



Saying less, seeing more
How the way we talk
about learning changes
educational theory & practice

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LET'S TAKE A LOOK

at what and how we do
as **RESEARCHERS**
interested in **TEACHING**
and **LEARNING.**

Conversation between pre-service Teacher and Noa (7 year-old, 1st grade)

1. T.: Can you count to 10?
2. N.: Yes. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
5. T.: What is the biggest number you can think of?
6. N.: Million.
7. T.: What happens when we add one to the million?

- 8. N.:** Million and one.
9. T.: Is it bigger than million?
- 10. N.:** Yes.
11. T.: So what is the biggest number?
- 12. N.:** Two millions.
13. T.: And if we add one to the two millions?
- 14. N.:** It's more than two millions.
15. T.: So can we arrive at the biggest number?

- 16. N.:** **Yes.**
- 17. T.:** Let's assume that *googol* is the biggest number. Can we add one to googol?
- 18. N.:** **Yes. There are numbers bigger than googol.**
- 19. T.:** So what is the biggest number?
- 20. N.:** **There is no such number!**

21. T.: Why there is no biggest number?

22. N.: Because there is always a number which is bigger than that?

Interpreting *The Biggest Number* episode

- Noa held **a misconception** about number
- The teacher corrected the misconception by exposing Noa to a **cognitive conflict**

Questions remain open:

- Why doesn't Noa change her answer the first time she encounters contradiction?
- When she corrects her answer, why isn't she certain of it?
- and besides, why the disparaging "*misconceptions*"? And how do we find it?

Interpretation of *The Big* *ode*

Do we really
need it?

- Noa held **a misconception** about number
- The teacher corrected the misconception by exposing

and besides, what is this
“misconception” and
where do we find it?

THESIS

As people of education, we tend to **USE TOO MANY WORDS** and to use some others in **UNHELPFUL WAYS**.

By **CHANGING OUR WAYS OF TALKING** we can improve our ability to see, to understand, and to act for the benefit of the educated.

Plan of this talk

**A. The metaphor of object in
educational discourse**

its origins and its perils

**B. Disobjectifying educational
discourse**

how it can be done and what we
gain from it

**We use metaphors
in research**

**even when
we think we don't and
believe we shouldn't!**

Metaphors

- What are they?

Implants from another discourse

- Where do we find them?

Everywhere (poetry, research)

Metaphors in research

Social plane

interiorization

mediation

meaning

More about metaphors

- Why do we need metaphors in research?

They make it possible for us to think about unfamiliar phenomena, thus creating new knowledge

Learning paradox

- to understand
new phenomena
to **talk**

**Metaphors
help us out!**

**Metaphor: using
the familiar to talk
about unfamiliar**

More about metaphors

- Why do we need metaphors in research?

They make it possible for us to think about unfamiliar phenomena, thus creating new knowledge

- But they also have traps:
for example, they may bring unhelpful entailments

On one ubiquitous
metaphor:
**the metaphor
of object**

**All seem to involve
objects**

- with them, we speak on learning
the way we speak of operating on
tangible things

**one's
knowledge**

mediation

Objectifying metaphor:

using a **symbol**
(word) as if it
signified an
“objectively”
existing **object**

objectifying often involves

- **REIFICATION**
transition
from the
talk about
processes
to talk
about
objects

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Speaking on PROCESS

on OBJECTS

In most arithmetic tests student
P scored below average

P has
discalculia

The car **moves** fast

The car moves
with high **velocity**

I am thinking

I have **thoughts**

objectifying often involves

- **REIFICATION**

**transition
from the
talk about
processes
to talk
about
objects**

- **ALIENATION**

**de-personalization
of the talk –
(obliteration of the
author) – the claims
about the existence of
the objects are
formulated as if they
had no human author**

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Speaking on PROCESS

on OBJECTS

In most arithmetic tests student
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**Who says
so?**

car moves
with high **velocity**

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Advantages of objectification in maths & science

A question

reification
makes
mathematics
manageable
(reduces
complexity)

the ... what the
following equality
says?

$$3+4 = 7$$

- If I have a set so that whenever I count its elements I stop at the word three,
- and I have yet another set such that whenever I count its elements I stop at the word “four”,
- and if I put these two sets together,

then

- if I count the elements of the new set, I will always stop at “seven”.

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What do we gain? (example: number)

Economy of discourse

“This set has five elements” vs. “Whenever you count the elements of this set, you stop at the number-word ‘five’”

Flexibility of expression

There are many “representations” for numbers and many ways to operate upon them

Wide applicability

We can say “ $3+2=5$ ” once and for all, rather than saying “2 apples and 3 apples make 5 apples”, “2 fingers and 3 fingers...” etc.

