

# Explanation and Understanding

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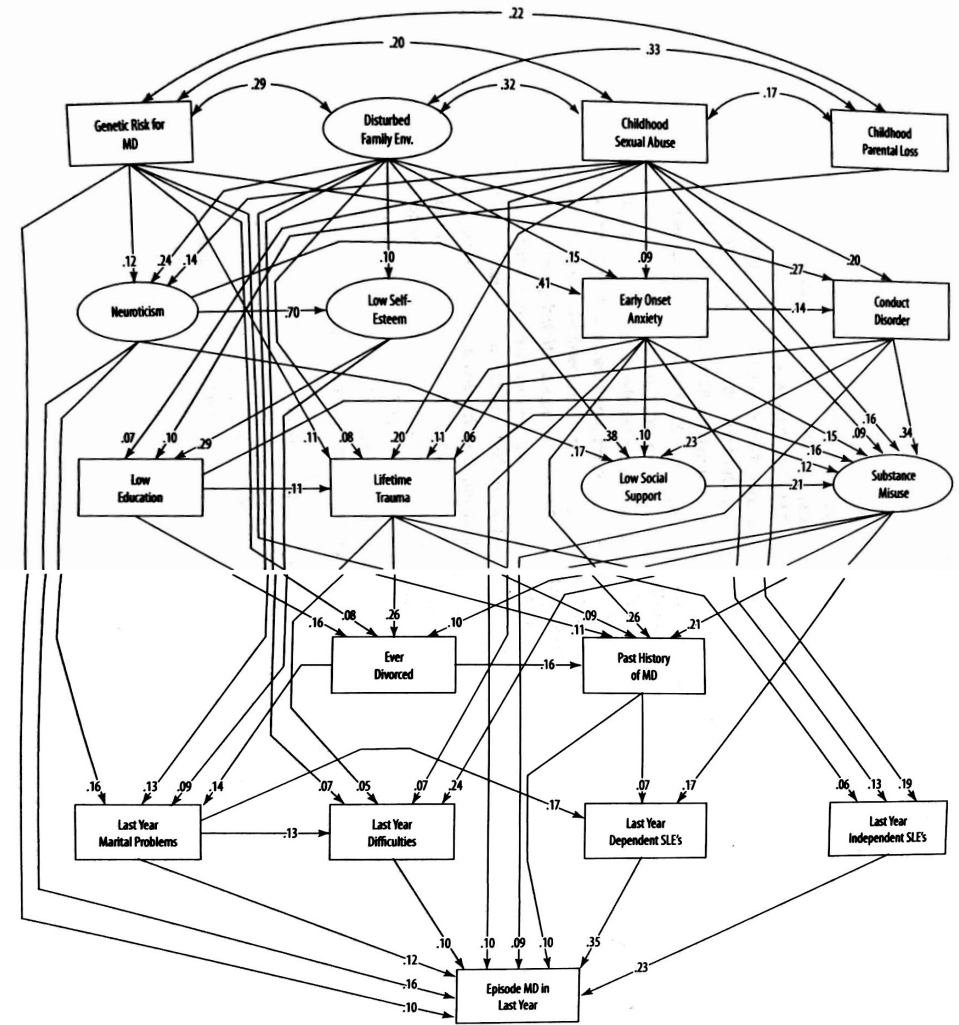


Figure 1.1. Results from an integrative model for the prediction of major depression (MD) in the last year in women. Latent variables—indexed by observed variables in a measurement model—are depicted in ovals, while observed variables are depicted in rectangles. SLEs = stressful life events. All variables have estimated residual variance not depicted in the figure. See text for a description of variables. Source: Adapted from Kendler, Gardner, and Prescott (2002).

# Overview

1. Description and explanation
2. The nature of explanation
3. DN-model and causal explanation
4. Mechanistic explanation
5. Understanding vrs. Causal explanation

# What is the aim of research?

- Description
- Prediction
- Explanation
- Manipulation (explanation for manipulative purposes)
- Classification (although categorization may "seem" like explanation)

# Description vrs. Explanation (C. Marhionni)

- Scientific research provides answers to different kinds of questions about the world
- – **Descriptions** tell that something happens or is the case. They answer *what-, where-, when-, how much* – questions
  - What's the boiling point of water?
  - What was the voting percentage of in parliamentary election in Finland (72,6)?
  - What are the symptoms of major depression

**Explanations** are answers to *why-* or *how-* questions

- Why does water boil at 100C?
  - Why did the voting percentage go down from 2019 to 2023 election?
  - What causes and realizes the symptoms of major depression?
- Explanation does not only organize descriptions
  - "All major depression have these symptoms in common"  
does not answer why or how they have the symptoms in common

# Explanation

- Explanations are not mere descriptions of what is or what has happened, but rather *why* it is the way it is or what were the reasons for why it happened
- Explanation answer: *why x?*
  - An explanation would make *x understandable* if true
- Core questions:
  - What produces understanding in explanation?
  - How can be evaluate explanations?

