Chapter 17

Projective content: Presuppositions and conventional implicatures

Edgar Onea
University of Graz

Anton Benz
Leibniz-Centre General Linguistics

This chapter deals with a group of sub-sentential meaning components that can be divided into two main groups: presuppositions and conventional implicatures. These include, for example, the factive meaning of certain clausal verbs, non-restrictive relative clauses, and parentheticals. This seemingly diverse group of phenomena is linked by common properties. The first is their *projective* behaviour. This means that their contribution to utterance meaning is not affected by embedding under truth-cancelling operators. The second is their status as *not-at-issue* content. This means, pre-theoretically, that they do not contribute to the speaker's main point. This chapter provides an overview of the phenomena and discusses approaches that attempt to sharpen the pre-theoretical notion of *at-issueness* in terms of subordination to a *question under discussion* (QUD). In particular, it discusses the extent to which the concept thus explicated helps to explain the projective behaviour of the individual phenomena.

1 Introduction

There are some phenomena that are included into virtually any introduction to the semantics-pragmatics interface. These include presuppositions, conventional implicatures, expressive content, information structure, and many more. Each of them comes with their own specific research topics and puzzles and each of these

Edgar Onea and Anton Benz. Projective content: Presuppositions and conventional implicatures. To appear in: Benz, Anton, Frey, Werner, Gärtner, Hans-Martin, Krifka, Manfred, Schenner, Mathias & Żygis, Marzena (eds.), Handbook of clausal embedding. Berlin: Language Science Press. [preliminary page numbering]

bundles of phenomena can be and has indeed been studied extensively in linguistic research over the past few decades within various frameworks. Oftentimes, however, the most successful theories are those that manage to bridge over individual phenomena and explain seemingly unrelated ones in a unified way. The main topic of this chapter is one of those ideas that has electrified research at the semantics-pragmatics interface by bringing together precisely the phenomena mentioned above.

Consider two fairly well-known cases: presuppositions illustrated in (1) and conventional implicatures introduced by non-restrictive relative clauses illustrated in (2).

(1) Skylar knows that Ashanti is very progressive.
   a. asserts: Skylar rightfully believes that Ashanti is very progressive.
   b. presupposes: Ashanti is very progressive.

(2) Josh told Ashanti, who is very progressive, a funny joke.
   a. asserts: Josh told Ashanti a funny joke.
   b. conventionally implicates: Ashanti is very progressive.

These two examples have something in common. In particular, if we were to embed them under some operator like negation, a modal operator or the antecedent of a conditional, the relevant asserted proposition is no longer entailed. However, the second entailment, the presupposed/conventionally implicated one, remains entailed. This is shown in (3). Such cases are usually known under the label of projection, i.e. presupposed and conventionally implicated content can *project*.

(3) a. Skylar does not know that Ashanti is very progressive.
      i. does not entail: Skylar rightfully believes that Ashanti is very progressive.
      ii. presupposes: Ashanti is very progressive.
   b. Skylar did not tell Ashanti, who is very progressive, a funny joke.
      i. does not entail: Josh told Ashanti a funny joke.
      ii. conventionally implicates: Ashanti is very progressive.

However, the two examples in (1) and (2) are also quite different in important ways. For example, one can assert (1) in a context in which the presupposed content has just been established, but not (2) in a context in which the conventionally implicated content has just been established. This is shown in (4). Further

differences that we do not elaborate upon here include differences with respect to binding of variables, speaker-orientation and more.

(4) a. Context: Did you know that Ashanti is very progressive?
b. Yes, and Skylar knows that Ashanti is very progressive.
c. Yes, and Ashanti (# who is very progressive) studied comparative literature.

The idea that we will explore in this chapter is the following: the projectiveness of these constructions has a common explanation that is widely independent of the syntactic (and semantic) peculiarities of the respective structures. In particular: all of the inferences that project are so-called not-at-issue inferences and they project for that very reason.

The intuition underlying this idea is this: when asserting (1) and (2), the speaker will usually not have the presupposed or conventionally implicated inferences as her main point. At an operational level, this means that this inference will not constitute the answer to the question the speaker may have had in mind when making the respective utterance, the so-called *question under discussion* (QUD).[1] Projection is claimed to be a side-effect of not being the answer to the question under discussion. This immediately raises the question of how not being the main point of an utterance actually leads to projection.

This will be the main topic of our investigation in this chapter. We adopt the following presentational strategy. In a first step, in Section 2 we introduce some of the main empirical phenomena that are usually discussed under the label of projection and explain their basic characteristics. Given the topic of this volume, we will try to limit our discussion to cases of clausal embedding modulo some phenomena that can at least be conceptualised as such, even if they are not prototypical cases. However, we will occasionally fail in this attempt for the simple reason that it is one of the main points of the theoretical approach we explore that many phenomena that seem remote and unrelated have in fact a common core. Hence, we will need to occasionally talk about epithets, appositives and other phenomena that really fall outside of clausal embedding. In the next step, in Section 3, we get into more technical details showing how the idea can be put in terms of a predictive theory and discuss some examples. This discussion will incorporate not only the question of what the QUD is and how it should

[1]The QUD is an important notion in many recent theories within formal pragmatics, developed among others by Klein & von Stutterheim (1987), van Kuppevelt (1995), Roberts (1996) and especially popular since Beaver & Clark (2008). We will return to this notion in Section 3 in more detail.

be modelled but also how exactly projection is predicted or not depending on the context. One of the important aspects of the discussion in this section is the exploration of possible implementations and limits of the theory that projection is based on not-at-issueness. In Section 4, we sum up the discussion of the features and limits of the theoretical approach discussed and outline some ways in which the main idea can be connected to some of the other approaches from the literature. Thereby, we suggest some possibilities for future research. Finally, the paper ends with some concluding remarks in Section 5.

Before concluding this introductory section, we need to point out that there are several very well-written books and overview articles on presuppositions that we want to mention here. Levinson (1983: Ch. 4) is a standard reference that summarizes the discussion up to the end of the 1970s. Beaver (1997) provides an excellent overview of the literature up to the end of the 1990s. It is particularly useful as a guide to the dynamic theories of Kartunen, Heim, and van der Sandt. There are very accessible accounts by Geurts (1999) and van der Sandt (2012) on the presupposition as anaphora account, which is embedded in *Discourse Representation Theory* (Kamp & Reyle 1993: DRT). The experimental literature has been reviewed by Schwarz (2019). Conventional implicature was introduced by Potts (2003, 2005). The phenomena are described exhaustively in Gutzmann (2013). Further accessible introductions to phenomena and theory are provided in (Liu 2012, Gutzmann 2015, 2019). In light of this, we do not make it our purpose to add to this body of literature; instead we focus on a detailed analysis of the relation of (not-)at-issueness and projection. Thus, the overview of the literature and theoretical discussions in Section 2 will remain limited and focus mainly on a comprehensive description of the main empirical facts.

2 Projective phenomena

2.1 What is projection?

What all linguistic phenomena that we address in this chapter have in common is that they involve *projective meaning*. The relevant *meaning* is a proposition that is implied by a certain *trigger*. For example, in (1), *Skylar knows that Ashanti is very progressive*, the verb *know* triggers the inference that the embedded proposition *Ashanti is very progressive* is true. Projective meaning is characterised by a peculiar property of these inferences:

(5) **Definition of projection** (Simons-Tonhauser-Beaver-Roberts).

An implication projects if and only if it survives as an utterance implication when the expression that triggers the implication occurs under the syntactic scope of an entailment-cancelling operator (Simons et al. 2010: 309)[2].

As an example let us consider (6). In the philosophical literature, *knowledge* is often identified with *justified true belief* (originally going back to Plato and more recently proposed, e.g. by Chisholm 1957, but see also Gettier 1963 and subsequent literature). Hence, one may be tempted to paraphrase *Skylar knows that* with *Skylar correctly/rightly believes that* and expect that (6a) and (6b) are almost synonyms.

(6) a. Skylar knows that Ashanti is very progressive.
b. Skylar correctly/rightly believes that Ashanti is very progressive.

For both (6a) and (6b), one would ordinarily infer that the speaker who utters (6a) or (6b) also believes that Ashanti is very progressive. However, when the sentences are negated, as in (7a) and (7b), then we see a difference between the two versions.

(7) a. Skylar does not know that Ashanti is very progressive.
b. Skylar does not correctly/rightly believe that Ashanti is very progressive.
c. Skylar does not believe that Ashanti is very progressive.

It can, pre-theoretically speaking, still be inferred from (7a) that the speaker believes that *Ashanti is very progressive*, whereas it is not possible to infer it from an utterance of (7b). An utterance of (7b) still implies that Skylar believes that Ashanti is very progressive. What is negated is that this belief is correct. If the adverbial is dropped, as in (7c), then there is a strong tendency to infer that Skylar believes that Ashanti is not very progressive, while nothing can be inferred about the beliefs of the speaker. Hence, although *know* and *correctly believe* may seem near synonyms, they turn out to behave differently when syntactically embedded under negation. As the proposition *Ashanti is very progressive* is entailed by both (6a) and (7a), where the trigger of this entailment is syntactically embedded under an entailment-cancelling operator, one says that it *projects*.

[2]This definition goes back to a large body of literature, primarily the *family-of-sentences* test proposed in Chierchia & McConnell-Ginet (1990), which involve the embedding under entailment-cancelling operators, as shown below, viz. examples (8) and (9).

From the perspective of clausal embedding, projection is the most interesting property of the linguistic phenomena that are discussed in this chapter.

Embedding under negation is the traditional test for projective meaning. Besides embedding under negation (8a), the most widely used ones are embedding under epistemic operators (8b), embedding in an antecedent of a conditional (8c), and embedding in questions (8d).

(8) a. **Negation**: Skylar does not know that Ashanti is very progressive.
b. **Epistemic operators**: It is possible that/Maybe/Probably Skylar knows that Ashanti is very progressive.
c. **Antecedent of conditionals**: If Skylar knows that Ashanti is very progressive, she will be at her party.
d. **Questions**: Does Skylar know that Ashanti is very progressive?

As in the case of negation, speakers of English would agree that normally someone who says (8b), (8c), or (8d) must believe that the proposition embedded under *know*, i.e. *that Ashanti is very progressive*, is true. If *know* is replaced by *believe*, then this is not the case any more:

(9) a. **Negation**: Skylar does not believe that Ashanti is very progressive.
b. **Epistemic operators**: It is possible that/Maybe/Probably Skylar believes that Ashanti is very progressive.
c. **Antecedent of conditionals**: If Skylar believes that Ashanti is very progressive, she will be at her party.
d. **Questions**: Does Skylar believe that Ashanti is very progressive?

If a proposition p entails q, then *not* p, *possibly* p, *if* p, and p*?* do not entail q. The definition in (5) says that an inference $p \Rightarrow q$ is called *projective meaning* if it has the surprising property of surviving these embeddings. The notion goes back to Langendoen & Savin (1971). The tests in (8) and (9) are collectively known as the *family-of-sentences diagnostic* (Chierchia & McConnell-Ginet 1990: 29f). In the following, we consider two types of projective meaning that have been extensively discussed in the literature: *presuppositions* and *conventional implicature*. Examples of presuppositions are the inferences from the factive *know* p to p or from the definite description *the dog* to the existential *there exists a dog*. An example of a conventional implicature is the inference that the speaker who uses the expressive adjective in *the damn book* has a dislike of the book. In the next section, we address presuppositions. In Section 2.3 we consider the main phenomena related to conventional implicature. These are two broad classes of

phenomena. In Section 2.4 we address the issue of whether there are projective phenomena that do not fall under the labels of presupposed or conventionally implicated content. We present a proposal by Tonhauser et al. (2013) that addresses this issue. They sub-divide projective phenomena into four classes based on two semantic conditions.

