2022年2月17日
共創言語進化学 若手の会 第9回全体研究会

ホモ・レギュラリスの憂鬱

規則に取りつかれた人類の見る幻想としての言語

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専門領域:

- Exemplar(-based) Linguistics
- 構文理論 [Construction Grammar]
- 社会統語論 [Sociosyntax] (→ Social Grammar)

趣味: クラフトビール (知る・飲む)

家族構成: 妻 (ヒト)・長女 (ネコ)・次女 (ヒト)

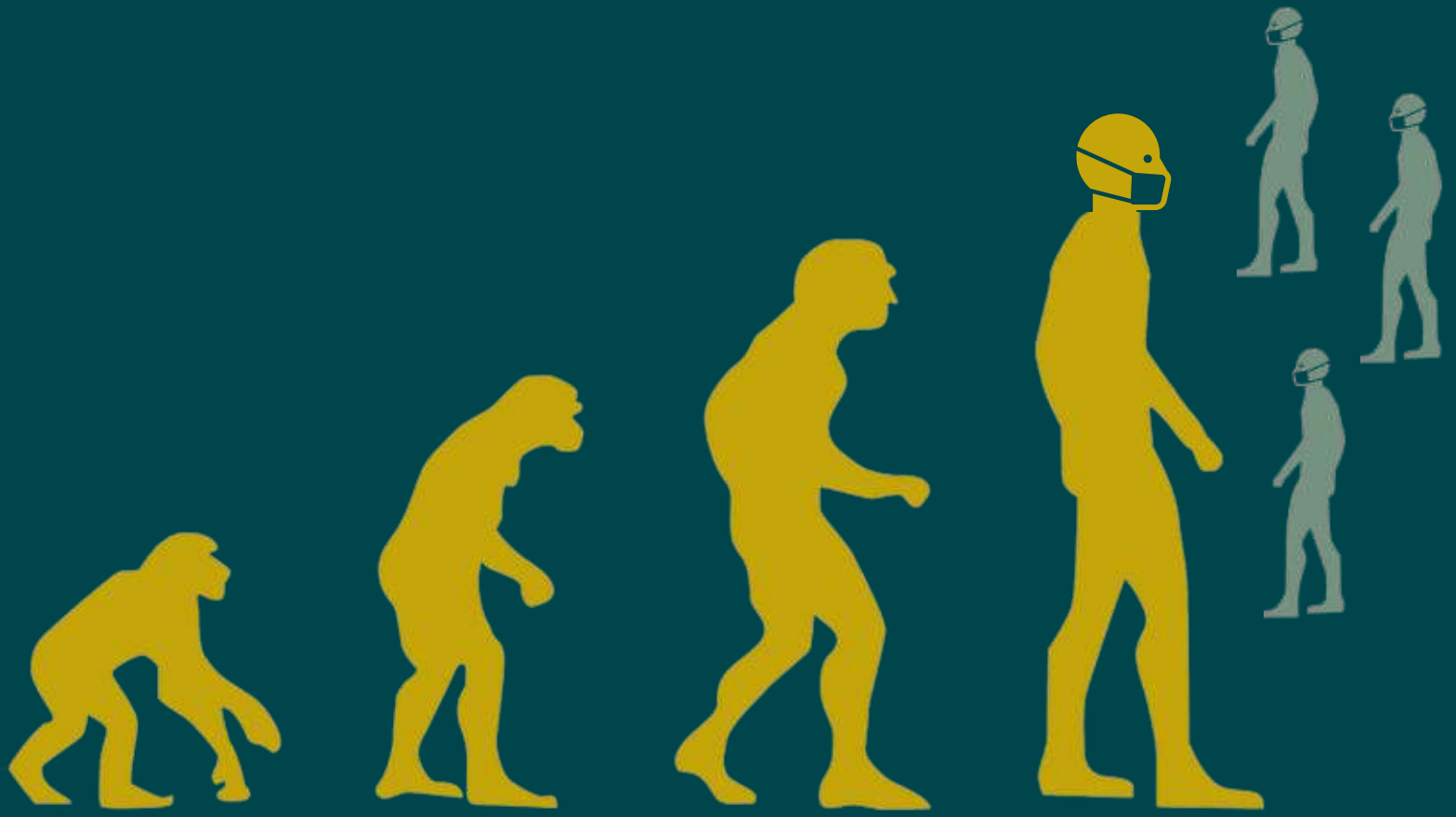
発表者自己紹介

3

@下北沢線路街空地 (2019年10月13日)

土足厳禁？

「規則の人」*Homo regularis* としてのヒト



ホモ・レギュラリス

ホモ・レギュラリスの幻想

2.　ホモ・レギュラリスの性質と文法

規範心理 (norm psychology) / 繰り返し学習 / 文法の発現

3. 規則生成のメカニズム

仮説推論 (abduction) / 類推

4. 結語

まとめと課題・展望

本日のメニュー

7

ホモ・レギュラリスの性質と文法

Keller (1994: 38-45) [von Hayek の経済学]

	学習	追従	柔軟性	リスク
理性	-	意識的	高	高
規則 (慣習)	必要 (個体発生)	盲目的 (自動的)	中	中
本能	不要 (系統発生)	盲目的 (自動的)	低	低