Perils

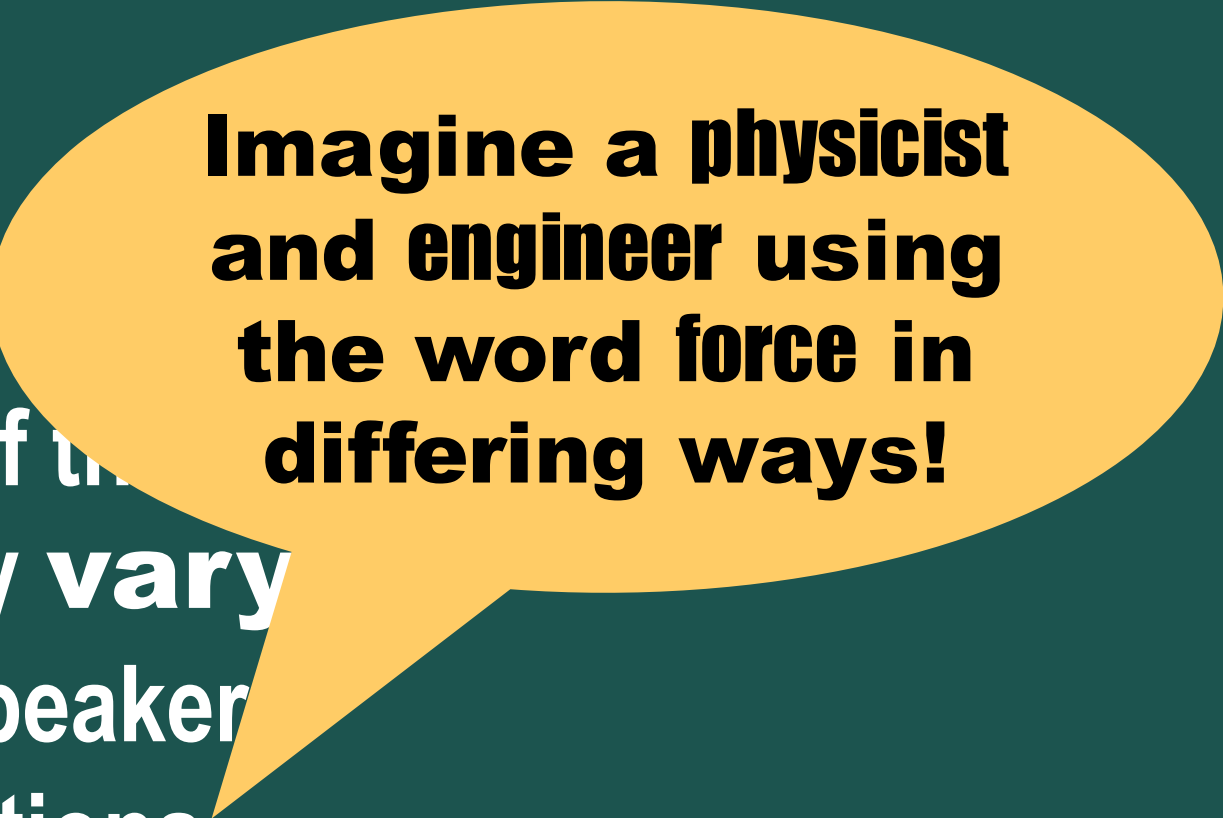
of objectification in

educational research

Lack of operationality – some consequences

**inherent
ambiguity**

the use of the
word may vary
across speakers
and situations



**Imagine a physicist
and engineer using
the word force in
differing ways!**

Think about the questions

- “**Can animals think?**”
(Dennet)
- “**When does numerical thinking begin?**” (Dehaene)

Can they be answered without first saying **what is meant by *thinking* & *numerical thinking*?**

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in ed-research discourse:

What are its traps?

unhelpful entailments

“acquiring knowledge”

- **knowledge is out there and can be transmitted / transferred**
- **one can re-build it single-handedly**
- **knowledge is commodity**

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in ed-research discourse:

What are its traps?

unhelpful entailments

Phony causal explanations

The traps of objectifying metaphor in ed-research discourse

□□□□□□ □: **Phony causal explanations**

“She knows
when to use
counting

because



she acquired
the concept of
number”

“He cannot
learn to
calculate
properly

because



he suffers
from
dyscalculia”



Time-honored dilemmas:

- transfer of learning
- mind and body
- nature and nurture

Phony **c** **ations**

Phony **qu**



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in ed-research discourse:

What are its trans?

we describe learning in terms of what the learners *don't do* rather than trying to notice and explain what they *do*

