Does occluding the agent's body affect Italian children's production of argument structure?

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Objective

To investigate how Italian adults and 3-6 y.o. children describe different types of causation events, in a video narration task with respect to:

- **Argument structure encoding**
  - active transitive
  - passive transitive
  - intransitive (anticausative)
  - periphrastic causative
- **Presence and type of agent/initiator**

Introduction

Background

Speaker's choice of argument structure encoding is affected by:

- **Linguistic cues** (Bock 1986b; Crain et al. 2009; Leonard et al. 2003; Manetti 2012, 2013, 2017; Messenger et al. 2008; Tedeschi et al. 2009: a.o.)
- **Visual cues** (Anton-Mendez 2017; Baltaretu et al. 2016; Gleitman et al. 2007; Hwang and Kaiser 2015; Myachykov et al. 2012; Rissman et al. 2019; Vogels et al. 2013: a.o.).

Background: Linguistic cues

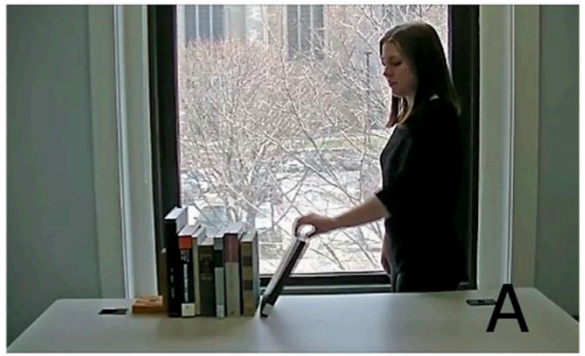
For Italian, several researchers (Belletti and Manetti 2015, 2019; Manetti 2012, 2013, 2017; Tedeschi et al. 2009; Volpato et al. 2014, 2016) showed that after showing participants transitive events with a fully visible agent and theme:

- **Patient-oriented questions** (*What happened **to X**?*) trigger:
  - Clear preference for producing **passive sentences in adults**
  - Production of some passive sentences, alongside alternative constructions (**clitic left dislocation and active sentences**) in **children** from age 3/4 y.o. (depending on the study).
- **Neutral questions** (*What happened?*) **do not trigger passive sentences** (Manetti 2013, 2017; Tedeschi et al. 2009).

Background: Visual cues - Rissman's study

Rissman et al. (2019) with English **adults** and a neutral (*what happened?*) question:

- Events with a **fully visible human agent** acting on an inanimate object (A) elicited **mostly active** transitive descriptions ('a woman tipped over a book').
- Events where the **body of the agent is mostly occluded** (B) significantly increased the production of **short passives** ('a book was tipped over')
- Events with **no visible initiator** (C) elicited mostly **anticausatives** ('a book tipped over').



Background: linguistic and conceptual preferences in children

LINGUISTIC PREFERENCES

- **Preference for active sentences** over passive ones (e.g., Bock 1986a; Slobin and Bever 1982), since actives are:
  - Less complex (Alexiadou et al. 2015; Belletti and Collins 2020; Bruening 2013)
  - Acquired earlier (Armon-Lotem et al. 2016; Guasti 2017)

Background: linguistic and conceptual preferences in children

CONCEPTUAL PREFERENCES

- **Agent bias in children** (Carey 2000):
  - They are **sensitive to the distinction between agentive vs. non-agentive events** (Meltzoff 1995; Muentener and Lakusta 2011).
  - They tend to **project agency whenever possible** (Keil and Newman 2015; Wu et al. 2016) even to inanimate causers (Braine and Wells 1978) and events that occur spontaneously (Saxe et al. 2005, 2007) and **express the agent overtly** (Guasti et al. 2023).
  - They tend to **express agents as grammatical subjects** (Bock and Warren 1985; Budwig 1990; McDonald et al. 1993).
  - **Agent-in-subject-position preference** reflects an agent-first bias in cognitive representations of prototypical transitive events (Budwig 1990; Papeo et al. 2024; Schouwstra and de Swart 2014; Slobin and Bever 1982).

Research Questions

- Do children behave like adults in argument structure encoding?
  - **Are children guided by visual cues** (in a similar way to adults)?
    - Are children sensitive to visual backgrounding of the agent (occlusion of the body)?
  - **Are children guided by an agent bias?**

Method

Method - Design of the task

- We use a design similar to Rissman et al. (2019)
  - **Video narration task** with a neutral (*What happened?*) question
  - 3 initiator conditions: full body agent, occluded agent, no agent
- Modifications:
  - We collect oral rather than written responses.
  - We extend the design to include a 4th initiator condition: non-agentive inanimate causer (e.g. non-instrumental ball, wind).
  - We collect data from both children and adults.

Method - Design of the task

Within-subjects design with 2 factors:

- Event type
  - 6 changes-of-state (*close*, *open*, *tear*, *turn off*, *turn on*, *wake*) [1]
  - 6 activities (*comb, draw, drink, eat, pet, read*)
- Initiator type
  - Body Agent (6 changes-of-state + 6 activities)
  - Hand Agent (6 changes-of-state + 6 activities)
  - Inanimate Causer (6 changes-of-state)
  - No Agent (6 changes-of-state)

Total of 36 videos of 7 seconds each + training items.

[1] These verbs are morphologically marked with the clitic *si* in the anticausative form.

Method - Design of the task

	Change-of-state (*accendere* ‘switch on’)	Activity (*bere* ‘drink’)
Body Agent		
Hand Agent		
Inanimate Causer		
No Agent		

Method - Design of the task

Order of presentation of the items:

- Hand-agent > Inanimate Causer > Body Agent > No Agent
- This order prevented participants' productions of the occluded agent and inanimate causer from being influenced by the prior appearance of a fully visible agent.

Method - Data coding

Coding

- Argument structure encoding
  - Active transitive (*The ballerina switched on the lamp*)
  - Passive transitive (*The lamp was switched on*)
  - Anticausative (*The lamp switched on*)
  - Periphrastic causative (*fare* + anticausative, *The ball made the lamp switch on*)

Participants

- 70 TD children - Italian native speakers recruited from 4 kindergartens in the Milan area
  - F = 32 ; M = 38
  - Mean age 4;5 y.o. - SD: 1.05 (range 3;1 - 6;2 y.o.)
  - 24 three y.o.; 23 four y.o.; 23 five-to-six y.o.
- 42 adults - Italian native speakers recruited through Prolific
  - F = 23 ; M = 18
  - Mean age 31;7 y.o. - SD: 9.6 (range 21 - 54 y.o.)

Predictions

Argument structure encoding: summary of predictions

Initiator Type	Adults	Children
Body Agent	mainly active transitives	same
Hand Agent	active and (short) passive transitives	??
No Agent	mainly anticausatives	same
Inanimate Causer	active transitive, anticausatives and periphrastic causatives	same??

Focus on the Hand Agent condition

Adults

- We expect both active and passive constructions.
- Across all conditions, passives should be mostly produced in this one.

Children

- If they are guided by the agent bias and the agent-in-subject-position preference, we expect:
  - Production of mainly active transitive constructions
- If they are sensitive to the visual cue, we expect:
  - Production of some passives, especially in older children (even though they already have access to the passive construction early on (Manetti 2012, 2013, 2017; Volpato et al. 2016, a.o.))

Focus on the Inanimate Causer condition

Adults

- We expect lexical causatives + more anticausatives (modified *'the lamp switched on from the ball'* or conjoined *'the ball was bouncing and the lamp switched on'*) and periphrastic causatives than in the Body Agent and Hand Agent conditions (Heidinger and Huyghe 2024; Song and Wolff 2003).

