NOMINAL MODIFICATION

GOETHE UNIVERSITÄT FRANKFURT AM MAIN

The (Possible) Role of Typology in Bilinguals' Acquisition of Recursion

Initial questions, predictions, and experimental design

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Presentation Overview

- My Research Questions

- Recursion & Acquisition

- Recursion Across Languages: Possessives

- Recursion Across Languages: Locatives

- What Makes Recursion Challenging?

- Past Findings from Bilingualism

- Goals, Design, & Predictions

- Next Steps

How does branching direction influence English-Mandarin bilingual children's acquisition of recursive possessive and locative phrases in both languages?

- Are the same forms of recursion (e.g. possessives) acquired at the same time in both languages in bilinguals, (in)dependent of branching direction?

- Are different forms of recursion acquired at the same time in the same language in bilinguals? (e.g. possession and locatives in English)

- Do bilinguals have a delayed age of acquisition (Mastery) for recursion in either language compared to monolinguals?

- *Is there an abstract, non-language specific representation of recursion available in the human language faculty, and do children have access to it?*

"The ability to iterate syntactic constituents inside constituents" (Pérez-Leroux et al., 2012)

= Indirect Recursion

Properties

- Iterative embedding (Limbach & Adone, 2010; Roeper, 2011)

- Ordered interpretation (due to the SMT) (Limbach & Adone, 2010)

- Frequently language-specific
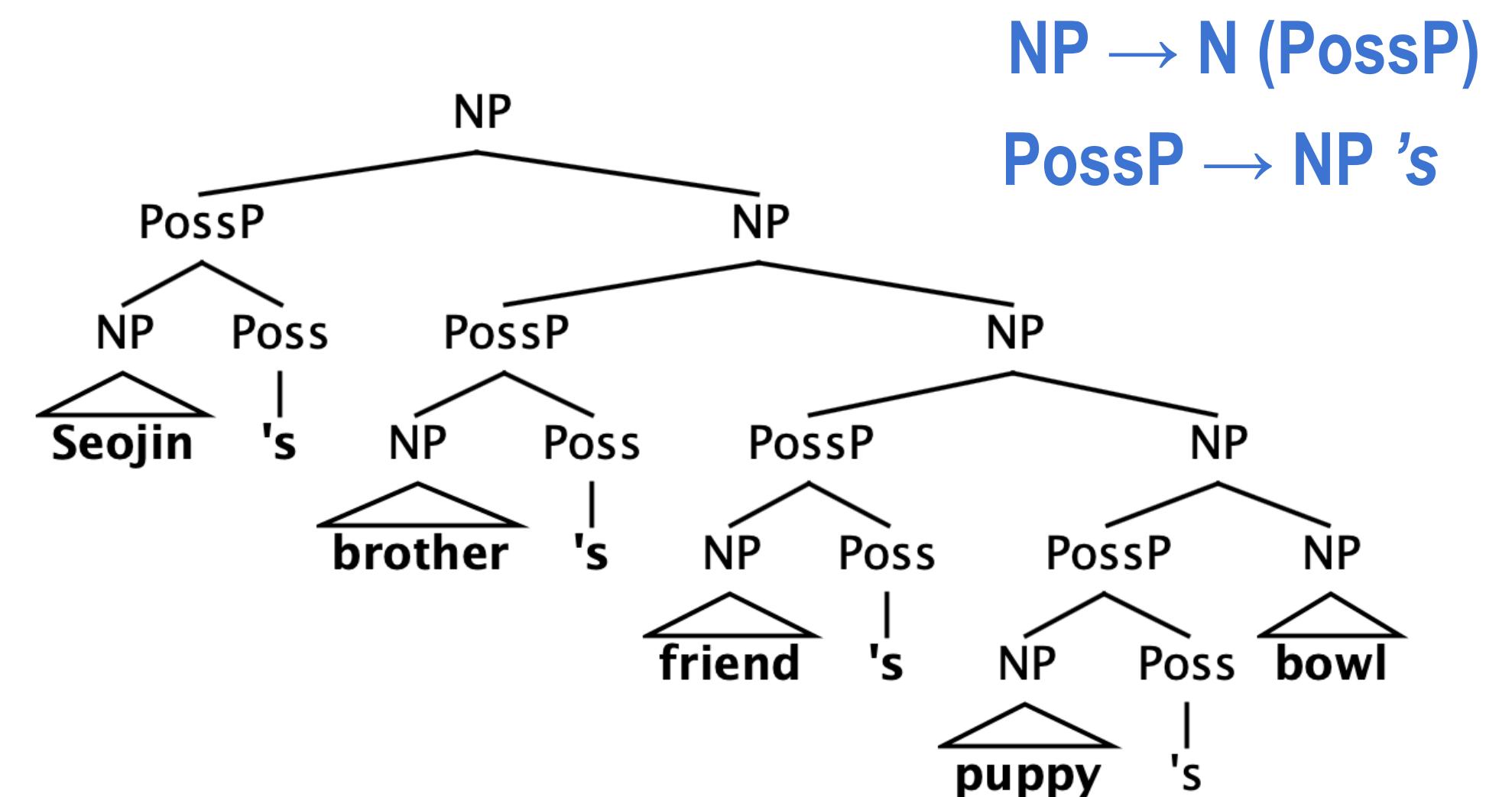
NP → N (PossP)

