

From Surprise and Confoundment to New Knowledge

Speech Acts between Imagination, Narrative Fiction, and Scientific Discourse

“Speech Acts, Scientific Discoveries, and Linguistic Etiolation”

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A Little Background

A few months ago, I submitted an abstract for a talk at the international conference “Cognitive Linguistics in the Year 2022” held here in Szczecin in September. Unfortunately, due to a Covid case in the family and the ensuing concern that I might infect someone at the conference, I had to cancel my presentation.

But then Maciej Witek had the idea for this workshop, which of course I liked right away. Maciej sees a connection to his work on irony, especially with regard to so-called *confounding findings*, which play a role in my work and which I will come to later. If I see it right, Maciej will try to use Austin’s idea of etiolated uses of language to characterize acts of reporting confounding findings.

Aims and Expectations

With Maciej's ideas and with the workshop in mind, I have reworked my original talk in a way that I hope will provide a good basis for the best possible insights into characterizing speech acts based on various findings, esp. confounding ones. In doing so, I will mainly try to work out the core idea of confounding findings.

Much of what I will present here is entirely new ideas, and I look forward to constructive feedback and inspiring discussions with you.

I am optimistic that this workshop will contribute to a better understanding of a key component of scientific discovery processes. To this end, let us proceed as follows ...

Outline

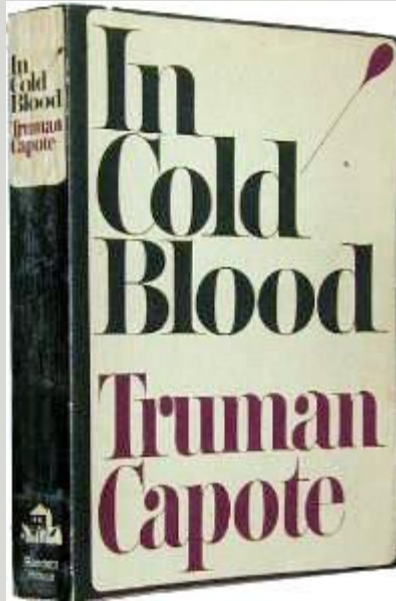
1. Starting point: Sentences of the form “This a is F ”
2. Scientific discoveries:
From finding and acceptance to new knowledge
3. Surprising and confounding findings
4. “This a is F ” between counterfactual reasoning and narrative (fiction?)

Starting point: “This a is F ” – everyday examples



“This (thing) is a chair.”

Starting point: “This a is F ” – everyday examples



“This is a book.”

Starting point: “This a is F ” – everyday examples



“This is a piece of metal.”

Starting point: “This a is F ” – everyday examples



“This is a beetle.”

1. Starting point: “This a is F ” – everyday examples

Some observations:

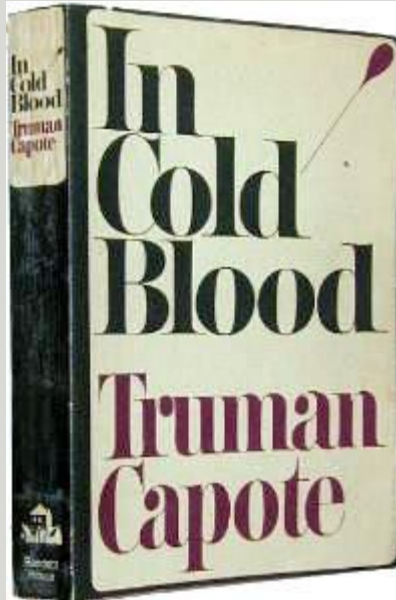
In each of these examples it is necessary that the object a in question is clearly identified, either verbally or by a pointing gesture (ostension)

Each of these examples can (but must not) be understood as an assertion intended to communicate a piece of information or a belief, for instance

In each of these examples a relatively simple predicate is used (“is a chair/book/metal/beetle”), presupposing only everyday knowledge – no special scientific-theoretical background knowledge is needed

But what about examples from science?

“This *a* is *F*” – examples from science: literature



“This book is an example of a non-fictional novel.”