2.2 Presuppositions

2.2.1 Defining presuppositions

The modern notion of *presupposition* can, at least, be traced back to Frege (1892). For Frege, a presupposition (*Voraussetzung*) is a proposition that must be true for a sentence to have a truth value. The presupposition has to be distinguished from what a sentence *asserts*. For example, the sentence in (10) presupposes that there is someone who discovered the elliptic form of the planetary orbits and asserts that this person died in misery.

(10) Whoever discovered the elliptic form of the planetary orbits died in misery.

As it was Kepler (1609/1937) who discovered the elliptic form of planetary orbits, sentence (10) is true if, and only if, Kepler died in misery. If the presupposition of (10) is false, i.e. if the elliptic form of the planetary orbits had never been discovered, then it is not clear which truth value to assign to (10), the intuitive reason being that it is unclear what the sentence asserts.[3] The same intuition provides a reason for why presuppositions survive embedding under entailment-cancelling operators: the embedding operator targets the asserted content; it can only target the asserted content if the content is a well-defined proposition; it can only be a well-defined proposition if its presuppositions are satisfied; hence, embedding under an operator can only be felicitous if the presuppositions are true.

It is far from obvious, however, that all phenomena that are traditionally subsumed under the notion of *presupposition* fall under Frege's concept of a *Voraussetzung* that has to be satisfied for a sentence to have a well-defined truth value. For example, the sentence (6a) *Skylar knows that Ashanti is very progressive* presupposes the proposition that *Ashanti is progressive* and asserts that Skylar believes it. However, the truth of the presupposed part is not a requirement for the

[3] For simplicity's sake, we follow here Strawson (1950) who argued that sentences like (10) lack a truth-value if the definite description has no referent. There was a famous debate between him, Russell (1905, 1919), and others about this issue.

asserted proposition to have a truth value. It seems rather that the speaker who says (6a) takes it for granted that the presupposed proposition is true. Stalnaker (1974) distinguished between *semantic* presuppositions, which are a property of *sentences* and correspond to the Fregean conception, and *pragmatic* presuppositions which are propositions that the speaker assumes to be shared beliefs between her or him and the addressee. Stalnaker shows that semantic presuppositions are also pragmatic presuppositions if one assumes that speakers normally assert sentences only if they have well-defined truth conditions. For example, if someone asserts (10), then she or he must assume that it is shared knowledge between speaker and hearer that the Fregean presupposition that *there is someone who discovered the elliptic form of planetary orbits* is true. Hence, the semantic presupposition of (10) is also a pragmatic presupposition.

2.2.2 Presupposition triggers

The issue of how to define the notion of *presupposition* is notoriously difficult, and it is safe to say that there is no universally accepted candidate. There is, however, a core of phenomena for which there is a general agreement that they *trigger* presuppositions. This means that they are linguistic constructions where an asserted and a presupposed proposition can be distinguished. The constructions can be divided into semantic and syntactic presupposition triggers. In the following list, we indicate the presupposition by $\gg$.

(11)
a. **Definite Descriptions**
The King of France is bald. $\gg$ There is a King of France.
The φ $\gg$ There exists an x such that $\varphi(x)$ is true.

b. **Possessives**
Toni and Niki come with their children. $\gg$ Toni and Niki have children.
P *poss* x $\gg$ There exists an x such that P possesses x.

c. **Quantifiers**
Every/Some/No Athenian is wise. $\gg$ There are Athenians.
Similar: *most, many, few, etc.*

d. **Factive Verbs**
Skylar *knows* that Ashanti is progressive. $\gg$ Ashanti is progressive.
Also: Skylar *discovered/noticed/accepts/regrets/etc.* that $\varphi \gg \varphi$ is true.

e. **Aspectual Verbs**
Ashanti *stopped* smoking. $\gg$ Ashanti smoked before.
Similar: *began, started, ceased, continued.*

f. **Implicative Verbs**
Sasha *managed* to open the door. ≫ Sasha tried to open the door.
Similar: Sasha *failed to V* ≫ Sasha tried to V;
Sasha *forgot/remembered to V* ≫ should have Ved.

g. **Iteratives**
Niki visited me *again*. ≫ Niki visited me before.
Similar: *a second time, before*; also: Niki visited me *too*.

h. **Clefts and Pseudo–clefts**
It was Bilge who wrote the programme. ≫ Someone wrote the programme.
What Bilge did was write the programme. ≫ Bilge did something.

In this list, only factive verbs embed a finite clause. Definite descriptions, possessives, quantifiers, and clefts trigger an *existence* presupposition (*there exists …*). Sometimes, pronouns are also counted among the triggers of existence presuppositions (it is on the shelf ≫ something is on the shelf).

If the family-of-sentence-test is applied to them, it can be seen that the presuppositions do project. In (12), this is demonstrated for a cleft sentence. In each case, the addressee can infer the presupposition that there is someone who wrote the programme.

(12) a. **Negation**: It wasn't Bilge who wrote the programme.
b. **Epistemic operators**: It is possible that it was Bilge who wrote the programme.
c. **Antecedent of conditionals**: If it was Bilge who wrote the programme, she will get a reward.
d. **Questions**: Was it Bilge who wrote the programme?

There is also an important test that is normally used to target specifically presuppositions. It is the *hey-wait-a-minute*-test (von Fintel 2004). While this test was not originally designed to distinguish presuppositions from other projective content, but rather from assertions, it works best for presupposed content. In von Fintel's example (13) it is applied to a sentence containing a definite description.

(13) A: The mathematician who proved Goldbach's Conjecture is a woman.
B: Hey, wait a minute. I had no idea that someone proved Goldbach's Conjecture.
B': #Hey, wait a minute. I had no idea that that was a woman.

The idea is that an addressee who disagrees about the presupposition of an utterance cannot simply reply with *no*. Negation can only target asserted content. *Hey, wait a minute* is a device that indicates that the reply targets something else. The contrast between B and B' shows that *hey, wait a minute* can introduce an objection to the presupposed content of an utterance, but not the asserted one.

2.2.3 Properties of presuppositions

Presuppositions have properties that would normally classify them as pragmatic in nature. The semantic meaning of a linguistic construction that contains no anaphoric or deictic element is context-independent. If presuppositions are a purely semantic phenomenon, then a linguistic trigger should create the presupposition whatever the context is. In the early semantic theory of Langendoen & Savin (1971), presuppositions are locally triggered by lexical or syntactic elements, and automatically projected to the global utterance context. What is locally embedded is only the asserted part; the presupposition becomes a presupposition of the global utterance. There are, however, cases that show that presuppositions are context-sensitive, and do not automatically project. For example, none of the following sentences presupposes that Bilge wrote a programme:

(14) a. If anybody managed to write the programme, then it was Bilge who did it.

b. Either no one wrote the programme, or it was Bilge who did it.

In response to these examples, Karttunen (1973) proposed general rules that specify when presuppositions triggered in embedded clauses become presuppositions of the embedding sentence. For example, if a presupposition is triggered in the consequent of a conditional, then it projects (becomes a presupposition of the whole conditional) if the truth of the antecedent does not entail the presupposition. This rule explains why the presupposition triggered by the cleft sentence in the consequent of (14a), that someone wrote the programme, does not become a presupposition of the whole conditional: if the antecedent is true, then the presupposition is entailed by it.

In (14), the features that cancel the presupposition are sentence-internal. Presuppositions can, however, also be cancelled by features of the wider discourse context, which points to their pragmatic nature. In the following example the critical implicature trigger is the factive verb *aware* (see also Levinson 1983: 189f).

(15) A: Well, I simply want to know whether Bilge wrote the programme.

B: The only person who would know for sure is Imani; I've talked to him, and he isn't aware that Bilge wrote the programme. So I think that she didn't write it.

In B's response, *aware* triggers the presupposition that *Bilge wrote the programme*. The trigger is embedded under negation in a conjunction, hence, according to standard assumptions, it should project. However, it does not. The context makes clear that the speaker B does not know whether Bilge wrote the programme or not. Examples like these show that presupposition cancellation cannot be explained purely on syntactic and semantic grounds.

Since Karttunen's seminal work, a wide variety of theories has been developed that tried to explain when and why presuppositions of embedded clauses project. All of them consider a mixture of semantic and pragmatic factors that can lead to activation, cancellation, or non-activation of presuppositions (e.g. Karttunen 1974, Gazdar 1979, Karttunen & Peters 1979, Heim 1983, 1992, van der Sandt 1992, Geurts 1999, Beaver 2001; see also Singh 2020 for a recent overview). In the new millennium, a novel kind of explanation emerged that explained presupposition projection on information-theoretic grounds. The core ingredient is the *question under discussion* that dominates a sentence or a stretch of discourse (Simons et al. 2010, Tonhauser et al. 2013, Simons et al. 2017). These accounts will be the main topic of Section 3.

2.3 Conventional implicatures

The term *conventional implicature* was coined by Grice (1975). It denoted meaning of linguistic expressions that is conventionalised but not truth-conditionally relevant. Examples are connectives like *but* and *therefore*. In the sentence *It is beautiful but expensive*, the truth-conditional contribution of *but* is equivalent to that of *and*. In addition, it signals a contrast between the two connected propositions and makes an argumentative contribution by weighing the second proposition more than the first. As conventional implicatures have no effect on truth conditions, it was widely held that their proper place is in pragmatics and not semantics. This changed with the influential work of Potts (2005). As conventional implicatures are *conventional*, as the name says, he argued that the proper place for studying them is in an extended framework of compositional semantics. Before sketching this framework, we first consider general properties of conventional implicatures and linguistic phenomena that have been identified there.

To build up some intuition about conventional implicatures, we consider the expressive adjective *damn* in (16) (see Potts 2005: 17).

(16) We bought a new electric clothes dryer [...] Nowhere did it say that the *damn* thing didn't come with an electric plug!

The word *damn* clearly contributes lexical meaning to the sentence. *The damn N* can be paraphrased as: the speaker is frustrated by whatever *the N* refers to. As lexical meaning, it is by definition a form of conventional meaning, i.e. meaning that is attached to the linguistic material and understood by language speakers just on the basis of this material. Furthermore, conventional implicatures are not cancellable, in contrast to presuppositions and conversational implicatures. In Potts's words, the speaker is committed to their conventional meaning. As the meaning can be paraphrased by a declarative sentence, it can be represented by a proposition that allows for further inferences. The main difference between conventional implicature and asserted truth-conditional content of a sentence is their deletability: if *damn* is deleted from the sentence, as in (17), then the shortened sentence states the same fact as the original one, i.e. both variants are true or false in the same contexts.

(17) Nowhere did it say that the thing didn't come with an electric plug!

The non-cancellability is demonstrated by the following examples:

(18) a. #Nowhere did it say that the damn thing, if it is indeed the case that the thing is frustrating, didn't come with an electric plug..
b. #Nowhere did it say that the damn thing didn't come with an electric plug; but, in fact, the thing is not frustrating.

Potts himself defines *conventional implicatures* (CIs) as follows (Potts 2005: 24; see also Potts 2003: 2):

(19) **Properties of conventional implicature**
a. CIs are part of the conventional meaning of words.
b. CIs are commitments, and thus give rise to entailments.
c. These commitments are made by the speaker of the utterance 'by virtue of the meaning of' the words he chooses.
d. CIs are logically and compositionally independent of what is 'said (in the favored sense)', i.e. independent of the at-issue entailments.