PossP → NP 's

Branching Direction in English and Mandarin

	English	**Mandarin**
Possessives	left	left
Locatives	right	left

Recursion Across Languages
Possessives

English

- Two forms: *'s* or *of*

- *'s* for animate possessors, external relationship (Grohe et al., 2021)

- Left-branching (*'s*)

- Both productive

Mandarin

- Two forms: NP + *de* 的 or Ø (Norman 160)

- Left-branching

- *de* 的 is productive

- Ø limited to familial relations and a few others (Paul, 2012)

The dissertation of the friend of the student of Prof. Schulz

Prof. Schulz's student's friend's dissertation

My sister's friend's dissertation

Prof. Schulz的student的friend的dissertation
DE   DE   DE

我 Ø sister的friend的dissertation
1sg   DE   DE

Past Findings for Monolinguals
## *Children's comprehension of possessive recursion*

Mastery varies between languages & studies

- Mandarin: 4 years (Shi et al., 2019); 6 years (Li et al., 2020)

- English: 5 years (Giblin et al., 2019); 7 years (Leandro & Amaral, 2014)

- Japanese: 4 years (Terunuma et al., 2017)

- Tamil: <5 years (Lakshmanan, 2020)

Frequent errors

- Conjunction

- Reduction

- Reversal or reordering

"**Give a leaf to the robot's lion's snake!**"
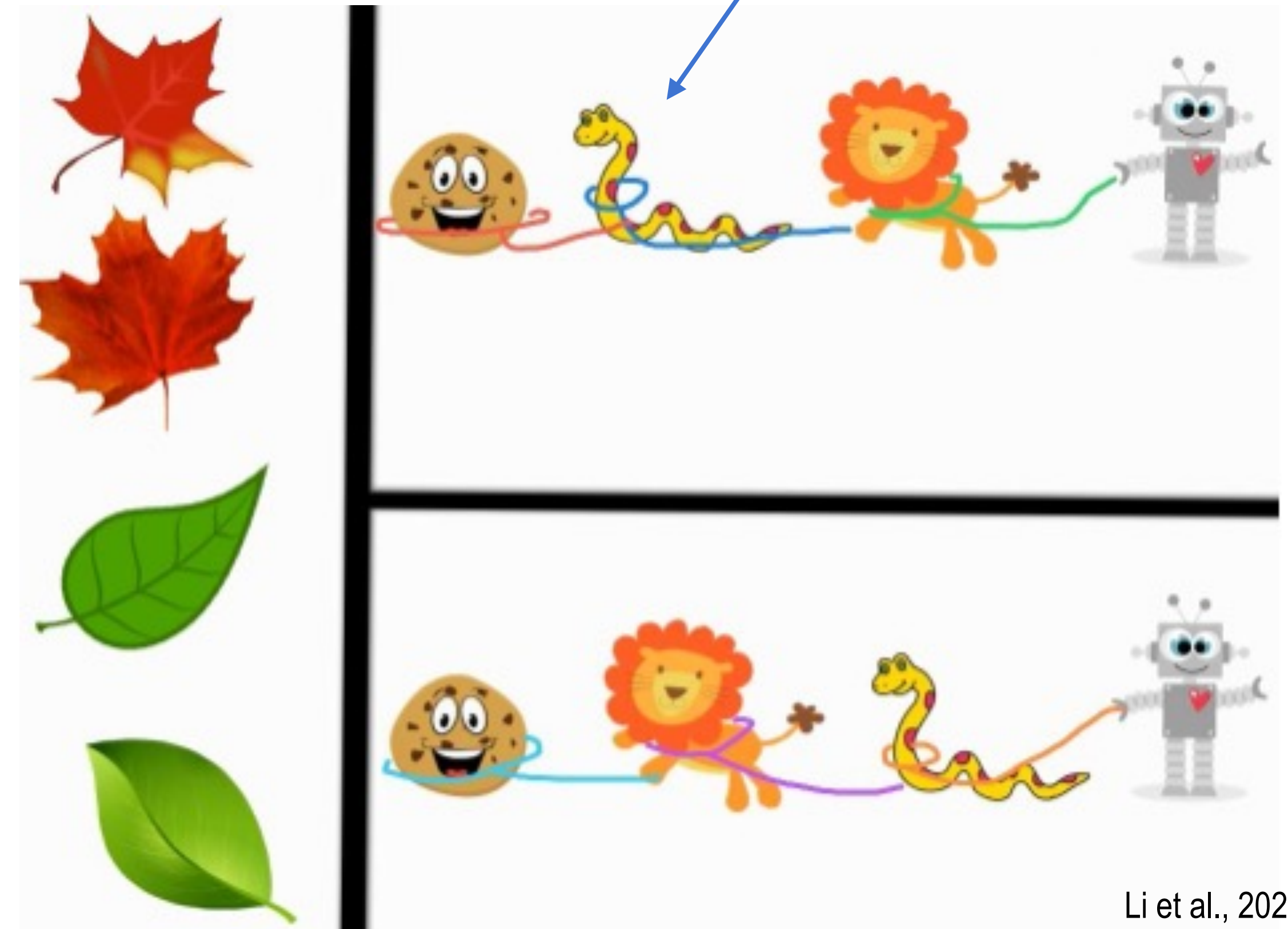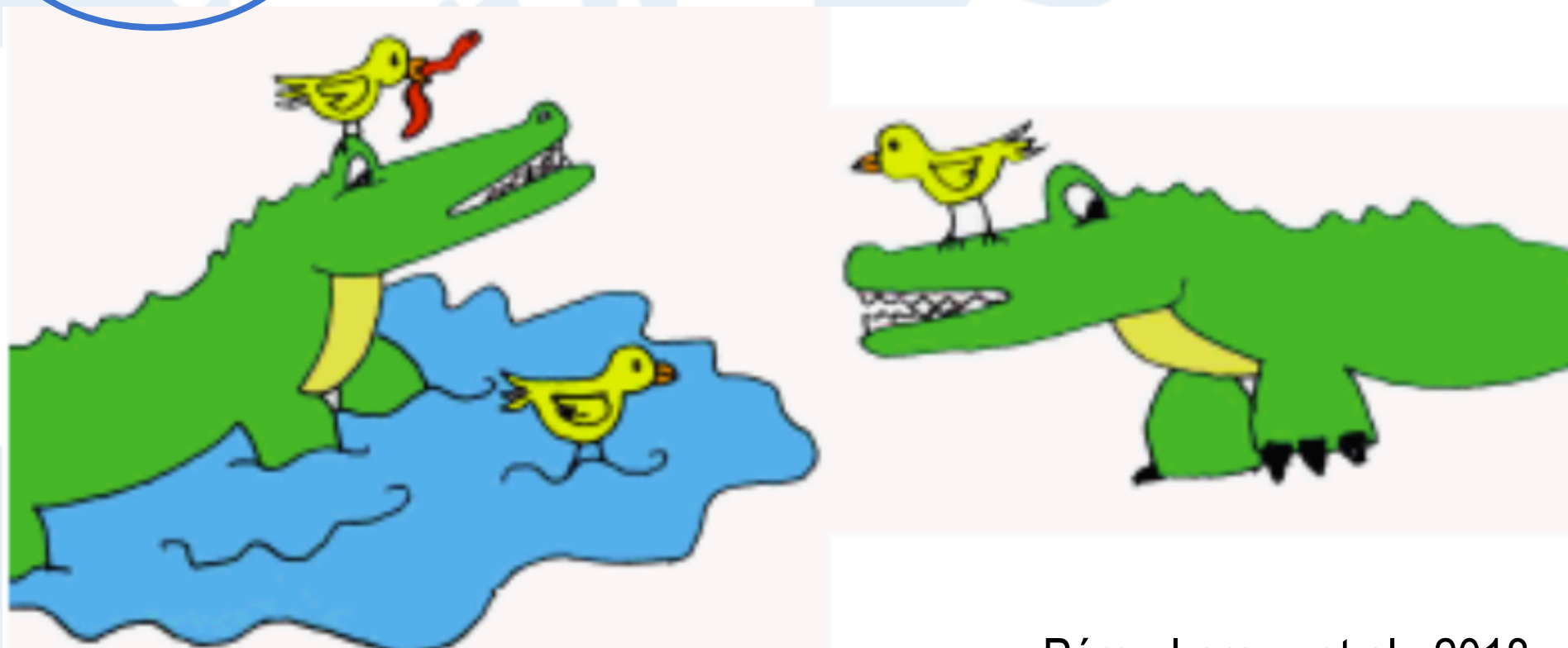
Li et al., 2020

