular sciences

At the bottom we find a strata containing physical and chemical mechanisms. Then follows biological, psychological and at the highest level we have social mechanisms. These strata are in some cases matched by disciplines in the sense that a specific discipline is focusing generative mechanisms at a specific level. For instance neurobiology is looking for mechanisms at the biological level and psychology at the psychological level and a social scientist is focusing at the social level.

The consequences of the assumption of the deep structure of reality are far reaching and cannot be fully explored here. Let me just briefly point to two of them. (1) The assumption that reality contains a domain of generative mechanisms that are separate from the empirical domain implies a critic of empiricism, the positivistic tradition (for a good summary of that critique see Manicas, 1987:243). The critique is well known and want not be repeated here. However, two of the main points are A) there are now theory independent observations. They are all dependent on our concepts. B) Science cannot be limited to the first mentioned domain, that of empirical observations. Doing that is to reduce the perspective to a 'flat' ontology and hence do away with the stratified ontology. Saying that is not equal with neglecting empirical observation. These play of course a very important role in scientific work. But the implication is that the crucial task for research is to discover underlying structures that generate empirical observed outcomes. This is an important shift of focus since there often is a complex interaction of mechanisms that sometimes results in empirical manifestations, sometimes not due to counter acting factors.

It is obvious that whether one shares this view of reality or not influences the interdisciplinary research.

(2) That reality is consisting of hierarchical ordered strata has also implications for the interdisciplinary research practice. Those phenomenon or problems which are focused in the interdisciplinary research are results of (produced by) mechanisms working at different levels of strata. The key concept here is *emergence*. By this means that something qualitative new emerge at one level that cannot be explained by mechanisms working at another level. However this must be further clarified. It is a difference whether an event is *produced by* or if it is determined by mechanisms at other levels. The difference can be illustrated by an example from disability research. A noise induced hearing impairment is a result of histopathological changes in the cortic organ, i.e. a result of mechanisms working at the biological level. These changes are experienced by the person e.g. the person is not able to hear some vocals in speech. How the person *experiences* the impairment through different psychological mechanisms differs from how another person with the same kind of impairment experiences it. The outcome at the psychological level (the experience) differs because of mechanisms working at that level. Such mechanisms could be e.g. differences in working memory and lexical memory (Rönnberg 1998). Hence, how the impairment is experienced is not caused by biological mechanisms although they *effect it*. The outcome, the experience of the impairment, is *produced* by psychological mechanisms. From an ontological perspective there is an important difference between neurobiological mechanisms generating the impairment and psychological mechanisms producing the experience of the impairment.

However, to have a noise induced hearing impairment is not only a question of hearing different than a normal hearing person. The impairment reduces our capability to communicate and is hence also a social phenomenon. How we communicate is socially constructed, e.g. produced by mechanisms at the social level. Furthermore, the stigma that goes with hearing impairment is also a social process, e.g. it works on the social level and is produced by mechanisms at that level. Stigmatisation can therefore not be explained by reference to mechanisms at other levels, e.g. biological or psychological. However, mechanisms at these levels are involved since they give the character of the impairment and how the person experiences it.

The important implication of this way of analysing a complex phenomenon such as noise induced hearing impairment is an anti reductive ontology. One cannot explain the event in terms of mechanisms working at just one level. The example given is *produced by mechanisms at different levels*.

Another example of this is dyslexia. Reading and writing abilities are very important in the current society. This is also the precondition for that the dysfunction in the brain that produces the inability to process a certain type of information should cause what we today label as dyslexia. Thereby dyslexia is a social determined phenomenon. We cannot talk about dyslexia in a society where the art of reading and writing is not developed. In that sense one could say that Gutenberg “invented” dyslexia. However, this does not imply that dyslexia is a social construction. Without the dysfunction in the brain *and* the type and the society we live in today, no dyslexia.