Children

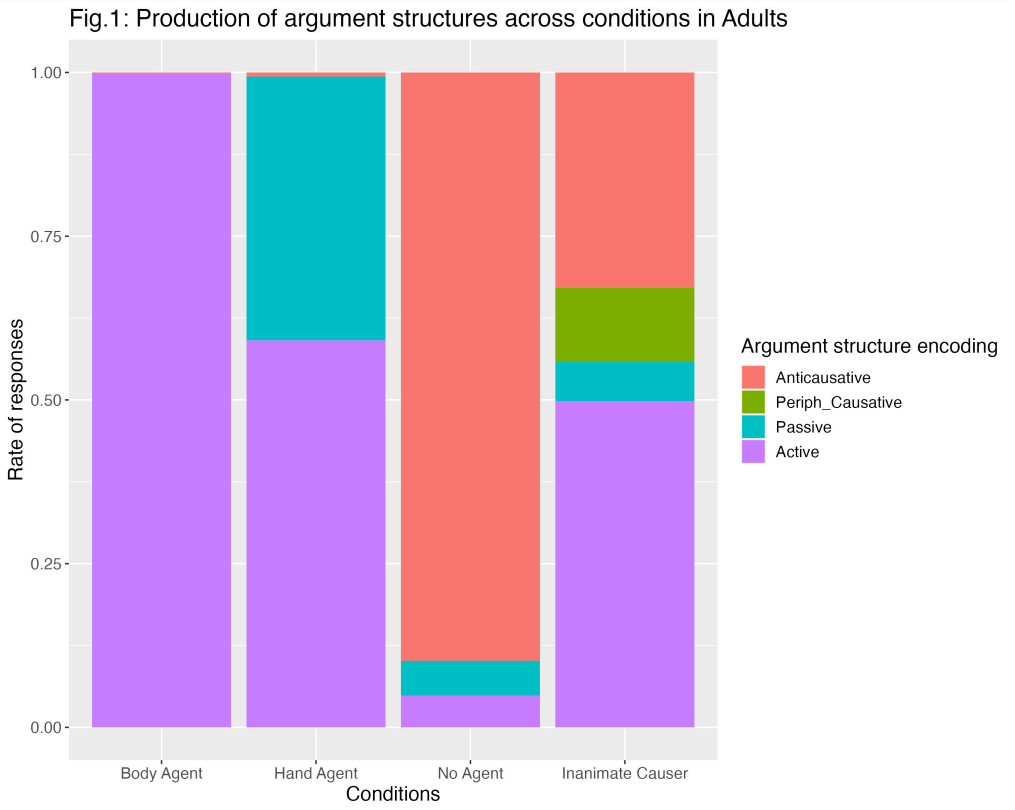
- Children exhibit an adult-like sensitivity to the distinction between agentive vs. non-agentive causation events at an early age (Meltzoff 1995; Muentener and Lakusta 2011).
- We expect anticausatives and periphrastic causatives productions. An effect of age may be found wrt periphrastic causatives (see Yamakoshi et al. 2018).
- Possible effect of agent bias in No Agent and Inanimate Causer conditions →more active transitives than adults.

Results

Results

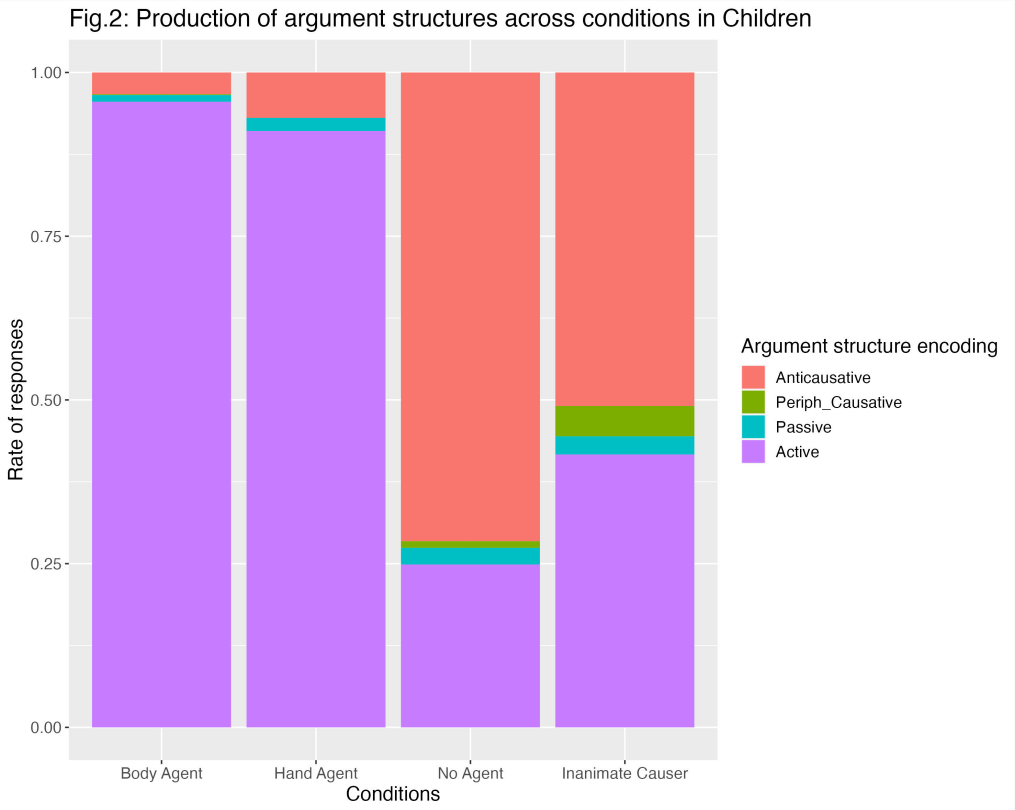
- 4032 utterances were collected of which **3777** were entered into the analysis, taking into account:
  - items where the verb used was target (N = 3567)
  - items where a different verb but of the same event type (change-of-state/activity) was used (e.g. *break* for *tear*) (N = 210)
- We performed mixed multivariate logistic models:
  - one model per condition, adding “Group” (adults/children) and, when possible - in Body Agent and Hand Agent conditions - “Event-type” (change-of-state/activity) as fixed effects and “Participants/Item” as a random effects.

Results: Adults



- Initiator Type:
  - Body Agent: mostly active transitives (99%)
  - Hand Agent: active (59%) and passive transitives (40%)
  - No Agent: mostly anticausatives (90%)
  - Inanimate Causer: active transitives (50%), anticausatives (32%), some periphrastic causatives (11%)

Results: Children



- Initiator Type:
  - Body Agent (95%) and Hand Agent (91%): mostly active transitives
  - No Agent: mostly anticausatives (71%), some active transitives (25%)
  - Inanimate Causer: anticausatives (51%), active transitives (42%), some periphrastic causatives (5%)

Results: Children and adults compared

Fig.1: Production of argument structures across conditions in Adults

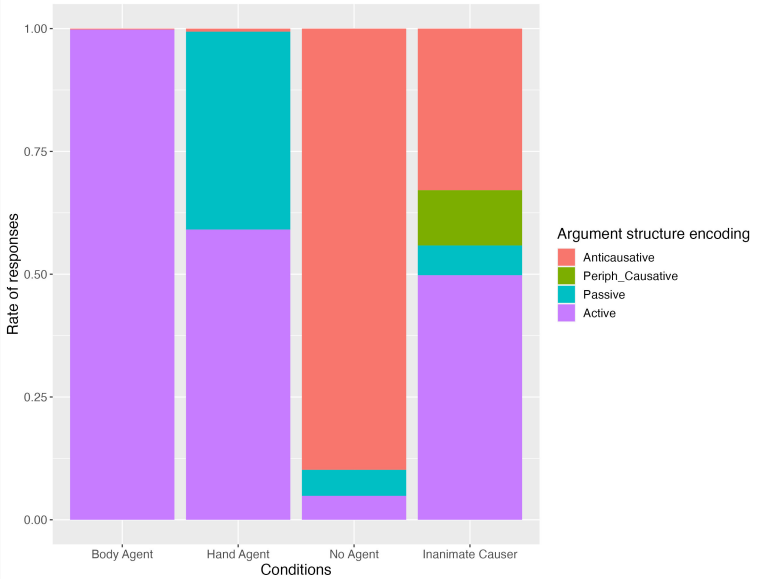
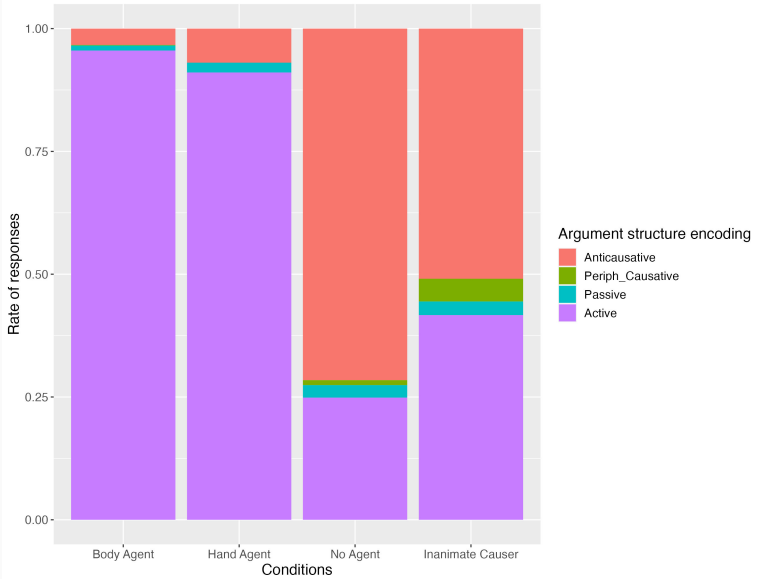