理性と本能のあいだ

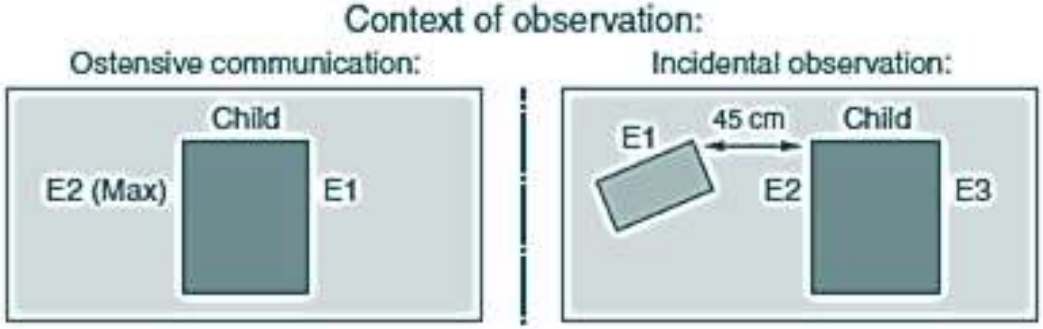


Figure 1 *Experimental setting. In the ostensive communication conditions (left), E1 sat to the child's left at one table. In the incidental observation conditions (right), E1 sat at a separate small table to the child's right, and E3 sat to the child's left.*

Table 1 *Basic structure of the target tasks with the experimental manipulations in the model phase presented for each condition separately*

	Ostensive communication		Incidental observation	
Phase	Recognizing	Inventing	Recognizing	Inventing
Model phase	E1 uses ostensive cues toward the child. E1 knows and recognizes the objects in his box ('Look what I have here. [Name], I'll show you something, look') and performs A_1 as if it were an existing action.	E1 uses ostensive cues toward the child. E1 'fortuitously' finds box, does not know the contained objects ('Huh, what's that? Hmm, well, [Name]') and performs A_1 as if he was just inventing it impromptu.	E1 is unknown to child, E2, E3, and does not use ostensive cues. E1 knows and recognizes the objects in his box (soliloquizing: 'I look at what I have here. I'll do that now, yes') and performs A_1 as if it were an existing action.	E1 is unknown to child, E2, E3, and does not use ostensive cues. E3 places 'unknown' box next to E1. E1 does not know box and objects contained in it (soliloquizing: 'Huh, what's that? Hmm, well') and performs A_1 as if he was just inventing it impromptu.
Action phase	Child is prompted by E1/E3 to act on the objects: 'Now, you can *have* that.'			
Test phase	Max announces 'Now I have that', and performs A_2 (accompanying it with a humming sound) for approximately 20 s.			

規範心理 (Schmidt et al. 2011)[1]

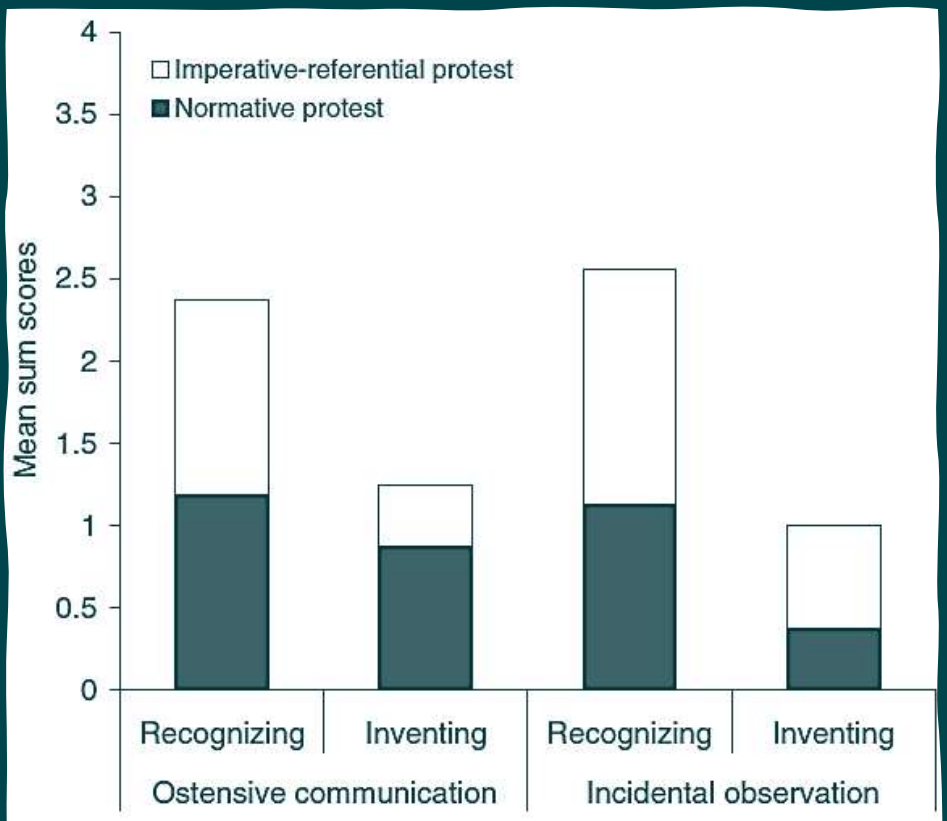


Figure 2 *Mean sum scores (0–4) of the different forms of protest in the test phase of each condition.*

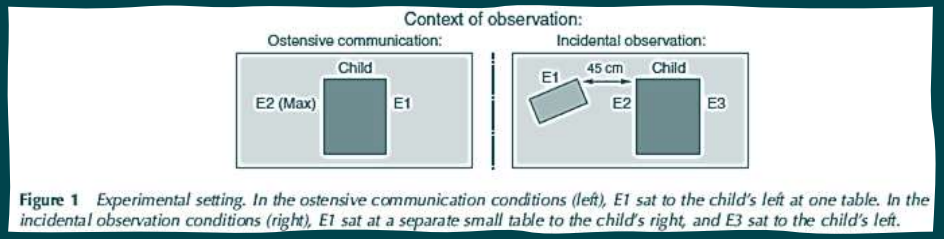


Figure 1 *Experimental setting. In the ostensive communication conditions (left), E1 sat to the child's left at one table. In the incidental observation conditions (right), E1 sat at a separate small table to the child's right, and E3 sat to the child's left.*

