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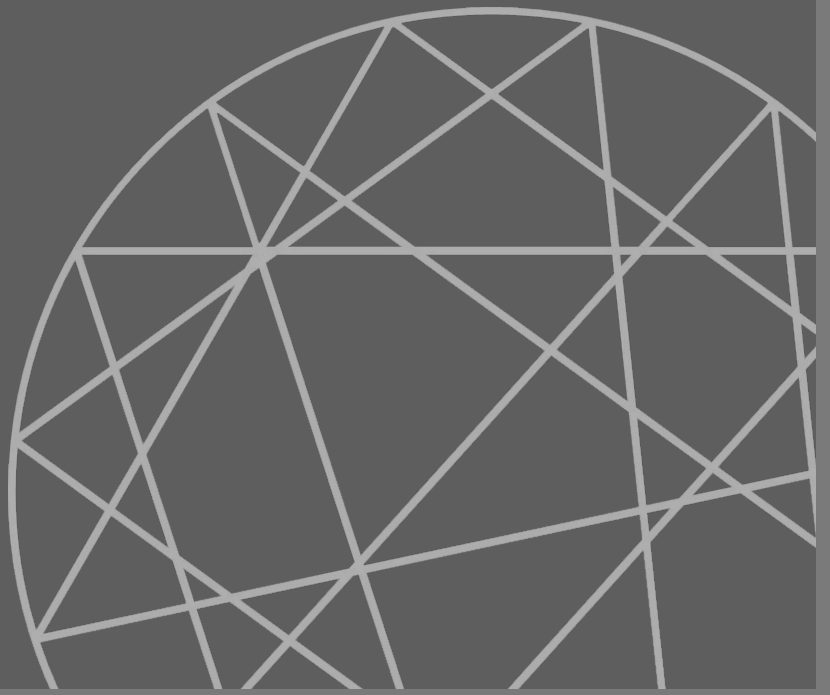
Belief-Intention alternation with Italian *convincere*



Agency and Intentions in Language 5
Georg-August-Universität Göttingen (virtual) – January 29, 2025

The Intention/Belief alternation

- Many verbs seem to shift their meaning depending on the type of complement they take, reporting both **belief-like** and **intention-like** attitudes.

  (1) Kim decided **to quit smoking**.

  → Kim formed the intention to quit smoking.

  (2) Kim decided **that smoking is harmful**.

  → Kim formed the belief that smoking is harmful

(Grano 2024)

Italian *convincere*

(3) Gianni ha convinto Mario **ad avere** **un figlio**.

Gianni has convinced Mario *a* have.INF a child

→ Gianni has convinced Mario to intend to have a child

(4) Gianni ha convinto Mario **di avere** **un figlio.**

Gianni has convinced Mario *di* have.INF a child

→ Gianni made Mario believe he has a child.

- **Italian *convincere* expresses both intention and belief within the non-finite domain, an apparent puzzle with previous accounts.**

The Intention/Belief alternation

- Other languages show a similar pattern:

(5) I Ariadne epise ton Nikolas **na fiji noris.**

the Ariadne persuaded the Nikolas that.SBJV leave early

→ Ariadne persuaded/convinced Nikolas to leave early

(6) I Ariadne epise ton Nikolas **oti i idea tou ine kali.**

the Ariadne persuaded the Nikolas that.IND the idea his is good

→ Ariadne persuaded/convinced Nikolas that his idea is good.

(Modern Greek, Giannakidou and Mari 2021)

The Intention/Belief alternation

- Many verbs seem to shift their meaning depending on the type of complement they take, reporting both **belief-like** and **intention-like** attitudes.

(7) Vasja dumaet **vypit'** **piva**.

