

On the plurality of verbs

Attitudes of knowledge and belief

Day 2: Knowledge, factivity, truth

Natasha Korotkova (Utrecht)
<https://natasha-korotkova.github.io/>

ESSLLI 37 @ Prague
August 11, 2026



- ▶ Attitudes: central in cognition / cogsci disciplines
- ▶ Attitude ascriptions: a foundational topic in linguistics and philosophy of language
- ▶ Tension: connection between language and thought
- ▶ Much research: general understanding of the logic of attitude reports
- ▶ Emerging trends: finer-grained distinctions based on combinatorial properties
- ▶ Our aspiration: successful marriage between compositional and lexical aspects of attitudinal meaning

Agenda for today

- ▶ Knowledge: lightning intro (parts creatively borrowed from Fabrizio Cariani's part of Cariani & Korotkova "Futurity, evidentiality and modality"
<https://natasha-korotkova.github.io/teaching/NASSLLI2022/>)
- ▶ Knowledge ascriptions: factive & veridical predicates, in contrast to "pure" doxastics

Knowledge

Knowledge orthodoxy I

Q What is knowledge?

Knowledge orthodoxy II

- ▶ The standard view: knowledge is Justified True Belief (JTB) (start here: <https://plato.stanford.edu/entries/knowledge-analysis/>)
 - ▶ only facts (true things) can be known (and not fake facts or alternative facts)
 - ▶ known things are believed
 - ▶ knowledge should pass some evidential threshold (more on Day 3)
- ▶ Caveat: mostly ignoring practical knowledge (“knowledge how”, *Natasha knows how to ride a bike*) and acquaintance knowledge (*Natasha knows Deniz*)

Knowledge orthodoxy III

- ▶ Challenge: epistemic luck & Gettier cases
- ▶ Many responses & refinements over the years, including experimental work with philosophically untrained participants across cultures with naturalistic scenarios

Knowledge orthodoxy IV

- ▶ These principles are important in epistemology and in semantics/philosophy of language
 - ▶ modelling information states of various agents (think of knowledge representation systems, incl. autonomous vehicles or conversational bots)
 - ▶ modelling, and understanding, human cognition and communication

- ▶ Much research: knowledge is the basis for the speech act of **assertion** (Williamson 2000, see overviews in Marsili 2024; Pagin and Marsili 2025 and papers in Goldberg 2020) (normal, non-hedged)
- ▶ A key example is the speech act of *assertion*:
 - ① **normativity**: assertion is governed by a norm to the effect that one ought to assert p only if one knows p .
 - ② **assertibility**: we have fairly clear judgments about assertibility (=non-defective assertion) in specific cases.
- ▶ *Example*: I am driving my mom to my garden where I plant various things. Before she has seen anything she says,

(1) Your tomato plants need to be watered.

Suppose it is true. There is something defective about her assertion. Plausibly it's that *she doesn't know that!*

Q Why believe that there is a knowledge norm for assertion?

- 1 Systematizes defectiveness judgments for assertions lacking the right standards
- 2 Helps explain the badness of (not quite Moore's paradox)

(2) #It's raining but I don't know that it is.

► Foundations of the knowledge norm

- 1 **Derivative:** the knowledge norm strengthens Grice's Maxim of Quality (see e.g. Benton 2016)
"one tries to be truthful, and does not give information that is false or that is not supported by evidence."
- 2 **constitutive:** the knowledge norm *is constitutive of* the speech act of assertion, in a similar way to how the rules of a game, say, basketball constitute what it is to play that game.

- ▶ Some views: maybe assertions (communicative notion) are weaker (Lackey 2007; Mandelkern and Dorst 2022)
- ▶ Some other views: assertion isn't about mental states but social behavior & commitment (Geurts 2019)
- ▶ Even so, we need to understand knowledge

Knowledge first I

- ▶ The orthodox view: knowledge as a species of belief
- ▶ The new view: knowledge is primary and independent (Phillips and Norby 2019; Nagel 2017; Williamson 2000)
- ▶ Some arguments: emergence of knowledge (Phillips et al. 2021)
 - ▶ Humans
 - ▶ Primates