Fig.2: Production of argument structures across conditions in Children



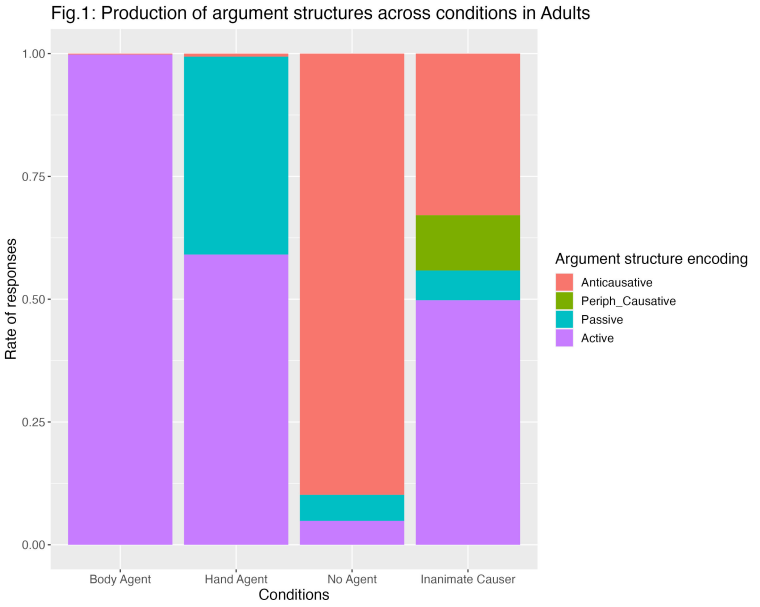
- Significant differences between children and adults emerged in all four conditions: Body Agent (p=.002); Hand Agent (p<.001); No Agent (p<.001); Inanimate Causer (p=.001);
- Children and adults behaved similarly in the Body Agent condition, while in the No Agent they produced more active transitives.
- In the Hand Agent condition, children mainly produced active transitive than adults. constructions and very few passives, while adults produced both active and passive transitives.

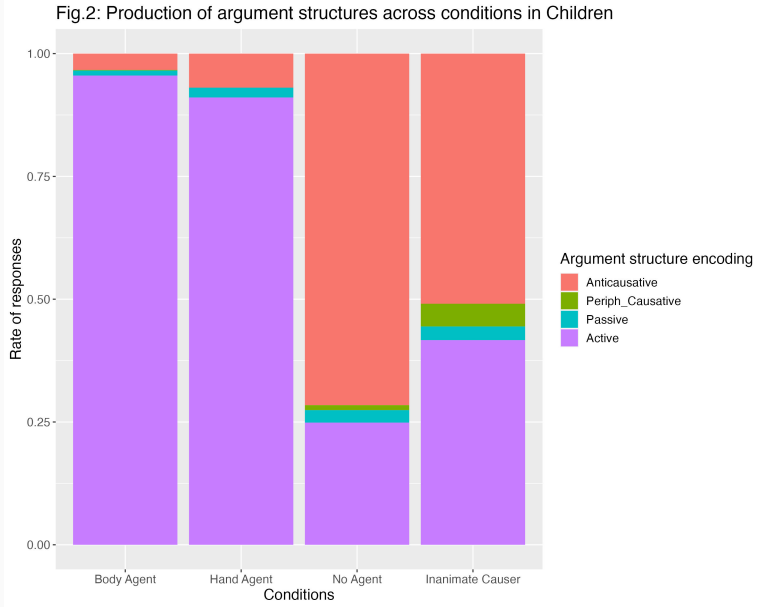
Results: what kind of passives?

Passives were also coded for presence of the by-phrase (*short* vs. *long* passive) and for the type of auxiliary used (*essere* (be) vs. *venire* (come)).

- In adults mainly *short* passives: the by-phrase was produced only in 9/193 occurrences; regarding the choice of auxiliary, they opted for *essere* (be) 128 times and for *venire* (come) 65 times.
- Children, on the other hand, never produced long passives and only used *essere* (be) auxiliaries (n = 15).

Results: Children and adults compared

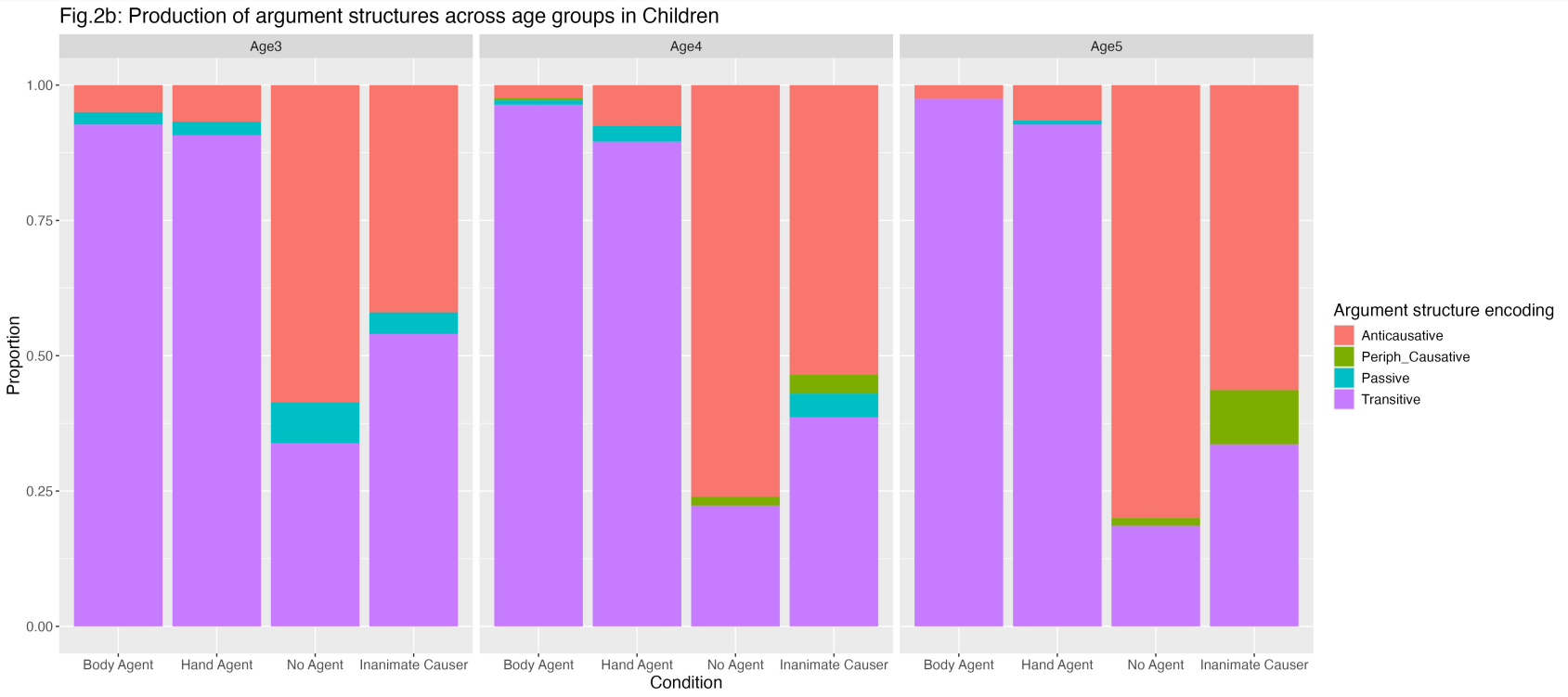




In Inanimate Causer condition:

- Adults produced active transitive structures, periphrastic causatives and anticausatives.
- Children produced more anticausatives than adults and a lower rate of periphrastic causatives than adults.

