Agent bias in child Italian event descriptions

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Agency

Properties distinguishing **agents** from other physical objects (Leslie 1995)

- Mechanical: Agents have an internal source of energy or force
- Actional: Agents pursue goals and perceive their environment
- Psychological: Agents have intentions and attitudes

Perceptual agency

- Adults, children and infants (from 6.5 months) attribute agency to inanimate shapes undergoing certain patterns of motion
- Initiators of "accidental" actions are perceived as having reduced agency

Agent bias in children

Psychological agent bias: Children project agency whenever possible

- Animism: Children attribute psychological states to inanimate objects (*stone*, *boat*) (Piaget 1929)
- Children perceive inanimate causers as agents rather than instruments in the absence of an animate competitor (*FIRE heat pot*) (Braine and Wells 1978)
- ▷ "Children tend to perceive events as being initiated by agents."
- However, children exhibit an adult-like sensitivity to the distinction between agentive vs. non-agentive events at an early age (Meltzoff 1995; Muentener and Lakusta 2011).

Agent bias in children

Linguistic agent bias: Children express agents as subjects whenever possible

- Active sentences are acquired before passive sentences
- Theme-oriented questions (*What happened to THEME?*) with two animate participants in Italian trigger the production of passives with adults, but trigger some alternative strategies with children
  (Belletti and Manetti 2019, Volpato et al. 2016, Tedeschi et al. 2009)
  - **Question:** *Che cosa succede al bambino?*
    'What is happening to the child?'
  - **Adult passive:** *(Il bambino) è/viene lavato dalla mamma.*
    'The child/He is being washed by the mother.'
  - **Child active with clitic pronoun:** *(Il bambino) la mamma lo lava.*
    '(The child,) the mother is washing him.'
- ▷ "Children tend to express agents as grammatical subjects."

Agent bias in children

Research questions

1. How does the **agency** of an initiator affect children's linguistic description of an event? Do children exhibit a psychological and/or linguistic agent bias in their event descriptions?
2. How does the perceptual **prominence** of an initiator affect children's event descriptions?

> We investigate the effects of both **animacy** and **visual prominence** of the initiator on **argument structure encoding**
> - Elicited production study with Italian children aged 3-6 and adult controls

Previous work

Muentener and Lakusta 2011: Initiator animacy in child English (see also Song and Wolff 2005 on adult English)

- Animate initiator
  *A lamp is resting on a table. A **woman** enters the room and **presses the light switch** on the wall. The lamp turns off.*

- Inanimate initiator
  *A lamp is resting on a table. A **ball** flies in from off screen and **contacts the light switch** on the wall. The lamp turns off.*

Initiator animacy

Question: *What happened?*

Initiator	Typical answers	Argument structure
Animate	*The girl broke the tower*	active transitive
Inanimate	*The wind broke the tower*	active transitive
	The wind was blowing…	conjoined
	…and the tower broke	anticausative
	The tower broke (from the wind)	(modified) anticausative
No initiator	*The tower broke*	anticausative

Muentener & Lakusta 2011, Song & Wolff 2005

Initiator animacy: Less **animacy** ⤳ More **anticausatives**

Initiator animacy

Inanimate causers are dispreferred as transitive subjects

- Transitive subjects tend to be animate (Hopper and Thompson 1980)
- Transitive subjects tend to be topics: Inanimates are less topic-worthy than animates (Dahl and Fraurud 1996, Heidinger and Huyghe 2022)
- The syntax/semantics of agentive and non-agentive causatives differ (Anagnostopoulou and Alexiadou 2020, Martin 2020)

(1) *La finestra si è rotta per il vento/*per Gianni.*
The window broke from the wind/from Gianni

(2) *Il vento ha rotto la finestra. ≈ La finestra si è rotta a causa del vento.*
'The wind broke the window.' ≈ 'The window broke because of the wind.'