### **The transitive and intransitive dimensions**

Thereby we have addressed a very important and highly debated issue; the existence of a reality independent of us vs. reality as a social construction. This is an issue that could cause great difficulties in interdisciplinary research. Very often the debate is characterised by caricatures and over simplified generalisations. In reality one very seldom come across a researcher who completely denies the insight which the sociology of knowledge has brought to us, that our knowledge is influenced by social factors (see e.g. Kuhn 1970). At the same token, it is very rare with researchers who claim that reality is totally a social construction. What differs is most often different perspectives on the epistemological dimension, i.e. what can we gain knowledge about. Is it possible to say something about the external reality in terms of “true” statements? In one sense one could say that the question is not first and foremost an ontological question in terms of whether an external reality exist or not (although there can be huge differences on how that external world is constituted). The question is about how to get access to it. Very simplified a realist answer is yes and a constructivist’s is no. The latter claim that what we can get knowledge about is the social process which constitute the

phenomenon, not “das ting in sich”. The former does not deny that the access to the reality is influenced by social factors by claim that it is possible to develop reliable knowledge about the external world.

I said above that it is rare that researchers claim that it does not exist an external reality independent of us. This statement needs to be modified. One ontological difference is that some researchers claim that there are phenomenon that are entirely social constructions. In disability research this is often the case. Disability as such is a social construction (for an overview, see e.g. Ingstad & Whyte 1995). Let me illustrate with a well know phenomenon, Martha´s Vineyard. In the end of the fifteenth century a group of people emigrated from a small village in England. They settled at a small island at the American East Coast, Martha´s Vineyard. Many people in this group, most of them were relatives, carried a hereditary disposition that resulted in that many of the children were born deaf. Over the years the number of deaf people became very high on the island. In more or less every family there were one or more deaf persons. A way of communication through signs developed on the island. Sign language became a very common mode of communication. Even among normal hearing persons. (About this extremely interesting social phenomenon could be read in Gorce, 1985.) What the example shows is that the meaning of and the consequences of deafness is highly contextual determined. To be deaf in a normal hearing context were nobody sign is something totally different from being deaf in a deaf community were everybody sign. Therefore some constructivists claim that deafness is a social construction. One could say that the biological level does only render importance through the discursive level, a kind of discursive reductionism (Turner, 1996:229). In other words biological mechanisms has in this perspective no inherent power that contributes to explanation of deafness.

However, it could fruitful to discriminate between strong and weak social constructivists (see e.g. Lupton 1998, Sayer 2000). The former claim that there exists no external realty independent of us and/or we cannot gain any reliable knowledge about it. This is also the great mistake they are making: the phenomenon in the reality is denied to have an “independently” existence because it is experienced, interpreted, understood and constituted through the human mind, and just because of that it cannot have any autonomy as a phenomenon as such, i.e. character of reality. A researcher taking this standpoint has very difficult participating in interdisciplinary research. Those how can be characterised as weak social constructivists are those who are fully aware of the fact that “there is no neutral access to the world, knowledge is linguistic (by and large) and social, and language is not a transparent, stable medium, but opaque and slippery” (Sayer 2000:71). The perspective I argue for in this paper is totally accepting this statement.



In sum: the second assumption is that there exist an external of us independent reality (an intransitive dimension) and that reality is full of mechanisms which cause those events we are analysing in the interdisciplinary research. The reality consists of one of nature given world and one social of human being constructed world. About this reality we have fallible knowledge (the transitive dimension) “which is a social product much like any other, which is no more independent of its production and the men who produce it than motor cars, armchairs or books...” (Bhaskar, 1978:21).

## **Mechanisms**

So far I have frequently used the concept “mechanisms” without clarifying the meaning. It is a common concept and the meaning differs depending on the user. From the perspective I take in this paper mechanisms are something we find in the domain of reality (see above). One could speak about *underlying* mechanisms. There exist something under the empirical observable surface. It is one property of reality is that it is not transparent. It has powers and mechanisms which we cannot observe but which we can experience *indirectly* by their ability to cause – make things happen in the world. (Danermark et al. forthcoming).

There exist both micro and macro mechanisms. This statement is however controversial. There are quite a few researchers who claim that there exist only micro mechanisms, a view closely related to “methodological individualism”, i.e. all social phenomenon are explained in terms of individuals and their actions. Individuals are given the role as “microfoundations” (see e.g. Elster, 1999:4). This is an assumption which I do not agree upon. As described above regarding strata and stratification the critical realist perspective claims that there exist mechanisms at the social level. In terms of structure and agents the former is given an ontological status with their “own” mechanisms (for further elaboration on this see e.g. Archer 1995).

Mechanisms have the power to produce events. This is often described as a ‘generative process’. ”To ‘generate’ is to ‘manufacture’, to ‘form’, to ‘produce’, to ‘constitute’ write Pawson & Tilley and continue ”the generative mechanisms thus actually *constitute* the regularity; they *are* the regularity” (1997:67).