Consequential omissions

Plan of this talk

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educational discourse**

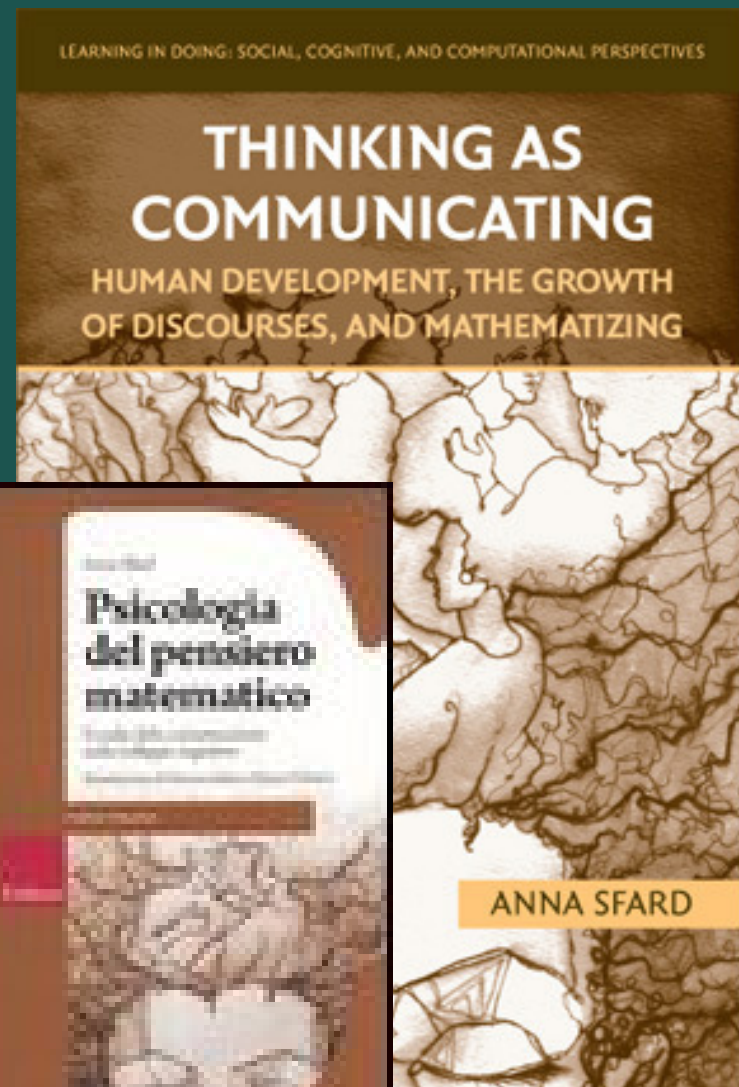
its origins and its perils

**B. Disobjectifying educational
discourse**

how it can be done and what
it gives us

In case I don't
have time to
tell.....

you may find
what is missing
in.....





Objectified vision of learning

What is it that changes
when one learns?

Jean Piaget: It's one's
**knowledge / concepts /
mental schemas**
which one **acquires/ constructs**



Disobjectifying the discourse on learning

**What is it that changes
when one learns?**

**Lev Vygotsky:
the way one
does things**

Examples of historically established human activities:

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Individualization:

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SO.....

- **arithmetic** is a **discourse** – a particular historically established form of activity of communicating
- **learning about numbers** is **individualization** of this discourse

and what about
arithmetic **thinking**?

Already included!

Human thinking
= individualized form of
communication
(not necessarily verbal or audible)

Back to the *Biggest Number* episode

Disobjectified interpretation of *The Biggest Number* episode

- Noa and the teacher are using number words **in different ways**
- There is a **communicational conflict** between Noa and the teacher

The Teacher thinks about number as OBJECT

- What *is* the biggest **number** (you can think of) ?

- What *is* the biggest **animal** (you can think of)?

- What *happens* when we add one to the million?

- What *happens* if we try to cross-breed elephant and giraffe?

- *Can we* add one to googol?

- *Can we* cross-breed elephant and giraffe?

Noa's and Teacher's conceptions of number - comparison

Teacher: Objectified

- **Number:**
an object, external to the discourse

- **Example:**
one hundred twenty two

- **Bigger number:**
corresponds to a bigger quantity

Noa: Unobjectified

- **Number:**
a word

- **Example:**
ten, hundred, million

- **Bigger number:**
appears later in the number sequence

Conflict: cognitive vs. communicational

	cognitive	communicational
The conflict is between:	the interlocutor and the world	two discourses
Role in learning:	optional way for “removal of misconceptions”	indispensable for learning
How is it resolved?	by effort to understand “the logic of the world”	by effort to understand choices of another person

What is the payoff of throwing away objectifying words (misconception)?

Previously

Now

- We won't
- Why
- up

no
in

We also start to think differently about teaching – e.g. we start appreciating **rituals**

of

t

discourse

To sum up....

We began with the

THESIS

As people of education, we tend to **use too many words** and to use some others in **unhelpful ways.**

I hope to have **convinced you**