(3) *Pietro ha rotto la finestra. ≉ La finestra si è rotta a causa di Pietro.*
'Peter broke the window.' ≉ 'The window broke because of Peter.'
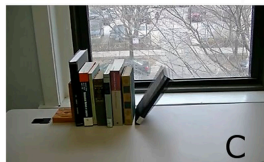
Initiator prominence

Rissman et al. 2019: Initiator prominence in adult English

Question: *What happened?*

- A. Fully visible initiator: active transitive
- B. Occluded (hand-only) initiator: active transitive and short passive (25%)
- C. No initiator: anticausative

> Initiator prominence
> Less **prominence** ⤳ More **passives** (if initiator is present) and **anticausatives** (if initiator is absent)

Initiator prominence

Perceptually less prominent initiators are less likely to be transitive subjects (or mentioned at all)

- Subject position is the default topic position (Li and Thompson 1976)
- Backgrounding of the initiator and foregrounding of the theme makes the theme more topic-worthy and more likely to be a subject
- Animate but backgrounded initiator: Active transitives are still preferred overall, but passives are common
- Backgrounded initiator is usually omitted entirely
  - Svartvik 1966: 80% short passive (no agent *by*-phrase) in corpus of written English
  - Altmiller et al. 2022: 80% short passive in English children's books

This study

> **Initiator animacy**
> Less **animacy** $\rightsquigarrow$ More **anticausatives**

If children have a **psychological agent bias** ("Children tend to perceive events as being initiated by agents") then they should exhibit less sensitivity to initiator **animacy** than adult controls.

> **Initiator prominence**
> Less **prominence** $\rightsquigarrow$ More **passives** (if initiator is present) and **anticausatives** (if initiator is absent)

If children have a **linguistic agent bias** ("Children tend to express agents as grammatical subjects") then they should exhibit less sensitivity to initiator **prominence** than adult controls.

Method

Design

Starting point: Rissman et al. 2019

- **Video narration task** with a neutral *What happened?* question
- 3 initiator conditions: full animate initiator, occluded animate initiator, no initiator
- Written responses from English-speaking adults

We modify their design in the following ways:

- We extend the design to include a **4th initiator condition: non-agentive inanimate causer** (e.g. *ball*, *wind*)
- We collect **oral** responses from Italian-speaking **children and adults**

Design

Within-subjects design with 2 factors:

- **Event Type**
    - 6 changes-of-state (*open*, *close*, *turn on*, *turn off*, *tear*, *wake*) [1]
    - 6 activities (*drink, eat, read, comb, pet, draw*)
- **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 Initiator** (6 changes-of-state)
- Total of 36 target videos of 7 seconds each + training items
    - Hand Agent videos were played first
    - Children were tested in 2 sessions

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

Design

Initiator Type	Change-of-state (*accendere* 'switch on')	Activity (*bere* 'drink')
Body Agent		
Hand Agent		
Inanimate Causer		
No Initiator		

14

Data coding

Argument structure encoding

- **Active transitive** (*The ballerina switched on the lamp*)
- **Passive transitive** (*The lamp was switched on*)
- **Anticausative**
  - **Bare** (*The lamp switched on*)
  - **Modified** (*The lamp switched on from the ball*)
  - **Conjoined** (*A man threw a ball and the lamp switched on*)
- **Periphrastic *fare*-causative** (embedding an anticausative, *The ball made the lamp switch on*)

Participants

- 33 typically-developing children: Italian native speakers recruited from and tested in 2 kindergartens in the Milan area
  - F = 20; M = 13
  - Ages 3;5 - 6;3 (mean age = 4;8, SD = 1.1)
  - Goal: 60 participants; data collection and transcription are still ongoing due to the pandemic
- 42 adults: Italian native speakers recruited via Prolific and tested online
  - F = 23; M = 18
  - Ages 21 - 54 years (mean age = 31.7, SD = 9.6)

Predictions

Initiator animacy

> **Initiator animacy**
> Less **animacy** $\rightsquigarrow$ More **anticausatives**

Scale: No initiator $<$ Inanimate Causer $<$ Body Agent, Hand Agent

- Body Agent, Hand Agent: ↑**Animacy**
  - Children are known to construe hands as agents (Leslie 1984, Woodward 1998, Wu et al. 2016)

If children have a **psychological agent bias** ("Children tend to perceive events as being initiated by agents") then they should exhibit less sensitivity to initiator **animacy** than adult controls.

- ▷ Reduced effect of animacy: Children will produce transitives even for less animate initiators
- Inanimate Causer $\approx$ Body Agent, Hand Agent wrt transitives

Initiator prominence

> **Initiator prominence**
> Less **prominence** ⤳ More **passives** (if initiator is present) and **anticausatives** (if initiator is absent)

Scale: No initiator < Inanimate Causer, Hand Agent < Body Agent

- Inanimate Causer, Hand Agent: similar ↓Prominence

If children have a **linguistic agent bias** ("Children tend to express agents as grammatical subjects") then they should exhibit less sensitivity to initiator **prominence** than adult controls.