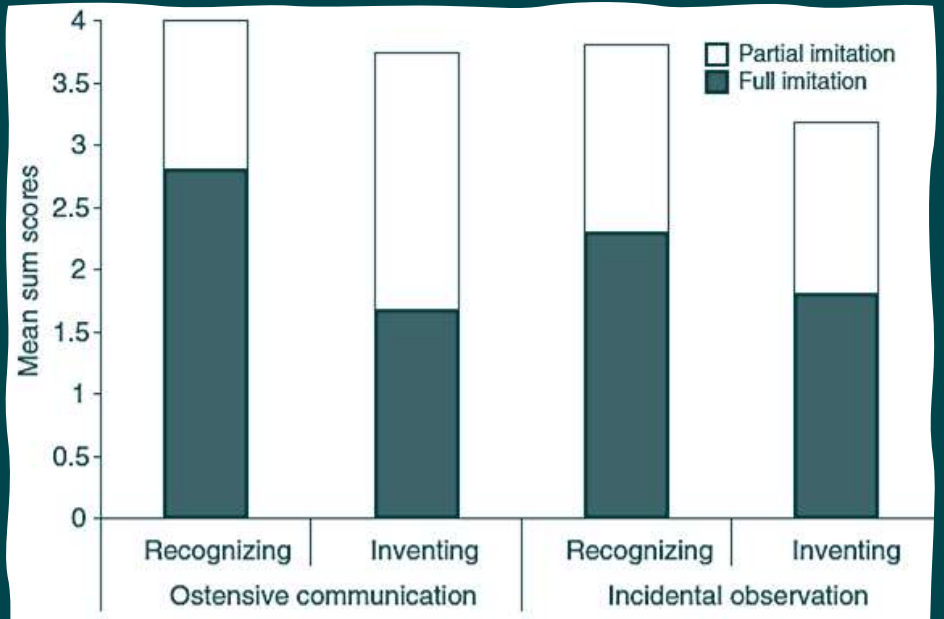


Figure 3 *Mean sum scores (0–4) of imitative responses over the four target tasks as a function of condition.*

規範心理 (Schmidt et al. 2011)[2]

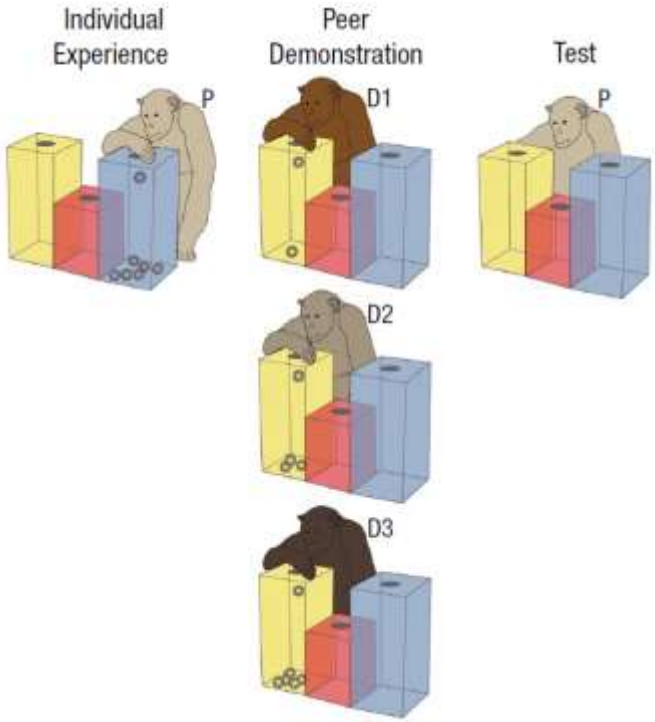


Fig. 1. Procedure in Study 1. Each participant (P) dropped balls into three holes in a puzzle box (left), one of which was associated with a reward. After the participant had demonstrated knowledge of which hole yielded rewards, a group of three peers (D1, D2, D3) demonstrated a successful alternative solution (middle). After the demonstration, the participant was given three balls, one at a time, and allowed to drop them into whichever holes he or she chose (right). The purpose of the test was to see whether participants would drop the ball in the same hole they had previously found to be associated with rewards or whether they would choose the hole the demonstrators had used.