Vasja thinks drink.INF beer

→ Vasja intends to drink beer

(8) Vasja dumaet **čto** **my idem pit'** **pivo.**

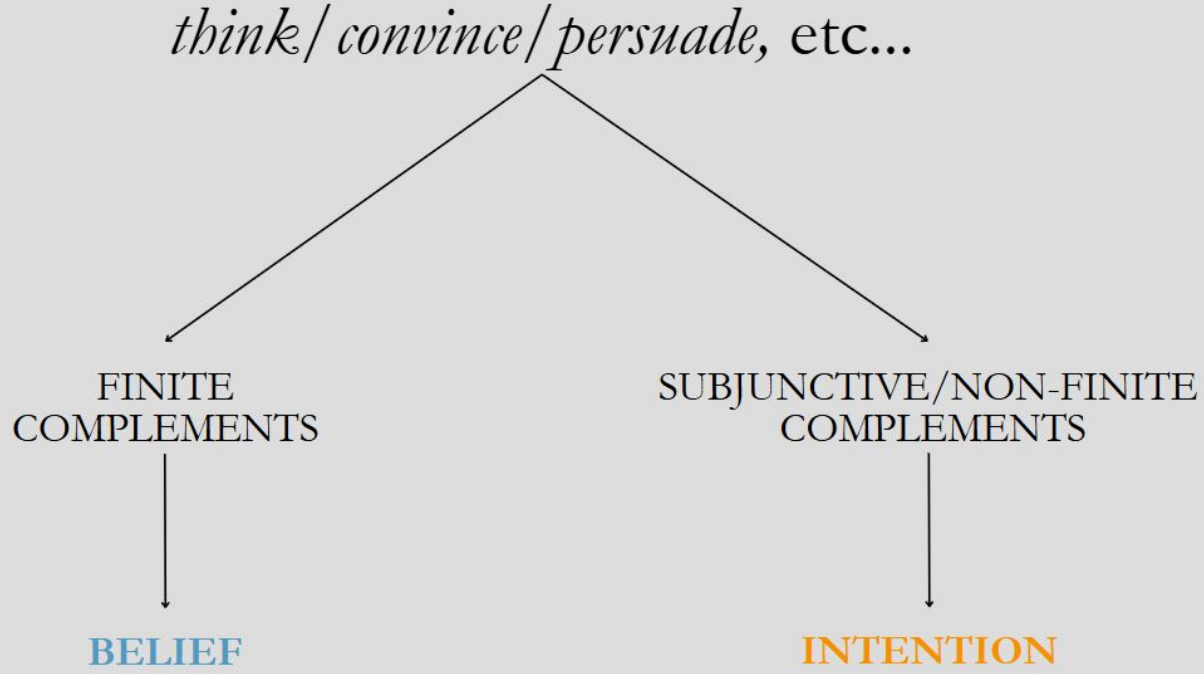
Vasja thinks that we go drink beer

→ Vasja thinks that we are going to drink beer

(Russian, Kasenov 2023)

The Intention/Belief alternation

- **A first generalization** (Grano 2019; 2024):



A solution for English *persuade*
Grano (2019)

- A **single, underspecified entry** rather than two distinct entries, roughly meaning ‘cause to have a rational attitude’.
  - **Rational attitudes:** a natural class of attitudes including **belief** and **intention** but not **desire**.

(9) $$[\![persuade]\!] = \lambda P_{\langle vt \rangle} \lambda x \lambda y \lambda e.\, \exists e' [persuade(e) \wedge Agent(e, y) \wedge Patient(e, x) \wedge CAUSE(e, e') \wedge RAT\text{-}ATTITUDE(e') \wedge Experiencer(e', x) \wedge P(e')]$$

A solution for English *persuade*
Grano (2019)

- **Finiteness** encodes **information/epistemic** modality (**belief**), **nonfiniteness** encodes **preference/root** modality (**intention**).

➢ Quantification over possible worlds in the complement clause (cfr. Kratzer, 2006; Moulton, 2009)

(10) $[\![\textbf{that it was raining}]\!] = \lambda e.\forall w' \in INFO(e) : \exists e'[rain(e') \text{ in } w']$

(11) $[\![\textbf{PRO to leave}]\!] = \lambda e.\forall w' \in PREF(e) : \exists e'[leave(e') \wedge Agent(e', PRO) \text{ in } w']$

- **But** this analysis does not immediately extend to the case of Italian *convincere*, as both meanings are associated with **non-finite** forms.

Intention and causal self-referentiality

Grano (2024)

- **Searle (1983, ch. 3):**

  “even though an event represented in the content of my intention occurs, it isn’t necessarily the satisfaction of my intention. [The event] has to come about ‘in the right way’, and this has no analogue for beliefs and desires”. (p. 82)

  “If I am carrying out that intention then the intention must play a **causal role** in the action, and the argument for this is that if we break the causal connection between intention and action we no longer have a case of carrying out the intention.” (p. 86)

Intention and causal self-referentiality

Grano (2024)

- **Causal self-referentiality:** carrying out an intention requires that the intention itself plays a causal role in the action

(12) $[\![intend]\!]^{w,t} = \lambda P_{\langle e,\langle i,\langle s,vt\rangle\rangle\rangle}\lambda x\lambda s.\, intention(s,w) \wedge Holder(x,s,w)$

$$\wedge \forall \langle w', t', y\rangle \in CONTENT(s) : \exists e.\, CAUSE^*(s,e,w') \wedge \exists t'' > t' : P(y)(t'')(w')(e)$$

(13) $[\![\text{PRO to leave}]\!]^{w,t} = \lambda x\lambda t'\lambda w'\lambda e.\, leave(e,w') \wedge Agent(x,e,w') \wedge \tau(e) = t'$

- The *CAUSE** predicate is a relation to an eventuality, so the complement clause must have an **abstracted eventuality argument**.

