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Representing Context: Presupposition Triggers and Focus-sensitivity

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**REPRESENTING CONTEXT:
PRESUPPOSITION TRIGGERS AND
FOCUS-SENSITIVITY**

A Dissertation Presented

by

ALEXANDER GÖBEL

Submitted to the Graduate School of the
University of Massachusetts Amherst in partial fulfillment
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

September 2020

Linguistics

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**REPRESENTING CONTEXT:
PRESUPPOSITION TRIGGERS AND FOCUS-SENSITIVITY**

A Dissertation Presented

by

Alexander Göbel

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In battle, we risk all for a taste of the immortal. In retreat, sure, we lose nothing, but what we gain is far worse than nothing: ignominy. And shame. We don't give up because they make us - we give up because we're lazy! Or would rather drink and watch "Treehouse Masters"...

- Jimmy Shive Overly (*You're the Worst*, "The Last Sunday Funday")

Gretchen can go anywhere!

- Gretchen Cutler (*You're the Worst*, "Fog of War, Bro")

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Chuck has contributed greatly to this thesis and my own thinking with his thor-

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ABSTRACT

REPRESENTING CONTEXT: PRESUPPOSITION TRIGGERS AND FOCUS-SENSITIVITY

September 2020

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This dissertation investigates the role of Focus-sensitivity for a typology of presupposition triggers. The central hypothesis is that Focus-sensitive triggers require a linguistic antecedent in the discourse model, whereas presuppositions of triggers lacking Focus-sensitivity are satisfied as entailments of the Common Ground. This hypothesis is supported by experimental evidence from two borne out predictions. First, Focus-sensitive triggers are sensitive to the salience of the antecedent satisfying their presupposition, as operationalized via the Question Under Discus-

sion, and lead to interference-type effects, while triggers lacking Focus-sensitivity are indifferent to the QUD-structure. Second, Focus-sensitive triggers are harder to globally accommodate than triggers lacking Focus-sensitivity. The picture that emerges from these results is that the same kind of meaning - presuppositions - is grounded in distinct underlying representations of context in relation to an independent property of the trigger - Focus-sensitivity - which directly affects the way a trigger is processed.

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Chapter 1

INTRODUCTION

1.1 Setting the Scene

We do not encounter language in a vacuum but as part of a larger context. Understanding how different aspects of such a context affect both the way in which a linguistic unit is processed as well as the outcome of its interpretation is thus an important task for any theory of language comprehension. The number of ways in which context affects language comprehension in this way is manifold. For instance, depending on the spatio-temporal context, the same utterance can result in laughter during a comedy show but in indignation at a formal dinner. Unsurprisingly, the influence of - specifically the *linguistic* - context has been shown to be pervasive for various aspects of comprehension in psycholinguistics (Frazier, 1978; Crain & Steedman, 1985; Futrell et al., 2020; Levy, 2008). However, comparatively little psycholinguistic work has been done on how a discourse context is represented and accessed, with the notable exception of work on referential expressions like pronouns and definite descriptions.

The question of how a discourse is represented is particularly crucial in light of the ubiquity of linguistic expressions whose interpretation depends on the context. While even cases of lexical ambiguity may be considered context-*sensitive* insofar as the context affects their interpretation, this relation to the context, in contrast,

is grammaticalized in the case of *context-dependent* expressions. A prime example of this latter category are pronominal expressions such as *she*, which are uninterpretable in the absence of material a suitable antecedent. Other less extreme cases that do not result in complete uninterpretability with a lack of context but allow certain defaults are, among others, quantifiers (von Stechow, 1994), gradable adjectives (Bartsch & Vennemann, 1972) and modals (Kratzer, 1977). What differentiates these cases from the accidental context-sensitivity of lexically ambiguous words from a psycholinguistic point of view is that context-dependent expressions actively require accessing representations of context rather than these representations serving as a passive backdrop against which comprehension occurs.

The goal of this dissertation is to address the question of how discourse is represented by using presuppositions as a case study. Presuppositions have been studied extensively in the semantics and pragmatics literature, going back to work in philosophy of language by Frege (1892) and Strawson (1950), but have also increasingly become the subject of experimental work in recent years (e.g. Schwarz 2015a). One linguistic trait presuppositions have come to be known for, most prominently from work in the 70s by - among others - Karttunen (1973) and Stalnaker (1970), is their persistence when embedded under entailment cancelling operators such as negation. This *projection behavior* is illustrated with the aspectual particle *again* in (1.1), where what is negated is the main event but not that a similar event had occurred previously. Other environments that allow presuppositions to project but prevent the main - at-issue - content to become something the speaker is committed to are questions, modals and the antecedent of conditionals, the latter being illustrated in (1.2). This backgroundedness has led to the characterization of presuppositions as indicating content that is taken for granted by the speaker, and formally implemented as a requirement that the presupposed content is part of the knowledge shared among interlocutors, the *Common Ground* (Stalnaker, 1978).

(1.1) Gretchen didn't take Jimmy's car *again*.

(1.2) If Gretchen took Jimmy's car *again*, he will be upset.

Since the early days of presupposition research, a vast number of presuppositional expressions - so-called *presupposition triggers* - have been discovered, among the most prominent ones factive verbs like *regret*, aspectual verbs like *stop*, and additive particles like *too*, which all pattern alike to *again* with respect to their potential to project. However, it has also been noted that triggers vary in the extent to which their presupposition projects in certain environments. One prominent account of this type comes from Abusch (2010). The achievement verb *win* in (1.3a) - which presupposes participating - can be felicitously embedded in the antecedent of a conditional when its presupposition is suspended in the context. Given that the expected result should be a contradiction since the presupposition is at odds with the speaker's initial statement, projection seems to be blocked here. In contrast, *too* - in (1.3b) presupposing that someone other than Priscilla has read the proposal - seems to be more persistent. Rather than being perfectly acceptable, the same environment results in markedness.

(1.3) a. I have no idea whether Sam ended up participating in the Road Race yesterday. But if he **won** it, then he has more victories than anyone else in history. (ABUSCH 2010, (3d))¹

b. ??I have no idea whether Lindsay read that proposal. But if Priscilla read it **too**, let's ask them to confer and simply give us a yes-no response.

(ABUSCH 2010, (5a))

¹Proper names in cited examples are occasionally changed throughout the thesis to ensure appropriate gender representation.

Moreover, presupposition triggers have not only been shown to vary with respect to their projection behavior, but also, for example, the extent to which they can be used felicitously out-of-the-blue (Kripke, 2009), whether their presupposition is entailed or not (Sudo, 2012), or the mechanism governing the extent to which they are obligatory when their presupposition is satisfied (Bade, 2016). This variation across triggers with respect to a number of properties has given rise to a complex typology of triggers. However, a comprehensive, coherent account of these differences has yet to be found. This dissertation contributes to this debate by investigating the role of Focus-sensitivity for a typology of presupposition triggers and relate it to a distinction in the representations of triggers along those lines. The contribution of this dissertation is thus two-fold. Empirically, the dissertation will provide novel data in relation to a distinction between triggers that has not received much attention thus far. Theoretically, the dissertation explores a novel account of how differences between triggers can be explained.

Focus-sensitive expressions exhibit a dependency of their interpretation on the location of Focus² (Beaver & Clark, 2008; Rooth, 1985). As an illustration, consider the two sentences in (1.4), which only vary in their stress placement - indicated by small capitals - serving as a proxy for Focus. In a context where Gretchen met someone other than Jimmy at a wedding, but never met Jimmy anywhere else, the sentence in (1.4a) is felicitous, whereas the sentence in (1.4b) is not. Conversely, if Jimmy was the only person Gretchen met at a wedding but they had also met somewhere else, (1.4b) is felicitous and (1.4a) is not. Other expressions that have been taken to be Focus-sensitive in this sense are particles like *only*, *even* and *at least*, but also negation (Jackendoff, 1972), quantificational adverbs like *always* (von Stechow, 1994), and counterfactuals (Rooth, 1999; Dretske, 1972), among others.³

²I will henceforth capitalize 'Focus' to indicate the technical linguistic term and differentiate it from its informal use.

³While all these cases have been taken to be Focus-sensitive in the sense presented here, Beaver & Clark (2008) make a more fine-grained distinction between different classes of Focus-sensitivity.

- (1.4) a. Gretchen **also** met JIMMY at a wedding.
b. Gretchen **also** met Jimmy at a WEDDING.