English

- Prepositions

- PP → P + NP

- Right-branching

- Productive

The bird on the alligator in the water

Pérez-Leroux et al., 2018

Mandarin

- Prepositions and postpositions (Norman 162-163)

- Prep + NP + [Post] + [*de* 的]

- Left-branching

- Productive

水　上　的　鳄鱼　上　的 鸟
shui　shang de　e-yu　shang de　niao
water above DE alligator above DE bird

Past Findings for Monolinguals
Children's comprehension of locative recursion

- English: Mastery ≥7 years old (Nelson 2016)

- Mandarin: Mastery ~4 years old (Mao et al., 2021)

- Conjunction is the most common error (Nelson, 2016)

- Repetition of the same item triggers a recursive reading (Nakato & Roeper, 2021, but see also Mao et al. 2021)

"Show me a lion <u>next to</u> a zebra <u>next to</u> a crocodile"
vs.
"Show me a lion <u>under</u> a zebra <u>next to</u> a crocodile

"Show me a lion next to a zebra under a crocodile"
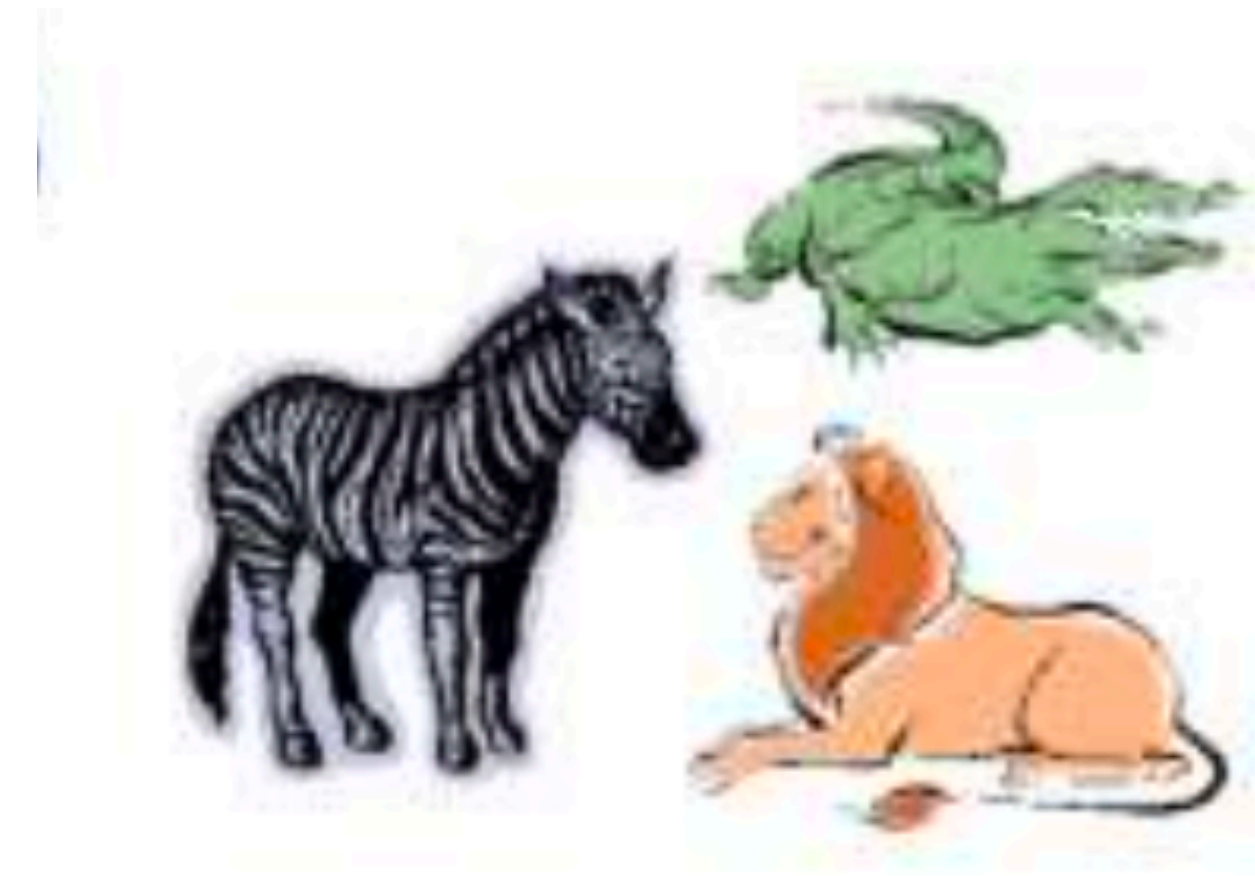
Nelson, 2016 (p.157)

Representational limitations

- Children's structure-building capabilities are limited to a certain depth of embedding (or perhaps even no embedding at all, in the earliest stages) (Roy et al., 2021)

- Only some sub-types of Merge, à la Rizzi (GK presentation)?

➡️ All forms of recursion should emerge at once, i.e. whenever the ability to embed becomes available

➡️ Branching direction does not matter

Need for evidence from the input

Children depend on some external evidence to conclude that a structure is recursive in their L1

- Acquisition depends on one or more input-specific factors e.g.
  - Input frequency
  - "Critical instances"
  - Characteristics of single-level embedding (Li & Schuler, 2021; Grohe et al., 2021)
  - ➡️ Acquisition of recursive structures will proceed one-by-one with no transfer effects within a language

Need for other cognitive abilities

Recursion per se isn't challenging, but comprehension and production are constrained by other cognitive factors such as:

- Conceptual accessibility: notions expressed by recursive structures are not necessarily of the same conceptual accessibility

  ➡e.g. possessives easier than locatives (cf. Pérez-Leroux et al. 2018)

- Working memory: computation of recursion is costly

  ➡Higher STM capacity should correlate with better performance on all types of recursion

Structural inconsistencies

Languages with diverse structures/branching directions (e.g. English) may be more difficult than languages with uniform branching directions (Pérez-Leroux et al., in prep)