Compositional independence causes a problem for semantics. The expressive adjective *damn* is syntactically part of the determiner phrase *the damn thing*. The adjective takes the meaning of *thing* and delivers an expressive proposition. The

article *the*, however, ignores the adjective and only combines with the meaning of the noun *thing* to deliver a referent for further compositional meaning computation. As the expressive proposition is not involved in these further computations, it remains unbound and floats above the meaning of the remaining sentence. Christopher Potts, and others after him (McCready 2010, Gutzmann 2015), therefore, developed a *hybrid* semantics with a two-layered representation of meaning, where the lower layer represents truth-conditional meaning, and the higher layer expressive content. Potts also introduced the notion of *at-issue* content for the truth-conditional content of a sentence, which is set in opposition to the *expressive* content. Both types of content can be represented as propositions. In standard model-theoretic semantics, a proposition is a set of *possible worlds*: the set of worlds in which the sentence that expresses the proposition is true, which is usually called the *truth-conditional meaning*. Gutzmann (2013) proposed to represent the expressive or use-conditional content in parallel fashion by a set of *utterance contexts*, and called it the *use-conditional* meaning of a sentence.

The carriers of conventional implicatures are syntactically but not semantically integrated in the sentences. In contrast to Fregean presuppositions, they are not necessary for calculating truth conditions of their surrounding hosts. With respect to clausal embeddings, conventional implicatures pose a problem similar to presuppositions: they are predominantly not represented by clauses but have a meaning that has to be paraphrased by a full sentence. So, even if the carrier of the conventional implicature is not sentence-like, on another layer, there is a full proposition embedded. In the following, we concentrate on clausal carriers of conventional implicatures, and on *appositives* as an example of a non-sentential carrier with clause-like semantics.

Potts (2005) distinguished between two broad classes of phenomena: *supplements* and *expressives*. Supplements comprise non-restrictive relative clauses, appositives, and parentheticals. Potts also subsumed certain adverbs under supplements (Potts 2005: 90):

(20) **Types of supplementary conventional implicatures**

a. Ames, a successful spy, is now behind bars. (*nominal appositive*)

b. Ames was, as the press reported, a successful spy. (*as-parenthetical*)

c. Ames, who was a successful spy, is now behind bars. (*supplementary relative*)

d. Amazingly, they refused our offer. (*speaker-oriented adverb*)

e. Thoughtfully, Ed destroyed the evidence for us. (*topic-oriented adverb*)

f. Just between you and me, Aldo is a dangerous spy.
(*utterance-modifying adverb*)

Among them, only parentheticals and non-restrictive relative clauses (NRRC, Potts's *supplementary relative*) embed a clause on surface level. The nominal appositive in (20a) is semantically equivalent to the NRRC in (20c), so that there is a semantically embedded proposition. The NRRC and the appositive take a nominal (*Ames*) from their host sentence as argument. The adverbs, and also the parenthetical, however, take as argument the whole proposition that is expressed by their host. Hence, they are embedding a clause, but not being embedded by a clause. From a semantic perspective, the meaning of the adverbs can be represented as properties of utterance contexts. For the given example, this is also plausible for the parenthetical (20b). For the meaning of the nominal appositive and the NRRC this is, however, not plausible. Their meanings are propositions of the same type as the propositions representing asserted content. In general, asparentheticals also do not express properties of the utterance context but truth-conditional meaning, as can be seen in (21).

(21) Ames, as a successful spy, was a respected employee of the secret service.

Expressives in the narrow sense are, for example, expressive adjectives (*damn*), honorifics (*Sir*), ethnic slurs (*Lessing is a Kraut*; Kraut = derogatory for German), and interjections as, for example, *ouch*.[4] They can broadly be considered as expressing properties of the utterance situation, for example, as propositions about speaker attitudes. Expressives are not clausal and, although they may take arguments, for example expressive adjectives, they are not clause embedding.

Some interjections and particles arguably take propositional arguments:

(22) a. Man, that is hot! (*interjectional use of* man)
b. Riku ist *wohl* in Japan. (*particle*, German)
Riku is *perhaps* in Japan.

The interjectional *man* intensifies the gradable adjective *hot* and turns the whole utterance (22a) into an expressive exclamative. With the German modal particle *wohl* in (22b), the speaker communicates that she/he assumes that the asserted proposition is true, without being certain about it.

[4]For a thorough overview, see Gutzmann (2013). For expressive adjectives see Liu (2012).

2.4 A classification of projective content

Potts (2005) distinguished between *at-issue* and *not-at-issue* content of utterances. The distinction was mainly an intuitive one. In later research, however, an attempt was made to give it a precise meaning. Simons et al. (2010) proposed to equate at-issue content with that part of a sentence that answers a possibly implicit *question under discussion* (QUD). The not-at-issue content can then be considered as the material that is not answering the QUD. This lead to the following proposal about projective content (Simons et al. 2010: 315):

(23) Hypotheses about what projects and why
   a. All and only those implications of (embedded) sentences which are not-at-issue relative to the question under discussion in the context have the potential to project.
   b. Operators (modals, negation, etc.) target at-issue content.

The condition in (23b) says that not-at-issue content is ignored by embedding truth-conditional operators. This entails that not-at-issue content is ignored by further calculations of compositional meaning. This is a generalisation of Potts's observation that expressive content is logically and compositionally independent of what is asserted. The qualification *have the potential* in the (23a) condition says that being not-at-issue is a necessary condition for projection, but not a sufficient one. For content to actually project, further pragmatic conditions have to be satisfied. These conditions will be discussed in more detail in Section 3.

We have seen two large groups of projective phenomena: presuppositions and conventional implicatures. Both the presuppositions of a sentence and its expressive and supplementary content are not-at-issue and, hence, are not answering the (implicit) QUD to which the asserted content answers. Based on this insight, Tonhauser et al. (2013) proposed a taxonomy of projective phenomena on the basis of two conditions: the satisfaction of a *strong contextual felicity constraint* and the existence of *obligatory local effects*. The taxonomy classifies items t for which the family-of-sentences diagnostic shows that t triggers projective content m, where m is some proposition. Tonhauser et al. (2013: 75) distinguish between two types of contexts that they called m-positive and m-neutral contexts. An m-positive context is a context in which it is known that m is true, and an m-neutral context is an utterance context in which it is both possible that m is true or that it is false. If an occurrence of trigger t is felicitous only if the utterance context makes clear that m holds, then t satisfies the *strong felicity* constraint (Tonhauser et al. 2013: 76):

(24) **Strong contextual felicity constraint**: If utterance of trigger t of projective content m is acceptable only in an m-positive context, then t imposes a strong contextual felicity constraint with respect to m.

Examples are pronouns that presuppose the existence of a referent, and the English particle *too* that presupposes an alternative, e.g. *Ashanti came too* presupposes that someone else than Ashanti also came. Clausal or clause embedding triggers, for example factive verbs, non-restrictive relative clauses, the focus particle *only*, and aspectual verbs come without strong contextual felicity constraints.

The next condition is satisfied if projected content m is semantically embedded under belief operators that embed the trigger t (Tonhauser et al. 2013: 93):

(25) **Obligatory local effect**: A projective content m with trigger t has obligatory local effect if and only if, when t is syntactically embedded in the complement of a belief-predicate B, m necessarily is part of the content that is targeted by, and within the scope of, B.

The existence presuppositions of pronouns and the particle *too* are embedded under belief operators and therefore satisfy this condition:

(26) Dayo believes that *it* is in the drawer *too*.
$\rightsquigarrow$ Dayo believes that something is in the drawer.
$\rightsquigarrow$ Dayo believes that something else but the referent of *it* is also in the drawer.

Among clausal or clause embedding triggers, some have obligatory local effects, and some do not. For example, non-restrictive relative clauses do not have them:

(27) Dayo believes that Ames, a successful spy, is now behind bars.
$\not\rightsquigarrow$ Dayo believes that Ames is a successful spy.

Factive verbs, the focus particle *only*, and aspectual verbs, for example *stop*, have obligatory local effects:

(28) a. Dayo believes that Ashanti knows that Riku is in Japan.
$\rightsquigarrow$ Dayo believes that Riku is in Japan.

b. Dayo believes that only Riku is in Japan.
$\rightsquigarrow$ Dayo believes that nobody else but Riku is in Japan.

c. Dayo believes that Bilge stopped programming.
$\rightsquigarrow$ Dayo believes that Bilge programmed before.

By cross-classification, Tonhauser et al. (2013) predict the existence of a class of projective phenomena that satisfy the strong contextual felicity constraint but do not have obligatory local effects. This is a small class of phenomena, none of which are clausal or clause embedding.

3 Interaction between at-issueness and projection

With this background we turn to the question raised in the introductory section: Is there a common explanation for projection across the categories shown in Section 2.4? As suggested in the introduction, we shall explore whether at-issueness as a semantic/pragmatic category can explain projection in a unified way, as suggested by Simons et al. (2010) and subsequent literature.

We start by briefly introducing the core idea that it is the not-at-issue status of an entailed inference that is responsible for projection. The core hypothesis is postulated in (5), repeated as (29) (Simons et al. 2010: 315).

(29) **The Simons-Tonhauser-Beaver-Roberts projection hypothesis**

a. All and only those implications of (embedded) sentences which are not-at-issue relative to the question under discussion in the context have the potential to project.

b. Operators (modals, negation, etc.) target at-issue content.

This formulation contains two aspects that we will ignore for now. Firstly, the hypothesis does not state that, whenever an implication is not-at-issue, it will invariably project, but merely that it has the potential to project. Essentially, this only guarantees that at-issue inferences do *not* project. However, usually, scholars interpreted the hypothesis as a biconditional: all and only embedded not-at-issue inferences project. This is partly because it is not obvious what would stop something that has the potential to project from projecting if operators do not. We will also not focus particularly on the second part of the thesis in this paper. This is in part because we are not aware of a complete compositional implementation of the theory within which this claim can be fully evaluated, but see compositional implementations in AnderBois et al. (2015) and the more recent Koev (2022) for a compositional implementation for a subset of the cases.

Focusing then on the core of the projection hypothesis, two important questions come to mind that need to be addressed, as well as a third one that emerges from the answers to the first two questions.

The first question is this: when exactly is an inference at-issue? How can we know? This is in fact not a trivial question and there are some misunderstandings

that need to be addressed in this paper. We deal with this question in Section 3.1. The second question is an elaboration on the biconditional nature of the generalisation: If it holds that what projects is not-at-issue, and that what is not-at-issue projects, then what is really the part that needs to be explained? Are, for example, presupppositions inferences that *want* to project but at-issueness prevents them from doing so, or are presuppositions entirely harmless inferences that are sent on to the way of projection precisely by their not-at-issue status? Whether and how the second part of the theory stated in (29) can help here will be discussed in Section 3.2.

3.1 What is at-issueness?

If one looks at the literature after the dissertation of Potts (2005) and especially Simons et al. (2010), it would seem that at-issueness has become a central topic at the semantics-pragmatics interface. It seems to play a role in quite a range of seemingly unexpected places. We name just a few of the domains in which it is being applied: semantics of it-clefts (Velleman et al. 2012, Destruel 2013, DeVeaugh-Geiss et al. 2018), word order in embedded sentences in German (Antomo 2016), or discourse coherence (Hunter & Asher 2016). Also, like a veritable it-girl, it is not only everywhere but there are also some reservations with which the success story is being viewed. Part of the problem boils down to a simple question: how do we know what is at-issue and what is not?

Koev (2018, 2022) discusses at length a range of possible notions of at-issueness alongside specific empirical tests for these notions. He distinguishes at least between Q-at-issueness, which is essentially the notion that both we use in this paper and Koev (2022) adopts eventually, P-at-issueness (essentially referring to propositions that have been proposed for a discourse update, e.g. in Farkas & Bruce 2010 but whose discourse acceptance or rejection is not yet settled, cf. Murray 2014, AnderBois et al. 2015 and others), and C-at-issueness (essentially reducing to the right frontier in *Segmented Discourse Representation Theory*, SDRT, see Asher & Lascarides 2003, Hunter & Asher 2016). We will ignore the notion of C-at-issueness in this paper since it is not connected to the notion of projection, even though it has important merits in discourse structuring.