Results: Children - Age groups



- Initiator type-by-age significant interaction ($X^2(6) = 28.01, p < .001$):
  - No agent: children displayed an increased production of anticausatives from ages 3 to 6
  - Inanimate causer: increased production of anticausatives from ages 3 to 6 + use of periphrastic causatives (from age 4)-
  - No effect of age in Body and Hand agent

Summary of results: Argument structure encoding

Condition	Adults	Children
Body Agent	active transitives cf. Rissman et al. 2019; Song & Wolff 2003	same cf. Muentener & Lakusta 2011
Hand Agent	active transitives and short passives cf. Rissman et al. 2019	active transitives
Inanimate Causer	active transitives ac and periph. cf. Song & Wolff 2003	same age effect on ac and periph. cf. Muentener & Lakusta 2011, Yamakoshi et al. 2018
No Agent	anticausatives cf. Rissman et al. 2019	same age effect on anticausatives

In red: unexpected results wrt our predictions

Discussion: Focus on backgrounding of the agent

- Children treated the **Hand Agent condition as the Body Agent one**, with respect to argument structure.
- (Very few) passive constructions are produced across all conditions, and **no age effect** arise.
- The **production of some (few) short passives** showed that they are not as affected by structural complexity (Belletti and Collins 2020; Bruening 2013; Belletti and Manetti 2015, 2019; Manetti 2012, 2013, 2017; Volpato et al. 2014, 2016)
- Children are indeed **less sensitive to the occlusion of the agent** than adults.
- They seem to be guided by the **agent bias** and the **agent-in-subject-position preference**.

Discussion: Focus on Inanimate Causer and No Agent

- Children are sensitive to the distinction between agentive vs. non-agentive events (Meltzoff 1995; Muentener and Lakusta 2011): they distinguish between Body/Hand Agent and Inanimate Causer/No Agent.
  - They displayed an increased production of anticausatives from 3 to 5/6 years of age in Inanimate Causer and No Agent conditions;
  - In Inanimate Causer children started using periphrastic causatives - 'fare + intransitive' constructions - from age 4
- The **agent bias** and the **agent-in-subject-position preference** is at work at least in younger children (3-4 y.o.) →the number of active transitive constructions was higher than in adults.

Take home message

Argument structure encoding:

- Children are not as sensitive as adults to the backgrounding of the agent
  - They may need to be linguistically cued at this age (i.e. by a patient-oriented question) in order to produce passives

Agent bias:

- Children's productions seem to reflect an agent bias: **agency = core concept** (Carey 2000; Guasti et al. 2023)
  - Argument structure encoding.
  - The hand seems to go proxy for the full agent.
  - Tendency to project agency whenever possible.
  - Agent-in-subject-position preference.

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References

Alexiadou, A., E. Anagnostopoulou, and F. Schäfer (2015). External arguments in transitivity alternations: A layering approach, Volume 55. Oxford University Press, USA.

Anton-Mendez, I. (2017). Visual salience effects on speaker choices: Direct or indirect influences on linguistic processing? Applied Psycholinguistics 38(3), 601–631.

Armon-Lotem, S., E. Haman, K. Jensen de López, M. Smoczynska, K. Yatsushiro, M. Szczerbinski, A. van Hout, I. Dabašinskienė, A. Gavarró, E. Hobbs, et al. (2016). A large-scale cross-linguistic investigation of the acquisition of passive. Language acquisition 23(1), 27–56.

Baltaretu, A., E. J. Krahmer, C. van Wijk, and A. Maes (2016). Talking about relations: Factors influencing the production of relational descriptions. Frontiers in psychology 7, 160726.

Belletti, A. and C. Collins (2020). Smuggling in syntax. Oxford University Press.

Belletti, A. and C. Manetti (2015). Causatives and the acquisition of the italian passive. In Language Acquisition and Development. Selected Proceedings of GALA 2013-University of Oldenburg, pp. 282–298. Cambridge Scholars Press.

Belletti, A. and C. Manetti (2019). Topics and passives in italian-speaking children and adults. Language acquisition 26(2), 153–182.

Bock, J. K. (1986a). Meaning, sound, and syntax: Lexical priming in sentence production. Journal of Experimental Psychology: Learning, Memory, and Cognition 12(4), 575.

Bock, J. K. (1986b). Syntactic persistence in language production. Cognitive psychology 18(3), 355–387.

Bock, J. K. and R. K. Warren (1985). Conceptual accessibility and syntactic structure in sentence formulation. Cognition 21(1), 47–67.

Braine, M. D. and R. S. Wells (1978). Case-like categories in children: The actor and some related categories. Cognitive psychology 10(1), 100–122.

Bruening, B. (2013). By phrases in passives and nominals. Syntax 16(1), 1–41.

Budwig, N. (1990). The linguistic marking of nonprototypical agency: An exploration into children's use of passives.

Carey, S. (2000). The origin of concepts. Journal of Cognition and Development 1(1), 37–41.

Crain, S., R. Thornton, and K. Murasugi (2009). Capturing the evasive passive. Language Acquisition 16(2), 123–133.

References ii

Gleitman, L. R., D. January, R. Nappa, and J. C. Trueswell (2007). On the give and take between event apprehension and utterance formulation. Journal of memory and language 57(4), 544–569.

Guasti, M. T. (2017). Analytical causatives. In M. Everaert and H. van Riemsdijk (Eds.), The Wiley Blackwell Companion to Syntax. Hoboken, NJ: Wiley.

Guasti, M. T., A. Alexiadou, and U. Sauerland (2023). Undercompression errors as evidence for conceptual primitives. Frontiers in Psychology 14, 1104930.

Heidinger, S. and R. Huyghe (2024). Semantic roles and the causative-anticausative alternation: evidence from french change-of-state verbs. Linguistics 62(1), 159–202.

Hwang, H. and E. Kaiser (2015). Accessibility effects on production vary cross-linguistically: Evidence from english and korean. Journal of Memory and Language 84, 190–204.

Keil, F. C. and G. E. Newman (2015). Order, order everywhere, and only an agent to think: The cognitive compulsion to infer intentional agents. Mind & Language 30(2), 117–139.

Leonard, L. B., P. Deevy, C. A. Miller, L. Rauf, M. Charest, and R. Kurtz (2003). Surface forms and grammatical functions.

Manetti, C. (2012). The acquisition of passives in Italian: Evidence from comprehension, production and syntactic priming studies. Ph. D. thesis, University of Siena.

Manetti, C. (2013). On the production of passives in italian: evidence from an elicited production task and a syntactic priming study with preschool children. In Boston University Conference on Language Development 37th Online Proceedings Supplement., pp. 219–240. Baiz, S., Goldman, N., and Hawkes, R. eds.

Manetti, C. (2017). Changing the topic in question-answer pairs: a production study on the use of subject, topicalization and passive in italian. Quaderni di Linguistica e Studi Orientali/Working Papers in Linguistics and Oriental Studies 3, 117–134.