Intention and causal self-referentiality
Grano (2024)

- On this account, the ability of subjunctive and non-finite clauses to allow for intention meanings is attributed to the abstraction of the eventuality argument. Indicative mood, on the other hand, provides the existential closure for this argument, making the clause unfit to compose with a predicate like *intend*.
- Again, this gives the wrong prediction that all non-finite clauses should express, or should be only compatible with, intentional meanings, contrary to the facts we discussed on Italian.

Probing another solution

- Grano (2024, fn. 36) hints at an alternative possible solution (reportedly suggested by Menéndez-Benito): existential closure, correlated with the **belief** meaning, may be effected not by mood itself, but by something structurally located below indicative mood and above subjunctive.
- If it can be shown that ***di*-infinitives** and ***a*-infinitives** also differ in structural size, than such an explanation would also account for the semantic alternation in the non-finite domain.

Mapping the Italian non-finite domain

- Crucially, **the two infinitivals reveal some key differences**.

(14) Marco ha convinto Gianni **di**/*__a__ voler/poter/saper/dover studiare.

Marco has convinced Gianni **di** want/can/know-how/have to study.INF
*Marco has convinced Gianni **a** want/can/know-how/have to study.INF

	di-infinitive	*a*-infinitive
ABILITY TO HOST MODALS	✓	✗

Mapping the Italian non-finite domain

- Crucially, **the two infinitivals reveal some key differences**.

(15) Marco ha convinto Gianni **di** avere un figlio, ma non è vero.
Marco has convinced Gianni that he has a child, but it is not true.

(16) Marco ha convinto Gianni **ad** avere un figlio, #ma non è vero.
Marco has convinced G. to have the intent of having a child, #but it is not true.

	di-infinitive	*a*-infinitive
ASSESSABILITY OF TRUTH	✓	✗

Mapping the Italian non-finite domain

- Crucially, **the two infinitivals reveal some key differences**.

(17) Domani convincerò Gianni **di** avere avuto un figlio l'anno scorso.
Tomorrow I will convince G. of having had a child **last year.**

(18) *Domani convincerò Gianni **ad** avere avuto un figlio l'anno scorso.
***Tomorrow** I will convince G. to have the intent of having a child **last year.**

	di-infinitive	*a*-infinitive
POSSIBLE DISSOCIATION OF THE EVENT TIME AND A REFERENCE TIME	✓	✗

Mapping the Italian non-finite domain

- Crucially, **the two infinitivals reveal some key differences**.

(19) Mario ha convinto Gianni **di** avere un figlio.
Mario has convinced Gianni that **he** has a child. → **he** = M. or G.

(20) Mario ha convinto Gianni **ad** avere un figlio.
Mario has convinced Gianni that **he** wants to have a child. → **he** = G

	di-infinitive	*a*-infinitive
SUBJECT/OBJECT INDEXING FOR THE COMPLEMENT SUBJECT	✓	✗