The central hypothesis to be tested in this dissertation is the Focus Presupposition Antecedent Hypothesis (FoPAH)⁴ stated in (1.5). According to this hypothesis, there are distinct representations that presupposition triggers access depending on whether a trigger is Focus-sensitive or not. Triggers lacking Focus-sensitivity are hypothesized to fit the traditional Stalnakerian picture of presuppositions as Common Ground entailments. In contrast, Focus-sensitive triggers - despite qualifying as presuppositional by virtue of their projection behavior - are rooted in what I will refer to as the discourse model, a record comprised of what has been previously mentioned, which has to provide a suitable antecedent. Notably, the FoPAH is intended as a hypothesis about how different presupposition triggers are processed rather than their treatment in formal linguistic theory, especially given that the concept of the Common Ground applied here will be strongly simplified relative to more current models available (e.g. Farkas & Bruce 2010; Biezma & Rawlins 2017).

(1.5) Focus Presupposition Antecedent Hypothesis (FoPAH)

Focus-sensitive presupposition triggers require a linguistic antecedent in the discourse model, whereas triggers lacking Focus-sensitivity require their presupposition to be entailed by the Common Ground.

There are a number of proposals from research on presupposition trigger typology that serve as precursors to this hypothesis, for instance and notably Zeevat (2002) and Roberts (2006, 2015). These proposals have popularized the idea that certain triggers are anaphoric insofar as they seem to target what is salient in a con-

I will come back to this distinction in Chapter 3.

⁴Pronounced with stress on the second syllable, like the French word for *mistake*.

text rather than merely what is shared knowledge. Moreover, the widely adopted Alternative Semantics framework by Rooth (1992) treats Focus as a propositional anaphor (see also Wagner 2020). However, the term ‘anaphoric’ has been used in a variety of ways such that it at best serves as a descriptive label that requires further specification. Furthermore, even though the Focus-sensitivity of some presupposition triggers has been no secret, research on presuppositions and Focus has mostly worked in parallel rather than result in a synthesized theoretical account. Finally, the FoPAH is crucially only concerned with Focus-sensitive presupposition triggers rather than Focus per se. While it may be possible to extend the hypothesis to Focus beyond its grammaticalization in Focus-sensitive triggers, the results will provide evidence that bare Focus should be distinguished from cases of Focus-sensitivity.

An obvious question the FoPAH raises is how to conceptualize the notion of an antecedent. Firstly, staying with the general conception of the FoPAH, the notion intended here is a psycholinguistic rather than a formal one, although motivated by formal linguistic theory and ideally with a close correspondence there. Secondly, I assume this antecedent to be semantic rather than syntactic. The argument for this assumption is two-fold. First, Focus-sensitive presupposition triggers can be satisfied by non-linguistic material. For instance, in a context that warrants the assumption that all relevant discourse participants are attending to the same event, the corresponding content can serve as an antecedent even if it is not linguistically instantiated, as shown in (1.6).⁵ This property likens presupposition triggers to deep anaphora in the sense of Hankamer & Sag (1976); Sag & Hankamer (1984)

⁵Note that non-linguistic material can also satisfy the presupposition of triggers lacking Focus-sensitivity:

- (i) *Context: Becca and Vernon are out on a hike together, during which Vernon is loudly singing. After a while, Becca says:*
Could you **stop** singing?

such as personal pronouns rather than surface anaphora, which require a linguistic antecedent, as for instance in the case of ellipsis. I will come back to the question to what extent examples of this sort pose a problem for the FoPAH in Chapter 6.

(1.6) *Context: Lindsay sees Edgar use cilantro while making breakfast nachos and says:*
Paul ALSO uses cilantro for making nachos.

The second argument against conceiving of the hypothesized antecedent of Focus-sensitive presupposition triggers as syntactic comes from the lack of syntactic parallelism effects for the case of *too*. Göbel (2017); Göbel et al. (2018) investigated short discourses like (1.7) and varied the first - antecedent - sentence such that it either matched the final - target - sentence both syntactically and with respect to the verb (*Parallel*), mismatched in voice (*Syntactically Non-Parallel*) or choice of verb (*Semantically Equivalent*). Additionally, the presence or absence of *too* in the final sentence was manipulated. Acceptability ratings of the target sentence showed no differences between the type of antecedent sentence but only a significant decrease if *too* was absent. These results suggest that syntactic factors such as (lack of) parallelism between the sentence that a Focus-sensitive presupposition trigger occurs in and the sentence satisfying its presupposition affect the processing of such triggers (see also Tanenhaus & Carlson 1990 for an experimental investigation on parallelism effects with respect to deep and surface anaphors).

(1.7) $\left\{ \begin{array}{ll} \text{At dinner, the butler disobeyed the countess.} & \textit{Paral.} \\ \text{At dinner, the countess was disobeyed by the butler.} & \textit{Synt. Non-Paral.} \\ \text{At dinner, the butler defied the countess.} & \textit{Sem. Equivalent} \end{array} \right\}$

The other staff were worried about bad consequences for him.

Surprisingly, he disobeyed the count (**too**).

Assuming the antecedent under consideration to be semantic rather than syntactic still leaves open the question about the relationship between the discourse model and the Common Ground, the latter of which is arguably semantic as well and may in fact represent the same abstract content. However, there may still be distinct ways in which this content can be represented, which is what is being assumed here. An argument for this view comes from what Stalnaker (1998) calls Kamp's Argument (Kamp, 1988). Consider a variant of the so-called "marble sentences" in (1.8) (going back to Barbara Partee, originals cited in Heim 1982). The first sentences of each discourse are semantically equivalent with respect to the Common Ground in terms of the possible worlds they are compatible with, but nonetheless vary in the extent to which the pronoun *it* is able to pick out the one ball that is not in the bag. Consequently, it may be necessary to represent the same content in different ways. The core of the FoPAH is simply that these distinct representations map to different classes in the domain of presuppositions, depending on whether a trigger is Focus-sensitive or not. While there is more to be said about the details of these representations, which I will come back to, I will assume Discourse Representation Theory (DRT, Kamp 1981; Kamp & Reyle 1993) as a way to conceive of the discourse model formally for now.

- (1.8) a. Exactly one of the ten balls is not in the bag. It is under the sofa.
b. Exactly nine of the ten balls are in the bag. #It is under the sofa.

(STALNAKER 1998, (2)-(3))

1.2 Preview of Findings

There are three predictions derived from the FoPAH that will be tested in this dissertation. The first prediction is that Focus-sensitive presupposition triggers by virtue of requiring an antecedent in the discourse model should be sensitive to

the salience of this antecedent. An illustrative analogy would be how the processing of pronouns is affected by different factors such as grammatical role or implicit causality influencing the salience of potential antecedents. In contrast, triggers lacking Focus-sensitivity are predicted to be indifferent to the salience of the linguistic material satisfying their presupposition by virtue of being entailments. A possible analogy for this case could be premises in a syllogism, which result in the same conclusion irrespective of the order in which they are presented.

The way salience will be operationalized will rely on the *Question Under Discussion* (QUD, Roberts 2012) and the discourse structure it gives rise to. The central idea behind the QUD-framework is that discourse is structured by a - often implicit - set of questions that guide how the discourse progresses. There is ample evidence that QUDs matter for language comprehension (e.g. Zondervan et al. 2008; Clifton & Frazier 2018; Kehler & Rohde 2017; Tian & Breheny 2016) but less work on their role as a discourse structuring device. Experiments 1a and 1b will use the Focus-sensitive trigger *even* to investigate how the QUD-structure affects the accessibility of linguistic material as an antecedent for *even*. Experiment 2 will contrast two triggers from each class - *also* as Focus-sensitive and *again* as not Focus-sensitive - with respect to how intervening material that is part of a shared QUD affects the accessibility of the material satisfying the respective presuppositions in the discourse.

The second prediction to be tested is that Focus-sensitive triggers are harder to accommodate than non Focus-sensitive triggers if their presupposition is not satisfied in the context. This prediction relies on the assumption made in Stalnaker's work that the Common Ground is governed by cooperative principles such that if a presupposition is not entailed by the Common Ground, a cooperative hearer may decide to add the presupposition to the Common Ground rather than let the conversation come to a halt. In contrast, the discourse model is assumed not to be subject to such principles and render repair of the context in the case of an unsat-

isfied Focus-sensitive triggers costly. Experiment 3 tests accommodation difficulty of four trigger-pairs, one for each class, in a rating study. Experiment 4 follows up by investigating the online processing behavior via a self-paced reading study, focusing on *again* and *too*.

The structure of this dissertation is as follows. Chapters 2 and 3 provide background from linguistic theory and psycholinguistics on presuppositions and Focus respectively. Chapter 4 presents the experiments on the salience prediction in relation to the QUD. Chapter 5 presents more background on accommodation as well as the experiments investigating accommodation difficulty of the two trigger classes. Chapter 6 summarizes the findings and discusses their implications for linguistic and psycholinguistic theory, as well as directions for future work.

