

Explaining mental illness

What is meant by explaining mental illness? How are the background factors for these disorders linked? A multilevel explanation model appears to provide the answers.

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There is unlikely to be disagreement about the need to consider biological as well as psychological and social factors when we explain mental disorders. This point may well be considered trivial, but it is nevertheless at the root of two associated problems. First: how are these factors *integrated* with each other? Second: what does *explaining* mental disorders really mean?

We will argue that these two related problems are best solved within the framework of a theoretical model which is highly influential within the philosophy of biology (1, 2). It is referred to as a «multilevel explanation model» (also «mechanistic explanation model»). The two problems mentioned are closely linked to various theories about reductionism, and I will therefore start by explaining the meaning of this concept. I will then go on to present the multilevel explanation model and some of its most important implications.

Two types of reductionism

Ontological reductionism (ontology: the study of the nature of existence) means that ultimately, everything that exists is composed of elementary particles. In other words, ontological reductionism is incompatible with dualistic theories which argue that people have a non-physical soul in addition to their body. However, there are extremely few philosophers and scholars who defend such dualistic theories these days. Most will argue that thoughts, pain and other mental conditions equal brain activity in some way or another. However, if you try to define what is meant by «in some way or another» in this context, you will soon find that there is little accord (3, 4). So far, nobody has solved the mind-body problem, i.e. nobody has explained how conditions in the brain can give rise to

specific sensations of pain, visual impressions, emotions etc. Exactly how the brain performs all these functions, remains a mystery, but this is a far-reaching question which falls outside the scope of this paper.

Ontological reduction is concerned with the relationship between the whole and its constituent parts. The relationship is one of parts on lower organisation levels constituting objects on higher levels, i.e. objects on a higher level are merely the interactions between constituent parts on lower organisation levels. Table 1 provides an outline explanation of ontological reductionism.

Our descriptions, analyses and theories about organisation levels are scientific categories referred to as *analysis* or *description levels*. These levels provide knowledge about organisation levels; they include a wide range of disciplines, all of which provide a different access route to reality (tab 1).

While the relationship between organisation levels is a whole-part relationship, it has proved considerably harder to define the relationship between description levels. Some philosophers of science have argued that higher-level theories can be reduced to lower-level theories. This is referred to as theory reduction. An extreme variant of this view suggests that all theories can be reduced to physics – i.e. everything can be explained by physics because everything that exists is composed of elementary particles. This view appears to suggest that all sciences other than physics are superfluous. The multilevel explanation model on the other hand, outlines a different, non-reductive relationship between the various description levels.

A multilevel explanation model

The object of using this type of explanation model is to define the relationship between the various description levels (fig 1). The phenomenon to be explained is on level 0 and we want to describe it as precisely as possible. In psychiatry, the phenomena we would wish to explain are certain symptoms or syndroms, such as compulsive behaviour, hyperactivity, hallucinations, delusions etc. On level 0 we want to provide as precise a description as possible of these symptoms. Not only observable behaviour will be important, but the patients' experiences as well, i.e. the subjective perspective. Because these may differ significantly from what is normal, and because direct observation of other people's experiences is impossible, they can be extremely difficult to describe. However, understanding a patient involves an attempt to reveal and describe the patient's wishes, perceptions and experience structures as well as his/her more basic relationship with the world. For example, it has been maintained that the schizophrenic are phenomenologically characterised by an alienating attitude to the outside world and the body (5).

A multilevel explanation model sits well with the symptom-based approach which is gaining increasing ground in psychiatric research circles. This means that importance is attached to individual symptoms (e.g. auditory hallucinations) rather than diagnoses (schizophrenia). There are a number of reasons for this turn away from diagnoses in recent psychiatric research (6). Firstly, the same symptom may appear in a number of different diagnostic categories (including

Table 1 Social interactions on organisation level 5 consist of people (level 4) who relate to one another in different ways. People are composed of cells (level 3), which in turn are composed of molecules (level 2), which in turn are composed of atoms and elementary particles. Each organisation level has a description level of theories about its objects.