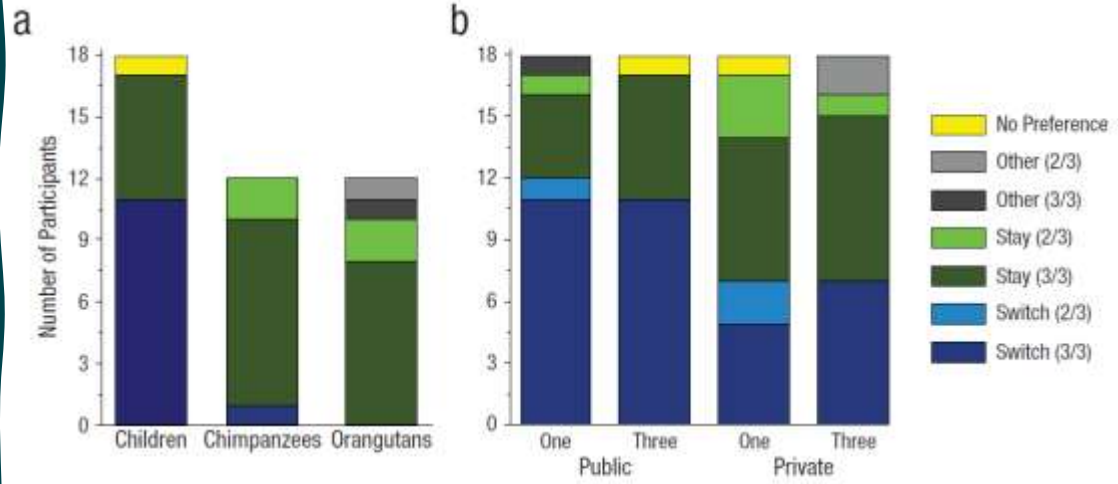


Fig. 3. Stacked bar graphs showing the distribution of participants according to their response pattern on test trials in (a) Study 1 and (b) Study 2. For Study 1, response patterns are shown for each group of participants. For Study 2, response patterns are shown across different levels of privacy (public response vs. private response) and numbers of demonstrators (one vs. three). Participants were categorized on the basis of whether they switched to a new section on two or three trials, stayed with the section they originally chose on two or three trials, or selected neither of these sections on two or three trials. In addition, a few participants showed no preference for any of the sections on the test trials.

Table 1. Results from Study 2: Distribution of Responses Across Varying Privacy Levels and Numbers of Demonstrators in Trial 1

	Public response		Private response	
Response	One demonstrator	Three demonstrators	One demonstrator	Three demonstrators
Switch	13	12	13	9
Stay	4	6	5	8
Other	1	0	0	1

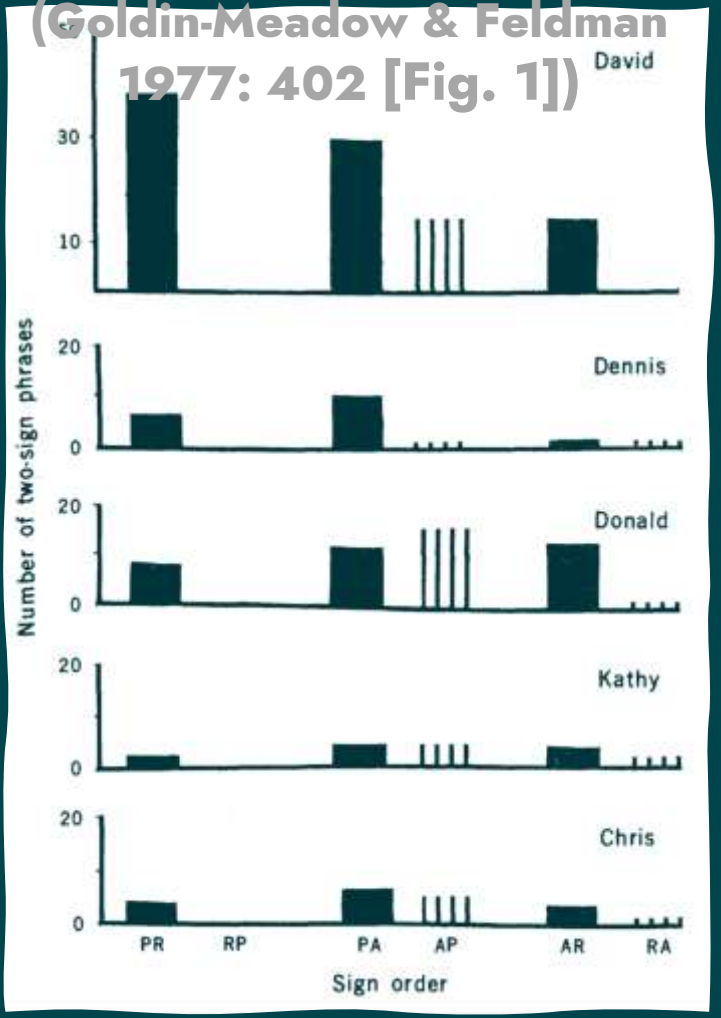
他者追従と規範意識 (Huan et al. 2014)

12 ニカラグア手話

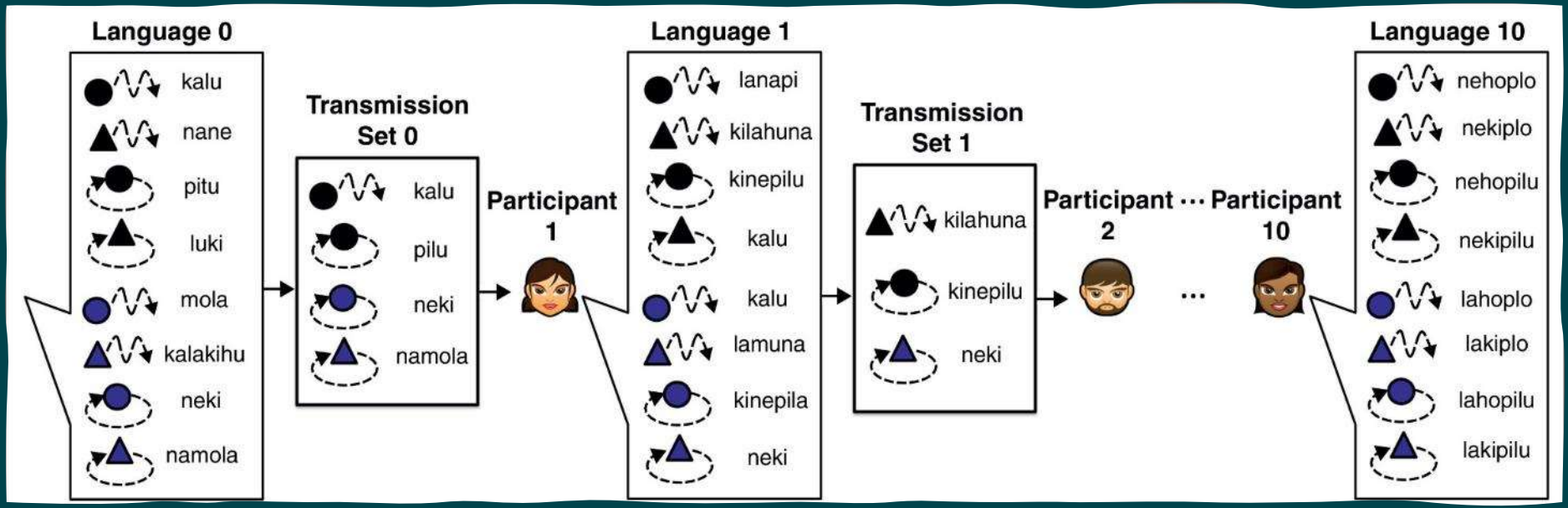
""See" (a) and "Pay" (b), produced in a neutral direction and spatially modulated to the signer's left." by A. Senghas [https://commons.wikimedia.org/wiki/File:See_pay_spatial_-_Copy.PNG]