CHAPTER 2

BACKGROUND ON PRESUPPOSITIONS

This chapter is dedicated to providing the background from formal linguistic theory and psycholinguistics to situate the present work relative to the contemporary research on presuppositions and clarify crucial assumptions along the way. Section 2.1 explicates the notion of presupposition adopted in this dissertation and where presuppositions fall in a typology of linguistic meaning. Section 2.2 introduces the most prominent formal approaches to modeling presuppositions. Section 2.3 reviews relevant issues and debates in presupposition theory. Section 2.4 picks up one specific issue that is central to this dissertation, namely different classifications of presupposition triggers and relevant empirical properties. Section 2.5 concludes the chapter with a discussion of notable psycholinguistic findings and the state-of-the-art on what is known about the processing of presuppositions.

2.1 Presuppositions in a Typology of Meaning

The goal of this section is to spell out the assumptions on the empirical profile of presuppositions and respective diagnostics. Doing so is particularly crucial given the long-lasting tradition of research on presuppositions, which has led to the label not always being applied consistently. This situation makes it necessary to not only specify what properties presuppositions have, but also indicate to what ex-

tent the respective properties are unique to presuppositions. It is thus important to consider presuppositions in relation to other kinds of natural language meaning and their similarities and differences.

Presuppositions were introduced in the previous chapter as being characterized by their projection behavior, i.e., their persistence in the context of entailment cancelling operators such as negation. That is, while the inference - to use a pretheoretical term - of (2.1a) that Cameron hired Joe is no longer warranted in (2.1b) in the presence of negation, the inference that Cameron had hired Joe before is associated with both sentences. Based on this pattern, these inferences have received the labels *assertion* (indicated by ' \Rightarrow ') and *presupposition* (indicated by ' \rightsquigarrow ').

- (2.1) a. Katherine "Cameron" Howe hired Joe McMillan **again**.
 \Rightarrow *Cameron hired Joe*
 \rightsquigarrow *Cameron hired Joe before*
- b. Cameron didn't hire Joe **again**.
 \nRightarrow *Cameron hired Joe*
 \rightsquigarrow *Cameron hired Joe before*

However, it was also already noted in the introduction that projection behavior can vary across presuppositional expressions and environments. Abusch (2010) observes the contrast in (2.2) (repeated from (1.3)) between *win* in (2.2a), which presupposes participation, and *too* in (2.2b), which here presupposes that someone other than Joanie read the proposal. What is crucial here is that *win* is felicitous in the antecedent of a conditional, which usually allows presuppositions to project, despite the fact that the preceding sentence asserts that the respective presupposition is not accepted by the speaker. Thus, if the presupposition of *win* were to project, it should result in inconsistency, but given the felicity of the discourse, the presupposition seems to be suspended. In contrast, *too* does lead to some degrada-

tion under the same circumstances, suggesting that its projection behavior is more robust. While projection will be discussed in more detail in the following sections, the takeaway here is that - given the observed variation - projection cannot serve as a reliable diagnostic to identify presuppositions.

- (2.2) a. I have no idea whether Ryan ended up participating in the Road Race yesterday. But if he **won** it, then he has more victories than anyone else in history. (ABUSCH 2010, (3d))
- b. ??I have no idea whether Joanie read that proposal. But if Haley read it **too**, let's ask them to confer and simply give us a yes-no response. (ABUSCH 2010, (5a))

What makes matters worse for using projection as a diagnostic for presuppositions is that there are other kinds of meaning that exhibit projection behavior, most notably conventional implicatures in the sense of Potts (2005), including appositives as in (2.3) and expressive meaning such as the epithet in (2.4) (using ' \rightsquigarrow ' for projective meaning more generally). Thus, in addition to a lack of projection not being sufficient to classifying a given inference as being not presuppositional, its presence does not warrant the conclusion that we are dealing with a presupposition. Projection should therefore be something to be studied - as has been the case - rather than a diagnostic.

- (2.3) a. Cameron, **a coding genius**, works at Cardiff Electric.
 \Rightarrow *Cameron works at Cardiff Electric*
 \rightsquigarrow *Cameron is a coding genius*
- b. Cameron, **a coding genius**, doesn't work at Cardiff Electric.
 \Rightarrow *Cameron works at Cardiff Electric*
 \rightsquigarrow *Cameron is a coding genius*

- (2.4) a. **That jerk** Joe works at IBM.
 ⇒ *Joe works at IBM*
 ∼ *The speaker has a negative attitude toward Joe*
- b. **That jerk** Joe doesn't work at IBM.
 ⇒ *Joe works at IBM*
 ∼ *The speaker has a negative attitude toward Joe*

As an alternative to using projection as a diagnostic for presuppositions, I will rely on three properties that jointly distinguish presuppositions from other kinds of meaning. The first diagnostic is the extent to which a particular meaning component can be directly targeted with assent or dissent (= **direct targetability**) (see [Tonhauser 2012](#) for a detailed discussion of this diagnostic)¹. An illustration is given in (2.5). While it is possible to target the asserted content - that Gordon grew a beard - in (2.5a), targeting the contribution of *again* - that Gordon had grown a beard before - in (2.5b) results in degraded acceptability. The diagnostic thus allows us to differentiate between asserted and presupposed content, and more reliably than projection would.

- (2.5) A: Gordon Clark grew a beard **again**.
- a. B: { No / That's not true / I don't think so }, I saw him clean-shaven just this morning.
- b. B: ??{ No / That's not true / I don't think so }, he's never had a beard before.

However, the direct targetability diagnostic merely differentiates presuppositions from asserted content. Other kinds of meaning, such as conventional implicatures

¹It is worth noting that the use of this diagnostic relies on the use of propositional anaphora like *that* or response particles like *no*, which have been treated analogously ([Krifka, 2013](#)), and may consequently be viewed as diagnosing anaphoric potential ([Snider, 2017](#)) (see also [Göbel 2019b](#)).

(2.6a) or scalar implicatures - here the *some but not all* inference associated with *some* (2.6b) - behave like presuppositions insofar as they cannot be directly targeted either. The diagnostic will thus be assumed to differentiate *at-issue content* - as an alternative, more specific term for what we called asserted content so far - from *not at-issue content*, which includes presuppositions, conventional implicatures and conversational implicatures, following Potts (2005, 2007a).²

- (2.6) a. A: **That jerk** Joe tricked Cardiff Electric into hiring him.
B: ?? That's not true, you like Joe.
- b. A: Donna owns **some** of the shares of *Mutiny*.
B: ?? That's not true, she owns all of them.

In order to further differentiate presuppositions from other not at-issue meanings, the second property I assume as being characteristic of presuppositions is that they are not **defeasible**³, in contrast to conversational implicatures.⁴ The standard test to check whether an inference is defeasible or not is to see whether it is possible to continue the discourse with the negation of the inference under consideration. This test is illustrated in (2.7a) for scalar implicatures. Since continuing the discourse with a statement that negates the *some but not all* inference does not result in unacceptability, scalar implicatures - and conversational implicatures more gen-

²That is not to say that not at-issue content is impervious to being challenged but rather that it requires more roundabout ways to get at it. One such way is the "Hey, Wait a Minute" Test from von Stechow (2004) (see also Pearson 2010). For the present purposes, it is not crucial whether the felicity of a direct denial and the "Hey, Wait a Minute" Test are in complementary distribution since the former is sufficient for motivating the distinction between at-issue and not at-issue content intended here.

³An alternative term that is often used in the literature is "cancellable", which will however be reserved for describing the projection behavior of presupposition under negation (see Section 2.4).

⁴On this assumption, cases of so-called *conversational presuppositions* discussed in (Kadmon, 2001, Ch. 11) (see also Potts 2005; Schlenker 2019) would be considered implicatures rather than presuppositions in this respect. Conversational presuppositions have been discussed due to the fact that they project but are defeasible. However, given that I have argued for projection to be unsuitable as a diagnostic for presuppositions, their defeasibility should take precedence in their classification.

erally - can be considered defeasible. In contrast, applying the same test to *again* in (2.7b) does result in unacceptability, showing that presuppositions are not defeasible.⁵

- (2.7) a. Donna owns **some** of the shares of *Mutiny*.
In fact, she owns all of them.
- b. Gordon grew a beard **again**.
#In fact, it was the first time he grew a beard.