Mapping the Italian non-finite domain

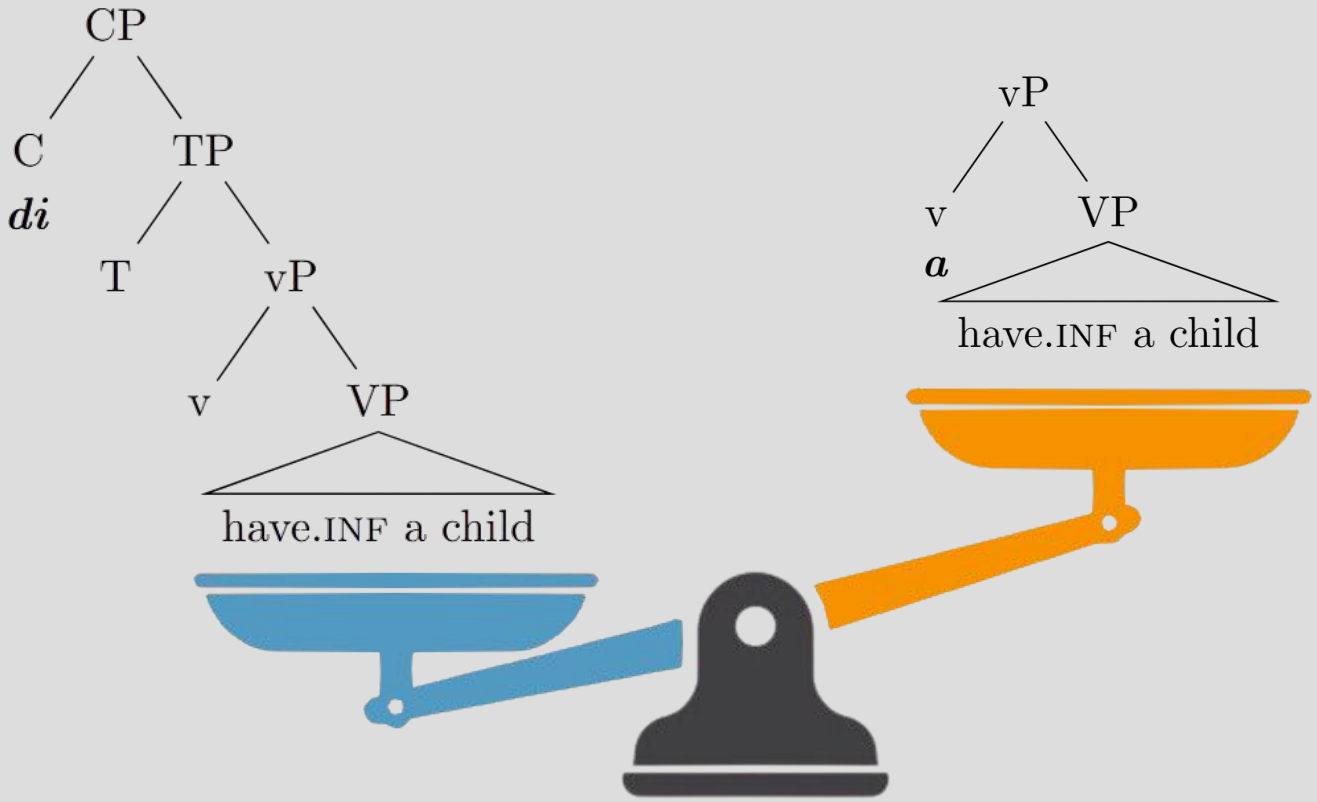
- Crucially, **the two infinitivals reveal some key differences**.

	di-infinitive	*a*-infinitive
ABILITY TO HOST MODALS	✓	✗
ASSESSABILITY OF TRUTH	✓	✗
POSSIBLE DISSOCIATION OF THE EVENT TIME AND A REFERENCE TIME	✓	✗
SUBJECT/OBJECT INDEXING FOR THE COMPLEMENT SUBJECT	✓	✗