Syrett & Koev (2015) use the anaphoric potential of propositions as a diagnostic for at-issueness, essentially targetting P-at-issueness. For example, in (30) the speaker B's contradiction can only target the proposition asserted by the main clause, but not the one expressed by the non-restrictive relative clause. This is often called the dissent diagnostics, cf. Amaral et al. (2007). Importantly, Syrett & Koev (2015) argue that – among others – based on this test, one could show that

in fact sentence final non-restrictive relative clauses can be at-issue, as shown in (31); however this only applies to the P-at-issue status.

(30) A: Skylar, who is on vacation in South Africa, is a big fan of Joe.
B: That is not true, she is not a fan of Joe.
B: #That is not true, she is in Mongolia.

(31) A: Skylar is a big fan of Joe, who is on vacation in South Africa.
B: That is not true, she is not a fan of Joe.
B: That is not true, he is in Mongolia.

Syrett & Koev (2015) suggest that double-questions are a reasonable diagnostic for what it means for an inference to be at-issue, this time clearly targeting Q-at-issueness.

(32) a. Where is Skylar and whom does she vote for?
b. # Skylar, who is on vacation in South Africa, is a big fan of Joe.
c. The greatest fan of Joe is Skylar, who is on vacation in South Africa.

However, Snider (2018) suggests that all the at-issueness diagnostics used by Syrett & Koev (2015) to show that sentence-final non-restrictive relative clauses can be at issue may allow for independent explanations, either involving more elaborate discourse structures or independently motivated anaphoric properties of propositions.

Another diagnostic that has been suggested, for example in Tonhauser et al. (2018), is the rephrasing of a polar question that focuses on the *main* partition introduced by the question, or put differently, on finding the primary speech act performed by the speaker. Accordingly, in the example (33), (33a) is expected to be dispreferred as a paraphrase of the speech act performed by Patrick as compared to (33b).

(33) Patrick asks: Was Martha's new car, a BMW, expensive?
a. Is Patrick asking whether Martha's new car is a BMW?
b. Is Patrick asking whether Martha's new car is expensive?

With all existing diagnostics discussed above, it is not entirely obvious whether they are actually based on the definition of at-issueness, understood as Q-at-issueness (in fact at least for the assert-dissent-test, Koev 2022 actually agrees that it targets a different notion of at-issueness), or whether both the diagnostics and the definition are attempts to capture some deeper intuitive notion.

This is surely a problem. Two remarks, however, are in order: firstly, the diagnostics do for better or worse correlate with the range of phenomena that have been claimed to be at-issue and not-at-issue respectively. Moreover, especially Tonhauser et al. (2018) convincingly argue that when it comes to experimental settings, both at-issueness and projection appear to be gradient notions. Whether or not these are intrinsically gradient or whether the gradience comes from the variability with which participants in experiments interpret utterances in the existing context or imagine a non-given one, remains to be seen in future.

For the purposes of this overview paper, we will focus on the main definition of at-issueness given in Simons et al. (2010), as in (34) (Simons et al. 2010: 317) and the respective auxiliary definition in (35) (Simons et al. 2010: 316).

(34) **The Simons-Tonhauser-Beaver-Roberts definition of at-issueness**. A proposition p is at-issue relative to a question Q iff ?p is relevant to Q.

(35) **Relevance to the QUD**

a. An assertion is relevant to a QUD iff it contextually entails a partial or complete answer to the QUD.

b. A question is relevant to a QUD iff it has an answer which contextually entails a partial or complete answer to the QUD.

We show the workings of the definition using a conjunction as an example, as in (36).[5]

(36) Q: Who danced?

A: Ashton smoked and Jaden danced.

Now, the theory itself does not specify a particular account of questions and answers, but for explicitness, we assume that questions are modelled as sets of Hamblin alternatives (cf. Hamblin 1973 and Onea & Zimmermann 2019 for a recent overview) and these alternatives are in fact the possible answers to the question. Hence, we model (36) as $\{\lambda w.danced(x,w) | x \in C\}$ for some contextually given domain C of individuals. We further consider the at-issue status of the following four entailments of (36).

(37) a. Ashton smoked = $\lambda w.smoked(A,w)$

b. Jaden danced = $\lambda w.danced(J,w)$

c. Jaden danced and Ashton smoked = $\lambda w.danced(J,w) \wedge smoked(A,w)$

d. Jaden danced or Ashton smoked = $\lambda w.danced(J,w) \vee smoked(A,w)$

[5]Thereby, we note in passing that the a. part of the definition in (35) is not necessary, as the relevance of an assertion plays no further role in the theory.

By definition, a proposition p is relevant to the QUD Q if $?p$ is relevant to Q. The relevant relations between the two questions are given in (38). Thereby, we use the symbol $\cong$ for relevance of a question to another question.

(38) a. $\{\lambda w.smoked(A,w), \lambda w.\neg smoked(A,w)\} \ncong \{\lambda w.danced(x,w) | x \in C\}$
b. $\{\lambda w.danced(J,w), \lambda w.\neg danced(J,w)\} \cong \{\lambda w.danced(x,w) | x \in C\}$
c. $\{\lambda w.danced(J,w) \wedge smoked(A,w), \lambda w.\neg danced(J,w) \vee \neg smoked(A,w)\} \cong \{\lambda w.danced(x,w) | x \in C\}$
d. $\{\lambda w.danced(J,w) \vee smoked(A,w), \lambda w.\neg danced(J,w) \wedge \neg smoked(A,w)\} \overset{?}{\cong} \{\lambda w.danced(x,w) | x \in C\}$

Let us consider (38a) first. Here, the polar question has two alternatives. It is relevant to the QUD if at least one of these answers (contextually, but we ignore this part here) entails one of the question alternatives of the QUD. Thus, we have to check whether any of the following holds:

(39) a. $\lambda w.smoked(A,w) \subseteq X$ for some X in $\{\lambda w.danced(x,w) | x \in C\}$
b. $\lambda w.\neg smoked(A,w) \subseteq X$ for some X in $\{\lambda w.danced(x,w) | x \in C\}$

Since neither is the case – unless very special contextual rules apply – we can conclude that *Ashton smoked* is indeed not-at-issue. By using similar steps, we can easily check that *Jaden danced* is indeed at-issue, as it is identical to one of the question alternatives. Moreover, we can show that *Jaden danced and Ashton smoked* as a conjunction is also at-issue, since it entails that Jaden danced. Finally, the disjunction *Jaden danced or Ashton smoked* is more complicated. Here, we can establish that the positive alternative is not relevant, as it does not entail any of the QUD-alternatives. When it comes to the negated version, the situation is more complicated. In particular, although the negated disjunction still does not entail any individual question alternative directly, as shown in (40), it does entail the negation of one of the question alternatives when rewritten as a conjunction of negations.

(40) $\lambda w.\neg danced(J,w) \wedge \neg smoked(A,w) \models \lambda w.\neg danced(J,w)$

If, for example, we assume that the question *Who danced* presupposes that someone danced, then it follows that someone other than Jaden danced. Then, at least a disjunction of a proper subset of the question alternatives is entailed. If, however, we do not take the question to presuppose that someone danced, it is hard to show that (37d) or its negation license any entailment regarding

the question alternatives. Since our discussion, is of course, limited by our decisions above regarding question alternatives, and since the intuitions are also not entirely clear, we leave it undecided whether the disjunction is at-issue or not, marked by the question marks in (38d).

Let us then use the example in (41) to check the predictions regarding projection. For this, we embed the conjunction under an entailment-cancelling operator such as *it is possible that*.

(41) A: Who danced?
B: It is possible that Jaden danced and Ashton smoked.

Applying the theory bluntly, *Ashton smoked* should project, *Jaden danced* should not project, and *Ashton smoked and Jaden danced* should also not project. It remains somewhat unclear whether the disjunction *Ashton smoked or Jaden danced* is predicted to project, since it is uncertain whether it is at-issue. Importantly, it is not obvious that the inference that *Ashton smoked* (or the disjunction) projects in (41). Hence, we have an example of at least one not-at-issue inference that fails to project. We would then like to know why. Yet, an anonymous reviewer correctly points out that the acceptability of the answer in (41) is questionable altogether, which may raise doubts about the conclusiveness of the example.

However, the problems do not stop here: let us consider another example, (42), explicitly discussed in Simons et al. (2010).

(42) Q: Why aren't you inviting any boys from your class to the party?
A: I don't like the boys in my class.

Here, according to Simons et al. (2010), the inference that there are boys in the speaker's class is in fact at-issue since the negation of this information, i.e. there are no boys in the class, would answer the QUD (in fact it would provide a complete answer to the QUD) in (42). Still, arguably, the inference that there are boys in the class projects in this case. Hence, we also have an example in which the at-issue inference projects.

The way Simons et al. (2010) address this question is by revising the definition of at-issueness somewhat. The revised definition is in (43):

(43) a. A proposition p is at-issue iff the speaker intends to address the QUD via ?p.
b. An intention to address the QUD via ?p is felicitous only if:

i. ?p is relevant to the QUD, and
ii. the speaker can reasonably expect the addressee to recognise this intention.

This definition leaves quite a bit of space for interpretation. However, it allows the following solution to the problem in (42): The proposition that there are boys in the class could in principle address the QUD but it is not intended to answer the QUD. There are in fact several reasons for this. One is that there is a more direct and more complete answer which is entailed: the speaker does not like the boys. In fact, if there were no boys in the class, this sentence would not even make sense. Another one is that a definite description is conventionally marked to not address the QUD by its existence presupposition:[6]

(44) Q: Is Kim a bachelor?
A: Her wife is talking with Michael and Jada in the living room.

Returning to (41), it is not really obvious how the revised version of the theory in and of itself helps correct the prediction. After all, there is no reasonable way in which the inference that Ashton smoked could be taken to address the question asked in the previous turn. Hence, by any account, this inference will be not-at-issue and thus should project.

At this point, a final complication comes into the picture: Simons et al. (2010) explicitly state, in the discussion of examples such as (45), that there are cases in which even inferences that are conventionally marked as being not-at-issue, such as epithets (cf. Potts 2005, Gutzmann 2012), do in fact sometimes provide the answer to the question explicitly asked in the dialogue:

(45) Q: What do you think of Bailey?
A: I've never met the son-of-a-bitch.

In order to deal with such examples, a very important feature of the QUD needs to be considered. In particular, following Roberts (1996) and subsequent research, scholars have assumed that every single utterance in discourse answers a question. However, if one looks at naturally occurring discourse, quite obviously, questions are far less frequent than assertions. Hence, clearly, the question addressed by a speaker can also remain implicit. So, how can we know what the

[6] Though examples such as (44) can easily be constructed, even if such examples seem to be somewhat rhetorically loaded because they, at least intuitively, require the hearer to use presupposition accommodation as a question-answering strategy.

question under discussion is? The answer is that the way in which an utterance made by a speaker is performed, be it in terms of word order, syntax, prosody or even morphosyntax, can be indicative of the question the speaker had in mind – the so-called congruent question. Usually, scholars do not assume a one-to-one relation between the way in which assertions are articulated and the questions that they address. Still, given that part of the construction of the contextual representation is driven by general domain inference patterns in addition to QUD-marking, the situation cannot be generally deemed hopeless; see e.g. Roberts (2012), Onea (2016) and many others. Thus, we assume that in (45), B's answer is taken to address another question and regarding that question, namely (46), the proposition associated with the epithet is indeed not-at-issue and projects. However, with regard to the overt question, the situation is different – thus the impression that the conventional implicature of (45) is at-issue.