Knowledge first II

- ▶ Cognitive development: series of predictable milestones (with some degree of cross-cultural variation)
- ▶ Argument for knowledge first: the concept of knowledge seems to come earlier than the concept of belief
- ▶ Testing ground: false beliefs and the theory of mind
 - ▶ An understanding of the minds of others: gradual process (we focus on neurotypical individuals)
 - ▶ The mastery of False Beliefs seems to come later than an understanding of other attitudes (e.g. desires and conflicting desires)

Knowledge first III

- ▶ Sample False Belief task (see e.g. Wimmer and Perner 1983 and much later work, pictures from <https://sll.stanford.edu/tom.html>)



“Where will Tom look for the candy?”

- ▶ Common results: children below four answer “In the drawer”
- ▶ Common interpretation: they track facts (and what if they answer a diff. Q, “Where should Tom look for the candy?”)

Knowledge first IV

- ▶ Fundamental issue: cognitive development is not monolithic
 - ▶ conceptual development (which is what we're after in the quest for understanding knowledge)
 - ▶ growing awareness of the world at large
 - ▶ social cognition
 - ▶ ...
 - ▶ language acquisition
- ▶ Many studies: an important methodological confound (see detailed discussion and pointers to further reading in Dudley 2018; Dudley and Vogel 2023)
 - ▶ when we are testing knowledge, we are often testing for the understanding of epistemic language (and other things)
 - ▶ Cases like Tom thinks/knows that the candy is/isn't on the table might be simply too complex!

- ▶ Non-verbal testing for false beliefs: different results, ability to track information states often as early as 6mnths (infants!)
- ▶ Possible measure: gaze length and vioated expectations (Onishi and Baillargeon 2005)
 - ▶ 15mth olds: gaze longer if smth unexpected happens
 - ▶ Set-up: actor looking for a hidden toy
 - ▶ Test case: true vs. false belief
 - ▶ Results: longer times when expectations about actor's belief violated, not just reality-incongruence
“They realize that others act on the basis of their beliefs and that these beliefs are representations that may or may not mirror reality.”

- ▶ Bottom line: we need to understand language and then see how it may in adjudicating between various of knowledge (if at all; cue: Jonathan's talk)

Knowledge ascriptions

Belief ascriptions I

► Our standard semantics for *think*

- (3) a. Let $\text{DOX}_{x,w}$ be the set of worlds compatible with what x thinks at w (what they hold as true).
- b. $\llbracket \text{think} \rrbracket^w = \lambda p \lambda x. 1 \text{ iff } \forall w' \in \text{DOX}_{x,w} [p(w')]$.

► Event-based/decompositional approaches (for proper intro, go to Day 2 of Attitude Adjustment)

- same semantic core
- produced in a different compositional way (clauses are modifiers not arguments, etc)

► Doxastic predicates: broader than just *think*

► Studying those: very useful in understanding possible building blocks of meaning (also related to the study of language universals)

Belief ascriptions II

- Existential belief (typologically rare): Slovenian *dopuščati* 'allow for a possibility' (South Slavic; Močnik 2019, 2025)

(4) Signature behavior of weak quantifiers (see esp. Rudin 2019 on *might*)

- a. Dopuščam, da dežuje, in dopuščam, da ne dežuje. $D_x p \wedge D_x \neg p$
 I.allow that rains and I.allow that not rains
 'I allow for the possibility that it's raining and I allow for the possibility that it's not raining.'
- b. #Mislim, da dežuje, in mislim, da ne dežuje. $\#B_x p \wedge B_x \neg p$
 I.think that rains and I.think that not rains
 'I think that it's raining and I think that it's not raining.'

(5) $\llbracket \text{dopuščati} \rrbracket^w = \lambda p \lambda x. 1 \text{ iff } \exists w' \in \text{DOX}_{x,w} [p(w')]$.