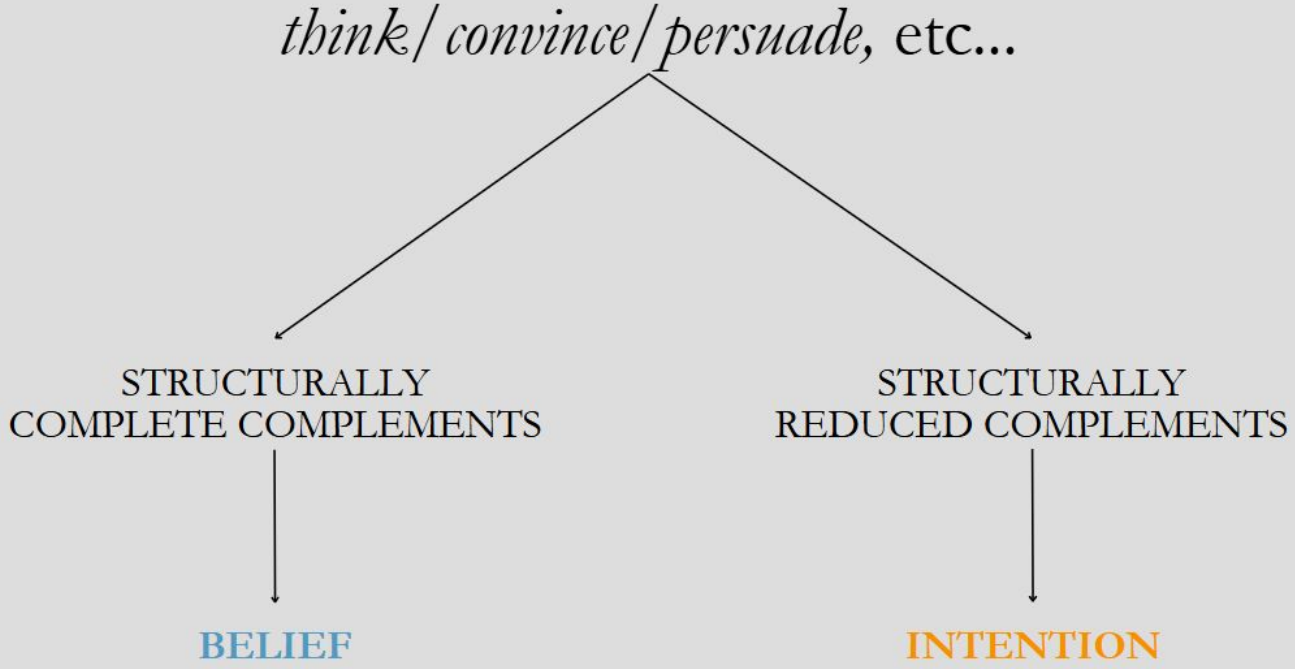
Mapping the Italian non-finite domain

- These difference are diagnostics for a **structural syntactic difference** between ***a*-infinitives** and ***di*-infinitives**, the former are incompatible with the properties above because they are **syntactically reduced**.
  - No space to host modals (Cinque 2004,2006; Grano 2015).
  - Cannot be assessed for truth for they are not syntactically truly propositional.
  - Possible dissociation of the event time and a reference time (the latter anaphoric to the matrix clause event time) (Wurmbrand & Lohninger 2023).
  - Cannot index the complement subject with the matrix subject because they lack the syntactic projection able to mediate it (Bianchi 2003; Landau 2024).

Mapping the Italian non-finite domain



The Intention/Belief alternation (revised)



A compositional analysis for *convincere*
Main ingredients

- A single lexical entry.
- “The attitude is in the complement”: quantification over possible worlds is contributed by the complementizers.
- ***di*** selects for larger complements, where existential closure of eventuality argument has already taken place.
- ***α*** selects for smaller complements with abstracted eventuality arguments, which allows for causal self-referentiality.

A compositional analysis for *convincere*

- We start from the smallest **vP infinitive**:

(21) $[\![\text{PRO avere un figlio}]\!]^w = \lambda e.\, \textit{have-a-child}(e, w) \wedge \textit{Agent}(x_1, e, w)$

- Abstraction of individual and world arguments takes place:

(22) $[\![\text{PRO avere un figlio}]\!]^w = \lambda x \lambda w' \lambda e.\, \textit{have-a-child}(e, w') \wedge \textit{Agent}(x, e, w')$

- This constituent can then compose, as it is, with ***a***, producing the denotation in (24)

(23) $[\![\text{a}]\!]^w = \lambda P_{\langle e,\langle s,vt\rangle\rangle} \lambda s.\, \forall \langle w', x\rangle \in \textit{COMPATIBLE}(s) : \exists e.\, \textit{CAUSE}^*(s, e, w') : P(x)(w')(e)$

(24) $[\![\text{a PRO avere un figlio}]\!]^w = \lambda s.\, \forall \langle w', x\rangle \in \textit{COMPATIBLE}(s) : \exists e.\, \textit{CAUSE}^*(s, e, w')$

$\wedge\, \textit{have-a-child}(e, w') \wedge \textit{Agent}(x, e, w')$

A compositional analysis for *convincere*

- Alternatively, the vP infinitive can first compose with a CLOSURE operator (25) and then undergo abstraction, giving (26):

(25) $[\![\text{CLOSURE}]\!] = \lambda P_{\langle vt \rangle}. \exists e. P(e)$

(26) $[\![\text{CLOSURE PRO avere un figlio}]\!]^w = \lambda x \lambda w'. \exists e. \textit{have-a-child}(e, w') \wedge \textit{Agent}(x, e, w')$

- At this point, the constituent can compose with ***di***:

(27) $[\![\text{di}]\!]^w = \lambda P_{\langle e, \langle st \rangle \rangle} \lambda s. \forall \langle w', x \rangle \in \textit{INFO}(s) : P(x)(w')$