(46) Have you ever met Bailey?

By analogy, then, we could say that the (41) case involves an example in which the apparently not-at-issue inference that Ashton smoked is in fact at-issue with regard to another question that the speaker B actually addresses. Consider, for example, that the actual discourse context contains a larger question, namely (47a). Crucially, when B answers, B does not only provide the answer to (47a) but also to the super-question (47) by also addressing (47b), thus, making the non-projecting inference at-issue.

(47) Who danced and who smoked?
   a. Who danced?
   b. Who smoked?

This raises the final point in this discussion. We have suggested above that there are conventional means to signal the QUD addressed by an utterance. We will briefly consider some of them, mainly focus-marking (see Roberts 1996, Beaver & Clark 2008, Zimmermann & Onea 2011), i.e. the requirement that the QUD has to be focus-congruent to the answer. And thus, we can never assume a QUD which is not focus-congruent to the utterance given. We briefly explain this idea. If an overt question is present and a direct answer to this question is given, the focus alternative value of the answer needs to be a superset of the set of question alternatives. In other words, the answer needs to be focus-congruent to the question. This idea has been spelled out in different ways in various theoretical frameworks. Example (48) follows Rooth (1992, see also Onea & Zimmermann

2019 for a soft introductory discussion of question answer congruence). In (48), we show how the so-called focus-semantic value $[\![\ ]\!]^F$ of some assertion is a superset of the question-alternatives provided by the congruent question.

(48) a. $[\![\text{Who danced?}]\!] = \{\lambda w.danced(x,w) | x \in C\}$
b. $[\![[\text{Jaden}]_F \text{ danced}]\!] = \lambda w.danced(J,w)$
c. $[\![[\text{Jaden}]_F \text{ danced}]\!]^F = \{\lambda w.danced(x,w) | x \in C\}$

Crucially, if we now return to (41), we realise that in fact this sentence can be pronounced with a variety of intonational patterns. The most natural one, it seems to us, is the one in (49), where the brackets mark prosodic and not merely syntactic units.

(49) a. Who danced?
b. It is possible that [[[Jaden]$_F$ danced] and [[Ashton]$_{CT}$ [smoked]$_F$]]

Here, the embedded disjunction is taken to involve two separate intonational phrases, each with its own information structural partition. In particular, the first phrase has a clear focus on Jaden. As we have already seen, this makes this part of the embedded clause focus-congruent to the immediately preceding question. Crucially, however, the second part has a contrastive topic intonation that is usually assumed, following Büring (2003), Rojas-Esponda (2015), Kamali & Krifka (2020), to signal the presence of a higher question within a discourse strategy. In this case the relevant super-question is the one in (50). This question now comes with two different strategies that could be used to answer it: the one in (50) and the one in (51). What makes the example somewhat odd is, indeed, that here the two strategies are mixed. The first part seems to follow the strategy in (51), whereas the second part seems to follow the strategy in (50). But notice that in the specific case in which there are only two individuals and two actions in the domain, the mixing of the strategies seems to be innocent.

(50) Who did what?
a. What did Ashton do?
b. What did Jaden do?

(51) Who did what?
a. Who danced?
b. Who smoked?

Importantly, now, *Ashton smoked* is at-issue with regard to both (50a) and (51b) and is thus not predicted to project. It conventionally signals that it addresses both questions.

Before concluding this section, we need to mention two additional issues. Firstly, we consider an example that shows the strength of the proposal, and secondly we consider a peculiarity of the theory.

Consider (52), from Beaver (2010). This example involves a factive verb that is usually taken to presuppose its clausal complement. However, the example nicely shows that the actual focus-background structure of the sentence determines whether projection obtains.

(52) a. If the TA discovers that [your work is plagiarised]$_F$, I will be [forced to notify the Dean]$_F$.
b. If the TA [discovers]$_F$ that your work is plagiarised, I will be [forced to notify the Dean]$_F$.

The logic of the example is as follows: in (52a) the focus on the embedded clause signals that the question addressed, the QUD, is (53a). Now, this is surely not the only question that is being addressed, and sticking to classical theories of discourse structure with questions (be it in the version of Roberts 1996, Onea 2016 and most other theories), it will not be easy to pinpoint how exactly conditionals relate and should be integrated into question-answering strategies. Regardless of the correct answer to this problem, it should be clear that the question (53a) is expected to be a highly relevant discourse question if this intonation contour is chosen. Indeed, in this case, the embedded clause is both at-issue and does not project. As opposed to this, if the focus is on the main verb in the conditional clause, the question addressed appears to be a question like (53b). Here, the embedded clause is not-at-issue and will indeed project.

(53) a. What will the TA discover?
b. Will the TA discover that your work is plagiarised?

For classical theories of presupposition projection, it is not obvious that predicting this contrast could ever be possible without incorporating some notion of at-issueness. We will have a brief discussion in Section 4 about this problem.

We now turn to the peculiarity of the theory that we indicated above without becoming more specific: it may seem that the theory is circular or at least non-falsifiable. The worry goes like this: you are saying that what projects is not at-issue. But how can I create a counter-example to your theory? I tried to create a case where something that appeared to be at-issue projected. Then you said,

roughly speaking, that it projected because it was not *meant* to be at-issue. Then I gave an example in which something that was in fact not-at-issue did not project, and then you said: well that is the wrong question. With regard to which I said that it is not-at-issue. It was actually at-issue. And you even said that, because it is marked grammatically for not being at-issue, it will project even if it directly answers the QUD! It is important to articulate such worries and address them head on.

There are several ways to address this problem: One perspective is a purely empirical one: is there a correlation between at-issueness and projection? If there is, the way in which the theory needs to be spelled out can be further discussed, but the worry of circularity (which would amount to zero predictions) is at least out of the way. Assuming we take the diagnostics used in Tonhauser et al. (2018) at face value, it seems that the answer to this question is clearly positive.

The second perspective is a more theoretical one: any theory that has empirical predictions will depend on some parameters. The more parameters a theory depends on (which can be fitted) the weaker the theory. For this approach, the crucial parameter seems to be an overall theory of question-answer congruence and of QUDs in discourse. For example, when we say that an NRRC or an epithet cannot be at-issue and will always need to project, we could mean that the compositional semantics of these items is simply not allowing focus to project in such a way as to make these congruent answers to a question. Hence, even if they appear in a sentence evidently uttered as an answer to a question with respect to which the respective utterance would be at-issue, we will still need to assume another QUD simply because otherwise the focus-congruence rule would be violated. Thus, it is often impossible to construct a counter-example. But this is not because the theory is not falsifiable but because the theory is using the question-answer congruence rule, which independently rules out certain question-answer configurations. More importantly with respect to the purposes of this paper, while certain constructions seem to be inherently incompatible with focus, such as epithets or non-clause-final-NRRCs, others, such as clausal arguments of embedding verbs, are and thus do in fact provide an ideal testing ground for the theory. As suggested by the example in (53), here, the predictions are borne out.

Summing up the results of this section, we conclude that the at-issueness hypothesis is made explicit mainly by considering the focus-background structure of utterances, which determines the range of possible QUDs the speaker could be addressing. Once the QUD is established we can decide whether an entailment is at-issue or not. Once this is established, it is predicted that the not-at-issue inferences will project.

3.2 What is the explanandum?

As discussed above, the at-issueness theory of projection is mainly a generalisation and not yet an explanation. In fact, we can entirely accept the generalisation and yet not even agree on what is the explanandum for a theory of projection. Does a theory of projection need to explain the cases in which projection takes place or should a theory of projection rather explain those cases in which projection does not happen? It may come as a surprise that this is not a rhetorical question.

One possibility is that a projective content projects because it has a specific conventional projective property, i.e. terms such as *presupposition* or *conventional implicature*, or simply *potential to project*, are compositional semantic notions. When we say that this is a conventional property, we mean that it is determined by the linguistic system itself. By default, then, what has the potential to project, projects. In this case, if there is anything to explain it is this: why is it that in some cases some of the instances of projective content fail to project? The answer then appears to be: projective content fails to project whenever it is at-issue.

The radically opposite view is this: there is no conventional difference between projective and non-projective content. These simply constitute inferences based on a sentence and whether or not they end up projecting or not depends on something else – the primal candidate being their pragmatic status with regard to the question under discussion. Let us call this the pragmatic view. In this case, the question to answer is: why do some entailments project? The theory of Simons et al. (2010) hints at this, but this point never really gets substantiated in the literature: entailment-cancelling operators somehow fail to see content that is not at-issue. One possibility would be that entailment-cancelling operators do in fact compositionally interact with focus and it is then indeed at-issueness that literally drives the computation of projection. A recent proponent of a radically pragmatic theory of presuppositions is Simons (2001, 2007). One could take Simons et al. (2017) to also advocate such a theory, inasmuch as they discuss cases in which inferences associated with non-factive verbs such as *to believe* seem to project in certain pragmatic contexts. But we simply do not see how such a view could apply to conventional implicatures, which appear to be conventionally marked as projective. Moreover, the systematic differences of different types of projective content, as classified in Tonhauser et al. (2013) and experimentally shown in Tonhauser et al. (2018) are also hard to explain on such an approach. If such a radically pragmatic perspective is to be a sustainable line of attack, in our view, it will have to be limited to presuppositions of so-called soft triggers.

Notice, however, that both the pragmatic and the semantic view outlined above take a causal approach. But an alternative is also conceivable. There might be a general pragmatic correlation between not-at-issueness and projection, but the correlation itself may not be causal in nature. Instead, there may be different explanations for the ways in which at-issueness and projection interact for different phenomena. Let us call this the hybrid view.

In what follows, we attempt to briefly explain how the hybrid view could be substantiated.[7] Suppose the speaker has two thoughts that she wishes to express, the propositions in (54). Suppose, further, that she knows what question she wishes to address, i.e. one of the three options in (55):

(54) a. George is an idiot beyond imagination.
b. George is a notorious criminal.

(55) a. Why is George a successful politician?
b. Why did George not pass his exam?
c. How is George?

By virtue of knowing which question is being addressed, the speaker knows which of the two propositions is at-issue, hence, the speaker can decide to express the other one as an appositive, thereby marking it as a conventional implicature, or to express them as a plain conjunction. The hybrid view now essentially boils down to suggesting that the projection itself may be a conventional property of the conventional implicature, the appositive, but one can only use such a structure if the corresponding proposition is not at-issue. This gives the options in (56).

(56) Q: Why is George a successful politician?
A: George, an idiot beyond imagination, is a notorious criminal.

(57) Q: Why did George not pass his exam?
A: George, a notorious criminal, is an idiot beyond imagination.

(58) Q: How is George?
A: George is a notorious criminal and an idiot beyond imagination.

Hence, projection, at least in such cases, is not necessarily derived from not-at-issueness, but from the very structural properties of the appositives. Encoding

[7] We gratefully acknowledge that parts of this idea go back to a discussion with David Beaver, p.c. 2017.

something as an appositive of the kind in (56) is, however, a speaker-decision that is correlated to the speaker-decision to address a question such that the very same proposition ends up as not at-issue. A possible – intuitive – bridge is the notion of *importance*: what is at issue-should be more important and what is more important should be the main clause rather than the appositive. The perspective suggested above for appositives is very closely related to Ott & Onea (2015) and Beaver (2020), who think of appositives and conventional implicatures in general as independent speech acts of different types. We will not go into further detail on this idea, but we will briefly return to it in Section 4.3. In this case, what requires explanation is neither the projection (as facilitated by not-at-issueness), nor the lack of projection (blocked by at-issueness), but rather the speaker-level necessity to encode not-at-issue material as potentially projective, i.e. the correlation between not-at-issueness and projection.