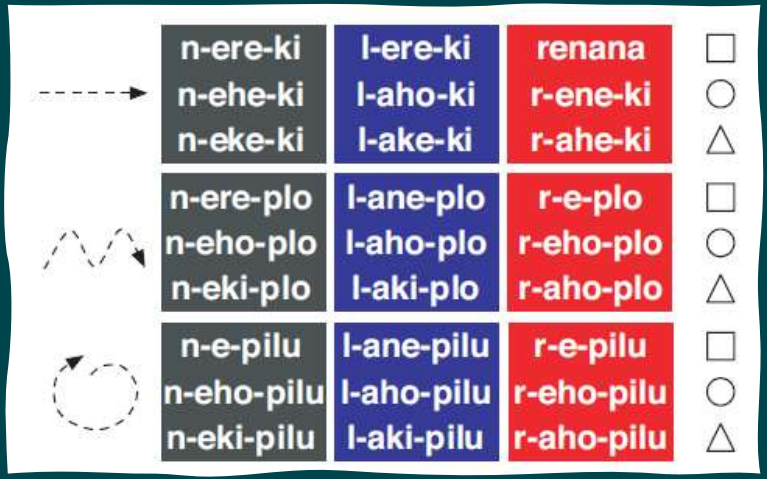
ホームサイン文法

(Goldin-Meadow & Feldman 1977: 402 [Fig. 1])



文法文法の発現





⇧繰り返し学習実験の模式図
(Kirby et al. 2014: 111 [Fig. 1])

⇦発現した文法規則の一例
(Kirby et al. (2008: 10684 [Fig. 5])

繰り返し学習 (Iterated Learning)

他者を真似て「規則」を見出してしまう性

≠ 単なる社会学習

└背後にある「規範」の推定と自己拘束的振る舞い

　└ ただし: 脱規則化 (e.g., Bergen 2001)

└マジョリティ追従 (& 年長者追従: Rakoczy et al. 2010)

⇩

文法を備えた言語の発現 (cf. 繰り返し学習)