Belief ascriptions III

- ▶ Graded beliefs: confidence reports *be certain, sure, confident* (see data and analysis in Cariani et al. 2024)

- (6)
 - a. I feel more certain that we focus on the wrong things. (web)
 - b. Ann has more confidence that it's raining than that it's snowing. (Cariani et al)

- ▶ Semantic solution: incorporate credences/degrees of confidence in the semantics of gradable doxastic expressions

- ▶ Pragmatic weakness: English *believe* (see Koev 2019, 2025)

- (7) Weak commitment (pragmatic notion), not credence
 - a. I believe the Patriots will win, but I'm not sure they will.
 - b. $Cr_{sp_c, w}(patriots.win) = 1 \wedge Com_{sp_c, w}(patriots.win) \prec 1$

- ▶ Other non-universal attitudes: *hope, doubt* ... (Anand and Hacquard 2013)

Belief ascriptions IV

- ▶ Meaning alternations: many languages have verbs/roots that mean *think* in some grammatical environments and something else in some other environments (typical factor: syntactic shape of the complement)
- ▶ Variable flavor attitudes: core accessibility relation unspecified and does not depend on the grammatical environment (first discussed by Bogal-Albritten 2016 for Navajo)

- (8) The many flavors of Koryak *ivək* (Chukotko–Kamchatkan; Močnik and Abramovitz 2019, data from Močnik 2025)

meλλo Ø-k-iv-ə-ŋ-Ø (əno)

Melljo.ABS.SG 2/3.S/A.IND-PRS-*ivək*-E-PRS-3.S.IND that

Ø-ku-muq-et-ə-ŋ-Ø

2/3.S/A.IND-PRS-rain-VB-E-PRS-3.S.IND

‘Melljo {says, thinks, allows for the possibility, hopes, fears} that it’s raining.’

- A teacher is always complaining to his wife about how bad his students are. One day, the principal asks him about his students, and he tells him that they are great.

inenyəjulevəčʔ-ən Ø-iv-i əno ən-nine-w
teacher-E-ABS.SG 2/3.S/A.IND-*ivək*-AOR that 3SG-POSS-3PL
jejyučewŋəlʔ-u metʔa-ŋ Ø-ko-jajyočawŋ-ə-la-ŋ-Ø
student-ABS.PL beautiful-ADV 2/3.S/A.IND-PRS-study-E-PL-PRS-3.S.IND
ʔam #(činin) Ø-iv-i əno əčč-u qekwa-ŋ
but self 2/3.S/A.IND-*ivək*-AOR that 3NSG-ABS.PL bad-ADV
Ø-ko-jajyočawŋ-ə-la-ŋ-Ø
2/3.S/A.IND-PRS-study-E-PL-PRS-3.S.IND
'The teacher said that his students studied well but thought (to himself)
that they studied badly.'

Belief ascriptions VI

- ▶ Such data: important support for parallels between attitudes and bona fide modals (Uegaki forth.)
 - ▶ Modals can be existential (can) and universal (must)
 - ▶ Modality is often graded (see overview in Willer forth.)
 - ▶ Modals may lexicalize force, flavor, both or none (Steinert-Threlkeld et al. 2023)
- ▶ With this background in mind: what about knowledge ascriptions?

Factive predicates I

- ▶ Philosophy: factive as a blanket term for reality-congruent attitudes
- ▶ Linguistics: more nuanced terminology
 - ▶ veridical: entails prejacent truth (shortcuts: $\rightarrow$ for entailment, w_0 for the world of evaluation)
 - ▶ factive: presupposes prejacent truth

- (10) a. Pranav **knows/discovered/found out/forgot** that Vulcan has three suns,
#even though it has only two. $\rightarrow [p(w_0)]$
- b. Pranav **didn't know/discover/find out/forget** that Vulcan has three suns,
#even though it has only two. $\rightarrow [p(w_0)]$
- (11) a. The study **confirmed/verified** that Vulcan has three suns, #though it only
has two. $\rightarrow [p(w_0)]$
- b. The study **didn't confirm/verify** that Vulcan has three suns, ✓because it
only has two. $\nrightarrow [p(w_0)]$

Factive predicates II

- ▶ **Veridical predicates** *demonstrate, prove, verify*: surprisingly little research (though see Anand and Hacquard 2014; van Elswyk 2025)
- ▶ **Factive predicates**: classic topic in clausal complementation (Kiparsky and Kiparsky 1970) but especially so as part of one of the most classic topics **presupposition projection** (starting with Karttunen 1973); more on this on Day 3

Factive predicates III

- Two classes with distinct inferences (the distinction has a long history; see Djärv 2019; Djärv et al. 2019 for recent overviews, verbs from Anand et al. 2017)

1 **cognitive factives:** describe beliefs

absorb, acknowledge, ascertain, aware, catch on, catch, comprehend, conscious, detect, discover, figure out, find out, forget, get, glimpse, grasp, hear, ignorant, intuit, know, learn, mindful, mystified, notice, observe, puzzled, realize, recall, recollect, register, remember, see, smell, surprised, take in, unaware, understand, uninformed, unsurprised, well-aware ...