The case discussed above involves two distinct, logically independent propositions and, thus, suggests that their encoding as potentially projective (in correlation with at-issueness) is clearly a decision problem of the speaker. But suppose what the speaker wants to express is not two independent thoughts, but something that is lexically constrained, i.e. one thought depends on another. An example would be the thought that the TA discovers that the hearer cheated on the exam, as in example (52) above. In this case, the thought that the TA discovers p, cannot be divorced from p itself. While in the case of appositives, there was a structural asymmetry between the main clause and the appositive that may be seen as a marker of the potential to project, in the case of (factive) presuppositions, there is a lexical/semantic assymmetry that is responsible for marking the potential to projection. This view appears to be a variant of the theory proposed by Abrusán (2011, 2016).

The core idea in Abrusán (2011) is that the *explanation* for why factive verbs presuppose is that the embedded proposition is not *about* the main event introduced by the factive verb. Her idea, inspired by research on vision, is that such entailments are not in the focus of attention and thus become presupposed. Abrusán (2011) is not interested in projection but in triggering of presuppositions. This paper is not the right venue to evaluate and discuss the triggering mechanism proposed by Abrusán in detail. Our point here is a simpler one: it appears possible to rephrase Abrusán (2011) as a variant of Simons et al. (2010) without losing any essential component of her theory. Abrusán (2011) claims that a presupposition of a factive verb is triggered *because* the complement of a factive verb is not about the main event of the matrix verb. But this suggests that the main event is by default more important than other events, which are not about it. Importance, however, can be spelled out in many ways. One prominent

option is this: what is important should be at-issue. Then, the default question addressed by a sentence containing a factive verb is not about the truth of the embedded proposition. Say, if you want to know whether it is raining, you usually do not speak about people's attitudes toward this proposition. And if you speak about people's attitudes you are not usually primarily interested in whether the content of their attitudes is actually correct.

Crucially, then, on the hybrid view, there seems to be a similarity between conventional implicatures and presuppositions. In both cases, an asymmetry (albeit a different one) is responsible for their structural or semantic marking of potentially projective content and is also exploited by the speaker in marking what issue is being addressed, by making what is – intuitively – more important the answer to the QUD.

But there is a big difference as well. While appositives are independent of each other and the speaker may find it easy to encode either of the inedependent propositions as the appositive or the main clause, in the case of (factive) presuppositions, the lexically coded dependency between the two propositions cannot be changed by the speaker (at least not easily). Hence, if the proposition which is marked for the potential to project is intended to be at issue, the speaker may use a more economical device to achieve this goal: focus. The semantic structure marks one proposition as dependent on another but focus gives the hearer a handle on at-issueness, which has a direct impact on projection. Indeed, Abrusán (2011) observes that the triggering mechanism of factive presuppositions needs to be focus-sensitive, i.e. presuppositions for so-called soft triggers, in our case factive verbs, are only ever generated if the sentence complement is not focused. This is because focus would act as an independent device that shifts the attention to another entailment. In Abrusán (2016) the idea is extended to projection and cancellation phenomena, where she argues that while the cancellation of presuppositions for soft triggers is driven by focus, blocking their very triggering, in the case of some other presupposition triggers such as some discourse particles, presuppositions are always triggered and they invariably project – as also noted by Tonhauser et al. (2013).

Hence, it would seem that on a hybrid view focus could in some way be responsible for the non-projection of (factive) presuppositions, and, in the case of conventional implicatures, the structure itself determines what projects (but the choice of the structure is determined by at-issueness). It turns out, however, that, despite initial evidence, the situation is more complicated and focus itself cannot be the whole answer to the problem of presupposition projection even under the at-issueness hypothesis.

The overall idea that focus signals the question addressed by an utterance in a compositional way goes back to the seminal paper of Roberts (1996). However, Roberts (2012) forcefully argues that it is not only the focus-congruent question that plays a role in the interpretation of utterances but also communicative goals and general domain questions.

Importantly, this claim is not limited to contrastive topics, which are claimed to associate with entire discourse strategies, and to some discourse particles, such as German *überhaupt* as analysed in Rojas-Esponda (2015). Instead, Roberts (2012) explicitly wants to incorporate the effects of more remote domain questions that cannot interfere with the semantic composition, at least not directly. She argues:

> The more general intentional structure of discourse outlined above also suggests a generalisation of the notion of Relevance to other goals and intentions, as well as to the QUD.

Roberts (2012) gives the following general example, where the patient's question is relevant to the goal proposed by the nurse's suggestion and not a QUD.

(59) Nurse: Don't eat on the morning before your test.
Patient: May I drink water?

With this in mind the question naturally arises whether at-issueness effects are limited to cases in which the QUD is focus-congruent to the relevant assertion. If remote, non-congruent QUDs still play a role, this has important consequences for the exact nature of the explanation of the role of at-issueness in projection. For if projection was in some way governed by focus at the level of compositional semantics, non-focus-congruent questions should not be responsible for projection-effects. Indeed, Simons et al. (2017) suggest that such effects may exist. They discuss the example in (60):

(60) Polly: Why is it taking Phil so long to get back here?
Amy: [with sudden realisation] He doesn't know the car's parked in the *garage*!

The intended intonation in this case is with a pitch accent on the embedded clause. This allows for a range of various foci, given the fact that focus tends to project from deeply embedded constituents. Crucially, however, the verb *know* cannot be the sole focus in the example and it is by all means very likely that the entire embedded clause or parts of it will be interpreted as the focus. Thus the congruent question will be a question like the ones in (61):

(61) a. What does Phil know?
b. What does Phil not know?
c. etc.

Importantly, if this is the congruent question, i.e. the compositionally relevant QUD, the proposition that the car is in the garage can be seen as at-issue (though it depends on the exact analysis of the question). More importantly, Simons et al. (2017) argue that the reason why projection occurs in the example (60) is that without projection the answer would not be relevant to the overt question, the domain question. Thus, in determining whether something projects or not, it not only matters what the congruent question is but also what the domain question is. In fact, they argue that the same line of reasoning could also lead to the prediction that not only *know* but also *believe* can embed projective content.

The fact that domain questions that are not focus-congruent can also be relevant to projection creates a serious problem for hybrid accounts. If a hybrid account is viable, it cannot be compositional since the domain question stands in no compositional relation to the relevant expression.

4 Pushing the limits of semantic theories

While the original hypothesis of Simons et al. (2010) would seem to suggest that all types of projective content work the same way, the classification in Tonhauser et al. (2013) suggests that a systematic distinction between different types of projective content. Moreover, we have suggested above that it is hard to imagine an entirely pragmatic explanation that handles conventional implicatures and presuppositions in the same way. Finally, we have also seen that a compositional interaction between focus and projection seems unlikely given the observation that a) in the case of conventional implicatures focus seems to be irrelevant and b) QUDs that are not focus-congruent can also impact projection. Thus, in this section, we wish to consider how the at-issueness-projection hypothesis could relate to existing theories of projection both in the domain of presupposition and conventional implicature. Of course, given the huge range of literature on both topics, we will need to limit ourselves to a small selection of ideas which we deem particularly interesting for future research.

In the domain of presupposition projection, we wish to make two points. Firstly, we suggest that the at-issueness theory could in fact provide a missing element in an old projection theory developed in Gazdar (1979). Secondly, we will discuss how this idea could significantly improve on the binding theory of

presuppositions developed by van der Sandt (1992). In a final sub-section, we briefly connect the theory of appositives and non-restrictive relative clauses from a QUD perspective with extant literature.

4.1 QUD and presupposition cancellation

One of the first truly predictive formal theories of presupposition projection was developed in Gazdar (1979). Gazdar famously proposes a fairly complicated system that manages all embedded inferences generated by an embedded clause. He distinguishes potential implicatures, "im-plicatures", and potential presuppositions, "pre-suppositions", from actual implicatures and actual presuppositions utterances may have. Pre-suppositions are triggered locally in some potentially deeply embedded environment. A filtering mechanism is used to decide which of the locally generated inferences will eventually survive and become true presuppositions.[8] One remarkable rule of the filtering mechanism that was deemed empirically necessary but which does not appear very intuitive is important: if the sentence has a potential presupposition that contradicts an implicature, the presupposition *loses* and is filtered out, while the implicature remains.

A well-known example is the filtering with conditionals, as in (62). Ever since at least Karttunen (1977) and Karttunen & Peters (1979), it has been received knowledge that if the antecedent of a conditional entails the presupposition of the consequent, this presupposition will not project. Otherwise, presuppositions of the consequent of the conditional project. Thus, both presuppositions in (63) are expected to project, whereas in (62), none do.

(62) a. If Justice has kids, Justice's kids will be linguists.
b. If Mary loves Jada, Michael surely found out that she does.

(63) a. If Justice decides to learn even just one more language, Justice's kids will be linguists.
b. If Mary keeps on talking, Michael surely finds out that she loves Jada.

According to Gazdar (1979), a conditional implicates that it is unknown to the speaker whether the antecedent is true. In (62) there is, hence, an implicature that the speaker does not know whether Justice has kids and Mary loves Jada respectively. Hence, for (62), the presupposition of the consequence will be cancelled, because it contradicts the ignorance implicature. As opposed to this, the

[8] For the details of the theory we have to refer to (Gazdar 1979) and general textbooks on pragmatics, e.g. (Levinson 1983, 2000, Huang 2014).

ignorance inference associated with (63) does not contradict the presupposition of the consequent and thus the pre-supposition of the consequent can become a true presupposition.

The theory proposed in Gazdar (1979) has its obvious historical merits but also some well-known issues we will not discuss here. However, even in introductions to pragmatics, students usually find it mysterious that implicatures would win against presuppositions – are they not supposed to be weaker inferences? It seems to us that the at-issueness hypothesis could help clarify that intuition in some way.

From a communicative perspective, presupposition projection does not amount to presupposed propositions becoming new information but rather to a requirement on the common ground. If p becomes a presupposition, it will be assumed that it is common ground that p is true. But if an inference is at-issue, it cannot be common ground and vice versa.[9] An ignorance implicature of the sort exemplified above would seem to obtain precisely in cases in which the inference the speaker is ignorant about is at-issue and, thereby, naturally blocks it from becoming a presupposition. Indeed, it has been shown in erotetic logics (Wiśniewski 1995) that the question about the truth of the antecedent of a conditional is often an erotetic inference, and thus a natural follow-up question to a conditional statement. Put this way, the theory of at-issueness could in fact be viewed as a powerful update of an old idea by Gazdar, by integrating it with erotetic theories of discourse.

4.2 QUD and binding of presuppositions

Another classical theory of presuppositions that exhibits a remarkable connection to the at-issueness theory of presupposition projection is the binding theory of presuppositions. Van der Sandt (1992) suggests that there is a deep connection between anaphora and presupposition. The core observation of van der Sandt (1992) is that, in the very same way dynamic semantics models the anaphoric binding of a pronoun, the satisfaction of presuppositions can be modelled. In particular, he distinguishes two main types of presupposition satisfaction: binding and accommodation. A presupposition is bound if in discourse an explicitly

[9] While this does not immediately follow from the theory of questions and answers sketched above, the theory can easily be accommodated to guarantee this. One way to do this, see e.g. Onea (2016), is to intersect all question alternatives with the context set (Stalnaker 1978). Thus, each question alternative entails the context set and thus information that is in the context set cannot be relevant to the question, i.e. cannot be at-issue.

represented antecedent can be found. A presupposition is accommodated if binding is not possible. For example, in (64a) the first sentence acts as an anaphoric antecedent and thus binds the presupposition of the second sentence. As opposed to this, in the second case, there is no binder available, and thus the presupposition needs to be accommodated. Importantly, whenever binding is an option, we no longer need to accommodate.