Lastly, to differentiate presuppositions from conventional implicatures, I will appeal to Potts's (2007b) notion of (non)displaceability.⁶ Potts argues that conventional implicatures are special by virtue of them necessarily being evaluated relative to the utterance context. An empirical correlate of this property is the inability to be part of quantification over situations. Potts's (2007b) example - credited to Florian Schwarz - to illustrate this property for an expressive adjective is given in (2.8). Rather than the heightened emotional state expressed by *damn* having to be part of all wine-pouring situations - including previous ones - for the utterance to

⁵A potential concern is that the standard *in fact* lead up of the test fits better with the implicature than other inferences due to the scalar relationship. However, we get the same result if we slightly modify the test as in (i), where the relevant inference is canceled by a preamble rather than a continuation. (While this test bears some resemblance to the suspension contexts of Abusch 2010 discussed earlier, they differ in that there is no sentential operator present.)

- (i) a. I don't know whether Donna owns all the shares of *Mutiny*.
She owns **some** of them though.
- b. I don't know whether Gordon ever had a beard.
#He's currently growing one **again** though.

⁶Potts (2005, 2007a) discuss a few other properties with respect to which presuppositions and conventional implicatures are supposed to differ, such as anti-backgrounding, cancellation by negation, and projection from verbs of saying. However, none of these hold up once we take a broader range of triggering expression into account and therefore do not qualify as reliable diagnostics.

The two classes of meaning are also argued to differ with respect to conventional implicatures being perspectival while presuppositions are not. However, given that perspective can be subject to a range of pragmatic factors (see Harris 2012; Harris & Potts 2009), it seems less suited as a diagnostic. (The property of Obligatory Local Effect proposed by Tonhauser et al. 2013, which might be another potential diagnostic, will be left aside here for the same reasons.)

be felicitous, the utterance is compatible with the speaker being perfectly calm at previous instances of the bottle dripping.

- (2.8) Whenever I pour wine, the **damn** bottle drips. (POTTS 2007b, (12))
- a. \neq For every wine-pouring situation, there is a bottle-dripping situation & the speaker has a negative attitude toward every bottle-dripping situation
 - b. \approx For every wine-pouring situation, there is a bottle-dripping situation & the speaker has a negative attitude toward this fact

In contrast, presuppositions are not restricted to the utterance situation in this way and may carry over to situations that are being quantified over. This behavior is illustrated in (2.9) for *again*. For B's reply to be felicitous and true, it has to be the case that in all Diane-at-the-gym situations Diane smiles at Bos *and has given him a smile before during the meeting*, rather than just the one time A pointed out.⁷

- (2.9) A: Diane gave Bos a smile yesterday during the meeting.
B: Whenever she's at the gym, she smiles at him **again**.

A summary of the discussion is given in Table 2.1 according to which presuppositions are uniquely identifiable by not being directly targetable, not being defeasible, and being (not non)displaceable. An application of the tests for a broader range of expressions, including those featured here, as well as the presupposition triggers discussed in Section 2.4 and used in the experiments of this thesis, can be found in Appendix A.1.

Note that this definition of presuppositions is a purely empirical one rather

⁷A's utterance is necessary here to satisfy *again*'s requirement without making it part of the restrictor situations. That is, if we changed the subordinate clause to "*Whenever Diane smiles at Bos, ...*", *again*'s contribution would be vacuous, whereas omitting *again* in (2.9) does in fact change its meaning.

	Directly Targetable	Defeasible	Nondisplaceable
At-Issue Content	+	-	-
Conversational Implicatures	-	+	-
Conventional Implicatures	-	-	+
Presuppositions	-	-	-

Table 2.1: Assumed Meaning Typology.

than other conceptual ones, such as one describing presuppositions as *taken for granted* (Chierchia & McConnell-Ginet, 1990; Kadmon, 2001) or *backgrounded* (Levinson, 1983).⁸ Moreover, the definition is restricted to *linguistic* content rather than an attempt to encompass other non-technical uses of what we might call presupposition, such as the reader being able to understand English and being aware that this document is a linguistic dissertation, for which I will reserve the term *assumptions* (what Beaver & Geurts 2014 refer to as *conversational presuppositions*). With these assumptions in place, the next section will move on to a discussion of formal theoretical approaches to presuppositions.

2.2 Approaches to Presuppositions

The goal of this section is to review seminal work in presupposition research and some of the debates that have shaped its history, most significantly from conceiving of presuppositions as a semantic phenomenon to the rise of pragmatic presuppositions. Additionally, this section introduces some of the most prominent formal approaches to presuppositions that go along with this development, namely the dynamic semantic account by Heim (1983) and the anaphoric approach to presuppositions embedded in Discourse Representation Theory, which will serve as a formal implementation of the ideas presented in Chapter 1. Although central to these

⁸That is not to say that these conceptual notions could not be rephrased empirically by equating what is taken for granted with new information and backgroundedness with the directly targetable test. However, crucially the former does not always hold and the latter is underspecified with respect to the relevant not at-issue notion at stake.

theoretical developments, a detailed discussion of approaches to the behavior of presuppositions in complex sentences (= the projection problem) will be delayed until the next section, given that projection will not be directly relevant to the goals of this thesis.

The earliest discussion of presuppositions - in the guise of referring expressions - goes back to the philosophical work by Frege (1892) and Strawson (1950), who argued for a treatment of presuppositions in terms of preconditions for a sentence to have a truth-value. To illustrate this intuition with the contrast between the sentences in (2.10), there is a sense in which someone uttering (2.10a) would make it impossible to judge whether what was said is true or false, given that Germany does not have a Queen. In contrast, the truth of (2.10b) can be determined straightforwardly.⁹ Approaches that define presuppositions in terms of their impact on the truth-value of a sentence have come to be known as *semantic*.

- (2.10) a. **The Queen of Germany** lives in Bellevue.
 b. **The Queen of England** lives in Bellevue.

In the widely adopted semantic framework of Heim & Kratzer (1998), this approach to presuppositions is formalized as treating presuppositions in terms of definedness conditions, more precisely, as restrictions on the domain of a function. That is, presuppositions are partial functions. Illustrated with the definite determiner in (2.11), the difference between presupposed and at-issue meaning can thus be represented in a lexical entry as its domain (here the italicized part between colon and period) and its output (here the bolded part following the period).

- (2.11) [[the]] =
 $\lambda f : f \in D_{\langle e,t \rangle} \ \& \ \exists$ *exactly one* x s.t. $f(x) = 1$. **the unique y such that $f(y) = 1$**

⁹This account has been traditionally contrasted with Russell's (1905) treatment of sentences like (2.10a) as resulting in falsity (see Schwarz 2015b; Kadmon 2001 for more research on this issue).

Applied to (2.10a), the result would be undefined - with undefinedness being treated as a third truth-value '#' (see Beaver 2001; Beaver & Geurts 2014 for more on trivalent approaches to presuppositions and specifically projection) - since *the* could not compose with *Queen of Germany*, whereas composition in (2.10b) would proceed flawlessly without the presupposition adding anything to the at-issue truth-conditions. This type of approach is considered *static* insofar as it is concerned with the definedness of individual propositions instead of their role in a larger discourse.

An alternative to treating presuppositions in terms of their effects on a sentence's truth-value made prominent by Stalnaker (1970, 1973, 1974) (see also Simons 2003) is the notion of *pragmatic presupposition* (or *speaker presupposition* in later work). On this view, presuppositions are not properties of sentences but of speakers and their utterances, namely something a speaker takes for granted in a conversation. Stalnaker's account emphasizes the role of presuppositions as an essential aspect of general practices of communication, the assumed goal of which is to exchange information in order to decide which of all possible worlds is the actual one.

The formal notions central to this pragmatic view of presuppositions are the *Common Ground* - identified with the *context* - and the *Context Set* (Stalnaker, 1978, 1998, 2002). The Common Ground encapsulates the shared knowledge between interlocutors, represented as a set of propositions.¹⁰ Its counterpart is the Context Set, which is the set of possible worlds that constitute viable candidates for the actual world - the intersection of the Common Ground. If a hearer were to accept an assertion made by a speaker, it would increase the Common Ground by virtue of the proposition associated with the assertion becoming part of the set of proposi-

¹⁰The notion of a Common Ground has also been widely used in work in psychology on dialogue and audience design, see the seminal work by Clark (1996), and Brown-Schmidt & Duff (2016) for a recent overview.

tions and shrink the Context Set by eliminating any possible worlds in which this proposition was not true.

A well-known formalization of these ideas based on Stalnaker (1978) comes from Heim (1982, 1983, 1992). In her framework, the meaning of a sentence is its *Context Change Potential* (CCP), namely a function from contexts to contexts, with a context being a set of possible worlds. To illustrate how a context gets updated, consider someone asserting the proposition *It is raining*. On the assumption that the initial context is empty - the Common Ground is the empty set and the Context Set is the set of all possible worlds W - the context would be updated with this assertion to contain only those worlds in which it rains, as in (2.12). That is, the context gets intersected with the asserted proposition. Presuppositions then serve as requirements on the context, allowing an update to proceed only in those contexts that entail the presupposition. An example for the presupposition of a possessive - that Emma owns a cat - is given in (2.13). Frameworks of this sort - as the one by van der Sandt (1992) discussed further below - belong to the class of *dynamic semantics* - in contrast to the static one seen earlier - since they are concerned with how information accumulates as a discourse progresses.