# Contrastive structure of explanation (C. Marchionni)

- Can be useful to think that explanatory questions contrastively
  - – Question: "Why does Peter give Hannah a kiss?" is ambiguous.
  - – Possible answers to the following questions:

Why **did** Peter give Hannah a kiss?

Why did **Peter** give Hannah a kiss?

Why did Peter **give** Hannah a kiss?

Why did Peter give **Hannah** a kiss?

Why did Anna give Simon **a kiss**?

Contrastive explanation Upshot: What is being or can be explained can be made more precise by explicating a **contrast class**.

- – E.g. why x rather than x' happened
- Ambiguity can be resolved by writing down contrasts: –

Why did Peter give Hannah a kiss in the first place?

Why did Peter rather than David give Hannah a kiss?

- Could you make your research more precise with contrastive questions?



# Covering law model (DN model)

- Hempel and Oppenheim (1948):
  - [T]he question “Why does the phenomenon occur?” is construed as meaning “according to what general laws, and by virtue of what antecedent conditions does the phenomenon occur?”
    - – Example: “Why did the solar eclipse occur at time t?”
- The event is explained “by subsuming it under general laws”.  
Explanations are arguments that answer why-questions:
  - Premises contain at least one law ( $\Rightarrow$  nomological) together with initial conditions
  - The explanandum is a conclusion that can be deduced from the premisses ( $\Rightarrow$  deductive)
- Variants of the D-N model: deductive statistical in which the conclusion is a statistical generalization, and inductive statistical in which the argument is inductive

# Criticism of the DN model

- Explanatory asymmetry?
  - The length of the flagpole can be explained by its shadow
- Explanatory relevance?
  - The consumption of contraceptive pills by a man can explain why he does not become pregnant.
- Explanations in sciences where there are no laws of nature?
  - Explanation in the social sciences?

# Unificationist and Causal Explanations

- **Unificationist account of explanation** (Kitcher 1989)

- Basic idea: scientific explanation is a matter of providing a unified account of a range of different phenomena
- Explanation is a matter of deriving descriptions of many phenomena by using as few argument patterns as possible, over and over again

- E.g. Gravitation theory is unificatory because it can explain tides and the movement celestial bodies.

- **Causal mechanical model** (Salmon 1984)

- An explanation of an event E will trace the causal

- processes and interactions leading up to E – the explanation shows how E fits into a “causal nexus”

# Causal explanation (C. Marchionni)

- **Woodward's interventionist theory**
- • Explanations are answers to **what-if-things-had-been-different** questions
  - – The relevant counterfactuals concern the outcomes of interventions: “If variable X were to be changed like this, then Y would take this and that value.”
  - – Vs. non-interventionist counterfactual “if the barometer dial falls, there will be a storm”
- To explain causally a phenomenon is to provide information about the factors on which it depends and to exhibit how it depends on those factors
- Explanatory relationships are relationships that in principle can be used for manipulation and control in the sense that they tell us how certain variables would change if other variables were changed
  - – (Woodward: causal notions linked to our nature as agents that manipulate their environment. If we were e.g. intelligent trees, we probably wouldn't have similar notions of cause and explanation!)
- Contrast to DN-model: Explaining as **revealing dependencies** between things in the world, not as subsuming under laws
  - – Causal explanation: giving knowledge of causal dependencies

# Opening black boxes: Mechanistic explanations

In many life sciences, it has become common to require that explanations of phenomena describe mechanisms (cf. Machamer & Darden & Craver 2000)

- – How information gets transmitted in a synapse – How does DNA replication occur
- • Since Merton (1967), similar claims made also in the social sciences
- – E.g. Critical realists, analytical sociologists
- • What is a mechanism?
  - – A collection of (1) components, which (2) organized in a certain way, sustain a (3) stable phenomenon
  - – Can often be described as a causal process that transforms inputs into outputs
- Mechanistic explanation are causal explanations

- Syphilis was one of the most devastating diseases encountered in mental hospitals until the discovery of penicillin at the beginning of the 20th century.
- Syphilis was called the “great imitator” because of its variable clinical course and diversity of manifestations (Carneiro et al. 2013).
- It was only when the bacterium, and the causal mechanism by which it produces the symptoms, were discovered, that the various courses and manifestations of the disease were lumped together under the same treatable kind heading.