McDonald, J. L., K. Bock, and M. H. Kelly (1993). Word and world order: Semantic, phonological, and metrical determinants of serial position. Cognitive psychology 25(2), 188–230.

Meltzoff, A. (1995). Understanding the intentions of others: reenactment of intended acts by 18-month-old children. Developmental Psychology 31, 838–850.

Messenger, K., H. Branigan, J. McLean, and A. Sorace (2008). English-speaking children's early passives: Evidence from syntactic priming. In BUCLD 32: Proceedings of the 32nd annual Boston University conference on language development, pp. 275–286. Cascadilla Press.

Muentener, P. and L. Lakusta (2011). The intention-to-cause bias: Evidence from children's causal language. Cognition 119(3), 341–355.

References iii

Myachykov, A., S. Garrod, and C. Scheepers (2012). Determinants of structural choice in visually situated sentence production. Acta psychologica 141(3), 304–315.

Papeo, L., S. Vettori, E. Serraille, C. Odin, F. Rostami, and J.-R. Hochmann (2024). Abstract thematic roles in infants' representation of social events. Current Biology.

Rissman, L., A. Woodward, and S. Goldin-Meadow (2019). Occluding the face diminishes the conceptual accessibility of an animate agent. Language, cognition and neuroscience 34(3), 273–288.

Saxe, R., J. Tenenbaum, and S. Carey (2005). Secret agents: Inferences about hidden causes by 10-and 12-month-old infants. Psychological science 16(12), 995–1001.

Saxe, R., T. Tzelnic, and S. Carey (2007). Knowing who dunnit: Infants identify the causal agent in an unseen causal interaction. Developmental psychology 43(1), 149.

Schouwstra, M. and H. de Swart (2014). The semantic origins of word order. Cognition 131(3), 431–436.

Serratrice, L. (2005). The role of discourse pragmatics in the acquisition of subjects in italian. Applied psycholinguistics 26(3), 437–462.

Slobin, D. I. and T. G. Bever (1982). Children use canonical sentence schemas: A crosslinguistic study of word order and inflections. Cognition 12(3), 229–265.

Song, G. and P. Wolff (2003). Linking perceptual properties to the linguistic expression of causation. Language, culture and mind, 237–250.

Tedeschi, R. et al. (2009). Acquisition at the interfaces: A case study on object clitics in early Italian. Ph. D. thesis, LOT Nederlands Graduate School of Linguistics.

Vogels, J., E. Krahmer, and A. Maes (2013). Who is where referred to how, and why? the influence of visual saliency on referent accessibility in spoken language production. Language and cognitive processes 28(9), 1323–1349.

Volpato, F., L. Verin, and A. Cardinaletti (2016). The comprehension and production of verbal passives by italian preschool-age children. Applied Psycholinguistics 37(4), 901–931.

Volpato, F., L. Verin, A. Cardinaletti, et al. (2014). The acquisition of passives in italian: Auxiliaries and answering strategies in an experiment of elicited production. New Directions in the Acquisition of Romance Languages: Selected Proceedings of The Romance Turn V, 371–394.

Wu, Y., P. Muentener, and L. E. Schulz (2016). The invisible hand: toddlers connect probabilistic events with agentive causes. Cognitive science 40(8), 1854–1876.

References iv

Yamakoshi, K., K. Miura, H. Jorinbo, K. Angata, and K. Yamasaki (2018). An experimental study of children's comprehension of lexical and productive causatives in Japanese. In Topics in Theoretical Asian Linguistics: Studies in honor of John B. Whitman, pp. 229–250. Amsterdam & Philadelphia: John Benjamins.

More on the agent bias

Agent bias is at work

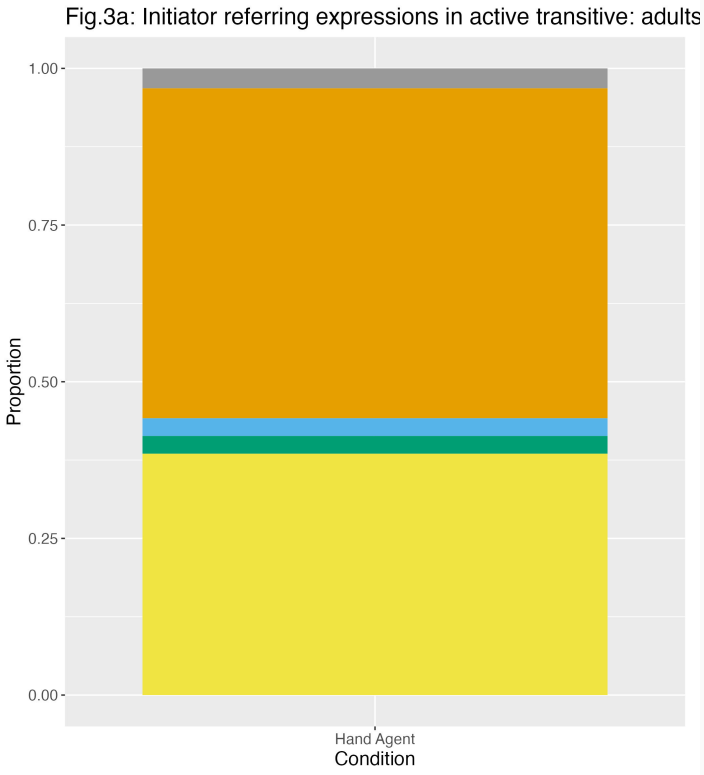
- On the **choice of argument structure encoding**.
- On the **agent referring expressions**: children tend to name the agent overtly even in the Hand-Agent condition.

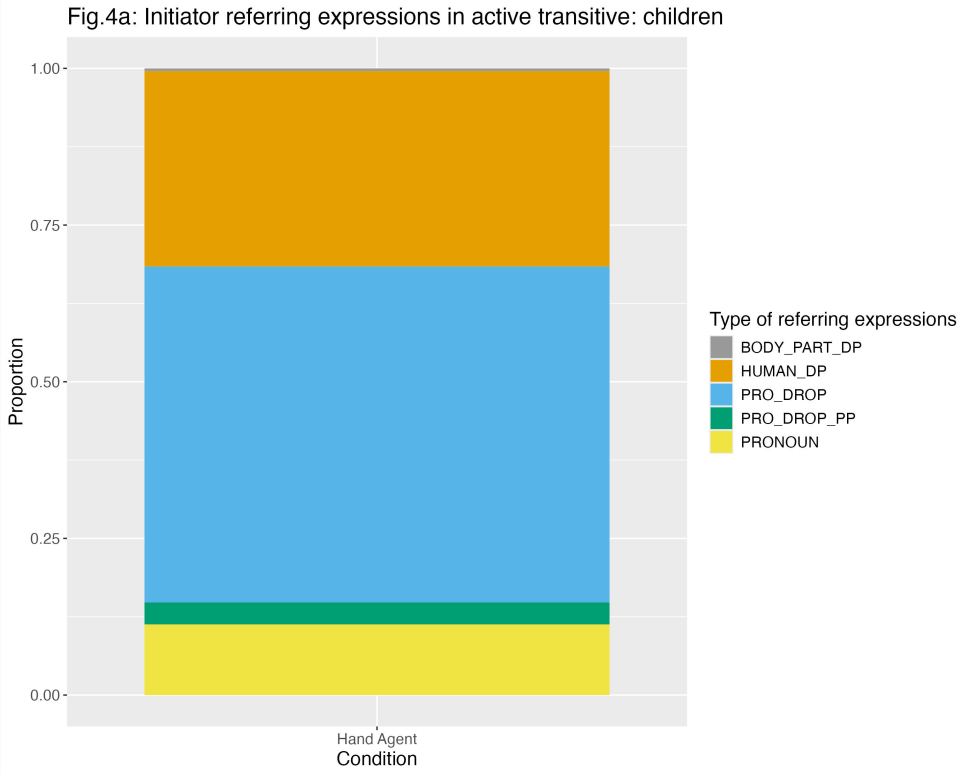
Focus on agent types

Coding

- Agent referring expression in active transitives (agent type)
  - Human DP (e.g. *the clown*, *a person*)
  - (Indefinite) pronoun (e.g. *somebody*)
  - Pro-drop (3rd person singular + 3rd person plural)
  - Body-part DP (e.g. *the hand*)
  - Non-human DP (e.g. *the wind*, *the ball*)
- Property used in the agent description
  - Specific property (e.g. *a clown, a woman*)
  - Generic property (e.g. *somebody, a person*)