Since interdisciplinary research is characterised of its focusing on complex problems is the point of departure most often an empirical phenomenon, an event. The task is to find the mechanisms that produce the actual phenomenon and to understand the interplay between them and how they shape the outcome. However, one can also approach interdisciplinary research the other way around. One can assume that there exist a certain mechanism and try to find how this mechanism is empirically manifested. Doing that can reveal that the mechanism is not empirically manifested because it is not active or there are counter acting

mechanisms. If we for instance look at the social phenomenon stigmatisation of hearing impairment there are mechanisms on the social level involved. There are norms and values and the concept of “normality” is crucial. Deviation from what in a certain context is regarded as normal often leads to stigmatized. This is mostly the case for hearing impaired persons. The stigmatisation process often triggers emotions like guilt and shame (Héту, 1996, Danermark 1998). One can say that these emotions are produced by social mechanisms in the interaction with other normal hearing people. Assume that the research task is to investigate this in a certain context. The empirical result is that although the mechanisms can be identified one could not find any empirical results among the hearing impaired in terms of guilt and shame. Does that imply that the assumed causal relation between the stigmatisation process and emotional outcome do not exist? I will shortly return to this and here only indicate that the answer is no. The absence of the expected emotional outcome could be a result of counter acting factors such as a very good self esteem, strong network and support and so forth.

### **Context**

The discussion about generative mechanisms and counter acting mechanisms takes us to the question of the importance of context. All events are produced in highly complex contexts. The only exceptions are the extreme cases where it is possible to isolate all other mechanisms than those one wishes to study. Even in natural sciences it is difficult – but possible – to design such experiment. As a rule it is not possible in social sciences. The outcome of a mechanism is therefore always dependent of the context in which it is active. The processes are always *contextual determined*. Regarding social phenomenon they are very often determined by cultural, class and gender factors. The stigmatisation process described above is different for a noise induced hearing impaired male industrial worker where his family and friends regard his impairment as a “natural part of the work career” (see Danermark 2000) than for a young female manager in the IT sector. In the former case the impairment is not regarded as a deviation from what is regarded as “normal”. In the latter case it for sure is. One can expect that the negative reactions from her colleagues are much stronger than in the former case. In both cases the same type of mechanisms are active but they operate in totally different class, gender and cultural contexts with results in different outcomes. The conclusion is that the context determines how the mechanism is empirically manifested, if it is a very clear and obvious empirical manifestation, if it is partly manifested or if it does not is manifested at all.

### **Results as tendencies**

A consequence of the assumptions that reality constitutes of strata with mechanisms activated in contexts is that the empirical manifestations cannot be studied in terms of regularities but as tendencies. This will have implication for

the explanation of the actual phenomenon. A hypothesis about a mechanism and what kind of outcome it produces cannot be discarded just because an expected empirical pattern did not occur. That means that the in quantitative research a common way of testing a null hypothesis is not adequate. Statistical analysis based on empirical regularities is not applicable in highly complex situations, not if the purpose is to find a causal *explanation*. (If the purpose is to *describe* parts of the social reality statistical analyses are very often fruitful.)

Using statistical analyses cannot be dismissed but from a critical realist perspective it more often is the starting point for looking for causal explanation than the final phase in the research. Another example from disability research can help us to better understand this. There is a very well established hypothesis that a certain hereditary disposition results in a certain type of hearing impairment. One has quite a good knowledge about the mechanisms working at the molecular and biological levels, e.g. what in the genetic code cause the damage and how it does it. Assume that an empirical investigation designed to further test the hypothesis did not show any empirical regulation between people who carried a hereditary disposition and the occurrence of hearing loss. The result cannot be taken as a “proof” that the hypothesis is wrong. It could very well be the case that the mechanism is there and its causal power is geared to effect the hearing cells in the expected way, but due to mechanisms in the context such as diet, health status, noise and toxin exposure and many other factors, the actual mechanism is effected by so many other mechanisms that the outcome is not the expected empirical regularity. A conclusion that the assumed relation does not exist should have negative effect on the development of our knowledge about hearing impairment and inheritance.