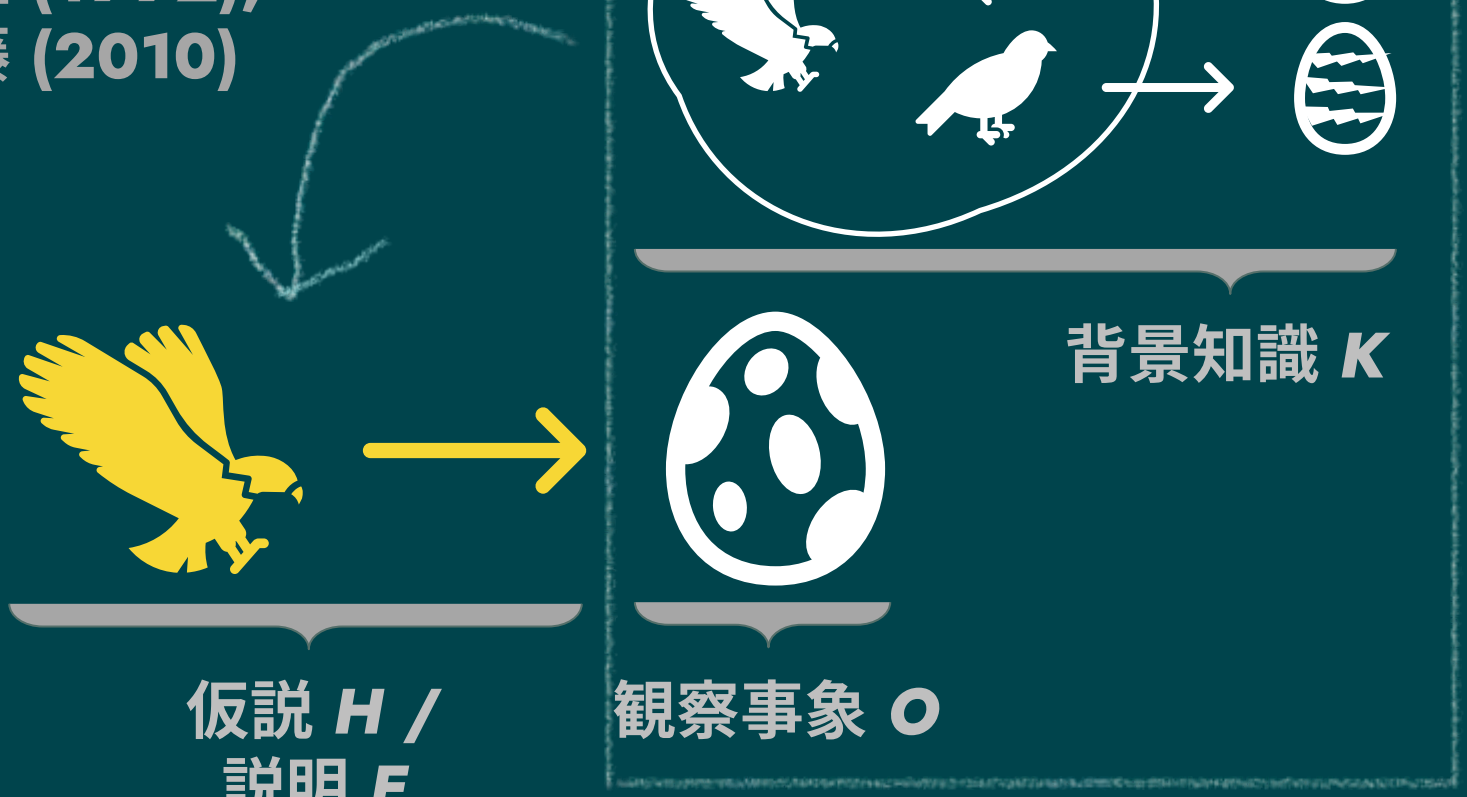
= 記号的なプロト言語からの文化進化

└「規則の生成」(⇔「学習」) の繰り返し (evo-devo)

ホモ・レギュラリスの憂鬱

規則生成のメカニズム

参考:
井上 (1992),
佐藤 (2010)



仮説推論 (abduction)


[Thrower, Throw, Throwed]
I threw the ball.
[Tosser, Toss, Tossed]
[Kicker, Kick, Kicked]
He kicked it.
背景知識 K
[Tosser, Toss, Tossed]
They tossed a coin.
仮説 H / 説明 E
観察事象 O

仮説推論と文法

仮説推論の利点:

経験ベース & 単純な帰納的一般化の難点を超克可

複数の仮説の競合と検証

O から得られる H は複数ありうる [原理的には無限]

└ $H = \{h_1, h_2, \ldots, h_n\} \rightarrow$ 仮説検証・選択

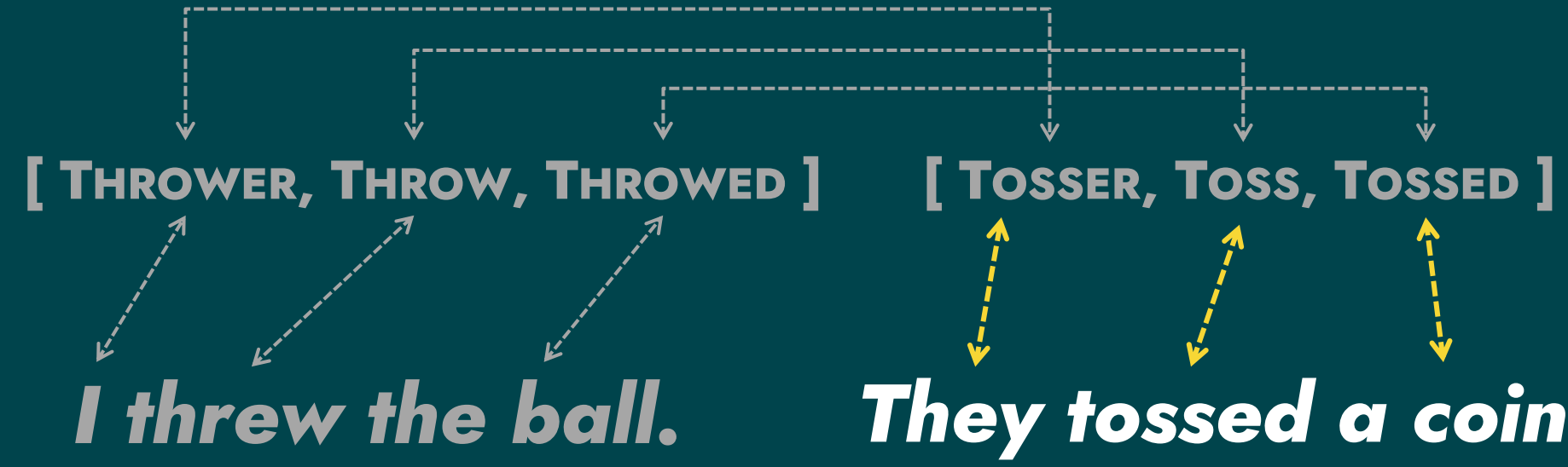
└ Cf. ベイズ推定 (e.g., Xu & Tenenbaum 2007)

語学習と仮説推論

語の習得も仮説推論 (e.g., Robert 2004, 佐治 2020)

仮説推論に関するその他の論点

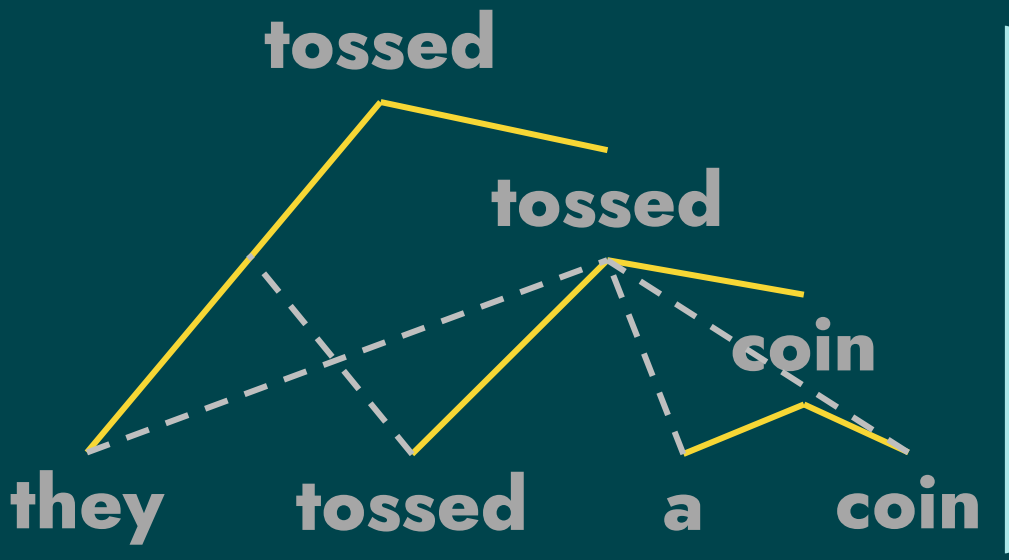
[Agent, Action, Object] / [Subject Verb Object]



