Lange 6
Stability

(pp. 95–105)

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P3 (again)

If $p \in U$, then $p \in \Lambda$ iff, for all $q \in U$ consistent with Λ, $q > p$ is correct in all contexts.

Last time we considered some challenges to the "only if" part of P3; they were not successful.

Proof of the "if" part of P3 (pp. 52 and 97, simplified)

1. Suppose $p \in U$ and, for all $q \in U$ consistent with Λ, $q > p$ is correct in all contexts.

2. Since $p \in U$, $\sim p \in U$.

3. Since $\sim p > p$ is not correct in any context, it follows from (1) and (2) that $\sim p$ is not consistent with Λ.

4. Therefore, Λ implies p.

5. Therefore, p is a logical consequence of the laws, so $p \in \Lambda$.

- In Lange 2 we saw that laws seem to have a special relation to counterfactuals, though common attempts to state that relationship are not correct.

- P3, if correct, does state a relation between laws and counterfactuals that accidents do not possess: Laws and their consequences are the only members of U that would hold under any supposition in U consistent with the laws.

- But "this does not explain why the laws' relation to counterfactuals is so *special*" (p. 15). It says that laws would be true under any supposition consistent with the laws, but accidents may be true under suppositions consistent with an accident.

- To show that laws have a *special* relation to counterfactuals, we must identify a relation that laws have to counterfactuals which is defined without using the concept of a law.

- "This is what I now propose to give." (p. 98)

Definition (simplified)

A set Γ of statements is non-nomically stable (NNS) iff:

1. Γ is a subset of U.
2. Every member of Γ is true.
3. If $p \in U$ is a logical consequence of Γ, then $p \in \Gamma$.
4. If $p \in \Gamma$ and $q \in U$ is consistent with Γ, then $q > p$ is correct.

It is easy to show that the following are NNS:

- the empty set
- the logical truths in U
- the truths in U

Lange says these are "trivially" NNS.

Only Lambda is nontrivially NNS

Argument that Λ is NNS (p. 103)

1. By the definition of Λ, Λ is a subset of U.

2. Lange here assumes laws are true; it follows that their consequences must all be true. Hence every member of Λ is true.

3. Every logical consequence of Λ is a logical consequence of the laws. Therefore, if $p \in U$ is a logical consequence of Λ, then $p \in \Lambda$.

4. The "only if" part of P3 implies that if $p \in \Lambda$ and $q \in U$ is consistent with Λ, then $q > p$ is correct.

- Lange also argues that no set other than those mentioned so far is NNS (the argument is given below).
- So he says: Λ *is the only nontrivially NNS set*.

According to Lange, the special relation between laws and counterfactuals is that Λ is the only nontrivially NNS set.

Reasons this is a special relation:

1. *We have here a distinction between the laws and the accidents that is not drawn by referring to the laws.* (p. 104)

2. *Non-nomic stability is a kind of <u>maximal</u> invariance . . . under hypothetical suppositions; a non-nomically stable set would still have obtained under any $p \in U$ under which it <u>could</u> still have obtained. So in virtue of Λ's non-nomic stability, the laws (in U) <u>collectively</u> possess a kind of <u>maximal</u> invariance.* (p. 105)

1. Why does Lange say that P3 "does not explain why the laws' relation to counterfactuals is so *special*"?
2. State what it means for a set of statements to be non-nomically stable.
3. State Lange's argument that Λ is NNS.
4. What is the special relation between laws and counterfactuals, according to Lange? What makes this relation special?

Lemma

If two sets are NNS then one is a proper subset of the other.

Proof: (pp. 100–101)

1. Suppose Γ and Γ' are NNS and neither is a subset of the other.
2. Let $r \in \Gamma - \Gamma'$ and $r' \in \Gamma' - \Gamma$.
3. Since $r' \notin \Gamma$, $\sim r'$ is consistent with Γ, hence $\sim r \vee \sim r'$ is consistent with Γ.
4. So, since Γ is NNS, $(\sim r \vee \sim r') > r$.
5. So $(\sim r \vee \sim r') > \sim r'$, hence $(\sim r \vee \sim r') \not> r'$.
6. An argument like (3) shows $\sim r \vee \sim r'$ is consistent with Γ'.
7. (5) and (6) contradict the assumption that Γ' is NNS.
8. Hence (1) is false, i.e., if Γ and Γ' are NNS then one is a subset of the other (and hence a proper subset if $\Gamma \neq \Gamma'$).

Argument that no other set is NNS (pp. 103–104)

- Suppose Γ satisfies clauses (1)–(3) in the definition of NNS, and is not one of the four sets already determined to be NNS.
- In view of the Lemma, one of the following must be true:
    - A. Γ is between the logical truths and Λ (i.e., the necessary truths are a proper subset of Γ, which is a proper subset of Λ).
    - B. Γ is between Λ and the set of all truths.
- If A:
    - There exists a physically impossible q that is consistent with Γ.
    - $q \not> p$ for some $p \in \Gamma$ in some context.
      E.g., $\sim$(Hooke's law) $\not>$ Snell's law.
    - So Γ doesn't satisfy (4) in the definition of NNS.
- If B:
    - There exists an accident $a \in \Gamma$ and an accident $b \notin \Gamma$.
    - $(\sim a \lor \sim b) \not> (a \cdot \sim b)$ in some context.
      (Lange gives an example for which this is plausible.)
    - Therefore, $(\sim a \lor \sim b) \not> a$ in some context.
    - $(\sim a \lor \sim b)$ is consistent with Γ.
    - So Γ doesn't satisfy (4) in the definition of NNS.