The above-described situation is for many researchers evident. In normal cases there is an awareness of so called confounding factors. That is the case in every field of science. However, two important conclusions can be drawn from the example and these conclusions are seldom made explicit in conventional quantitative research. First, causality is not a question of *how often* a mechanism is empirically manifested. (It is enough that it has been manifested ones!) The second conclusion is that the methodological approach has to be designed in accordance with the context in which the phenomenon is a part. If the phenomenon is situated in a context where it is possible to create experiment (i.e. keeping other mechanisms under control), or in other words to “close” the system, one can apply a certain type of methods. In situations where it is not possible to “close” the system, like in social sciences, other methodological approaches have to be applied. That means that researchers addressing different levels of reality need different methodology and methods. The sociologist investigating how disabled students are coping with a certain classroom situation cannot “close” the system and study the mechanisms one by one. But the neurobiologist who wishes to study a certain mechanism can create a more or less “closed” system.

There are attempts within social sciences to imitate the experimental model, trying to create “semi-closed” systems. A well-known example is Stanley Milgram study of authority and obedience (Milgram 1974). The critic of such approaches in social sciences is, however, strong. The conclusions which can be drawn from these quasi experimental studies are often very limited. In some of these studies the researcher has might been able to demonstrate mechanisms and how they work in a certain context (the artificial experimental context). But the critic often focuses on the conclusions that are often drawn from these studies. Many researcher in favour of quasi experimental approaches in social sciences seems to underestimate the impact of contingent factors, in other words results found in one context can seldom be applied to another much more complex context.

This also illustrates that the common view on interdisciplinary research that one should try to integrate methods and approaches is not in accordance with the perspective advocated here, namely that, first, methods should be designed to suite the conditions on the level which is focusing. At each level methods and techniques for studying phenomenon specific for that level have been developed. To convey one methodological approach from one level to another level is seldom fruitful. Each level requires it own methodological approach. The integrative part of interdisciplinary research is in the end of the process, integrating the knowledge. I will shortly return to this.

Another way of expressing this is to say that different strata is characterised by different types of contexts and these contexts differs profoundly regarding the possibility to create closed systems and keep other mechanisms under control. Since natural sciences are dealing with mechanisms at a lower strata they have of course developed methods designed for the possibility to close the system, i.e. experimental designs. This is considered to be the “best practice” in these sciences. However, in social sciences focusing phenomenon at a higher strata can never do that, otherwise than in the mind, i.e. abstraction. There are too many mechanisms involved. As a consequence the methodology in social sciences is (or should be) characterised by a methodology designed for “open systems”. Therefor the methodological design must differ between different strata.

The characteristics of the conditions for methodologies in natural sciences and social sciences in terms of closed and open systems only catch the fundamental and basic features and it is worth underlying on the one hand that phenomenon in natural sciences is often very complex, e.g. the study of climate changes, where it is impossible to close the system. On the other hand in some social psychological studies it might be fruitful to design the study and reduce the number of contingent factors. Therefore it is more appropriate to talk about the differences in terms of degree of possibilities to close the system. It is not either or.

The conclusion is that since different disciplines or area of knowledge are focusing different strata different methodological approaches have been developed. To bring to a head one can say that each strata/level requires its own methodological approach.

### **Interdisciplinary research – to study same phenomenon at different levels**

As a way of ending this presentation of the five ontological assumptions and the discussion of its consequences I will now try to catch the main meta theoretical features of interdisciplinary research.

The first is that, according to this ontological perspective, interdisciplinary research implies analysing a problem at different levels with different methods. Thereby the researcher uses different concepts, different theories, developed in order to explain and understand the phenomenon's manifestation at the respective level. This way of understanding interdisciplinary differs from that which emphasises integration in terms of unifying theories, concepts and methods. Such a unifying is not possible according to a critical realistic approach. This is clearly illustrated in the examples of the study of noise induced hearing impairment given above. To study the stigmatisation process require its specific methodological design while the study of how noise exposure effects the hearing status require its methods, concepts and theories. The integrative part of the research process consists of *integration of knowledge* about a complex phenomenon.

Further, a genuine integration of knowledge requires a close collaboration with the researchers from different disciplines. Basic knowledge about other disciplines or area of knowledge involved in the interdisciplinary research is of outmost importance. The reason for this is that in order to understand what is happening at one level one need to have insight of how mechanisms working at other levels might influence the outcome at the actual level (see e.g. the example above regarding understanding the experience of noise induced hearing impairment). Therefore, interdisciplinary research differs from what sometimes is labelled multi-disciplinary research if one by the latter means that a phenomenon can be analysed more or less independently of other disciplines and then add the results from the different in an more additive meaning. However, this is not an unusual way of practising multy- or interdisciplinary research. What I have tried to express so far is a perspective that focuses both the differences and the integrative part of the research process.