Cf. Tomasello (2003)

類推 (analogy)

Merge-based

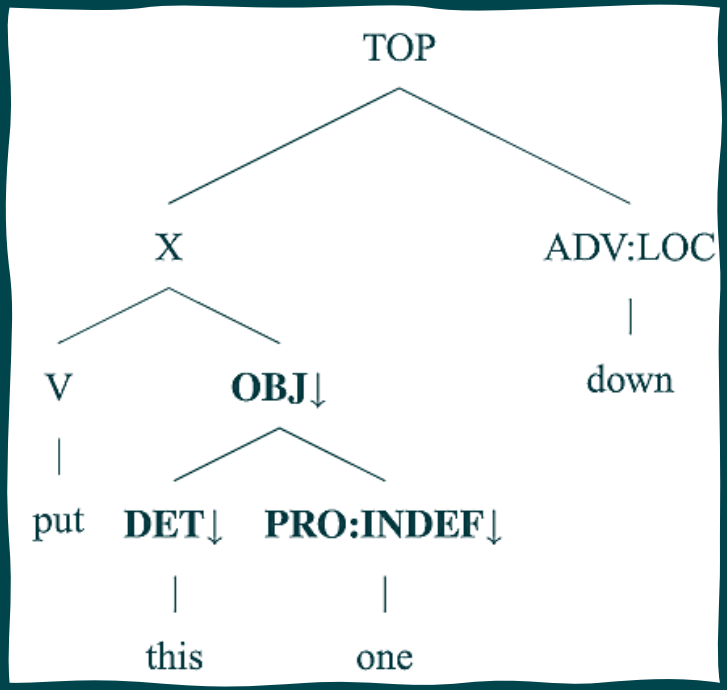


完全分節化，組み合わせ爆発？

They tossed a coin.

Analogy-based

analogy *vs* Merge

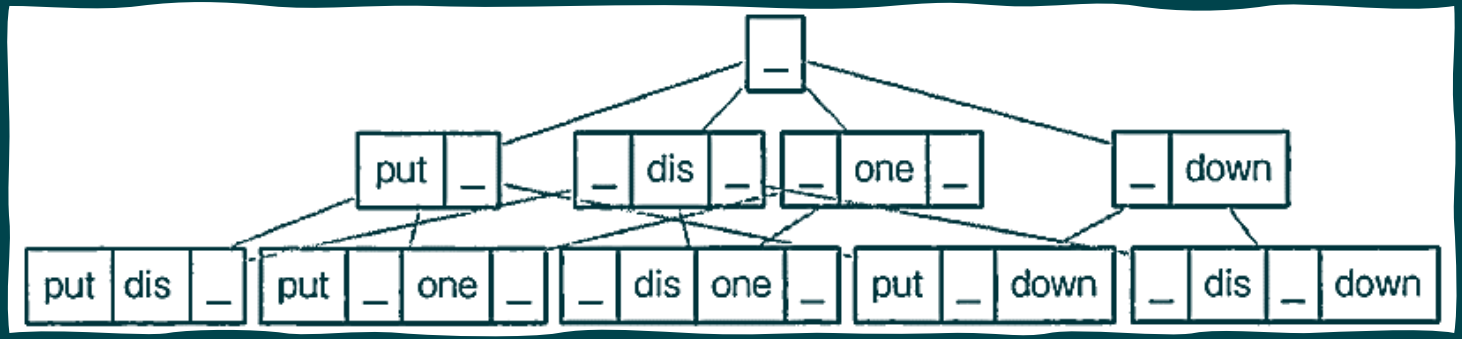


⇦ 構文木 with Data-oriented Parsing

(Borensztajn et al. 2009: 183, Fig. 3)