Results: agent types in Hand Agent

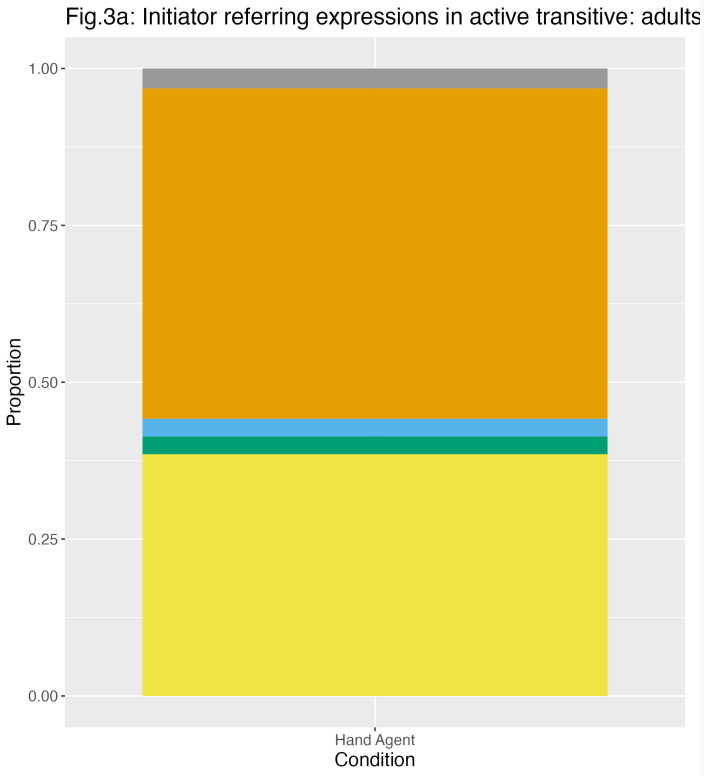


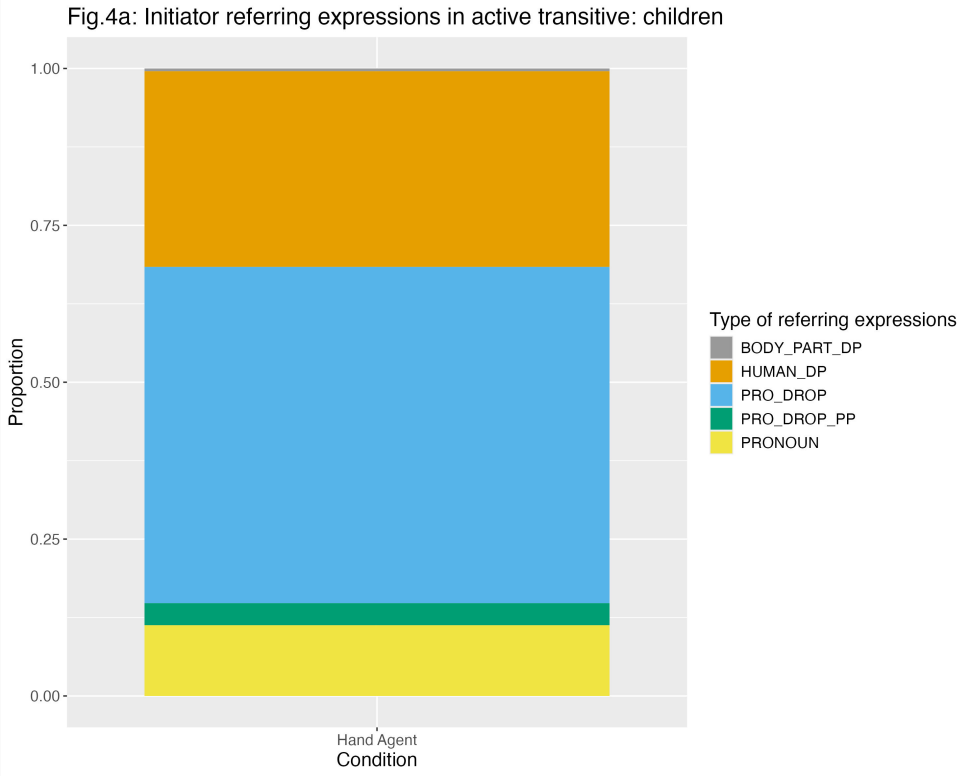


- Rates of **Human DP** in adults (52.6%) and children (31.2%), BUT:

	Specific property (*a clown, a woman*)	Generic property (*a person*)
Adult	5%	**95%**
Child	**89%**	11%