(2.12) For any context c , $c + it\ is\ raining = \{w \in c : \text{it is raining in } w\}$
(HEIM 1992, (5))

(2.13) $c + Emma's\ cat\ is\ hungry$ is defined iff
 $c \subseteq \{w : \text{Emma has a unique cat in } w\};$
 where defined, $c + Emma's\ cat\ is\ hungry$
 $= \{w \in c : \text{Emma has a hungry cat in } w\}$ (HEIM 1992, (7))

One apparent obstacle to the view that presuppositions are contextual requirements that need to be met in order for an utterance containing a presupposition

trigger to be felicitous is that presuppositions can also be used to convey new information, so-called *informative presuppositions* (see Tonhauser 2015). For example, Stalnaker (1974) notes that B's reply in (2.14) does not result in infelicity in a context where A is not aware that B has a sister.

(2.14) A: Are you going to lunch?

B: No, I have to pick up **my sister**. (STALNAKER 1974, fn.2)

While it has been argued that the ease with which presuppositional requirements can be violated in such cases, in combination with the fact that these cases may be more of the rule than the exception in terms of raw frequencies (Spencer, 2002), constitutes a fatal flaw to the Stalnakerian picture, Stalnaker (1998, 2002, 2014) argues that this supposed violation is a feature rather than a bug in his system. Using (2.14) as illustration, by virtue of B's utterance, A can infer that B assumes B having a sister to be part of the Common Ground. On the assumption that B is a cooperative and reliable speaker, A can therefore conclude that B believes to have a sister and wants A to believe that B has a sister as well, thus indirectly making A adopt this belief. This process has come to be known as (global)¹¹ *Accommodation* after Lewis (1979) (see also von Stechow 2000, 2008; Simons 2006a; Roberts 2015). (A more detailed discussion of accommodation can be found in Chapter 5.)

Despite the terminological contrast between semantic and pragmatic approaches to presuppositions, Stalnaker (1970, 1973) notes that they are not mutually exclusive but rather that the former may be a superset of the latter. That is, any semantic presupposition will also be a pragmatic presupposition, but not vice versa. However, since its original conception, the semantic-pragmatic distinction has been used to describe two different issues that should be distinguished (see Simons

¹¹*Global* is meant to contrast with *local* accommodation, which is a mechanism employed in projection contexts discussed in Section 2.4.

2006b). On the one hand, there is the original characterization in terms of what happens when a presupposition is not met, with semantic approaches arguing for a truth-value gap and pragmatic approaches treating such a case in terms of infelicity. On the other hand, the contrast has also been applied to the question of where presuppositions come from, namely whether they are a lexicalized part of an expression's meaning (semantic) or arise from more general principles of conversation (pragmatic). Examples of semantic presuppositions in this sense can be found in the different triggers discussed thus far, while an instantiation of a non-lexicalized presupposition would be the inference that a speaker uttering an English sentence assumes her addressee to be sufficiently knowledgeable in English - an inference that cannot be pinned to any lexical item of the sentence but only the communicative act itself. This latter interpretation - lexicalized vs non-lexicalized - has also been brought to bear on differences between presupposition triggers, for instance in (Abusch, 2010). Although these two issues - how presuppositions are conceptualized, and where they come from (= the triggering problem, see Section 2.3.2) - might be related, they are logically independent and should thus be distinguished.

The last approach to presuppositions to be discussed here is the anaphoric approach proposed by van der Sandt (1992). On this account, presuppositions are treated analogously to anaphoric expressions such as the pronoun *it* in the donkey sentences in (2.15). van der Sandt's idea of assimilating presuppositions to anaphora is based on the observation that the projection behavior of presuppositions in (2.16) appears to be parallel to that of the pronominal expressions in (2.15). That is, the nominal expression *all of Jack's children* in (2.16) is taken to presuppose that Jack has children, but this presupposition does not arise in the sentences in (2.16). What van der Sandt proposes is to think of these cases as presuppositions being bound by a previously introduced nominal expression just like the donkey

anaphora in (2.15), going as far as allowing substitution of the presuppositional expression in (2.16) with the corresponding pronominal expression without any interpretive difference.

- (2.15) a. Katie owns a donkey. She pets *it*.
 b. If Katie owns a donkey, she pets *it*.
 c. Either Katie does not own a donkey or she pets *it*.

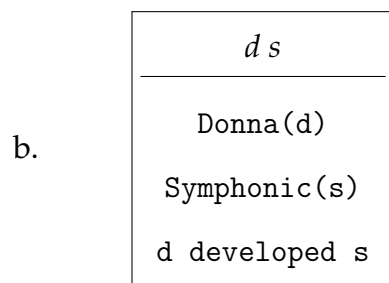
(after VAN DER SANDT 1992, (14/15/16b))

- (2.16) a. Tom has children and **all of Tom's children** / *they* like soccer.
 b. If Tom has children, then **all of Tom's children** / *they* like soccer.
 c. Either Tom has no children or **all of Tom's children** / *they* like soccer.

(after VAN DER SANDT 1992, (14/15/16a))

The theory [van der Sandt](#) proposes is couched within the framework of Discourse Representation Theory (DRT, [Kamp 1981](#); [Kamp & Reyle 1993](#); [Geurts et al. 2020](#)), which - loosely - consists of a set of discourse referents and their predications. Using (2.17) as an illustration,¹² both the subject and the object are represented as discourse referents at the top of the box (the discourse "universe"), with their predications (or "conditions") below.

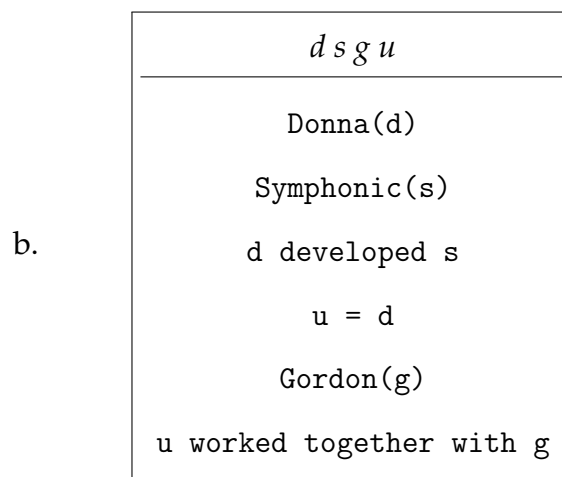
- (2.17) a. Donna developed the Symphonic.



¹²Thanks to Julian Schlöder for sharing his LaTeX macro with me.

This structure would make it possible that, if we were to continue the discourse with the sentence in (2.18a), for the pronoun *she* to be bound by the previously introduced discourse referent *d* and accumulate the additional information as the discourse progresses. DRT furthermore specifies a set of accessibility relations between partial structures that is particularly relevant to cases of anaphora in complex clauses, which will however not be discussed here.

(2.18) a. *She* worked together with Gordon.



Although the development of a formal theory of presuppositions is not the main goal of this dissertation, for the purposes of this investigation, I will assume that the hypothesized distinction between presupposition triggers based on their (lack of) Focus-sensitivity maps to a distinction in their formal representation. For triggers lacking Focus-sensitivity, which are hypothesized to fit the [Stalnakerian](#) picture of presuppositions as contextual entailments, I will assume an account along the lines of [Heim \(1982\)](#). For Focus-sensitive triggers, which are hypothesized to require an antecedent in the discourse model, I will assume a standard version of DRT. The resulting picture - which will be discussed further in [Chapter 6](#) - is thus one in which different formal approaches are used to capture different classes of triggers, rather than arguing for a formally unified account of presuppositions. As

a slightly separate point, I will assume that presuppositions are specified lexically and part of the conventionalized meaning of an expression. With these assumptions in place, we can move on to a review of major theoretical issues and debates that shaped presupposition theory.

2.3 Issues in Presupposition Theory

This section is intended to cover some of the seminal research on prominent theoretical issues related to presuppositions. As noted earlier, the main phenomena that has occupied research on presuppositions over the decades is their projection behavior. A less studied but in no way theoretically less important question concerns what is known as the triggering problem, namely the question why presuppositions arise in the first place. Another issue that has received more attention in recent years concerns variation between triggering expressions, which will be addressed in a more exhaustive fashion in the next section since it is of central concern to this dissertation. In the current section, the projection problem and the triggering problem will be discussed in turn.