In sum, *interdisciplinary research is to study a common phenomenon and how that phenomenon is manifested at different levels of reality. This is done by using specific theories and methods developed for respective level. The results are then integrated in an attempt to reach a more holistic perspective on the phenomenon.*

## Disability research as interdisciplinary research

In order to illustrate and further develop some parts of the above discussion I now turn more explicitly to disability research. In this very broad field I will mainly focus on research on hearing impairment. It will be obvious that interdisciplinary research has to identify mechanisms working at different levels. At the biological level we find the biological processes resulting in the impairment. At the psychological level we have structures and mechanisms constituting the phenomenon, such as memory capacity, which determine the ability of lip reading which in turn is of utmost importance for an hearing impaired persons communication skills and thereby his or hers interaction with other people and the stigmatisation process. In order to understand hearing impairment one need knowledge from all three levels. It is not possible to “explain” the phenomenon by reducing to one or two levels.

One consequence of this perspective is reflected in how to view the rehabilitation process. The rehabilitation can address different levels. Regarding the biological level it is most often a question of compensation. One tries to compensate the biological impairment by different methods. The most common way today is hearing aids. In the near future it might be genetic therapy. At another level rehabilitation can address the cognitive aspect, e.g. by learning more about the impairment and how to develop new communication strategies. At a sociological level it might be about changing attitudes among the hearing impaired person’s network (e.g. family and workplace) or in the society as a whole (e.g. though different campaigns in the media). Rehabilitation must be based on knowledge and methods specific for each level in a complex battery of measures and not be reduced to e.g. only providing the hearing person with a hearing aid. This reductionistic perspective is seldom successful. One indication of this is that it is very common that hearing impaired persons very often do not use the hearing aid he or she has got from the clinic or bought.

### **Mechanisms and impairment – function – disability**

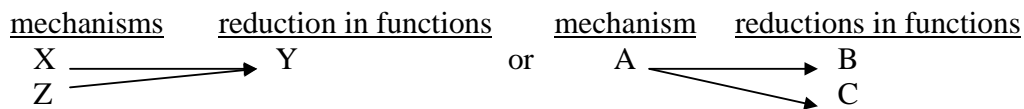
The three concepts impairment, function and disability, can be coupled with different levels of reality. Impairment is often used in order to describe the results of mechanisms at the biological level. By function, or more correct, functional problems, is usually meant manifestations of impairments in the daily life, e.g. not able to hear birds, classical music. Sometimes impairment results in a reduced function, sometimes not. If one for instance lose the sight in one eye the brain will adjust and after about six month the vision function will be restored. Disability is a more social concept. When impairment results in a reduction in functions and this has implications for the interaction with the environment it become a

disability. In the latter example a loss of vision in one eye results in Germany in withdraw of the driving licence but this is not the case in Sweden (in Sweden you are not allowed to drive during the first six month after the loss). The example illustrates that disability is caused by factors in the environment.

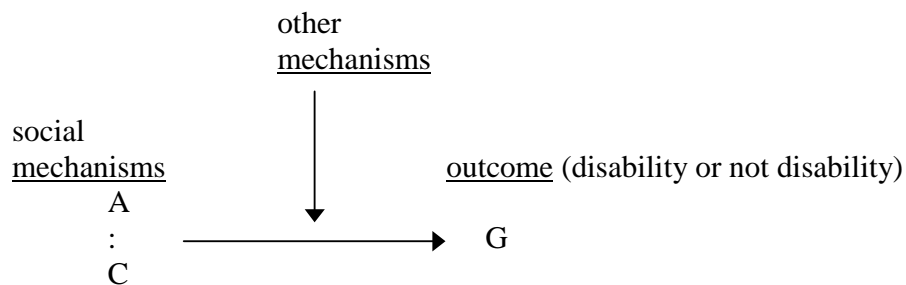
Another aspect of disability research from a stratified ontological perspective is that *impairment* (often expressed in a diagnose) is cause by a set of clearly identified mechanisms. This can be illustrated in the following way:



Turning to *reductions in functions* the situation is often more complex. Sometimes different mechanisms produce the same reduction in function. For instance not be able to talk fluently can be a result of an impairment in the inner part of the ear but it can as well be a result of an impairment in the speech organ. It could also be the other way around; the same set of biological mechanisms can produce different reductions in functions. An illness can result in both a chronic hearing impairment and disturbance of balance.