2 **emotive factives:** describe affective states & beliefs

amused, angry, anguished, annoyed, calm, concerned, delighted, disappointed, ecstatic, elated, embarrassed, envious, euphoric, excited, exhilarated, fortunate, glad, gleeful, grateful, gratified, grieve, happy, hate, heartbroken, heartsick, impatient, incredulous, indignant, irate, jealous, joyful, jubilant, like, livid, loathe, love, lucky, mad, peeved, pissed, pleased, proud, regret, rejoice, relish, resent, resentful, respect, sad, satisfied, scared, thankful ...

Factive predicates IV

► **Cognitive factives:** *know, discover, realize, be aware* (more on Day 3)

- presuppose: truth
- assert: agent's belief

(12) Q discovered that Janeway is a human.

- a. ...#even though she is a Vulcan.
→ $[p(w_0)]$.
- b. ...# even though he believes she is a Vulcan.
→ $\forall w' \in \text{Dox}(Q, w_0)[p(w')]$.

(13) Q didn't discover that Janeway is a human.

[assume normal prosody]

- a. ...#even though she is a Vulcan.
→ $[p(w_0)]$.
- b. ...✓ so he still he believes she is a Vulcan.
↯ $\forall w' \in \text{Dox}(Q, w_0)[p(w')]$.

Factive predicates V

► Emotive factives *be sad, be happy, be surprised, regret*

- presuppose: truth and agent's belief
- assert: agent's emotional stance

- | | |
|---|--|
| <p>(14) Q regrets that Janeway is a human.</p> <ul style="list-style-type: none"> a. ...#even though she is a Vulcan.
→ $[p(w_0)]$. b. ...# even though he believes she is a Vulcan.
→ $\forall w' \in \text{Dox}(Q, w_0)[p(w')]$. c. ...#even though he is happy about it.
→ Q is unhappy about p. | <p>(15) Q doesn't regret that Janeway is a human.</p> <ul style="list-style-type: none"> a. ...#even though she is a Vulcan.
→ $[p(w_0)]$. b. ...# even though he believes she is a Vulcan.
→ $\forall w' \in \text{Dox}(Q, w_0)[p(w')]$. c. ...✓he is in fact happy about it.
↯ Q is unhappy about p. |
|---|--|

Factive predicates VI

- ▶ Our focus today and on Day 3: cognitive factives
- ▶ Large-scale investigations of the two classes:
<https://megaattitude.io/projects/mega-intensionality/>

The meaning of *know* I

- Standard view: knowledge as a true belief, nothing about justification/evidence (evidence as grounds for knowledge is discussed in research on memory predicates, which are factive)

- (16) a. Let $\text{DOX}_{x,w}$ be the set of worlds compatible with what x thinks at w (what they hold as true).
- b. $\llbracket \text{know } \phi \rrbracket^w$
presupposes ($\approx$ defined if)
 $\phi(w) = 1$ [sometimes couched as “speaker belief”]
asserts (if defined)
 $\lambda x. \forall w' \in \text{DOX}_{x,w} [\phi(w') = 1]$
- (17) $\llbracket \text{think } \phi \rrbracket^w = \lambda x. \forall w' \in \text{DOX}_{x,w} [\phi(w') = 1]$. [=3]

NB Important gap: no veridical counterpart of *think* (though it may change based on one’s view on presuppositions; we’ll touch upon this on Day 3)

- *I know* is a hedge, not a true knowledge construction

The meaning of *know* II

► Ramifications of the standard view:

- <think, know>: scalemates (<some, all>, <might, must>)
- choice between the two: pragmatic competition
- driving force: Maximize Presupposition principle (first introduced by Heim 1991; see overview in Bade 2021)
- mandate: choose the presuppositionally strongest alternative
- result: *think* can be interpreted as lacking knowledge/certainty without encoding it
- caveat: recall that *think* is often interpreted parenthetically

- (18)
- a. Deniz thinks that the workshop dinner is on Tuesday.
 ~→ Deniz doesn't know/speaker thinks Deniz doesn't know.
 - b. She still thought they [the smiles] meant something. Actually, she knew they did. (web)

The meaning of *know* III

- ▶ If factives describe facts, are they intensional (=modal operators)?
- ▶ No de re/de dicto ambiguities: only de re (not discussed explicitly in the literature, but follows naturally from most accounts)

(19) *Pascal and you watched Moonage Daydream together, Brett Morgen's documentary about David Bowie. However, he mistakenly thinks that he watched a mockumentary.*

- a. ✓Pascal believes/thinks that [the mockumentary about Bowie]_{de dicto}/[the documentary about Bowie]_{de re} won a Grammy award.
 - b. ✓Pascal discovered/found out/is surprised/learned/knows/regrets that [the documentary about Bowie]_{de re} won a Grammy award, even though he mistakenly thinks that it is a mockumentary.
 - c. #Pascal discovered/found out/is surprised/learned/knows/regrets that [the mockumentary about Bowie]_{de dicto} won a Grammy award, # even though it actually is a documentary.
- ▶ Could we say that the meaning of *know* is radically different from the meaning of *think*? (supporting the Knowledge First thesis)

The meaning of *know* IV

- ▶ Another diagnostic of intensionality: sequence-of-tense phenomena (SOT)
 - ▶ Many lgs: embedded tenses interpreted relative to the attitude time (Ogihara and Sharvit 2012)
 - ▶ Formal representation of tense: bundled together with worlds in indices of evaluation (Musan 1997, 1999)
 - ▶ Everything that shifts tenses shifts worlds, and vice versa (Farkas 1997; Percus 2000)

- (20) **Present-under-past: simultaneous reading** (lgs w/out SOT use present, e.g. Japanese, Russian)
 Last week Pranav realized/was upset that it ✓was/#is raining so we couldn't go snorkelling.
 (is only good if it is still raining, so-called “double-access” reading, abuschi1997)

- ▶ Verdict: factives are intensional (though there is room for interesting discussion, including tense, cf. Enç 1996)

More about *know* I

- ▶ Cognitive factives vs. doxastics: further asymmetries
 - ▶ Argument structure
 - ▶ Language acquisition

Role of DP complementation I

- ▶ A host of nouns: propositional content *claim, news, rumor, statement* (more narrow than repositories of information such as *articles* and *magazines* discussed by Anand et al. 2017)
- ▶ When combined with propositional content DPs, distinct patterns (outside of concealed questions, DP that denote questions)

- ▶ Cognitive factives: the acquaintance reading, no attitude
- ▶ Doxastics: the endorsement reading

- (21)
- a. Pranav **knows/learned/discovered** the rumor that Voyager is coming home, ✓but he is certain that it is false.
 $\nrightarrow [\forall w' \in \text{DOX}_{\text{Pranav}, w_0} [p(w')]]$
 - b. Pranav **believes** the rumor that Voyager is coming home, #but he is certain that it is false.
 $\rightarrow [\forall w' \in \text{DOX}_{\text{Pranav}, w_0} [p(w')]]$

- ▶ Not discussed:

- ▶ *believe* + non-content DP: source (*Natasha believes Deniz*)
- ▶ *believe* + DP $\neq$ *believe in* (*angels, the government ...*) (Wimmer 2024)

Role of DP complementation II

- ▶ Standard view: incorrect predictions
- ▶ Solutions: differentiate in how *know* combines with DPs vs. clauses (also invoked in factivity alternations, e.g., Bondarenko 2020; Özyıldız 2017)
- ▶ Djärv's (2023) theory: attention to polysemy
 - knowledge by acquaintance: familiarity with individuals
 - propositional knowledge: familiarity with facts
- ▶ We will come back to it on Day 3