(Cf. Capote interview, NYT 1966)

“This a is F ” – examples from science: chemistry



“This metal is radioactive.”

(What you see here is Radium.)

“This a is F ” – examples from science: biology



“This beetle is an exemplar of *Lilioceris lili*.”

(A.k.a. the lily leaf beetle)

“This a is F ” – examples from science

Some observations:

In each of these examples it is necessary that the object a in question is clearly identified, either verbally or by a pointing gesture (ostension) – just like above

Each of these examples can be understood as an assertion intended to communicate a piece of information or a belief, for instance – just like above

Unlike the above examples from everyday life, however, the examples from science require some background or commonly accepted knowledge

But: What if there is no such knowledge?
How are these sentences to be understood?
Are they still assertions?

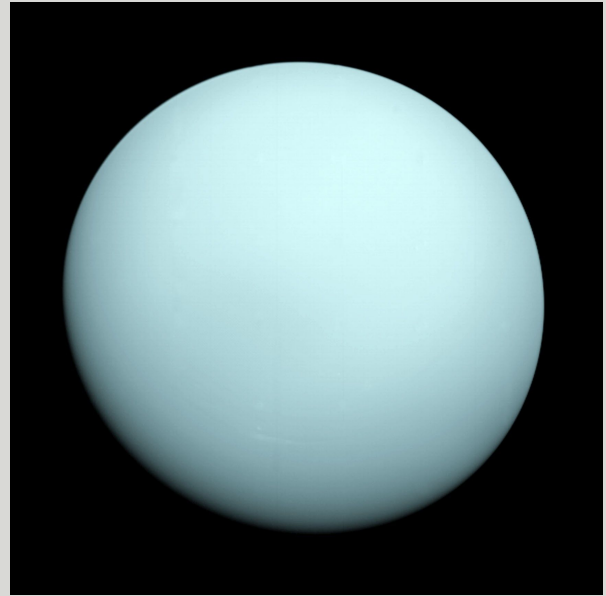
The Philosophy of Scientific Discovery

In order to be able to find an answer to these questions together with you, I would like to consider a special case of a scientific discovery (incl. some variations) in the following. In order to be able to evaluate this case, however, a short introduction into the philosophy of scientific discoveries is required at first.

The crucial question is this:

What is the difference between scientific discoveries and non-scientific discoveries?

1. Learning from analyzing (fictional & non-fictional) cases



1. Learning from analyzing (fictional & non-fictional) cases

- surprise or sudden insight (Archimedes' "Eureka!")
- new findings through observation (Newton) or thought experimentation (Einstein)
- the role of science funding (Columbus)
- serendipity (Penicillin, X-Rays, Teflon, Dead Sea Scrolls ...)
- joint discoveries (against the stereotypical view)
- nested discoveries (crystal in cave)
- genuine vs. non-genuine discoveries (e.g. theology/church history)
- complex discoveries (anthropogenic climate change)
- the structure of scientific discoveries

2. Scientific discoveries as structured processes

Unlike our sock-hole discovery, scientific discoveries have a certain structure with dispensable and indispensable general structural features.

One of the dispensable general structural features is the use of a microscope (biology vs. linguistics).



Indispensable feature #1: Finding

sFo

s: subject of finding

can be an individual – human or non-human – or also a group or team of individuals

o: object of finding

a single object (archaeology), a proof (mathematics), an interpretation (literary studies), a method (chemistry), a species (biology), a fact (we are in Szczecin now)

F: relation of finding

since an object of finding usually does not find its subject of finding, the relation of finding is non-symmetric