Regarding *disability* (the social level) the situation is even more complex. Different mechanisms at lower levels can interplay with social mechanisms and produce the same outcome. The stigmatisation process is an illustrative example of this. If a person deviate from what is regarded as normal behaviour or outlook, independently of what constitute this deviation, it will trigger a stigmatisation. This results in difficulties to establish and maintain social bonds. Another example is the problems a person in a wheel chair confronts with when e.g. using the subway. The problems are the same despite of the reasons why the person has to use a wheel chair. However, this presupposes that, in the first example the deviating behaviour is negative valued and in the second example that the subway is not adjusted for persons in wheel chairs.



To summarise, at the lower levels the phenomenon in disability research are more often specific and related to natural sciences. At higher strata psychological and social mechanisms are involved which makes the analysis more complex.

### **Scientific research and practice**

Regarding the relation scientific research and practice there are two aspects which I would like to highlight. The first is the relation between the research and the practitioner and their different tasks. In order to be able to identify and analysis mechanisms the researcher has to separates the different levels. A complex problem must be analytical divided in relation to different levels. The stratified ontology and the idea of emergence make this necessary. A researcher is also focusing mechanisms at the level he or she is trained to study. A result of the development of knowledge is that in the scientific community there exist a far-reaching specialisation that has often resulted in a huge gap between research and the practical clinical work. Such a specialisation does not correspond with the every day reality for the practitioner. There he or she confronts with the “whole”. This difference often results in problems. In an effort to be concrete and “practical” the researcher runs the risk to jump from an abstract level in the research to an empirical level and reduce the complexity and simplify the relation between the real domain and the empirical domain. Sometimes this is called “misplaced concretedness” (see e.g. Collier 1994). This mistake is very easy to understand since there is an expectation that the research should end up in practical recommendations. However one must have in mind that there is sometimes a very long step from knowledge about how certain mechanisms work and how the outcome of the complex interplay of al other mechanisms involved will look like.

The practitioner confronts the whole complex phenomenon. For instance a doctor cannot reduce the problem to the biological level (although there are some who does). In order to achieve a successful treatment he or she has to take into account mechanisms working at many levels. If an audiologist only treat a hearing impairment as a biological problem and reduce the problem to the question of a hearing aid or not the “cure” will seldom be successful. It is a well-known fact



that many hearing aids are not used because of psychological and social mechanisms. Also these mechanisms have to be included in a successful rehabilitation. Therefore the knowledge and experience that the practitioner represents differs from his or her research fellows. An implication of this is that the relation between a researcher and a practitioner must be a reciprocal learning process. On the one hand the practitioner can give the researcher insight in how mechanisms at different level interplay in “real life” and how the empirical result is manifested. This will in turn increase the possibility for the researcher to further develop the knowledge. On the other hand the practitioner can by learning how different mechanisms is working at different levels increase his or her understanding the outcome as a complex interplay between a number of factors.

Another related problem is that practitioners often expect that research will imply the possibility to make predictions. In their practice they wish of course be able to do as accurate predictions as possible. What will the outcome of this or that treatment be? From what have been described above the possibility to make such predictions as higher up in the strata we are moving, a move towards more and more complex interplay of mechanisms. This is especial true for the social level. A prediction at this level has often character of speculation with very little value for a serious prediction. It is important to emphasize that this has nothing to do with the maturity of the discipline. It has to do with how the reality looks like. The task is in these cases not to give (often misleading) predictions but to give insight in how mechanisms are working. Then it is up to the practitioner to use his or her experience and make decisions of treatments and make predictions. This can be illustrated in the following example: A person has been exposed for noise and is beginning to experience some reduced capacity in hearing. An investigation shows the type of and the extension of the impairment. From this it is possible to make a prediction how the impairment will evolve. This is a prediction based on mechanisms working at the biological level. This prediction is therefore based on knowledge about mechanisms at a lower level than e.g. the social level. Such a prediction is usually a good prediction. The development will most probably develop as predicted. The answer to the question how the person will experience and cope with the increase in hearing loss cannot be answered with the same accuracy. This is a psychological and social issue and hence there are mechanisms at these levels involved. In every day language we use the expression “it depends. It depends on that many factors so it is impossible to make any predictions. For a researcher in this case to make a prediction is often to exceed what is possible to do as scientist. What the researcher can do is to give knowledge about mechanisms and tendencies.