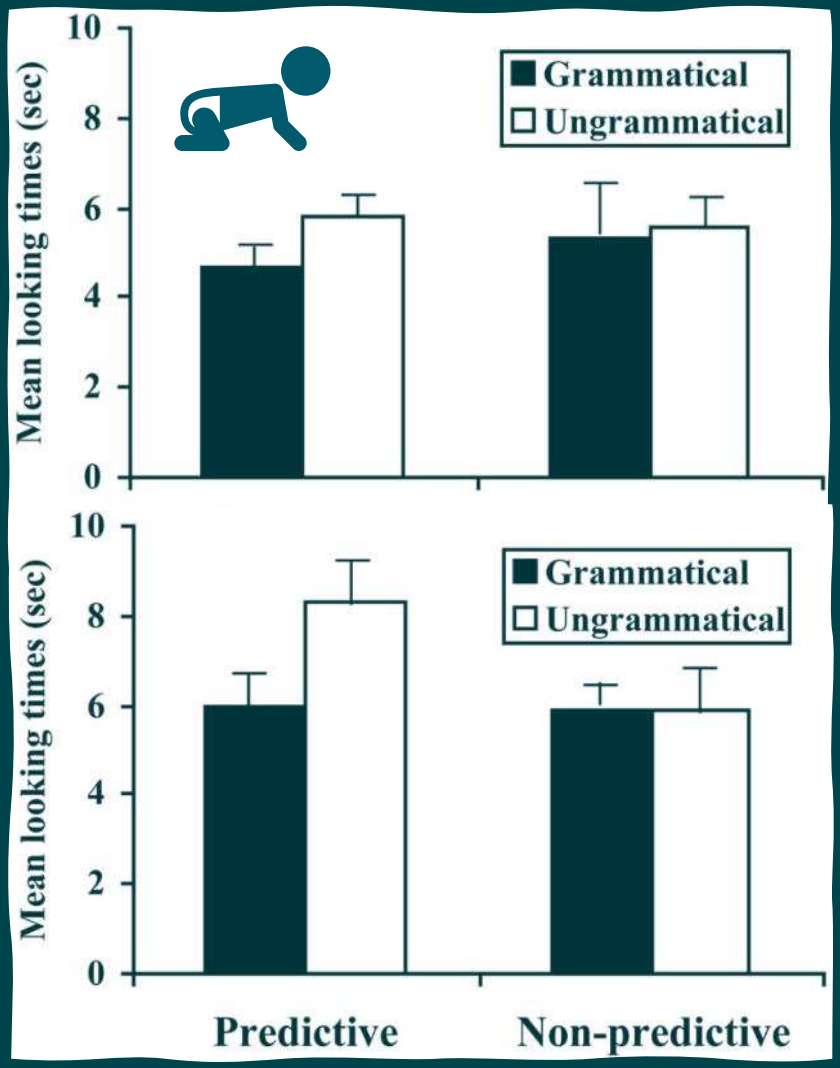
⇩ パターン with Patter Lattice Model (PLM)

(吉川 2012: 233)

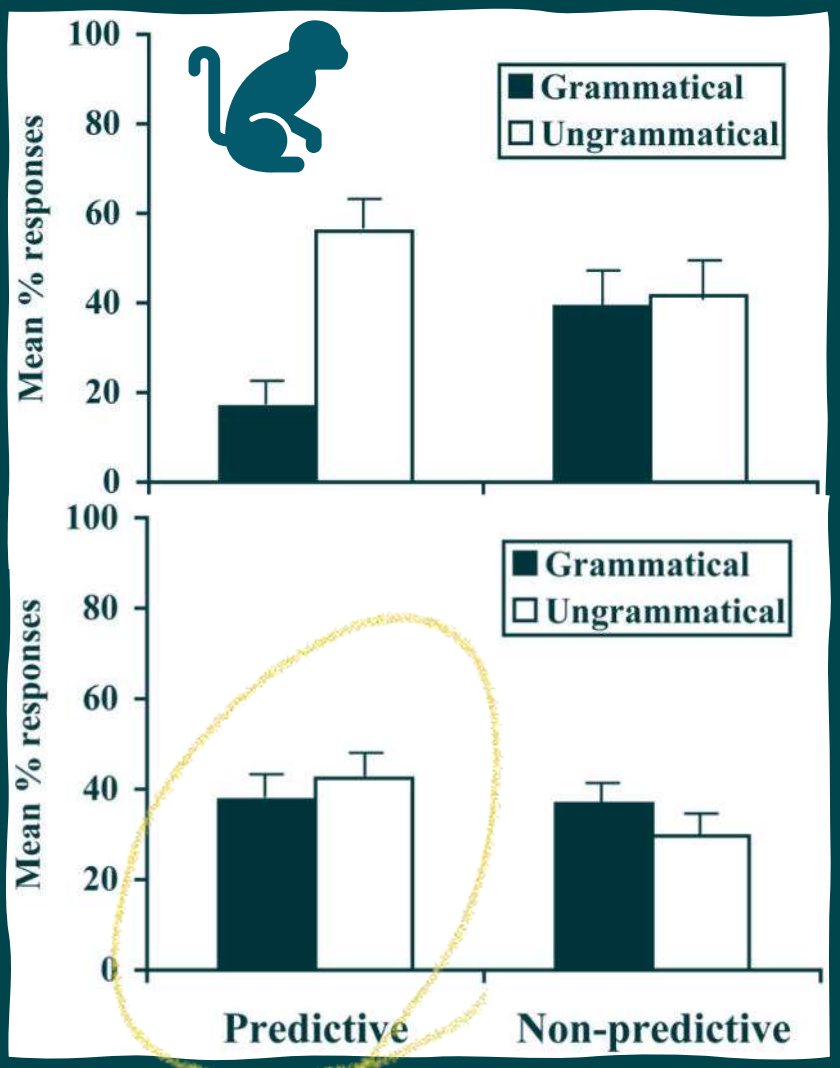


参考: 構文木 vs パターン (吉川 2012)

ヒト vs タマリン (Saffran et al. 2008: Fig. 1-4)



Easy (item-based) vs *Hard* (abstract)



おまけ: 予測性と文法の学習

結語と課題・展望

言語 = ホモ・レギュラリスの憂鬱の産物

勝手に見出してしまった規則 [≈ 規範] の集合体

└記号 (操作) + 規範心理 + 世代間継承 (+ X)

言語の文化進化 = 規則生成の繰り返し

規則生成 = 類推に基づく仮説推論 (abduction)

└仮説推論: 経験主義だがその難点を超克可

└類推: 経験主義と合致 & 高コストパフォーマンス?

まとめ

経験的妥当性

1. 比較認知科学的/霊長類学的アプローチ
   └他生物 (霊長類その他) の能力に関する検証

2. 計算機科学/情報科学的アプローチ
   └シミュレーションベースの研究に関する検証

3. 認知 (神経) 科学的アプローチ
   └類推の計算論的優位性の検証
   └規則生成の神経的基盤に関する検証 (Cf. Mattson 2014)

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