Level	Organisation levels	Description levels
5	Social interactions	Social sciences
4	People	Psychology, psychiatry, medicine
3	Cells	Biology
2	Molecules	Chemistry
1	Elementary particles and atoms	Physics

the normal) and may be caused by similar brain mechanisms (6). For example, auditory hallucinations occur in normal people who are not included in any diagnostic category (7). Secondly, it is simpler from a research point of view to postulate an explanatory mechanism for a symptom than to postulate a mechanism which is intended to explain a syndrome (6). Once we know how to explain individual symptoms, we may later find ourselves in a position to explain how these relate to each other in syndromes. In other words, the symptom approach is compatible with the existence of psychiatric syndromes (8).

Level 0 descriptions are not static, for diagnostic categories may well need to be re-classified on the basis of increased knowledge about the causes of symptoms. It is normal within the world of science to be able to provide increasingly precise descriptions of phenomena as explanations change. For example, the emergence of modern chemistry made it possible for us to describe corrosion as a certain type of oxidation. The explanations and explanatory mechanisms for level 0-phenomena are found on level -1.

Level -1

What we have referred to as «level -1» involves the provision of a constitutive explanation (also referred to as a «mechanistic explanation») of a phenomenon, which means that we describe its constituent parts and show how they interact to produce the phenomenon. This type of explanation shows how a phenomenon and its qualities are completely determined by its constituent parts and their structural organisation and interactions (1, 2, 9). Typical examples of constitutive explanations are descriptions of photosynthesis, protein synthesis, respiration, immune responses etc.

In psychiatry our immediate response may well be to look at a constitutive explanation as an incentive to look for a neurobiological explanation of symptoms. This conclusion is too hurried, because we frequently make use of another description level between the symptom and neurobiology: – a cognitive level. Memory research may serve as an illustration (10).

Sensory stimulations can be stored for a couple of hundred milliseconds in the sensory register, after which the information is transferred to the short-term memory. When the information in the short-term memory is repeated, it may be transferred to and stored in the long-term memory. Information in the long-term memory may be retrieved to the short-term memory, where it is processed and further utilised for various types of problem solving.

These relationships and concepts are purely cognitive – they describe information transfers in abstract terms and do not refer to explicit processes in the brain.

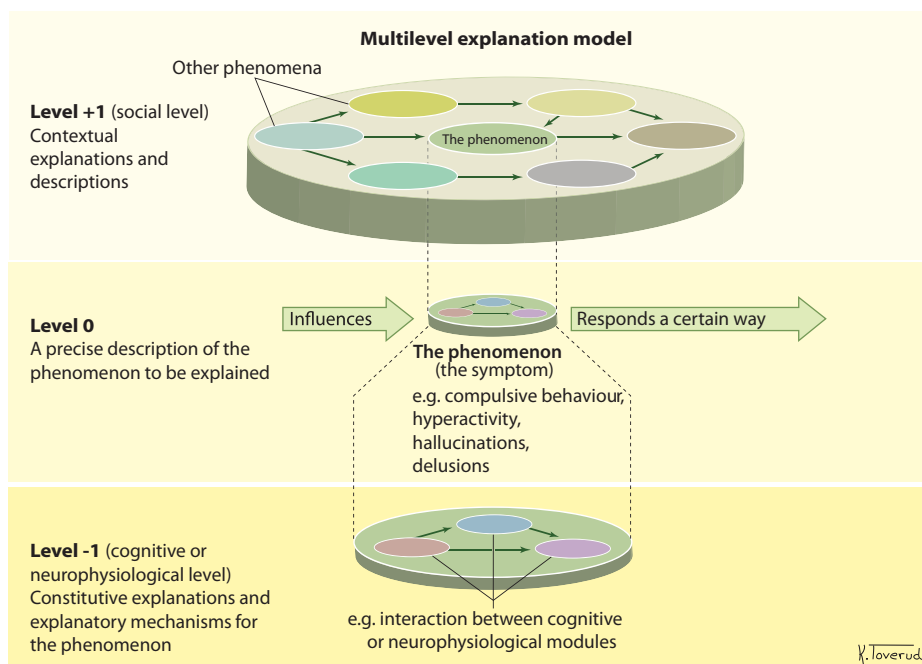


Figure 1. The phenomenon to be explained [the 0 level] responds in a certain way (arrow pointing right) when exposed to influences (arrows from the left). The influences originate from the environment (level +1) of which the phenomenon is a part. On level -1 the phenomenon is composed of three interacting parts. This may form a starting point when seeking to provide a detailed explanation of the phenomenon.