- ▷ Reduced effect of prominence: Children will produce active transitives even for less prominent initiators
- Hand Agent ≈ Body Agent wrt active transitives
- If both psychological and linguistic bias: Inanimate Causer, Hand Agent ≈ Body Agent wrt active transitives

Summary of predictions

Condition	Adults' typical descriptions	Children's typical descriptions
Body Agent	active transitives cf. Song & Wolff 2005	same cf. Muentener & Lakusta 2011
Hand Agent	active transitives and short passives cf. Rissman et al. 2019	Psych bias: same Ling bias: active transitives
Causer	active transitives and anticausatives	Psych bias: active transitives Ling bias: same cf. Muentener & Lakusta 2011
No Initiator	anticausatives cf. Rissman et al. 2019	same

In red: has not been previously tested, as far as we know

Results

Results

- 2700 responses were collected: **2661** were entered into the analysis, including
  - items with the correct target verb (N = 2519)
  - items with a different verb but of the same event type (change-of-state/activity) (e.g. *break* for *tear*) (N = 142)
- Analysis: GLMM with Initiator Type as a fixed effect and Participant and Item as random effects, conducted by group (Adults and Children)

Fig1: Production of argument structures across conditions in Adults
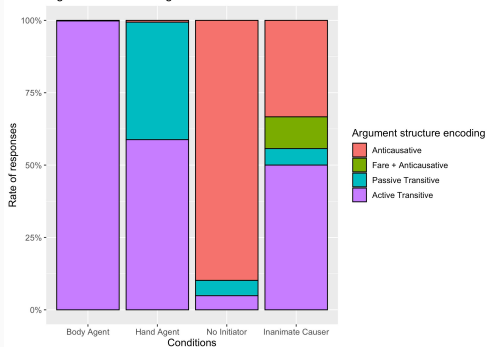
Effect of Initiator Type

- Body Agent: mostly active transitives
- Hand Agent: active and passive transitives
- No Initiator: mostly anticausatives
- Causer: active transitives and anticausatives (some under *fare*)

21

Results: Adults

	Active transitive	Passive (long)	Anticausative
Body Agent	500	0	1
Hand Agent	283	194 (5)	3
Causer	116	13 (8)	77 (+26 *fare*)
No Initiator	12	13 (0)	221

(4) **Body Agent:** *la cuoca ha aperto la porta.*
'The cook opened the door.'

(5) **Hand Agent:** *la porta è stata aperta.*
'The door was opened.'

(6) **Inanimate Causer:** *il vento ha fatto aprire una porta.*
'The wind made the door open.'

(7) **No Initiator:** *la porta si è aperta da sola.*
'The door opened on its own.'

Results: Adults

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Initiator animacy
Less **animacy** ⤳ More **anticausatives**
Scale: No initiator < Inanimate Causer < Hand Agent, Body Agent

Initiator prominence
Less **prominence** ⤳ More **passives** (if initiator is present) and **anticausatives** (if initiator is absent)
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Results: Children

Fig2: Production of argument structures across conditions in Children
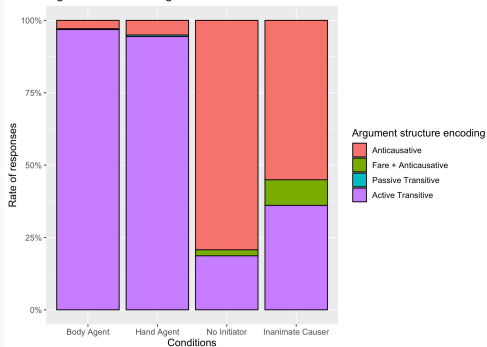
Effect of Initiator Type
- Body Agent and Hand Agent: mostly active transitives
- No Initiator: mostly anticausatives, some active transitives
- Causer: anticausatives (some under *fare*) and active transitives

25

Results: Children

	Active transitive	Passive (long)	Anticausative
Body Agent	356	0	11 (+1 *fare*)
Hand Agent	345	2 (0)	16 (+1 *fare*)
Inanimate Causer	55	0	86 (+15 *fare*)
No Initiator	36	0	147 (+4 *fare*)

(8) **Body Agent:** *una ragazza aveva acceso la lampada.*
'A girl switched on the lamp.' (F, 5;2)

(9) **Hand Agent:** *un ragazzo ha acceso la lampadina.*
'A boy switched on the lamp.' (F, 5;2)

(10) **Inanimate Causer:** *la palla ha rotolato nella lampada e si è acceso.*
'The ball rolled into the lamp and it switched on.' (M, 5;6)