(28) $[\![\text{di CLOSURE PRO avere un figlio}]\!]^w = \lambda s. \forall \langle w', x \rangle \in \textit{INFO}(s) : \exists e. \textit{have-a-child}(e, w') \wedge \textit{Agent}(x, e, w')$

A compositional analysis for *convincere*

- A **single lexical entry** for *convincere* (after Grano 2019):

(29) $$[\![convincere]\!]^w = \lambda P_{\langle vt \rangle} \lambda x \lambda y \lambda e.\, \exists s.\, persuade(e) \wedge Agent(e, y) \wedge Patient(e, x)$$
$$\wedge CAUSE(e, s) \wedge RAT\text{-}ATTITUDE(s) \wedge Experiencer(s, x) \wedge P(s)$$

A compositional analysis for *convincere*

- Composition with the two complement clauses, and with the other arguments, gives the following denotations:

(30) $[\![\text{Gianni ha convinto Mario di avere un figlio}]\!]^w = \exists e \exists s.\, persuade(e) \wedge Agent(e, g) \wedge Patient(e, m)$
$\wedge\, CAUSE(e, s) \wedge RAT\text{-}ATTITUDE(s) \wedge Experiencer(s, m) \wedge \forall \langle w', x \rangle \in INFO(s) :$
$\exists e'.\, have\text{-}a\text{-}child(e', w') \wedge Agent(x, e', w')$

(31) $[\![\text{Gianni ha convinto Mario ad avere un figlio}]\!]^w = \exists e \exists s.\, persuade(e) \wedge Agent(e, g) \wedge Patient(e, m)$
$\wedge\, CAUSE(e, s) \wedge RAT\text{-}ATTITUDE(s) \wedge Experiencer(s, m) \wedge \forall \langle w', x \rangle \in COMPATIBLE(s) :$
$\exists e'.\, CAUSE^*(s, e') \wedge have\text{-}a\text{-}child(e', w') \wedge Agent(x, e', w')$

Discussion

- In our proposal, we followed Grano (2024) in attributing the **belief**/**intention** alternation to the **existential closure** of the **eventuality argument**.
- We suggested that this feature is in turn dependent on the **size of the complement clause**:

➢ **di-infinitives** are larger and can host an operator to effect existential closure, leading to a **belief** meaning

➢ **a-infinitives** are smaller and their eventuality argument remains unsaturated, making them suitable arguments for **intention** reports (through the CAUSE* relation).

Further refinements

- As it stands, our proposal does not account formally for the subject/object control alternation available with the **di-infinitive**:

(32) $[\![\text{Gianni ha convinto Mario di avere un figlio}]\!]^w = \exists e \exists s.\, persuade(e) \wedge Agent(e, g) \wedge Patient(e, m)$
$\wedge\, CAUSE(e, s) \wedge RAT\text{-}ATTITUDE(s) \wedge Experiencer(s, m) \wedge \forall \langle w', x \rangle \in INFO(s) :$
$\exists e'.\, have\text{-}a\text{-}child(e', w') \wedge Agent(x, e', w)$

- However, the **di-infinitive**, being structurally richer, may host an extra layer in the embedded left periphery where a null *pro* is associated with some **coordinate of the reported context** (the AUTHOR or the ADDRESSEE, i.e., the subject or the object of the matrix clause) (see Bianchi 2003, Landau 2024)

Further refinements

- We remained intentionally vague on the modal domain for the **a-infinitives**

(33) $[\![\text{a PRO avere un figlio}]\!]^w = \lambda s. \forall \langle w', x \rangle \in COMPATIBLE(s) : \exists e. CAUSE^*(s, e, w')$

$\wedge$ *have-a-child*$(e, w') \wedge$ *Agent*(x, e, w')

- We speculate that it may be something similar to the **inertia worlds** assumed for the semantics of the progressive (Dowty 1979; Portner 1998; Copley 2009, 2014). Apparent support for this hypothesis comes from the use of **a-infinitives** in progressive and aspectual constructions:

(34) Gianni sta **a** perdere tempo. ('Gianni is wasting time')

(35) Gianni ha iniziato **a** suonare. ('Gianni started playing')

Open questions/future work

- What is the nature of the CLOSURE operator? Where is it located precisely in the syntactic structure?
- Can the present analysis be extended to other constructions?

➢ More clause-embedding verbs: *pensare di/a* (‘think *di*/*a*’), *avere paura di/a* (‘be afraid *di*/*a*’)

➢ *a*-imperatives: *a lavorare!* (‘work/let’s work!’)

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Thank you!

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