The brain modules which determine these cognitive processes have however been localised with a certain degree of success. Sticking to the terminology in Figure 1, we may say that things cognitive are found on level -1, things neurophysiological are on level -2. It is not unreasonable to consider cognitive descriptions to be abstract descriptions of brain processes.

Level +1

We do not normally restrict ourselves to studying an 0-level phenomenon in isolation; we will normally try to put it into context (on level +1) (9). On level +1 we see how the phenomenon works in concert with other phenomena. This is highly relevant to psychiatry, because people will always form part of social relationships. The trigger for certain symptoms can often be found on this social level (+1). The social sciences and some of the arts will be able to provide important contributions in this respect.

Explanations and descriptions on this level may be referred to as «contextual explanations and descriptions». Studies have shown, for example, that the actions of close family members (mothers and fathers) may trigger psychotic outbursts and relapses in the schizophrenic (7). To be precise, this refers to parents who display considerable emotional involvement in the form of critical comments, negative attitudes and over-protective behaviour. Studies have shown that schizophrenic patients display a high level of emotional activation (measured by galvanic skin response) after an encounter with a relative with a high emotional involvement score (7).

On level -1 we should ideally be able to explain in greater detail how a psychosis is triggered by considerable emotional involvement, but we are currently unable to do so. The behaviour of psychotic patients (and all the rest of us) cannot be fully understood unless we also consider the socio-contextual level. In other words, a multi-level explanation model is not focused on the individual and does not ignore the importance of the social environment.

Figure 1 shows how phenomena, such as symptoms, are the product of mechanisms on lower cognitive and neurobiological levels and how they are influenced by the environment. The figure refers to that which in psychiatry is called «pathology». If, on the other hand, you are looking for the «original» or distal causes of a syndrome, i.e. how it originally arose, this would be a question of the syndrome's aetiology. Heredity and environment are aspects of aetiology.

By way of a preliminary conclusion, we could suggest that going down one level (to -1) equals a reductive strategy, whereby a phenomenon (the 0-level) is explained on the basis of its localisable functional parts, while going up one level (+1) shows how the phenomenon's properties and manner of operation may be influenced and changed by the wider context (the environment) of which it is a part (fig 1).

Consequences for psychiatric research

A multilevel explanation model may have certain normative implications for psychiatric research. I will list five such impli-

cations, more or less overlapping, which appear to follow from the model.

Firstly, one should refrain from postulating cognitive psychological mechanisms which appear fairly implausible from a neurobiological point of view, in the sense that it is difficult to envisage one or more neurobiological mechanisms that may implement them.

Secondly, it is an explicit aim to provide constitutive explanations of phenomena. This means that a psychiatric model which fails to refer to neurophysiology is incomplete (11). The search for constitutive explanations has been one of the most successful strategies in science for more than 300 years. In fact, René Descartes (1596–1650) outlined this strategy with a fair degree of precision (12).

Thirdly, a multilevel explanation model requires not only that the description levels be compatible, i.e. not contradictory. Quantum physics and sociology are clearly compatible disciplines, but they are not explicitly linked. (There would probably be no scientific benefit to be gained from providing an explicit link between two such disparate description levels.) There should however be an explicit link between the various description levels of a psychiatric syndrome model.

Fourthly, it is worth noting that the multilevel explanation model is not based on a prerequisite for genuine explanations to refer to laws of nature. It is a topic of much debate whether there are any genuine laws to be found in psychiatry; the same applies for a number of other sciences. For example, a number of academic disciplines will accept that simulations and descriptions of mechanisms represent genuine explanations. Any textbook on cell biology, chemistry, neurobiology or psychiatry and psychology could serve as an example.

The last point is that the drawing up of good models for mental disorders requires scholars from different scholarly backgrounds (whose expertise relates to different description levels) to be working in partnership. This requires them to learn the basic concepts and theories of the other sciences, to enable communication and integration between the various description levels. In the field of psychiatry, this means that the development of good models for mental disorders requires explicit integration of knowledge from disciplines such as psychiatry, psychology, the neurosciences, history, philosophy and the social sciences.

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