Role of DP complementation III

- (22) a. Acquaintance with an individual (that may or may not have propositional content)

$$\llbracket \sqrt{AQ} \rrbracket^w = [\lambda y_e. [\lambda x_e. AQ_w(x)(y)]]$$

$$\llbracket know_{AQ} \rrbracket^w = \llbracket \sqrt{AQ} \rrbracket^w (\llbracket DP \rrbracket^w) = [\lambda y_e. [\lambda x_e. AQ_w(x)(y)]] (\llbracket DP \rrbracket^w)$$

- b. $\llbracket \text{Pranav knows the rumor that } p \rrbracket^w = 1$ iff
 $AQ_w(\text{Pranav})(\iota x. \text{RUMOR}(x) \wedge \text{CONTENT}_w(x) = p)$

- (23) Propositional knowledge: acquaintance with a situation that exemplifies p + belief (rooted in Kratzer 2002, see also relevant discussion in Kaufmann and Kaufmann 2020)

- a. $\llbracket \text{SITU}_{bel} \rrbracket^w = [\lambda R_{\langle e, et \rangle}. [\lambda P_{\langle st, t \rangle}. [\lambda x_e. \exists s \leq w [\exists p \in P [s \text{ is a situation exemplifying } p \wedge R(s)(x) \wedge \text{believe}_w(x)(s)(p)]]]]]]$
- b. $\llbracket know_{EPIST-bel} \rrbracket^w = \llbracket \text{SITU}_{bel} \rrbracket^w (\llbracket \sqrt{AQ} \rrbracket^w) =$
 $[\lambda P_{\langle st, t \rangle}. [\lambda x_e. \exists s \leq w [\exists p \in P [s \text{ is a situation exemplifying } p \wedge AQ_w(x)(s) \wedge \text{believe}_w(x)(s)(p)]]]]$
 ‘s is a situation exemplifying p & x is acquainted with s & x believes p of s’

Role of DP complementation IV

- ▶ This theory: important step towards understanding polysemy
- ▶ We'll come back to it on Day 3

- ▶ One important strand of research: 1st language acquisition
- ▶ Many difficult issues wrt attitudes (see discussion and references in Dudley 2017; Dudley et al. 2015)
 - ▶ role of input
 - ▶ no direct mapping to reality
 - ▶ complex concepts
 - ▶ variety of syntactic/semantic factors
 - ▶ tricky methodology
 - ▶ ...
 - ▶ even controls with naive adults don't always work as expected!

- ▶ Much prior work: children below 4 have difficulties with *think* vs. *know*
 - ▶ conceptual difficulties? (no false belief/theory of mind)
 - ▶ non-factive *know*?
 - ▶ factive/veridical *think*? (cf. van Elswyk 2025)
 - ▶ ...

NB *think* vs. *want*: acquired earlier, usually around 3yo (incl. non-own desires)

► New experimental kid-friendly paradigm (Dudley et al. 2015)

- Shy puppet, Lambchop: whispers a toy's location
- Experimenter: reports her words

Lambchop thinks it's in the red/blue box.

Lambchop doesn't think it's in the red/blue box.

Lambchop knows it's in the red/blue box.

Lambchop doesn't know it's in the red/blue box.

- Task: find the toy based on prompt

► Results

- Adult-like *think* (incl. no ignorance implicature *think* $\rightsquigarrow$ *not know*: look in the box)
 - Adult-like *not think*: look in the other box
 - Adult-like *know*: look in the box
 - Bimodal distribution for *not know*
-
- Key takeaway: children understand *think* as non-factive
 - Remaining issues: so what bout *know*?
 - Important differences (apart from presupposition): child-directed speech
 - *think*: often parenthetical, i.e. endorsing content
 - *know*: often with questions, a stable predictor of factivity (learning from environment called “syntactic bootstrapping”)
 - Much remains to be done and understood!