A conclusion is that a researcher can seldom produce practical knowledge in terms of “if you want to achieve x do y”. The practitioner can not expect that of the researcher but he or she can become more “theoretical” and regard the outcome of research as a base for knowledge and not as rules for practical actions.

## **Irreductionism and methodological pluralism**

In this last part of the paper I will address internal scientific issues, the consequences of the here advocated perspective for the *relation between researcher* from different disciplines or area of knowledge. I have many times emphasised that representatives from different disciplines approach a problem using their theories, concepts and methods developed on basis of the level where the mechanisms work. That means, which I also have underlined, that the phenomenon cannot be explained by referring to mechanisms at only one level. Such a biological reductionism has to be condemned. An emotion cannot be explained in terms of chemical processes in the brain. Biological mechanisms are involved -without them any emotions – but it is psychological and social mechanisms that produce emotions. However, the ontological status of emotion is debated in the literature. For instance claims Elster (1999, see also Scheff 1997) that some emotions are solely produced by social mechanisms. Such emotions are produced in the interaction with other people, like shame. In this case the generative mechanism is social. Psychological and biological mechanisms play a role but as contingent factors, not as the emergent causal power.

A consequence of this perspective is that in order to solve a practical problem, e.g. rehabilitation of a hearing impaired person there is a need for theories and concepts developed in different disciplines. No type of knowledge has priority. There exist no hierarchy between different disciplines. That makes interdisciplinary work from a critical realistic perspective to equal and democratic activity. I thereby dismiss the opinion that natural science is more valuable than psychological and social when it concerns disability research. All levels are necessary in order to fully grasp the problem. If you have good insight in biological factors but are ignorant regarding e.g. psychological mechanisms there is a great risk that the treatment will be unsuccessful.<sup>2</sup> The implication of this is that in the interdisciplinary work requires respect and equality in the view of each other's disciplinary work.

A second consequence of this view is methodological pluralism. However, by this is not meant methodological relativism, i.e. the attitude that you cannot argue that some methods are more suitable than others are. I have several times pointed to the fact that the levels differs regarding how mechanisms at the respective level best can be analysed. Experiment, quasi-experiment or more theoretical methods using abstraction are different approaches that have been developed as rational answers to the specific character of the level. To claim that a method used at one

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<sup>2</sup> However, to which this is applicable vary. For instance to cue a broken leg require less insight in mechanism at a higher level than e.g. treatment of diabetes where lifestyle is crucial for the outcome of the treatment.

level should be the model for research on mechanisms at other levels are only destructive. Methods developed for one level are seldom suitable for another level. This is a fundamental wrong approach and such claims only reveal ignorance about reality. For instance a method which requires closed systems cannot be used at a level when this condition cannot be fulfilled. Using such methods at a level where analysis are conducted in open systems only results in meaningless results and lack scientific interests.

The conclusion is that interdisciplinary research has to be characterised by *methodological pluralism* and not by methodological imperialism or methodological relativism. Even here true interdisciplinary research demands respect for the different discipline's methodology.

### **Concluding**

In this paper I have described and argued for five fundamental ontological assumptions (1) the stratification of reality, (2) the intransitive and intransitive dimension of reality, (3) causation in terms of underlying generative mechanisms, (4) the importance of contextualisation, and (5) the that empirical outcomes most often have to be expressed in terms tendencies, not as regularities.

I have further argued for the fruitfulness to highlight the (often tacit) assumptions each researcher by necessity have about reality. Another strand of argumentation is that the perspective advocated in this paper is a perspective that goes extremely well together with interdisciplinary research. I have also claimed that neither biological reductionism nor social reductionism is consistent with interdisciplinary research.

This perspective has far reaching implications for interdisciplinary research. It effects the choice of methods, the view on what science can achieve and what it cannot. It also effects the relation to actors outside the scientific community, e.g. clinical working persons. Another relation that it effects is the relation among the researchers; it demands methodological pluralism and respect for other theories and methods.

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