(64) a. Justice has kids. If his kids are happy, he is happy.
b. Justice is a simple guy. If his kids are happy, he is happy.

Thus, accommodation is governed by a global geometry constraint intrinsic to DRT (Discourse Representation Theory, Kamp 1981); a current formulation is given in Kamp et al. (2011). In particular, DRT has a hierarchic system of discourse representation, such that a presupposition starts out as a designated entailment at the lowest possible starting location and floats upwards, i.e. tries to project in search of an antecedent to bind. If binding is successful the process stops. This also explains the filtering function of, e.g. conditional antecedents, as within the DRT-architecture used by van der Sandt (1992) and Geurts & van der Sandt (1999), conditional antecedents are anaphorically accessible from the consequence. If the attempt to find an appropriate binder is unsuccessful, the presupposition floats to the global level and then tries to be accommodated from there, in the highest slot in which a contradiction does not emerge. If such contradictions eventually lead to contradictions in all projection sites, the final option is always local accommodation, which oftentimes means no projection whatsoever, as the presupposition is limited to a local effect in this case. We illustrate the idea in example (65). In (65a) no contradiction arises, and thus we can globally accommodate, hence project, the presupposition that Justice has a car. In (65b), global accommodation is blocked by the information that the speaker does not know whether Justice has a car, and thus only local accommodation remains an option, hence yielding: If Justice has a car and Mary discovers that he has one ...

(65) a. If Mary discovers that Justice has a car, he will have to drive her home.
b. I don't know whether Justice has a car. But if Mary discovers that he has one, he will have to drive her home.

The binding theory of presuppositions has been extended to a theory of focus as a presupposition-inducing device in itself; see Geurts & van der Sandt (2004). However, the theory has no obvious built-in means to deal with the variability

captured by the at-issueness theory of presupposition projection. In fact, DRT itself is not particularly well suited for question-semantics and question-answer patterns never have been a main topic of investigation in standard DRT to start with.

However, at least a very rudimentary theory of questions can be given. Take Hamblin-question-alternatives and represent them as individual propositions marked in some way such as to avoid taking them as inferences. If we now assume that question-alternatives are available discourse referents and thus possible binders for presuppositions, we end up with a surprising prediction: whenever a presupposition is at-issue in the sense that it could be anaphorically bound to a question-alternative, it will be bound to a question-alternative and not accommodated globally. Since question-alternatives are mere possibilities and do not license global entailments, it follows that at-issue inferences do not project. Not-at-issue inferences, on the contrary, need to project. We summarise this idea in terms of a simplified but respectable unified theory of at-issueness and presupposition binding.

(66) A unified theory of at-issueness and presupposition binding
   a. All presuppositions need to be bound or accommodated.
   b. Binding has priority over accommodation.
   c. Question-alternatives are possible binders.

This theory now comes with a remarkable prediction: suppose that question-alternatives disappear from a discourse representation structure (DRS) once the question is resolved. Suppose, further, that all open questions in the QUD-stack in the sense of Roberts (1996) are represented in the global DRS. Then, it is immediately predicted that not only the immediate focus-congruent question but also the entire question strategy, and thus the domain question, are responsible for determining the at-issue status and thus the projection of potential presuppositions.

Let us return to the example (65a). Here, the presupposition that Justice has a car needs to be bound somewhere or become accommodated. But where it can be bound depends on what questions we encounter. Suppose the QUD contains the open question (67a). This does not simply mean that it is unknown whether Justice has a car (which would not block accommodation) but that this question has been recognised as relevant for and thus as part of the discourse strategy at hand. In this case, the presupposition is bound to the positive alternative of the question and since the alternative to which it is bound is not entailed, the presupposition is not entailed either. But suppose the question is (67b) and (67a)

is not part of the QUD stack. Now, there is no antecedent for the presupposition to be bound to. Hence, accommodation obtains.

(67) a. Does Justice have a car?
b. Under which conditions does Justice have to drive Mary home?

Of course, we do not suggest this as a fully worked out theory, but rather as a fairly obvious and hitherto unexplored path for future research. Such a theory could finally have both the merits of the at-issue-projection hypothesis and a true-explanative power as presupposition projection would be tied to an independently motivated and needed mechanism of anaphoric binding.

4.3 QUD and non-restrictive relative clauses

Finally, in this very brief section, we turn to the way in which existing theories of appositives can relate to the at-issueness-based projection hypothesis for appositives and non-restrictive relative clauses. Here, the main question to be asked is this: are for example non-restrictive relative clauses actually syntactically embedded at all?

Both theoretical options have been proposed in the literature and while there may be some debate about what the nature of syntactic dependence and independence means, the view that non-restrictive relative clauses and appositives are generated deep in the syntactic structure of the main clause is a well-established view advocated by Potts (2005) and subsequent literature, e.g., AnderBois et al. (2015). However, a larger portion of the literature going back to McCawley (1988), del Gobbo (2003), Ott & Onea (2015), Ott (2016), Onea & Ott (2022) and many others (see Schlenker 2020 for a recent overview) suggests that these items are, at least in many cases, in fact generated high in the syntactic structure or as independent speech acts only linearly interposed into the structure of the host clause.

With this in mind, under such theories predicting projection turns out to be a simple exercise, for they are not embedded in the first place under any operator that could cancel them as entailments. As already argued, however, there is still truth to the observation that these items are not-at-issue. It just so happens that projection, in this case, is not a puzzle. The reason why a speaker may have chosen to use a construction that needs to be globally entailed can still be not-at-issueness. But this is only a tendency. Thus, not surprisingly, Onea & Ott (2022) argue that, at least for nominal appositives, there is a systematic type of examples which is usually at-issue and does not project.

5 Conclusion and outlook

With respect to clausal embedding, the most interesting property of presuppositions and conventional implicatures is their projective behaviour. Even if their triggers are embedded deep in the sentence structure, they can emerge as independent truth-conditional or expressive content that is not affected by the embedding linguistic material. This raises the issue of whether projective phenomena can be understood in a uniform way. Questions under discussion and the associated notion of at-issueness are core ingredients of newer approaches that try to achieve such a uniform understanding. This chapter introduced the main ideas and discussed the conceptual and empirical problems that arise when one tries to spell out in detail the meaning of at-issueness and the mechanics of projection. Most theories assume that sentences are subordinated to a focus-congruent question that is again subordinated to higher discourse structuring questions (see, for example, Klein & von Stutterheim 1987, van Kuppevelt 1995, Roberts 1996; see also Benz & Jasinskaja 2017). Hence, progress about the questions whether at-issueness can be defined in terms of superordinated questions and whether, in turn, projective behaviour is conditioned by at-issueness can be expected from annotated corpora. Some work has been done in this direction (in particular de Kuthy et al. 2018, Riester 2019, Westera et al. 2020, Hesse et al. 2022); however, there is still work to be done before the theoretical questions can be answered.

Acknowledgements

We gratefully acknowledge the helpful comments of two anonymous reviewers, which helped us improve the quality of this paper a lot. We also thank Hans-Martin Gärtner for his comments on an earlier version, and Maya Cortez Espinoza for helpful comments on the last version of the paper. AB also thanks the Deutsche Forschungsgemeinschaft (DFG) for funding of project BE 4348/5-1. The pre-final version of the chapter was submitted in 2023.

References

Abrusán, Márta. 2011. Predicting the presuppositions of soft triggers. *Linguistics and Philosophy* 34. 491–535.

Abrusán, Márta. 2016. Presupposition cancellation: Explaining the 'soft–hard' trigger distinction. *Natural Language Semantics* 24. 165–202.

Amaral, Patricia, Craige Roberts & E. Allyn Smith. 2007. Review of *The logic of conventional implicatures* by Chris Potts. *Linguistics and Philosophy* 30. 707–749.

AnderBois, Scott, Adrian Brasoveanu & Robert Henderson. 2015. At-issue proposals and appositive impositions in discourse. *Journal of Semantics* 32. 93–138.

Antomo, Mailin. 2016. Marking (not-)at-issue content by using verb order variation in German. In Ingo Reich & Augustin Speyer (eds.), *Co- and subordination in German and other languages*, 21–54. Hamburg: Buske.

Asher, Nicholas & Alexis Lascarides. 2003. *Logics of conversation*. Cambridge: Cambridge University Press.

Beaver, David. 1997. Presupposition. In Johan van Benthem & Alice ter Meulen (eds.), *Handbook of logic and language*, 939–1008. Amsterdam: Elsevier.

Beaver, David. 2001. *Presupposition and assertion in dynamic semantics*. Stanford: CSLI Publications.

Beaver, David. 2010. Have you noticed that your belly button lint colour is related to the colour of your clothing? In Rainer Bäuerle, Uwe Reyle & Thomas Ede Zimmermann (eds.), *Presuppositions and discourse: Essays offered to Hans Kamp*, 65–99. Leiden: Brill.

Beaver, David. 2020. *How to do things inside a sentence*. Talk given at SPAGAD 2: Speech Acts in Grammar and Discourse (virtual). Berlin: Leibniz-ZAS.

Beaver, David & Brady Clark. 2008. *Sense and sensitivity*. Oxford: Blackwell.

Benz, Anton & Katja Jasinskaja. 2017. Questions under discussion: From sentence to discourse. *Discourse Processes* 54. 177–186.

Büring, Daniel. 2003. On D-trees, beans, and B-accents. *Linguistics and Philosophy* 26. 511–545.

Chierchia, Gennaro & Sally McConnell-Ginet. 1990. *Meaning and grammar: An introduction to semantics*. Cambridge: MIT Press.

Chisholm, Roderick M. 1957. *Perceiving: A philosophical study*. Ithaca: Cornell University Press.

de Kuthy, Kordula, Nils Reiter & Arndt Riester. 2018. QUD-based annotation of discourse structure and information structure: Tool and evaluation. In Nicoletta Calzolari, Khalid Choukri, Christopher Cieri, Thierry Declerck, Sara Goggi, Koiti Hasida, Hitoshi Isahara, Bente Maegaard, Joseph Mariani, Hélène Mazo, Asuncion Moreno, Jan Odijk, Stelios Piperidis & Takenobu Tokunaga (eds.), *Proceedings of the Eleventh International Conference on Language Resources and Evaluation (LREC 2018)*. Miyazaki: European Language Resources Association (ELRA).

del Gobbo, Francesca. 2003. *Appositives at the interface*. University of California at Irvine. (Doctoral dissertation).

Destruel, Emilie. 2013. *The French c'est-cleft: Empirical studies of its meaning and use*. University of Texas at Austin. (Doctoral dissertation).

DeVeaugh-Geiss, Joseph, Swantje Tönnis, Edgar Onea & Malte Zimmermann. 2018. That's not quite it: An experimental investigation of (non-)exhaustivity in clefts. *Semantics and Pragmatics* 11(3). DOI: 10.3765/sp.11.3.

Farkas, Donka F. & Kim Bruce. 2010. On reacting to assertions and polar questions. *Journal of Semantics* 27. 81–118.

Frege, Gottlob. 1892. Über Sinn und Bedeutung. *Zeitschrift für Philosophie und philosophische Kritik* 100. 25–50.

Gazdar, Gerald. 1979. *Pragmatics: Implicature, presupposition, and logical form*. New York: Academic Press.

Gettier, Edmund. 1963. Is justified true belief knowledge. *Analysis* 23. 121–123.

Geurts, Bart. 1999. *Presuppositions and pronouns*. Amsterdam: Elsevier.