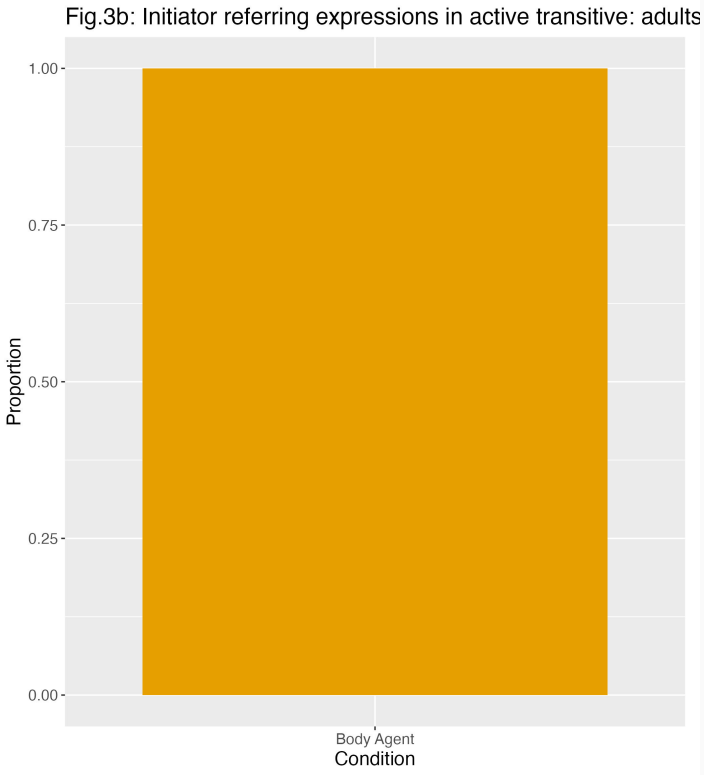
Results: agent types in Hand Agent

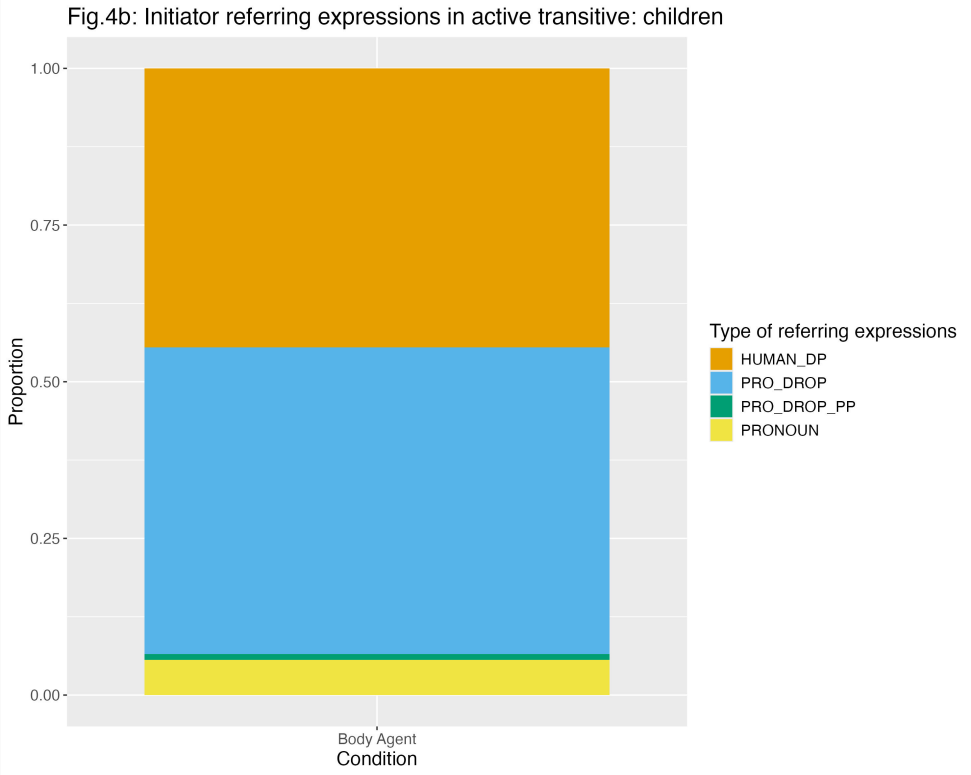




- Other most produced strategies:
  - Adults: **indefinite pronouns** (37.7%)
  - Children: **pro-drop** (53.5%) - mainly in 3 and 4 y.o.

Results: agent types in Body Agent



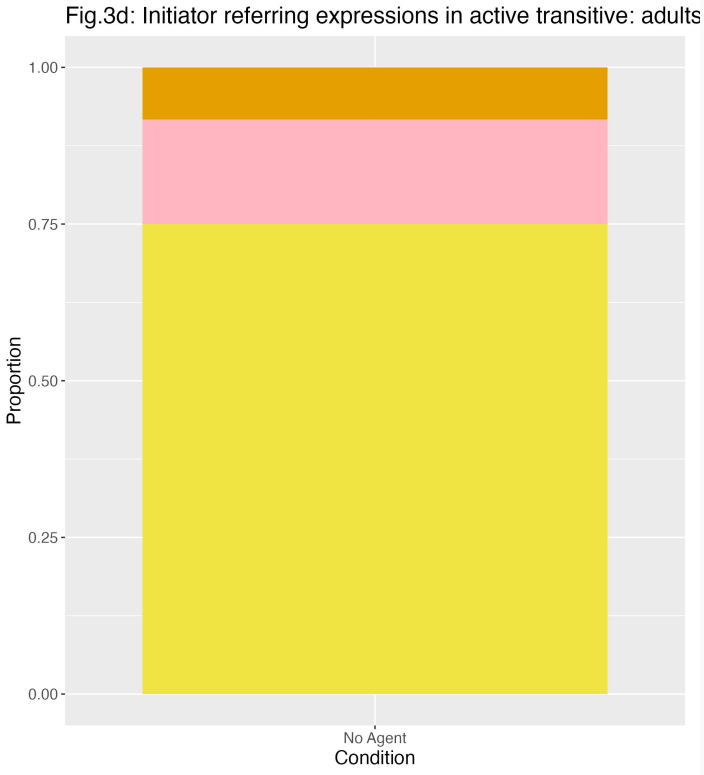


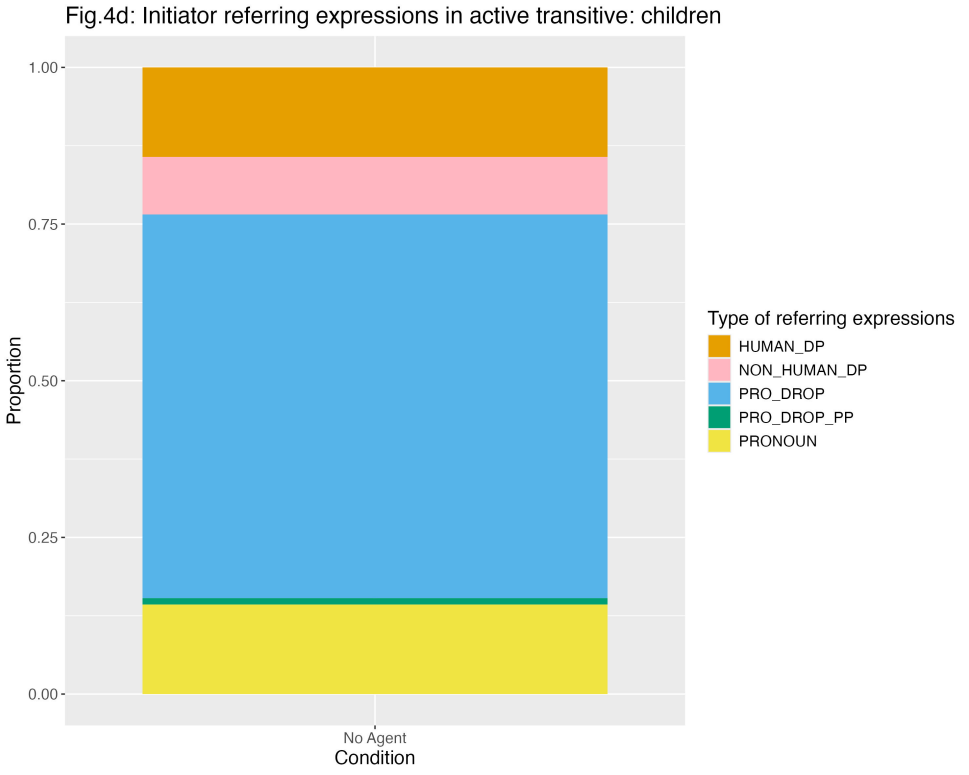
- Pro-drop seems to be a child strategy for active transitives, including the Body Agent condition
  - Adults: Human DPs only
  - Children: pro-drop (49%) not a strategy for passives - mainly in 3 and 4 y.o.

Discussion

- **Children assign specific properties to occluded agents** even without a fully visible visual cue.
- **Children overuse null subjects/pro-drop** in active transitive constructions:
  - True for both Body Agent and Hand Agent conditions
  - Even in spontaneous speech of Italian children, subjects in discourse-new contexts are null up to 15% (Serratrice 2005).
  - Lack of acquisition literature on pro-drop
  - We need to expand the research to non pro-drop languages.