(11) **No Initiator:** *una lampada si è accesa da solo.*
'A lamp switched on by itself.' (M, 5;6)

Results: Children

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Discussion

Discussion

Initiator animacy

- Both adults and children are sensitive to **animacy** of the initiator in event descriptions
  - Body agent, Hand Agent: Transitives
  - Inanimate Causer: Transitives and anticausatives
  - No Initiator: Anticausatives
- Children are adult-like in how they encode animacy in production
  - Inanimates are not treated on par with animates
- No evidence of a **psychological agent bias** ("Children tend to perceive events as being initiated by agents") in choice of argument structure encoding

Discussion

Initiator prominence

- Adults are also sensitive to **visual prominence** of the initiator but children are not
  - Adult: Hand Agent passives
  - Child: Almost no Hand Agent passives
- Children are non-adult-like in how they encode prominence in production
  - Adult: Visual $\rightarrow$ discourse $\rightarrow$ linguistic prominence
  - Child: Visual ?$\rightarrow$ discourse ?$\rightarrow$ linguistic prominence
- Evidence for a **linguistic agent bias** ("Children tend express agents as grammatical subjects") in argument structure encoding

Discussion

Lack of passive

- Neutral *What happened?* question insufficient to elicit passives with Italian children
    - Italian children of the same age do produce some passives with theme-oriented questions (*What happened to THEME?*) but not *What happened?* questions (Volpato et al. 2016)
- Italian children sometimes produce reflexive *si + fare* causative constructions in lieu of standard passives (Manetti, 2013; Manetti and Belletti, 2015)
    - *La bambina **si fa** pettinare dalla mamma.*
      'The girl was combed by the mother.'
    - Children in our study used the *fare* causative more widely than adults in general
    - However, no evidence of a *si fare* passive strategy: only 1 (simple) *fare* construction was elicited in the Hand Agent condition

Conclusion

- 3-6 y.o. Italian children exhibit sensitivity to the **animacy** but **not visual prominence** of the initiator in their choice of argument structure in event descriptions
- Evidence for a **linguistic** but not psychological **agent bias** in production

Acknowledgments

We are grateful to:

- Children, families and teachers from the kindergartens in Melzo and Cologno
- Research Assistants and the Lab Manager at Milano Bicocca
- Uli Sauerland for advice on study design

Appendix

Results: Children and adults side-by-side

Fig1: Production of argument structures across conditions in Adults
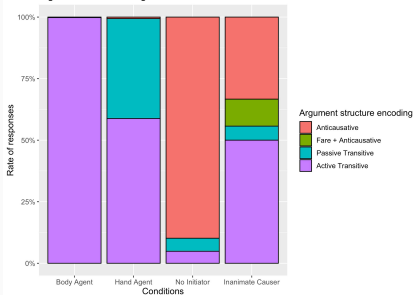
Fig2: Production of argument structures across conditions in Children
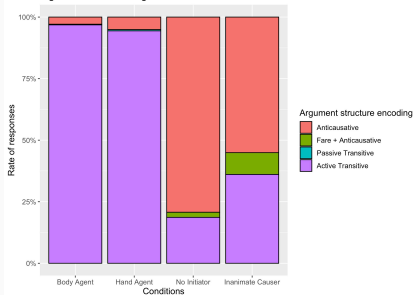
- **Children overuse null subjects** in active transitive constructions
  - True for both Body Agent and Hand Agent conditions
  - Even in spontaneous speech of Italian children, subjects in discourse-new contexts are null up to 15%. (Serratrice, 2005)
- **Children assign specific properties to occluded agents** even without visual cues

Coding

- Agent referring expression in active transitives (agent type)
  - Human DP (e.g. *the clown*)
  - (Indefinite) pronoun (e.g. *somebody*)
  - Pro-drop
  - Body-part DP (e.g. *the hand*)
- Property used in the agent description
  - Specific property (e.g. *the mum, a woman*)
  - Generic property (e.g. *somebody, a person*)