Example: finding some beetles

Indispensable feature #2: Acceptance

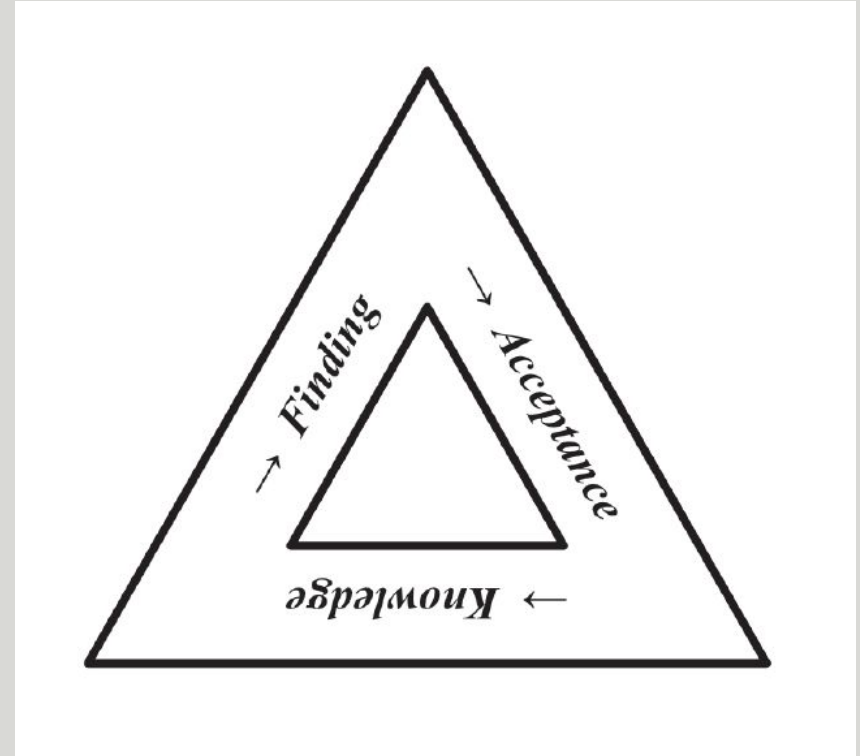
1. Two cases: Purely private discovery vs. scientific discovery
2. Enter Prof. Schmitt
3. Drawings, photos, preparations
4. (Joint) writing of a paper containing both assertives (“This a is F”) and declarations (“We hereby declare this species as new to biology”, “We hereby name the species so-and-so”)
5. Submission of the paper, review, revision, editorial decision: Accept
6. Degrees of acceptance, from acceptability to 100% agreement

Indispensable feature #3: Knowledge

As soon as a finding is accepted as a new scientific discovery, we are dealing with a new case of scientific knowledge, by which the previous body of knowledge of the field in question – in our example: coleopterology – is extended or modified in some other way.

Dynamic process

Individual vs. institutional knowledge



Surprise and Confoundment

Let us now consider – applied to discoveries – a distinction made by Mary Morgan (in a different context), namely that between Surprise and Confoundment:

Something you find is confounding, rather than merely surprising, if it is “both surprising and unexplainable within the given realm of theory” (Morgan 2005, 324).

I think that this distinction can help us better understand the transition from an initial finding to the entry into an appropriate acceptance process (and thus, in the case of success, to new scientific knowledge).

Surprise and Confoundment

In our beetle discovery case, we seem to be dealing with a case of **Surprise**: The subject(s) of the finding may have been surprised, but their finding can be well explained within the framework of existing theories and taxonomies of coleopterology.

“This a is F ” uttered in the context of a surprising insight are usually based on **counterfactual reasoning** (taking into account certain criteria such as simplicity) and, at least initially, have less the character of assertions than of **conjectures** (still: assertive family).



Surprise and Confoundment

In contrast, the case of nuclear fission, e.g., seems to have been a case of **Confoundment**. Otto Hahn and Lise Meitner were not only surprised, but also realized that the theoretical framework was not suitable to explain the newly discovered phenomenon; they had to develop a new framework.

This required more than counterfactual reasoning. A (now) accepted sentence such as “This is a nuclear fission” seems to be based on the creation and consideration of a **narrative**, more reminiscent of fictional discourse, with the goal of describing the new finding in the best possible way.



What lessons can we draw from this?

Among other things, it should have become clear that sentences of the form “This a is F ” can be expressions of knowledge, although the processes that led to their acceptance can vary widely – sometimes our knowledge is based heavily on observation or testimony, sometimes on surprise and counterfactual reasoning, and now and then even on purposefully and carefully crafted narratives that fill an explanatory gap.

Much more could be said about all this, but for today I will leave it at that, and look forward to discussing all the points I have touched on with you now.

Thank you!