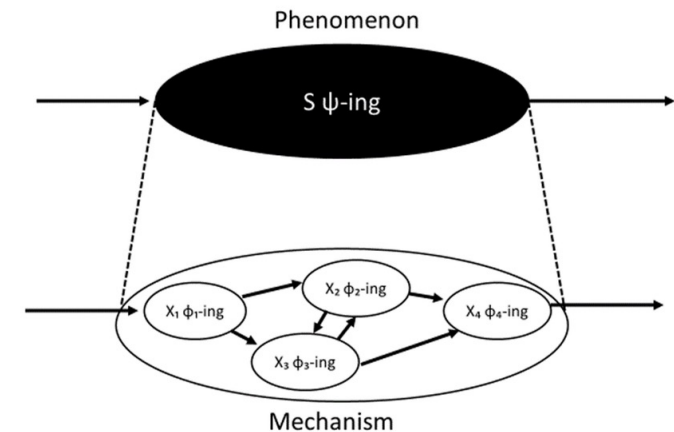
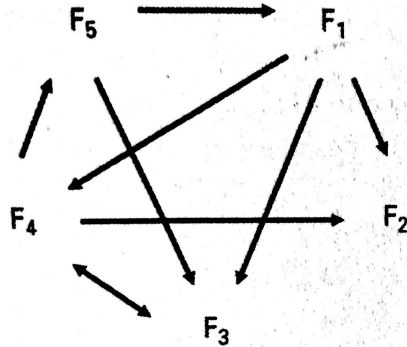
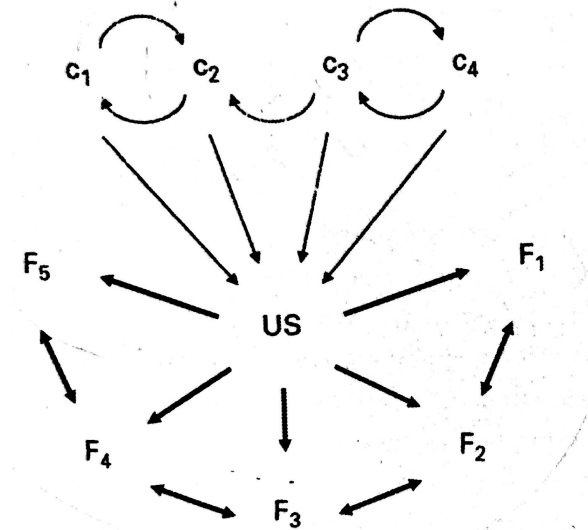


Figure 2. (Craver 2007)

# Different Mechanisms (Kendler, Zachar, Craver 2011)



**Fig. 2.** One possibility for a property cluster kind in which individual clinical features (labeled F<sub>1</sub> to F<sub>5</sub>) are causally inter-related to one another. There is no underlying essence that is responsible for the clustering of the symptoms. For example, if the disorder is major depression, suicidal ideation (F<sub>2</sub>) might be caused by both depression mood (F<sub>1</sub>) and feelings of guilt (F<sub>4</sub>).



**Fig. 3.** Another possibility for a property cluster kind in which we have a series of causes (C<sub>1</sub> to C<sub>4</sub>) that interact with each other to produce an underlying state (US) that in turn leads to the individual clinical features (F<sub>1</sub> to F<sub>5</sub>). These causal processes could be psychological or biological. These clinical features in turn could causally interact with each other.

# Understanding vrs. Causes

- However, many philosophers have thought that it is troublesome to assimilate reasons for action to causes and laws.
- Reasons for action belong to the language of the subjects of inquiry, and social-scientific concepts should make references to reasons, whereas causal laws need not make a reference to meaning or motive.
- Based on these, Peter Winch argued that human action cannot be explained by laws. What is rightly expressed in first-level normative concepts (the agent's reasons) cannot be properly expressed by second-level causal concepts alone (social scientific theories).
- Winch rejects the idea that there are universal standards available to compare witchcraft beliefs and science.
- The empiricist apparatus of law-like generalizations and hypothesis testing is blind to the subjective character of social reality. Social sciences require special methods.