Agent types in No Agent

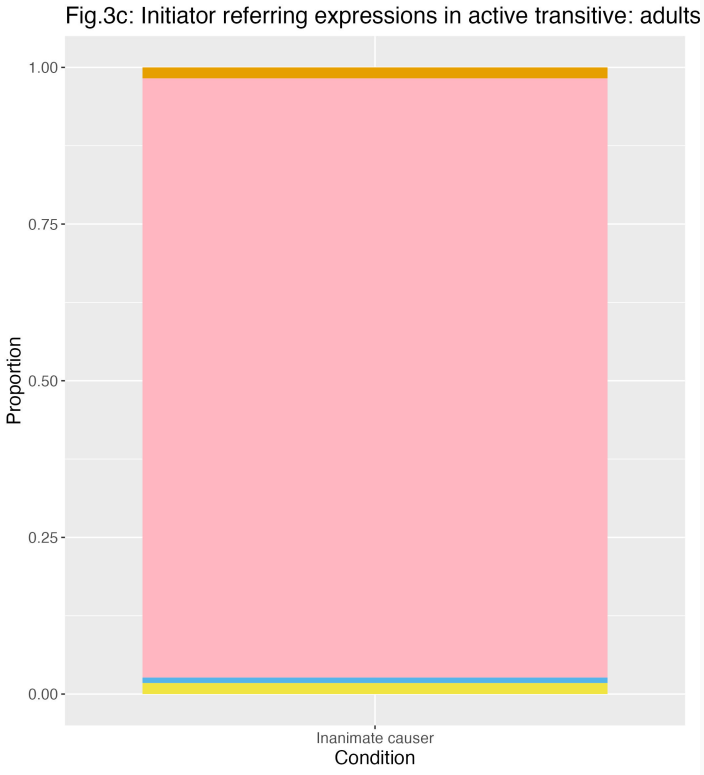


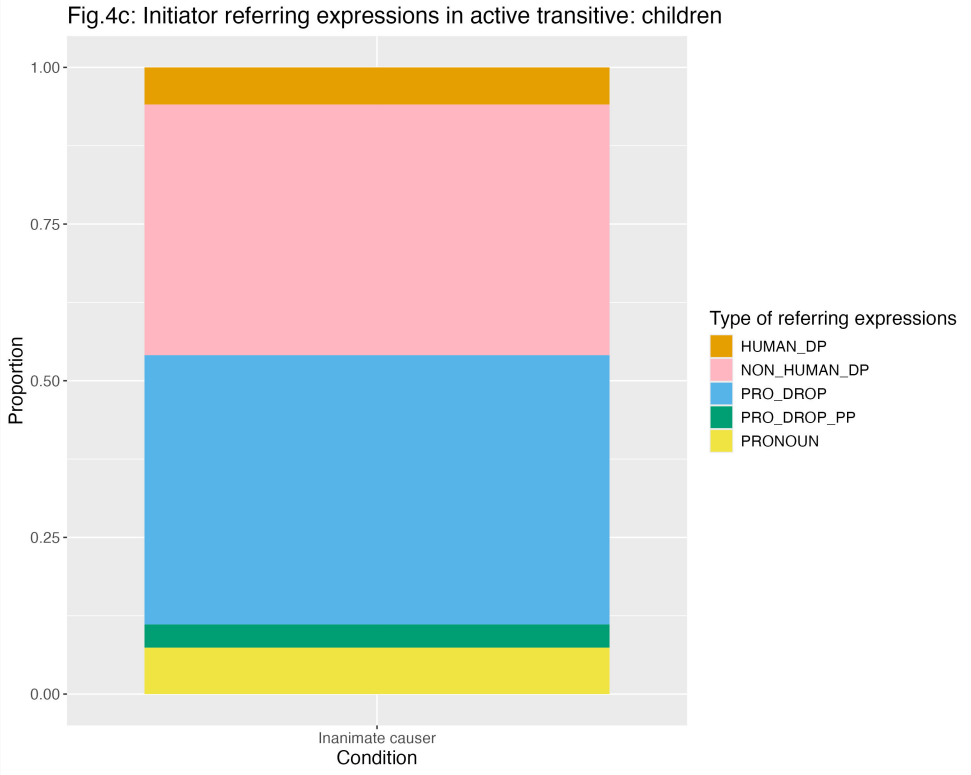


Active transitives in adults = 12

Active transitives in children = 98

Agent types in Inanimate Causer

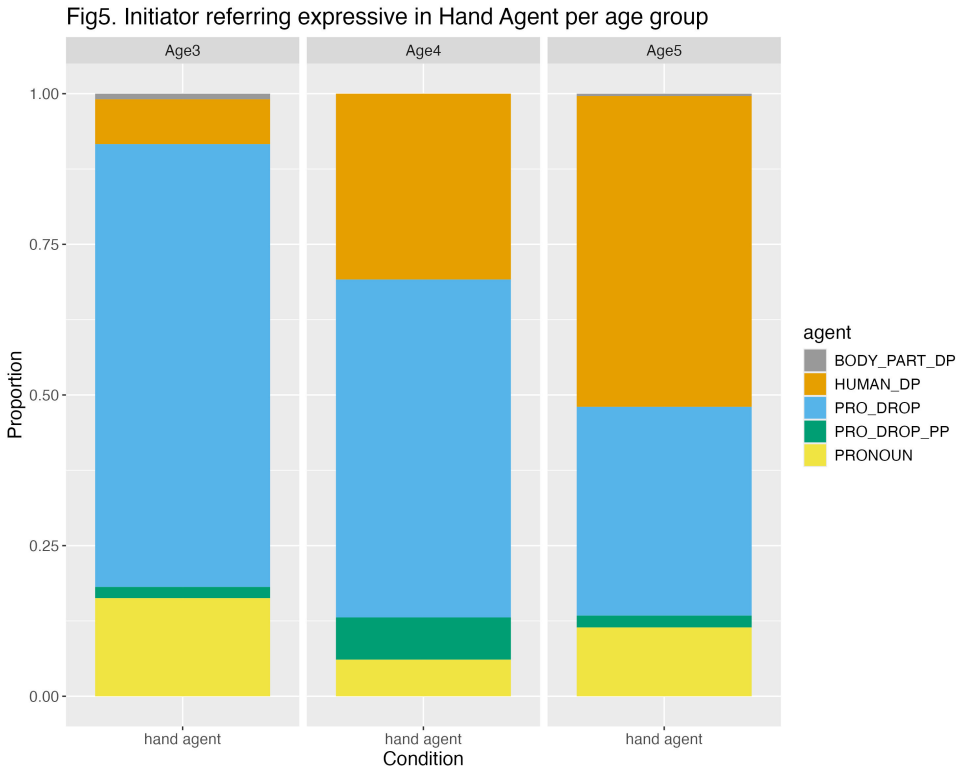




Active transitives in adults = 115

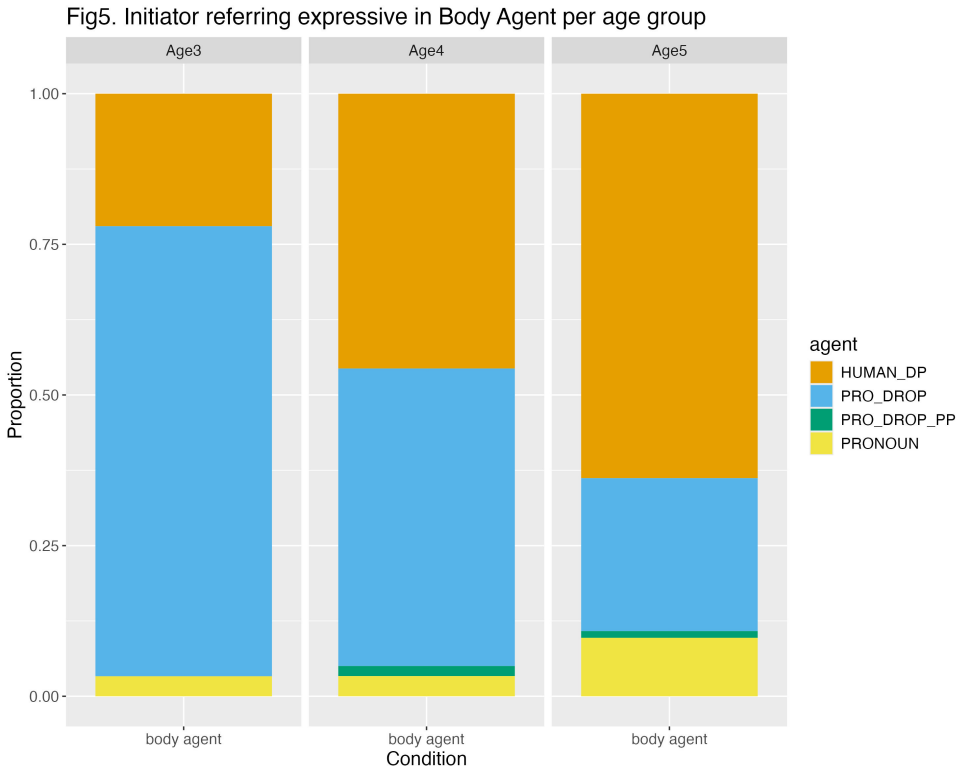
Active transitives in children = 135

Agent types per age group in Hand agent



	Age 3	Age 4	Age 5
Human DP	16	66	131
Pro-drop	158	120	88

Agent types per age group in Body agent



	Age 3	Age 4	Age 5
Human DP	53	109	171
Pro-drop	180	118	68

Inanimate causer

Table 1: Raw numbers argument structures in Inanimate causers

Group	Active transitives	Conjoined AC	Modified AC	Bare AC
Adult	115	24	38	14
Children	135	53	19	93

* Interesting to look at the type of initiators in the active transitives.