- Concepts which can be expressed using more than one structure (e.g. possession in English) would take longer to master

➡️Children acquiring a language with one uniform branching direction would master recursion earlier than children acquiring a language with inconsistent branching directions

Three prior studies on recursion and bilingualism, all with different results:

Finding	Authors	Language Pair	Task Type	Structure
No effect of bilingualism on the production of recursion	Pérez-Leroux et al., 2017	English/ Spanish	Elicited production	Locatives
Bilinguals between 3 and 7 performed **better** than English monolinguals at every age	Leandro & Amaral, 2014	Wapichana/ English	Comprehension Forced choice	Possessives
No increase in recursive responses in the bilinguals between ages 5-7 ➡️Different branching direction caused the **delay** in Hungarian-speaking bilinguals	Avram et al., 2021	Romanian/ Hungarian	Comprehension Act out	Locatives

Testing Comprehension
Design

Target

- Simultaneous Mandarin-English bilinguals, 3-7 years old

- Age-matched, monolingual control group for each language

- Adult controls

The design

- Forced choice task similar to e.g. Li et al. (2020)

- Eye-tracking component?

Independent variables

- Language

- Structure (locative/possessive)

- Embedding level

- Age

Dependent variables

- Percentage of recursive interpretations of the target structure

Branching Direction in English and Mandarin

	English	**Mandarin**
Possessives	left	left
Locatives	right	left

Option A: **Representational limitations**

- Maturation of the necessary representational mechanisms will lead to acquisition of recursion

- Mastery of all structures will be the same in both languages

$$\text{Loc}_{\text{Eng}} = \text{Loc}_{\text{Mand}} = \text{Poss}_{\text{Eng}} = \text{Poss}_{\text{Mand}}$$

Option B: Need for evidence from the input

- Mastery depends on input characteristics
- Mastery of all structures should be disjoint from one another

$$Loc_{Eng} < Poss_{Eng} < Poss_{Mand} < Loc_{Mand}$$

Or some other, unsynchronized combination

Predictions for Bilinguals
Age of mastery

Option C: Need for other cognitive abilities

- Recursive structures with the same relationships will emerge at the same time

- Mastery of English possessives = Mandarin possessives

- Mastery of English locatives = Mandarin locatives

$$\text{Poss}_{\text{Eng}} = \text{Poss}_{\text{Mand}} > \text{Loc}_{\text{Eng}} = \text{Loc}_{\text{Mand}}$$

or

$$\text{Poss}_{\text{Eng}} = \text{Poss}_{\text{Mand}} < \text{Loc}_{\text{Eng}} = \text{Loc}_{\text{Mand}}$$

Option D: Structural inconsistencies

- Mastery of (left-branching) possessives will be the same for both languages
- Mastery of Mandarin locatives will be the same as possessives
- Mastery of English locatives might be later than other structures

$$Poss_{Eng} = Poss_{Mand} = Loc_{Mand} < Loc_{Eng}$$

- Acquisition of language-specific recursion occurs late in monolinguals

- Prior studies on bilinguals & recursion have had mixed results

- Open question: is recursion sensitive to "transfer" effects during acquisition?
  - Does structural (a)symmetry between the two languages have an effect?
  - Does conceptual (a)symmetry have an effect?

- Open question: are bilinguals delayed in the acquisition of recursion, compared with monolinguals?
  - Yes, according to Avram et al. (2021) & Pérez-Leroux (2017), in line with Tsimpli (2014)
  - No, according to Leandro & Amaral (2014)

Stay tuned to find out…

Next Steps

- Finalize methodology for the main experiment: create a script, translate into Mandarin, decide on logistics (e.g. order of presentation)

- Determine methodology for control variables: STM task, language dominance

- Ethics approval

- Contact schools for potential participants (Mainland China/Singapore)

- Pilot study with monolingual adults

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Discussion & Feedback

- Have I overlooked any structural characteristics of possession or location that might influence the outcome?

- How can I depict a possessive relationship without relying on some sort of linearity in the visual paradigm?