- Anand, P., J. Grimshaw, and V. Hacquard (2017). Sentence embedding predicates, factivity and subjects. In C. Condoravdi (Ed.), *Lauri Karttunen Festschrift*. CSLI.
- Anand, P. and V. Hacquard (2013). Epistemics and attitudes. *Semantics and Pragmatics* 6(8), 1–59.
- Anand, P. and V. Hacquard (2014). Factivity, belief and discourse. In L. Crnič and U. Sauerland (Eds.), *The Art and Craft of Semantics: A Festschrift for Irene Heim*, pp. 69–90. Cambridge, MA: MITWPL.
- Bade, N. (2021). On the scope and nature of *Maximise Presupposition*. *Language and Linguistics Compass* 15(6).
- Benton, M. A. (2016). Gricean quality. *Noûs* 50(4), 689–703.
- Bogal-Albritten, E. (2016). *Building Meaning in Navajo*. Ph. D. thesis, University of Massachusetts, Amherst.
- Bondarenko, T. (2020). Factivity from pre-existence: Evidence from Barguzin Buryat. *Glossa: a journal of general linguistics* 5(1).
- Cariani, F., P. Santorio, and A. Wellwood (2024). Confidence reports. *Semantics and Pragmatics* 17(14), 1–40.

References II

- Djäv, K. (2019). *Factive and assertive attitude reports*. Ph. D. thesis, University of Pennsylvania.
- Djäv, K. (2023). Knowing and believing things: What DP-complements can tell us about the argument structure and composition of (factive) attitudes. *Journal of Semantics* 40(2), 1–55.
- Djäv, K., J. Zehr, and F. Schwarz (2019). Cognitive vs. emotive factives: An experimental differentiation. In R. Truswell, C. Cummins, C. Heycock, B. Rabern, and H. Rohde (Eds.), *Proceedings of Sinn Und Bedeutung 21*, Volume 21, pp. 367–386. Open Journal Systems.
- Dudley, R. (2017). *The role of input in discovering presupposition triggers: figuring out what everybody already knew*. Ph. D. thesis, University of Maryland.
- Dudley, R. (2018). Young children's conception of knowledge. *Philosophy Compass* 13.
- Dudley, R., N. Orita, V. Hacquard, and J. Lidz (2015). Three-year-olds' understanding of *know* and *think*. pp. 241–262. Cham: Springer International Publishing.
- Dudley, R. and C. Vogel (2023). Knowledge, the concept *know*, and the word *know*: considerations from polysemy and pragmatics. *Synthese* 203(1).

References III

- Enç, M. (1996). Tense and modality. In S. Lappin (Ed.), *The Handbook of Contemporary Semantic Theory*, pp. 345–358. Oxford: Blackwell.
- Farkas, D. (1997). Evaluation indices and scope. In A. Szabolcsi (Ed.), *Ways of Scope Taking*, pp. 183–215. Dordrecht: Springer Netherlands.
- Geurts, B. (2019). Communication as commitment sharing: Speech acts, implicatures, common ground. *Theoretical Linguistics* 45(1-2), 1–30.
- Goldberg, S. (Ed.) (2020). *The Oxford Handbook of Assertion*. Oxford: Oxford University Press.
- Heim, I. (1991). Artikel und Definitheit [Articles and definiteness]. In A. von Stechow and D. Wunderlich (Eds.), *Semantik: Ein internationales Handbuch derzeitgenössischen Forschung*, pp. 487–535. Berlin: de Gruyter.
- Karttunen, L. (1973). Presuppositions of compound sentences. *Linguistic inquiry* 4(2), 169–193.
- Kaufmann, M. and S. Kaufmann (2020). Talking about sources. In M. Asatryan, Y. Song, and A. Whitmal (Eds.), *NELS 50: Proceedings of the Fiftieth Annual Meeting of the North East Linguistic Society*, Amherst, Massachusetts. GLSA.