2.3.1 The Projection Problem

What has come to be known as the projection problem is the question how to determine the presuppositions of a complex sentence given the presuppositions of their parts (Langendoen & Savin, 1971). A solution to this problem therefore involves an accurate description of the empirical generalizations and a theoretical explanation for them. One possibility could be that a complex sentence simply inherits all presuppositions of its parts, the *cumulative hypothesis* (Morgan, 1969). However, the empirical facts are far more complex. Given that vast amount of research on this topic (see Beaver 2001; Kadmon 2001; Beaver & Geurts 2014; Schwarz 2019 for

some overviews), there are four issues I want to highlight in this section that have been central to the development of different theories, namely (i) filtering, (ii) the proviso problem, (iii) projection from quantifiers, and (iv) the behavior of factives. (Another issue concerns accommodation, which I will leave aside for now given that there will be more on it in the next section in the context of differences between presupposition triggers.)

(i) Filtering

One of the earliest approaches to the projection problem that contributed greatly to its empirical aspects is Karttunen's (1973) plugs-holes-and-filters account. Karttunen distinguishes between three classes of embeddings. The first two classes - plugs and holes - are characterized by preventing, or allowing respectively, presuppositions to project and become a presupposition of the whole sentence. Examples of plugs include verbs of saying, such as *say* in (2.19), and potentially other propositional attitude verbs; examples of holes originally included a range of verbal embedding predicates such as *understand* or *be surprised* (2.20), but has since come to include those entailment cancelling operators which have come to be known as comprising the *family-of-sentences test* (Chierchia & McConnell-Ginet, 1990) - namely negation, questions, antecedents of conditionals and modals (2.21).

(2.19) Bos said that IBM threatened him **again** ...
(... but he's just making it up to scare Joe, he's never talked to IBM).
↷ *IBM threatened Bos before*

(2.20) Bos was surprised that IBM threatened him **again** ...
(... #but he's just making it up to scare Joe, he's never talked to IBM).
↷ *IBM threatened Bos before*

- (2.21) a. IBM didn't threaten Bos **again**.
 b. Did IBM threaten Bos **again**?
 c. If IBM threatened Bos **again**, Cardiff Electric might be in trouble.
 d. IBM might have threatened Bos **again**.
 ~> *IBM threatened Bos before*

The third, and arguably most complex group, are the *filters*. This group includes all binary connectives, namely conditionals, conjunction and disjunction. What is crucial about this class is that their projection behavior depends on the content of the first clause. For example, while the conditional in (2.22a) seems to project the presupposition that IBM threatened Bos before from its consequent clause, this no longer seems to be the case when the antecedent already contains the content of the presupposition, as in (2.22b). That is, the presupposition gets filtered out by virtue of being entailed by the first clause of the connective.¹³

- (2.22) a. If Cameron can't reconstruct the BIOS code, IBM will threaten Bos **again**.
 ~> *IBM threatened Bos before*
 b. If IBM threatened Bos before, they will threaten him **again**.
 ~> *IBM threatened Bos before*

What Karttunen's (1973) approach is lacking, despite its empirical insights, is a proper explanation for why connectives behave the way they do. An improvement in this respect is Gazdar's (1979) cancellation account, which proposes that context updates proceed in stages, with at-issue content taking precedence over

¹³Note that talking about presuppositions being "filtered out" can be somewhat confusing given that the phrase is meant to describe both conditionals, in which case the presupposed content does not become part of the global context, and conjunction, in which case the presupposed content *does* become part of the global context, just not by virtue of the presupposition but by virtue of it being at-issue content of the first conjunct.

implicatures, and implicatures over presuppositions. The reason the presupposition in (2.22b) does not project is because (i) using a conditional implicates that the speaker is not certain that the antecedent holds such that (ii) the presupposition gets cancelled, since it conflicts with the implicature.

However, Heim (1983) notes empirical issues with this account for cases like (2.23). Consider first (2.23), which Heim ascribes the lack of any presupposition. According to Gazdar, the antecedent is taken to implicate that the speaker is uncertain whether Cameron has twins, which would be compatible with her having *some* children. The cancellation account would thus predict the presupposition to go through, contrary to what is observed.

(2.23) If Cameron has twins, then Joe will not like her children.

↗ *Cameron has children*

(HEIM 1983, (6))

As an alternative, Heim (1983) - building on Stalnaker (1974) and Karttunen (1974) - proposes a dynamic semantic account that treats the meaning of sentences as their context change potential. This account was introduced in the previous section, albeit without projection in mind. The crucial addition that allows Heim to extend her ideas to capture projection behavior in complex sentences is the notion of a *local context*. That is, rather than evaluating the whole sentence relative to the context is uttered in, the context gets updated incrementally. While the first clause, for example of a conditional, still gets evaluated relative to the global context c , the second clause now gets evaluated relative to the local context c' that is the result of updating the initial context c with the content of the first clause. A formalization of this idea is given in (2.24) (' \setminus ' stands for intersection), which treats an update of a context c with a conditional as the intersection of c with the intersection of c being updated with the antecedent S_1 (first step) and c being updated with both the antecedent and the consequent S_2 (second step).

- (2.24) Context Change Potential for Conditionals
 $c + \text{If } S_1, \text{ then } S_2 = c \setminus ((c + S_1) \setminus (c + S_1 + S_2))$ (HEIM 1983, (14))

Although Heim's (1983) account overcomes some of the empirical issues of Gazdar (1979) while being able to derive projection properties of connectives from their context change potential, it has been argued to be too strong and overgenerate. For example, it is possible to define conjunction in a way that leaves its truth-conditional content unaffected but reverses the order in which the conjuncts update the context, namely with the second conjunct preceding the first. Given that no such connective is attested in natural language, the explanation for the projection patterns of the connectives under consideration becomes stipulative.

A solution to this problem comes from Schlenker (2008) and subsequent work, who proposes an alternative that uses classical non-dynamic semantics for connectives in combination with two pragmatic principles. The first, stated in (2.25), can be viewed as requiring people to satisfy their presupposition beforehand (where \underline{d} stands for the presuppositions associated with an expression).

- (2.25) Be Articulate
 In any syntactic environment, express the meaning of an expression $\underline{dd'}$ as (d and $\underline{dd'}$) (...unless independent pragmatic principles rule out the full conjunction.) (SCHLENKER 2008, (13))

The second principle is called *Be Brief* and stands in opposition to *Be Articulate* by prohibiting people from stating something that is already part of the context. *Be Brief* is crucially ranked above *Be Articulate* such that, to use (2.26) as illustration, choosing (2.26a) over (2.26b) will be dispreferred, unless the presupposition is not already entailed by the initial context.

- (2.26) a. Donna is upset and Gordon **knows** that she is upset. (*d* and *dd'*)
b. Gordon **knows** that Donna is upset. (*dd'*)

Schlenker's (2008) account thus avoids the overgeneration problem of Heim (1983) by appealing to more general - but violable - pragmatic principles. One consequence of this account is that filtering is no longer strictly asymmetric - with asymmetric projection being calculated left-to-right rather than globally - but allows the possibility for material following a presupposition trigger to prevent it from projecting, as in (2.27). However, the empirical facts on this matter have been disputed such that it is unclear whether the ability of Schlenker's account to capture such cases is an argument in favor of or against it.¹⁴ Another issue that Schlenker - and most other accounts - suffer from is the proviso problem, to which we will turn next.

- (2.27) If the bathroom is not hidden, this house has no bathroom.
(SCHLENKER 2008, (32b))

(ii) The Proviso Problem

The proviso problem is concerned with a discrepancy between the prediction of many major theories of presupposition projection - with the exception of DRT - for triggers occurring in the second clause of a connective and the attested intuitions (coined after Geurts 1996). For example, both Heim (1983) and Schlenker (2008) predict the conditional in (2.28) to have a weaker conditional presupposition rather than the stronger unconditional presupposition it is perceived to have.

¹⁴Experimental results bearing on this issue come from Mandelkern et al. (2019), which will be discussed in Section 2.5.

- (2.28) If Theo hates sonnets, then so does **his wife**. (MANDELKERN 2016, (3))
 ~> *If Theo hates sonnets, then he has a wife* (predicted)
 ~> *Theo has a wife* (intuitively attested)

The standard response of such accounts to the proviso problem is to appeal to some strengthening mechanism. A crucial issue for this route is to explain why and how this strengthening arises. One proposal made by Schlenker (2011) is that the stronger unconditional presupposition is a result of the hearer ignoring material irrelevant to the presupposition in order to minimize her computational load. If we take into account the oddness conditional presuppositions may often have, see (2.28), given that it would still have to be checked whether such a presupposition is entailed by the context, it seems plausible that a hearer might make devise a strategy to allow the conversation to proceed swiftly. In Schlenker's terms, for *if p, then qq'*, the hearer will look for the most conservative restriction C^+ of a context C that entails the presupposition of the full sentence for any non-presuppositional clause p' . This mechanism successfully derives the strengthened meaning insofar as C^+ will entail q .

