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 $p \in \Lambda$.

P3 not a special relation (pp. 15–16, 97–98)

- 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)

Non-nomic stability (p. 103)

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*.

The special relation (pp. 104–105)

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

Questions

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?

Argument that no other set is NNS (won't be on exam)

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 $b \notin \Gamma$.
  - $(\sim a \vee \sim b) \not> (a \cdot \sim b)$ in some context.
    (Lange gives an example for which this is plausible.)
  - Therefore, $(\sim a \vee \sim b) \not> a$ in some context.
  - $(\sim a \vee \sim b)$ is consistent with Γ.
  - So Γ doesn't satisfy (4) in the definition of NNS.