References IV

- Kiparsky, P. and C. Kiparsky (1970). Fact. In M. Bierwisch and K. Heidolph (Eds.), *Progress in Linguistics*, pp. 143–173. Mouton de Gruyter.
- Koev, T. (2019). Strong beliefs, weak commitments. In T. M. Espinal (Ed.), *Proceedings of Sinn und Bedeutung 23*, Universitat Autònoma de Barcelona, Bellaterra (Cerdanyola del Vallès), pp. 557–574.
- Koev, T. (2025). An argument for a strong force semantics of *believe*. *Linguistic Inquiry*. Advanced publication.
- Kratzer, A. (2002). Facts: Particulars or information units? *Linguistics and Philosophy* 25, 655–670.
- Lackey, J. (2007). Norms of assertion. *Noûs* 41(4), 594–626.
- Mandelkern, M. and K. Dorst (2022). Assertion is weak. *Philosophers' Imprint* 22.
- Marsili, N. (2024). The definition of assertion: Commitment and truth. *Mind & Language* 39(4), 540–560.
- Močnik, M. (2019). Slovenian 'dopuščati' and the semantics of epistemic modals. In *Proceedings of Formal Approaches to Slavic Languages 27*.
- Močnik, M. (2025). *Strange Attitudes on Top*. Ph. D. thesis, MIT.

References V

- Močnik, M. and R. Abramovitz (2019). A variable-force variable-flavor attitude verb in Koryak. In J. J. Schlöder and D. M. and Floris Roelofsen (Eds.), *Proceedings of the 22nd Amsterdam Colloquium*, pp. 494–503.
- Musan, R. (1997). *On the Temporal Interpretation of Noun Phrases*. New York: Garland.
- Musan, R. (1999). Temporal interpretation and information-status of noun phrases. *Linguistics and Philosophy* 22(6), 621–661.
- Nagel, J. (2017). Factive and nonfactive mental state attribution. *Mind & Language* 32(5), 525–544.
- Ogihara, T. and Y. Sharvit (2012). Embedded tenses. In R. I. Binnick (Ed.), *The Oxford handbook of tense and aspect*, Chapter 22, pp. 638–668. OUP.
- Onishi, K. H. and R. Baillargeon (2005). Do 15-month-old infants understand false beliefs? *Science* 308(5719), 255–258.
- Özyıldız, D. (2017). Attitude reports with and without true belief. In D. Burgdorf, J. Collard, S. Maspong, and B. Stefánsdóttir (Eds.), *Proceedings of SALT 27*, pp. 397–417.

References VI

- Pagin, P. and N. Marsili (2025). Assertion. In E. N. Zalta and U. Nodelman (Eds.), *The Stanford Encyclopedia of Philosophy* (Fall 2025 ed.). Metaphysics Research Lab, Stanford University.
- Percus, O. (2000). Constraints on some other variables in syntax. *Natural Language Semantics* 8(3), 173–229.
- Phillips, J., W. Buckwalter, F. Cushman, O. Friedman, A. Martin, J. Turri, L. Santos, and J. Knobe (2021). Knowledge before belief. *Behavioral and Brain Sciences* 44.
- Phillips, J. and A. Norby (2019). Factive theory of mind. *Mind & Language* 36(1), 3–26.
- Rudin, D. (2019). Deriving a variable-strength *Might*. In N. Bade, P. Berezovskaya, and A. Schöller (Eds.), *Proceedings of Sinn Und Bedeutung 20*, pp. 587–603. Open Journal Systems.
- Steinert-Threlkeld, S., N. Imel, and Q. Guo (2023). A semantic universal for modality. *Semantics and Pragmatics* 16(1), 1–20.
- Uegaki, W. (Forth.). Modality and attitude verbs. In A. Arregui, V. Hacquard, and M. Ippolito (Eds.), *The Cambridge Handbook of Natural Language Modality*. Cambridge University Press.

References VII

- van Elswyk, P. (2025). Veridicality and the acquisition of *think*. *Linguistics and Philosophy* 48(2), 353–370.
- Willer, M. (Forth.). Modality, gradability and probability. In A. Arregui, V. Hacquard, and M. Ippolito (Eds.), *The Cambridge Handbook of Natural Language Modality*. Cambridge University Press.
- Williamson, T. (2000). *Knowledge and Its Limits*. Oxford: Oxford University Press.
- Wimmer, H. and J. Perner (1983). Beliefs about beliefs: Representation and constraining function of wrong beliefs in young children's understanding of deception. *Cognition* 13(1), 103–128.
- Wimmer, S. (2024). Belief-in is belief-that with affectivity and evidentiality. In G. Baumann, D. Gutzmann, J. Koopman, K. Liefke, A. Renans, and T. Scheffler (Eds.), *Proceedings of Sinn Und Bedeutung* 28, pp. 961–979.