However, Mandelkern (2016) notes that any account of strengthening runs into problems for cases where the antecedent is clearly relevant to the presupposition of the consequent in the absence of obvious sources of pragmatic pressure. One such case is given in (2.29).

- (2.29) [It is common ground that Smith has gone missing, and we don't know whether he is still alive. A detective enters and says:]
 If the butler's clothes contain traces of Smith's blood, then **it was the butler** who killed Smith.
 ~> *Someone killed Smith* (MANDELKERN 2016, (11))

In this scenario, the truth of the antecedent would provide good reason to accept the presupposition that someone killed Smith such that we should expect a conditional presupposition, according to accounts like [Schlenker \(2011\)](#), contrary to what is attested. Moreover, even if we were to assume that unconditional presuppositions arise due to being more plausible than their conditional counterpart, the given scenario constitutes the reverse case where the conditional presupposition may be considered more plausible than the unconditional one, and yet the latter is what seems to be the case.

[Mandelkern \(2016\)](#) concludes from this and similar data that the proviso problem constitutes a serious problem for the majority of projection theories. A notable exception is the anaphoric account of [van der Sandt \(1992\)](#) in DRT. However, DRT-approaches face empirical challenges in other areas. One such area is the projection behavior of quantificational expressions, to which we will turn next.

(iii) Projection from Quantifiers

Thus far, we have only been concerned with presuppositions at the propositional level. Quantificational expressions, however, pose a challenge by virtue of their standardly assumed tri-partite structure ([Heim, 1982](#)), consisting of a quantificational term, the restrictor, and the nuclear scope, illustrated in [\(2.30\)](#).

- (2.30) a. Every nation_i cherishes its_i queen. (*after* HEIM 1983, (7))
 b. every x_i ; x_i (is a) nation; x_i cherishes x_i 's queen (*after* HEIM 1983, (8))

In order to handle such cases, [Heim \(1983\)](#) adjusts her system such that contexts no longer consist of sets of propositions but of sets of sequence-world pairs (where a sequence is an assignment function) that allow the relativization of any update to a given variable assignment g . Updating the context with the presupposition of

the definite description in (2.30) would thus look as in (2.31).

$$(2.31) \quad c + x_i \text{ has a queen} = c \cap \{ \langle g, w \rangle : g(i) \text{ has a queen in } w \}$$

Independently of the formal issues that arise from devising a system that is able to include quantificational expressions, there is also an empirical question about what the projection behavior of presuppositions in such environments is. Heim (1983) - as well as other theories such as Schlenker (2008) - predicts the sentence in (2.30) as a whole to presuppose that every nation has a queen. This reading has been labeled *universal* projection, in contrast to the *existential* reading that some nation has a queen predicted by accounts like Beaver (2001).

However, what renders an assessment of the accuracy of these claims difficult is that theories of projection may appeal to additional mechanisms that can apply to whatever the basic interpretation is in order to account for diverging data. Two such mechanisms are *local accommodation*, which would mean that the presupposition is interpreted as part of the restrictor (more on local accommodation in the next section), and *domain restriction*, such that the sentence in (2.30) would be interpreted as in (2.32). (Given that universal projection plus local accommodation and existential projection plus domain restriction would thus yield the same final interpretation, one source of evidence could come from psycholinguistic data on how people arrive at this interpretation, e.g. Zehr et al. 2016.)

$$(2.32) \quad \text{Every nation}_i \text{ that has a queen cherishes its}_i \text{ queen.}$$

What further complicates the empirical picture is that it has been observed that projection behavior may in fact vary by the quantifier under consideration (Chemla, 2009; Tiemann, 2014; Creemers et al., 2018), as well as the triggering expression (Charlow, 2009; Sudo, 2012). For instance, Chemla (2009) provides experimental

evidence showing that *each* and *no* overwhelmingly receive a universal reading, whereas quantifiers involving numerals such as *less than 3* were around chance level. Thus, while data on the projection behavior of quantificational expressions is an important testing ground for theories of presupposition projection, the empirical foundation is far from clear and continues to be an focal point of presupposition research.

(iv) Projection from Factives

A qualitatively different approach to projection, which has received traction in recent years, comes from [Simons et al. \(2010, 2017\)](#); [Beaver et al. \(2017\)](#). This account is motivated by observations about the effects of prosody on the projection behavior of factives. An illustration of this effect is given in (2.33), featuring the cognitive factive verb *discover*, which is standardly taken to presuppose the truth of its complement clause. While this presupposition seems to project from the antecedent of the conditional in (2.33b) when the embedding verb is stressed - as expected - the prosodification in (2.33a) with stress on the embedded verb does not seem to give rise to the inference that the sentence as a whole presupposes that the student's work is plagiarized.

- (2.33) A professor to a student:
- a. If the TA discovers that your work is PLAGIARIZED, ...
 - b. If the TA DISCOVERS that your work is plagiarized, ...
... I will be forced to notify the Dean. (BEAVER 2010, (73c,d))

[Simons et al.'s \(2017\)](#) explanation of this contrast builds upon work by [Rooth \(1992\)](#), [Roberts \(2012\)](#) and [Beaver & Clark \(2008\)](#) on Focus and its relation to im-

implicit questions in the discourse.¹⁵ On this view, Focus indicates a set of alternatives that marks an implicit question in the discourse, labeled the *Current Question*. For instance, the sentence in (2.34a) is taken to indicate the question in (2.34b).

- (2.34) a. HALEY ate a cake.
 b. *Current Question*: Who ate a cake?

Additionally, questions are taken to give rise to certain entailments, namely of whatever is shared among all alternatives in the set. In the case of (2.34), the question would entail that someone ate a cake. Applied to the examples in (2.33), the presupposition in (2.33b) is simply a by-product of the Focus-structure indicating a question that entails the complement clause. In contrast, (2.33a) does not have an entailment of this sort since the Focus on the embedded verb indicates that the content of the complement clause is still under discussion, thus giving rise to the impression that projection is blocked. Simons et al.'s account thus takes a different perspective on the projection problem by highlighting the relevance of the discourses that sentences containing presupposition triggers occur in and treating projection as a property of utterances rather than sentences.

One consequence of Simons et al.'s (2017) account is that presuppositions are no longer lexicalized (or conventionalized) parts of the meaning of an expression, as was assumed in the approaches we previously discussed, but arise from independent discourse factors. In fact, the authors take the lack of projection in (2.33a) as an empirical argument against a lexical treatment of presupposition. However, the ability to account for effects of prosody via the pragmatic mechanism laid out by Simons et al. come at the price of losing the standard explanation for the observed differences between attitude verbs such as *think* vs *know*. For example, Djärv & Ba-

¹⁵Since the next chapter will provide a detailed introduction to these concepts, I will keep the current discussion informal and restricted to the essential ideas.

covcin (2020) provide experimental evidence that lexical differences far outweigh effects of prosody (but see also Vaikšnoraitė et al. 2019 on production evidence supporting a pragmatic account). Given these findings, Djärv & Bacovcin argue for a multi-faceted account of projection that takes into account different factors (see also Dudley 2017 on data from acquisition, Özyıldız 2017, 2018 for cross-linguistic data, and Tonhauser et al. 2019 on data beyond factives). A crucial question these findings raise, however, is where presuppositions come from, as manifested by the debate between lexicalist and pragmatic approaches, which we will turn to now.