# Example: Azande witchcraft (T. Erikssen)

- Evans-Pritchard's fieldwork in Southern Sudan took place at various times during 1926–39, and his first monograph was *Witchcraft, Oracles and Magic among the Azande* (1983 [1937]).
- The Azande blame witchcraft for their accidents (e.g. illnesses and deaths)
- The scientific doctrine about cause and effect cannot provide explanations of this kind: it cannot tell why the granary had to collapse just when several Azande were resting in its shade.
- Evans-Pritchard suggests that witchcraft is invoked as an explanatory principle 'whenever plain reason fails'.
- Winch took the idea to the extreme
- Principle of charity
- How "natives think"?
  - Lévy-Bruhl's *How Natives Think*
  - *Obeyesekere and Sahlins debate*



- In a way there are two languages involved in the social sciences: the subjects' own and the social scientists'.  
Language is integrated into social life: Events get their identity from the way language and action are mutually embedded.
- Charles Taylor: this speaks against a naturalistic approach to social sciences. There is no neutral description of social events because they are normative, rule-constituted activities.
- To express such activities, the social scientists, and the actors themselves, must interpret the motions as conforming to rules. Interpretations are never neutral. What is interpreted in one way can be re-interpreted otherwise. Interpretation requires taking a stand on what the action means.
- This applies to language in general and hence the concepts of
- social science should be understood more like translations of the
- subject's language than like representation of their beliefs.

- Max Weber: “Ideal types”. Concepts of the social sciences need to capture the meanings and motivations that are significant for the subjects to be studied.  
First describe the actions to be explained in terms of typical motivations. Then form the concept by abstracting characteristics of the action from a variety of observations.
- Ideal types related observable behaviours by identifying the motivations that stand behind them. E.g. “aggression” cannot be defined solely in terms of observable behaviour but needs to identify typical feelings, beliefs, and social meanings that stand

# Thick concepts

- Clifford Geertz articulates the idea of social scientific concepts being translations in his essay “Thick description: Toward an interpretive theory of culture”.
- Ethnographic description tries to make foreign culture intelligible, in that sense it is a bit like translating novels or poetry.
- “Thick” and “thin” descriptions. Thin descriptions have minimal relationships to other descriptions. E.g. to say just that someone “is walking” is a thin description. A thicker description is to say that someone “is walking to class”. Even thicker would be “...is hurrying to class”.
- Thick descriptions have specific relationships to other actions, events, motivations, possibilities for response, outcomes, strategies, etc.

# Thick concepts

- The conceptual relationships expressed by thick descriptions are embedded in the language, symbolic system, and actions of the subjects.
- In that sense they correspond to Schutz's common sense but Geertz doesn't think they are the subjects "theories" of the society. Instead he subscribes to a Wittgensteinian idea of meaning as use.
- Thick descriptions capture what the members of the community have in common – their culture.
- The goal of interpretive social science is to thickly describe the culture, and thereby express in the interpreter's language the relationships that make the subjects' social world meaningful.

# Cross-cultural cognitive variation?

- These differences, nonetheless, do not prove that there is no cognitive unity rather than undermine the presupposition that WEIRD (Western, Educated, Industrialized, Rich and Democratic) people's similarities in normally considered cognitive processes are representative of human cognition in general
- Joe Henrich et al. (2010), for instance, demonstrate that there is considerable cross-cultural variation in self-concepts, the visual system, and even in visual illusions usually considered to be cognitively impenetrable (e.g. the Müller-Lyer illusion). According to Segall et al. (1966), San foragers of the Kalahari Desert were not affected by the illusion possibly because they were not visually exposed to "carpentered corners" when growing up.

# Intentional explanation is causal?

- The general view in the philosophy of social sciences is that reasons can function as causes in explanations and that interpretation and causal explanation need not be mutually exclusive (Tuomela 1977; Henderson 1993; Kincaid 1996; Ylikoski 2001).
- As an example, when an anthropologist conducts fieldwork by interpreting local customs and behaviours, she relies on the causal efficacy of cultural structures and beliefs.
- This means that a putative intentional explanation is explanatory if it can answer questions concerning how the explanandum action would have been different, had the relevant beliefs and desires been different (see Ylikoski 2001, p. 97).

- What type of explanation do you employ in your research?
- Could you make it more explicit?