Geurts, Bart & Rob van der Sandt. 1999. Domain restriction. In Peter Bosch & Rob van der Sandt (eds.), *Focus linguistic, cognitive and computational perspectives*, 268–292. Cambridge: Cambridge University Press.

Geurts, Bart & Rob van der Sandt. 2004. Interpreting focus. *Theoretical Linguistics* 30. 1–44.

Grice, Herbert Paul. 1975. Logic and conversation. In Peter Cole & Jerry L. Morgan (eds.), *Speech acts*, 41–58. New York: Academic Press.

Gutzmann, Daniel. 2012. *Use-conditional meaning. Studies in multidimensional semantics*. University of Frankfurt. (Doctoral dissertation).

Gutzmann, Daniel. 2013. Expressives and beyond: An introduction to varieties of use-conditional meaning. In Daniel Gutzmann & Hans-Martin Gärtner (eds.), *Beyond expressives: Explorations in use-conditional meaning*, 1–58. Leiden: Brill.

Gutzmann, Daniel. 2015. *Use–conditional meaning: Studies in multidimensional semantics*. Oxford: Oxford University Press.

Gutzmann, Daniel. 2019. *The grammar of expressivity*. Oxford: Oxford University Press.

Hamblin, Charles Leonard. 1973. Questions in Montague English. *Foundations of Language* 10. 41–53.

Heim, Irene. 1983. On the projection problem for presuppositions. In Michael Barlow, Daniel Flickinger & Michael Wescoat (eds.), *Proceedings of the 2nd West Coast Conference on Formal Linguistics*, 114–125. Stanford: CSLI Publications.

Heim, Irene. 1992. Presupposition projection and the semantics of attitude verbs. *Journal of Semantics* 9. 183–221.

Hesse, Christoph, Maurice Langner, Ralf Klabunde & Anton Benz. 2022. Testing focus and non-at-issue frameworks with a question-under-discussion-annotated corpus. In *Proceedings of the thirteenth language resources and evaluation conference*, 5212–5219.

Huang, Yan. 2014. *Pragmatics*. 2nd edn. Oxford: Oxford University Press.

Hunter, Julie & Nicholas Asher. 2016. Shapes of conversation and at-issue content. In Mary Moroney, Carol-Rose Little, Jacob Collard & Dan Burgdorf (eds.), *Proceedings of SALT 26*, 1022–1042. Ithaca: CLC Publications.

Kamali, Beste & Manfred Krifka. 2020. Focus and contrastive topic in questions and answers, with particular reference to Turkish. *Theoretical Linguistics* 46. 1–71.

Kamp, Hans. 1981. A theory of truth and semantic representation. In Jeroen Groenendijk, Theo Janssen & Martin Stokhof (eds.), *Formal methods in the study of language*, 277–322. Amsterdam: Mathematical Centre Tracts.

Kamp, Hans & Uwe Reyle. 1993. *From discourse to logic. Introduction to modeltheoretic semantics of natural language, formal logic and Discourse Representation Theory*. Dordrecht: Kluwer.

Kamp, Hans, Josef van Genabith & Uwe Reyle. 2011. Discourse Representation Theory. In Dov Gabbay & Franz Guenthner (eds.), *Handbook of philosophical logic*, vol. 15, 125–394. Dordrecht: Springer.

Karttunen, Lauri. 1973. Presuppositions of compound sentences. *Linguistic Inquiry* 4. 167–193.

Karttunen, Lauri. 1974. Presuppositions and linguistic context. *Theoretical Linguistics* 1. 181–194.

Karttunen, Lauri. 1977. Syntax and semantics of questions. *Linguistics and Philosophy* 1. 3–44.

Karttunen, Lauri & Stanley Peters. 1979. Conventional implicatures in Montague grammar. In Choon-Kyu Oh & David Dineen (eds.), *Presupposition*, 1–56. New York: Academic Press.

Kepler, Johannes. 1937. *Astronomia nova*. Max Caspar & Walther von Dyck (eds.), vol. 3. München: Bayerische Akademie der Wissenschaften. http://publikationen.badw.de/de/002334739.

Klein, Wolfgang & Christiane von Stutterheim. 1987. Quaestio und referentielle Bewegung in Erzählungen. *Linguistische Berichte* 109. 163–183.

Koev, Todor. 2018. Notions of at-issueness. *Language and Linguistics Compass* 12(12). e12306.

Koev, Todor. 2022. *Parenthetical meaning*. Oxford: Oxford University Press.

Langendoen, D. Terence & Harris Savin. 1971. The projection problem for presuppositions. In Charles J. Fillmore & D. Terence Langendoen (eds.), *Studies in linguistic semantics*, 54–60. New York: Holt, Rinehart & Winston.

Levinson, Stephen C. 1983. *Pragmatics*. Cambridge: Cambridge University Press.

Levinson, Stephen C. 2000. *Presumptive meanings: The theory of generalized conversational implicatures*. Cambridge: MIT Press.

Liu, Mingya. 2012. *Multidimensional semantics of evaluative adverbs*. Leiden: Brill.

McCawley, James. 1988. *The syntactic phenomena of English*. Chicago: The University of Chicago Press.

McCready, Eric. 2010. Varieties of conventional implicatures. *Semantics and Pragmatics* 3(8). 1–57. DOI: 10.3765/SP.3.8.

Murray, Sarah. 2014. Varieties of update. *Semantics and Pragmatics* 7(2). 1–53. DOI: 10.3765/sp.7.2.

Onea, Edgar. 2016. *Potential questions at the semantics-pragmatics interface*. Leiden: Brill.

Onea, Edgar & Dennis Ott. 2022. Nominal appositives in grammar and discourse. *Language* 98. 359–391.

Onea, Edgar & Malte Zimmermann. 2019. Questions in discourse: An overview. In Klaus von Heusinger, Edgar Onea & Malte Zimmermann (eds.), *Questions in discourse: Semantics*, vol. 1, 5–117. Leiden: Brill.

Ott, Dennis. 2016. Ellipsis in appositives. *Glossa* 1(1). 34. DOI: 10.5334/gjgl.37.

Ott, Dennis & Edgar Onea. 2015. On the form and meaning of nominal appositives. In Thuy Bui & Denis Özyildiz (eds.), *Proceedings of NELS 45*, 203–212. Amherst: GLSA.

Potts, Christopher. 2003. Expressive content as conventional implicature. In Makoto Kadowaki & Shigeto Kawahara (eds.), *Proceedings of NELS 33*, 303–322. Amherst.

Potts, Christopher. 2005. *The logic of conventional implicatures*. Oxford: Oxford University Press.

Riester, Arndt. 2019. Constructing QUD trees. In Malte Zimmermann, Klaus von Heusinger & Edgar Onea (eds.), *Questions in discourse*, vol. 2: Pragmatics, 403–443. Leiden: Brill.

Roberts, Craige. 1996. Information structure in discourse. Towards an integrated formal theory of pragmatics. *Ohio State University Working Papers in Linguistics* 49. 91–136.

Roberts, Craige. 2012. Information Structure: Afterword. *Semantics and Pragmatics* 5(7). DOI: 10.3765/sp.5.7.

Rojas-Esponda, Tania. 2015. *Patterns and symmetries for discourse particles*. Stanford University. (Doctoral dissertation).

Rooth, Mats. 1992. A theory of focus interpretation. *Natural Language Semantics* 1. 75–116.
Russell, Bertrand. 1905. On denoting. *Mind* 14. 479–493.
Russell, Bertrand. 1919. *Introduction to mathematical philosophy*. London: George Allen & Unwin.
Schlenker, Philippe. 2020. The semantics and pragmatics of appositives. In Daniel Gutzmann, Lisa Matthewson, Cécile Meier, Hotze Rullmann & Thomas Ede Zimmermann (eds.), *The Wiley Blackwell companion to semantics*. Oxford: John Wiley. DOI: 10.1002/9781118788516.sem110.
Schwarz, Florian. 2019. Presuppositions, projection, and accommodation. In Chris Cummins & Napoleon Katsos (eds.), *The Oxford handbook of experimental semantics and pragmatics*, 83–113. Oxford: Oxford University Press.
Simons, Mandy. 2001. On the conversational basis of some presuppositions. In Rachel Hastings, Brendan Jackson & Zsofia Zvolensky (eds.), *Proceedings of SALT 11*, 1–19. Ithaca: CLC Publications.
Simons, Mandy. 2007. Observations on embedding verbs, evidentiality, and presupposition. *Lingua* 117. 1034–1056.
Simons, Mandy, David Beaver, Craige Roberts & Judith Tonhauser. 2017. The best question: Explaining the projection behavior of factives. *Discourse Processes* 54. 187–206.
Simons, Mandy, Judith Tonhauser, David Beaver & Craige Roberts. 2010. What projects and why. In Nan Li & David Lutz (eds.), *Proceedings of SALT 20*, 309–327. Ithaca: CLC Publications.
Singh, Raj. 2020. Matrix and embedded presuppositions. In Daniel Gutzmann, Lisa Matthewson, Cécile Meier, Hotze Rullmann & Thomas Ede Zimmermann (eds.), *The Wiley Blackwell companion to semantics*. Oxford: John Wiley. DOI: 10.1002/9781118788516.sem132.
Snider, Todd. 2018. *Anaphoric reference to propositions*. Cornell University. (Doctoral dissertation).
Stalnaker, Robert. 1974. Pragmatic presuppositions. In Milton K. Munitz & Peter K. Unger (eds.), *Semantics and philosophy*, 197–213. New York: New York University Press.
Stalnaker, Robert L. 1978. Assertion. In Peter Cole (ed.), *Pragmatics*, 315–332. New York: Academic Press.
Strawson, Peter F. 1950. On referring. *Mind* 59. 320–334.
Syrett, Kristen & Todor Koev. 2015. Experimental evidence for the truth conditional contribution and shifting information status of appositives. *Journal of Semantics* 32. 525–577.

Tonhauser, Judith, David Beaver & Judith Degen. 2018. How projective is projective content? Gradience in projectivity and at-issueness. *Journal of Semantics* 35. 495–542.

Tonhauser, Judith, David Beaver, Craige Roberts & Mandy Simons. 2013. Toward a taxonomy of projective content. *Language* 89. 66–109.

van Kuppevelt, Jan. 1995. Discourse structure, topicality, and questioning. *Journal of Linguistics* 31. 109–147.

van der Sandt, Rob. 1992. Presupposition projection as anaphora resolution. *Journal of Semantics* 9. 333–377.

van der Sandt, Rob. 2012. Presupposition and accommodation in discourse. In Keith Allan & Kasia M. Jaszczolt (eds.), *The Cambridge handbook of pragmatics*, 329–350. Cambridge: Cambridge University Press.

Velleman, Dan, David Beaver, Emilie Destruel, Dylan Bumford, Edgar Onea & Liz Coppock. 2012. It-clefts are IT (inquiry terminating) constructions. In Anca Chereches (ed.), *Proceedings of SALT 22*, 441–460. Ithaca: CLC Publications.

von Fintel, Kai. 2004. Would you believe it? The king of France is back! (Presuppositions and truth-value intuitions). In Marga Reimer & Anne Bezuidenhout (eds.), *Descriptions and beyond*, 269–296. Oxford: Oxford University Press.

Westera, Matthijs, Laia Mayol & Hannah Rohde. 2020. TED-Q: TED talks and the questions they evoke. In *Proceedings of the twelfth language resources and evaluation conference*, 1118–1127. Marseille: European Language Resources Association.

Wiśniewski, Andrzej. 1995. *The posing of questions: Logical foundations of erotetic inferences*. Dordrecht: Kluwer.

Zimmermann, Malte & Edgar Onea. 2011. Focus marking and focus interpretation. *Lingua* 121. 1651–1670.