- Would eye-tracking add something significant?

谢谢大家!
Thank you!

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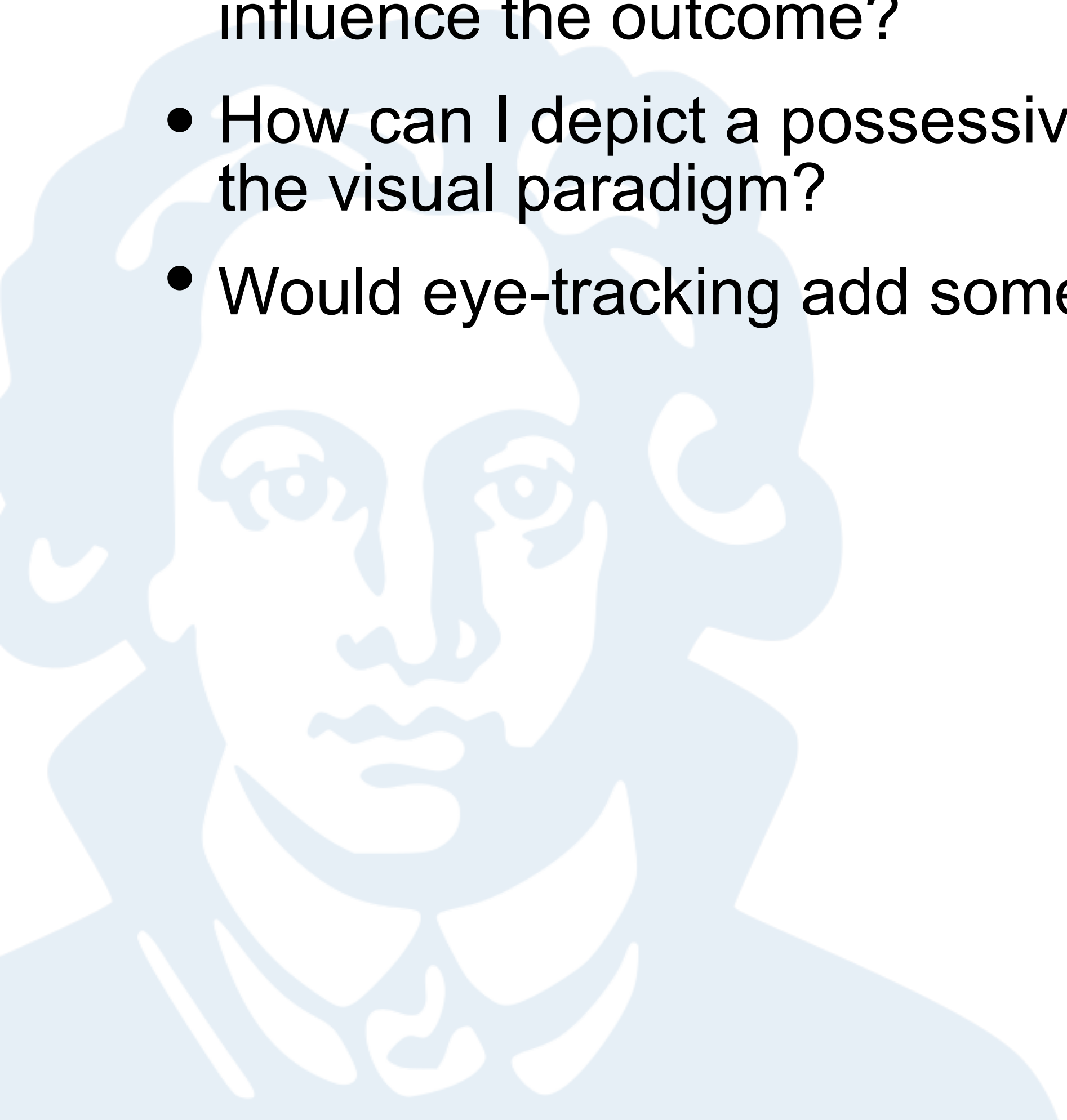
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