Results: Body Agent

Fig5. Agent types in active transitive: Adults
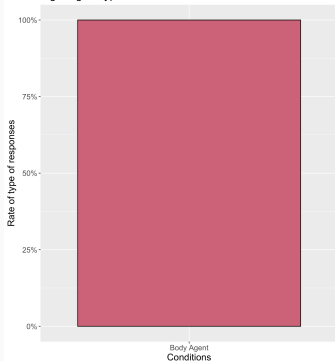
Fig6. Agent types in active transitive: Children
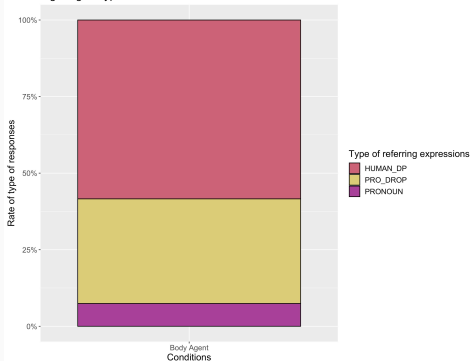
- Pro-drop seems to be a child strategy for active transitives, including in the Body Agent condition
  - Adults: Human DPs only
  - Children: pro-drop (34%) not a strategy for passives

Results: Hand Agent

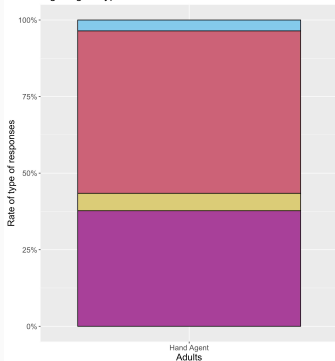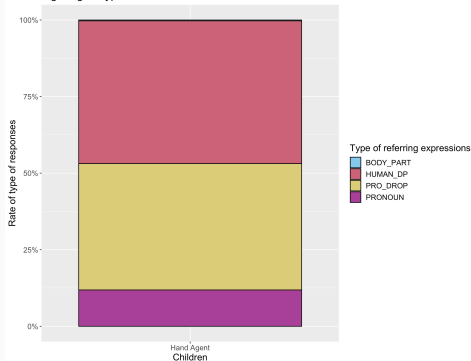Fig3. Agent types in active transitive: Adults

Fig4. Agent types in active transitive: Children

Type of referring expressions
BODY_PART
HUMAN_DP
PRO_DROP
PRONOUN

- Similar high rate of Human DP in children and adults, BUT:

	Specific property (*the mum, a woman*)	Generic property (*a person*)
Adult	5%	**95**%
Child	**87.7**%	13.3%

Results: Hand Agent

Fig3. Agent types in active transitive: Adults

Fig4. Agent types in active transitive: Children
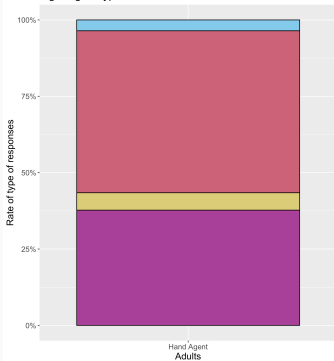
Type of referring expressions
- BODY_PART
- HUMAN_DP
- PRO_DROP
- PRONOUN
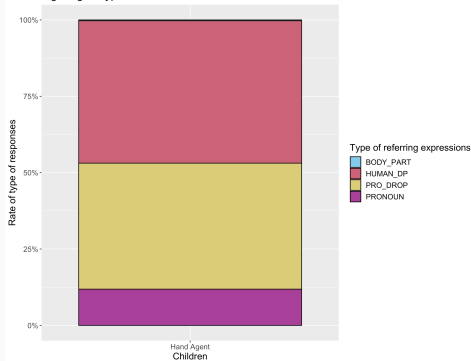
- Other most produced strategies:
  - Adults: indefinite pronouns (37.7%)
  - Children: pro-drop (41%)

Results: Inanimate Causer

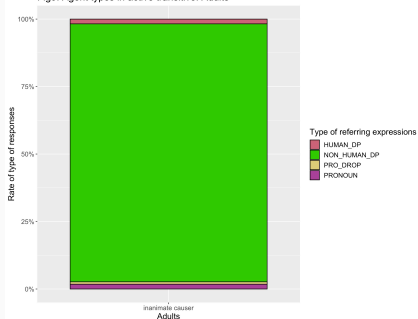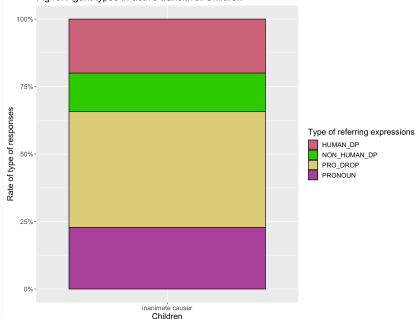Fig9. Agent types in active transitive: Adults

Fig10. Agent types in active transitive: Children

Active transitives in adults = 114
Active transitives in children = 57

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