2.3.2 The Triggering Problem

While the majority of presupposition research has been concerned with the projection problem - as noted earlier - a less studied but just as essential question is the triggering problem. The triggering problem refers to the question of how and why presuppositions arise in the first place. In our discussion thus far, presuppositions have been predominantly taken to be idiosyncratic components of the lexical entry of certain expressions. However, while this assumption allows us to address issues like the projection problem, it begs further questions, namely why it is that a given expression that licenses inferences that p and q comes to be lexicalized with one inference as at-issue content and the other as a presupposition rather than the other way around (see Simons 2006b).¹⁶

Let's use *stop* as an example to illustrate this issue. The sentence in (2.35a) gives rise to two inferences, an at-issue component that Gordon does not work at Cardiff Electric at some relevant time, and a presupposition that he used to work there before. In principle, nothing prevents us from imagining a lexical item *shtop* as

¹⁶There is also a cross-linguistic perspective to be taken with respect to this problem, namely why it is that the same kinds of inferences get lexicalized as presuppositions across languages. However, there is relatively little research on presuppositions cross-linguistically beyond English and major European languages such as French and German, such that I will not be able to comment on this further, but at least impressionistically it seems like prominent presupposition triggers like *stop* or *too* have an equivalent in other languages.

in (2.35b) where this inference pattern is reversed, which raises the question why such an expression is not attested in English.^{17,18}

- (2.35) a. Gordon **stopped** working at Cardiff Electric.
⇒ *Gordon does not work at Cardiff Electric at time t*
↷ *Gordon worked at Cardiff Electric prior to time t*
- b. Gordon **shtopped** working at Cardiff Electric.
↷ *Gordon does not work at Cardiff Electric at time t*
⇒ *Gordon worked at Cardiff Electric prior to time t*

One account that circumvents the issues that come with stipulating presuppositions as an arbitrarily lexicalized part of an expression is that by Simons et al. (2010) mentioned in the previous subsection. Beyond its application to prosodic effects on projection behavior discussed previously, Simons et al.'s account is an attempt to relate projective meaning in general to effects of the Question Under Discussion. Their hypotheses, stated in (2.36), is that anything that is relevant to the Question Under Discussion is at-issue, and anything that is not relevant becomes not at-issue (with presuppositions as one type of not at-issue content).

- (2.36) 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.

(SIMONS ET AL. 2010, (12))

¹⁷Note that a potential candidate would be *used to*, which however only implicates that the relevant state no longer holds.

¹⁸Abusch (2010) has argued that a candidate for an instantiation of such a presuppositional minimal pair are *be right* vs *be aware*. However, Schlenker (2010) argues that the two expressions differ in other respects (see also Abrusán 2011).

As an illustration of their account, consider the example in (2.37). The answer to the question contains the factive verb *know*, which is standardly taken to presuppose its complement clause. The content of the complement clause - that you can eat raw vegetables - here does not address the question regarding A's surprise, and is consequently - and correctly - predicted to project from negation. In contrast, the sentence without negation - that the first graders knew that you can eat raw vegetables - does address the question, and is thus by virtue of being at-issue within the scope of negation.

(2.37) *Background scenario: a nutritionist has been visiting first grade classrooms to talk to the children about healthy eating*

Q: What most surprised you about the first graders?

A: They didn't **know** that you can eat raw vegetables.

(SIMONS ET AL. 2010, (15))

However, while this explanation makes the correct predictions for (2.37) and is applicable to a broad range of cases, it also suffers from an overgeneration problem. As Abrusán (2011) notes, the content of the complement clause in (2.38) - that the first graders failed the exam - may be taken as a possible answer to the question and thus expected to project, contrary to fact. Thus, in the absence of additional constraints, Simons et al.'s (2010) account faces serious empirical challenges.

(2.38) Q: What most surprised you about the first graders?

A: They didn't **know** that they have failed the exam.

(ABRUSÁN 2011, (14))

Abrusán (2011) proposes an alternative that is restricted to verbal triggers and grounded in the way our attention separates foregrounded from backgrounded

information, in an analogy with vision research. The central idea is that a sentence has a main point and content that is independent of this main point (see also [Abbott 2000](#)). The main point will be constituted by the part of the sentence that is about the event time of the matrix predicate and become at-issue, while inferences that are not necessarily about the event time of the matrix predicate will become presupposed. To illustrate the idea with the sentence we looked at in (2.38), the state of A's knowing and the event of the first graders failing the exam could take place at different times, and it is this independence that leads to the content of the complement clause being presupposed.

Although [Abrusán's \(2011\)](#) mechanism is able to account for the triggering behavior of a broad range triggers, [Schlenker \(2019\)](#) notes some empirical challenges with respect to the embedding predicates in (2.39). Despite the event time of the embedded predicate being independent of the event time of the matrix predicate and therefore predicted to be presupposed, the content of the complement clause fails to project from the question in (2.39b). [Abrusán's](#) account thus seems to suffer from an overgeneration problem much like [Simons et al. \(2010\)](#).

- (2.39) a. The bloody gloves {demonstrate, imply, prove, show} that Diane committed the murder.
 ⇒ Diane committed the murder.
- b. Do the bloody gloves {demonstrate, imply, prove, show} that Diane committed the murder?
 ⇒ Diane committed the murder. (SCHLENKER 2019, (32))

In addition to his criticism of previous accounts, [Schlenker \(2019\)](#) exacerbates the triggering problem by pointing out evidence from the productiveness of presupposition triggering from gestures (see [Tieu et al. 2019](#)). For example, a wheel-turning gesture seems to give rise to a presupposition that there has been a wheel, despite

the fact that there is no lexical entry that could be appealed to, which emphasizes the need for a triggering algorithm. Schlenker (2019) proposes an account that uses insights from Abrusán (2011) but additionally relates the triggering problem to the projection problem. Presuppositions are treated as semantically inert with respect to projection, that is, they do not add meaning themselves but are meant to indicate information that was already present in the context, i.e. presuppositions are intended to be trivial. Schlenker argues that entailments that are usually known ahead of time, i.e. are cognitively inert, should also be semantically inert and thus be realized as presuppositions.

To relate this idea to the wheel-turning gesture, there is an entailment that there is a wheel and an entailment that the wheel is being turned. However, in most cases one will have acquired the knowledge that there is a wheel before learning about it being turned. As a result, the presence of the wheel will be presupposed, whereas the turning itself remains at-issue. Schlenker (2019) thus provides a precise characterization of the intuition that presuppositions are *epistemic preconditions* that need to hold relative to the at-issue content. Additionally, his account is able to cover a broader range of triggers than Abrusán's (2011), extending beyond verbal triggers to definite descriptions and Focus-sensitive particles.

To sum up, there are convincing arguments that treating presuppositions as lexical idiosyncrasies is not sufficiently explanatory and a triggering algorithm is called for. One phenomenon that the triggering problem can be related to additionally concerns the variability in projection behavior of different triggers that was brought up several times by now. If - at least some - presuppositions are not lexically specified but arise pragmatically - for instance as a by-product of the order in which we acquire certain information about the world - then it may not be surprising that certain presuppositions fail to arise under certain conditions. This reasoning brings us to one of the central issues of this dissertation, namely differ-

ences between presupposition triggers, which will be discussed in more depth in the next section.

2.4 Typology of Presupposition Triggers

The goal of this section is to provide an in-depth discussion of distinctions between presupposition triggers that have been proposed in the literature. In doing so, special attention will be given to empirical correlates of these distinctions, since some proposed distinctions are primarily conceptual and lack a clear diagnostic, but nonetheless warrant discussion. The current section furthermore comments on how these proposals relate to the classification in terms of Focus-sensitivity proposed in the thesis. However, since a proper introduction of Focus-sensitivity and how to diagnose it has to wait until the next chapter, the reader will have to take for granted for now which triggers are Focus-sensitive and which are not.

A higher level question in this regard is to what extent all proposals are equally necessary or whether some might be able to replace others, specifically with respect to the present proposal. This question will be addressed where possible in the following discussion, but otherwise deferred until Chapter 6. Nonetheless, I will make an attempt at synthesizing and highlighting resulting overlaps and clusters along the way, as well as provide a final summary after relevant proposals have been reviewed.

Before delving into the discussion of the different distinctions, however, a comment about the scope of this investigation is required. Based on the characterization of presuppositions assumed in Section 2.1, the range of expressions in natural language that qualify as presuppositional is vast such that an exhaustive classification of all triggering expressions would be too much for a single dissertation, but even doing justice to all triggers that have been identified in the literature - Levinson (1983) famously attributed a list of 13 different trigger types to Karttunen

(see Karttunen 2016; see also Beaver & Geurts 2014 for an extensive list with references) - is hardly feasible. Instead, a selection of triggers that have been featured more prominently across classifications and consequently in the preceding discussion are shown in (2.40).¹⁹ A cross-classification of these triggers for all reviewed proposals can be found in [Appendix A.2](#).

- (2.40) a. Definite Descriptions
The TV-show *Halt and Catch Fire* was never nominated for an Emmy.
~> *There is a unique TV-show called Halt and Catch Fire*
- b. Selectional restrictions
Cameron is a **bachelorette**.
~> *Cameron is female*
- c. Achievement Verbs
Haley **won** a science competition at school.
~> *Haley participated in a competition*
- d. Cognitive Factives
Diane **discovered** that Bos hid something from her.
~> *Bos hid something from Diane*
- e. Emotive Factives
Joe **regrets** that he left Texas.
~> *Joe left Texas*
- f. Aspectual Verbs
Joanie **stopped** going to school.
~> *Joanie went to school before*

¹⁹For data showing that these expressions qualify as presuppositions, see [Appendix A.1](#).

- g. Aspectual Particles
Gordon apologized to Donna **again**.
↪ *Gordon apologized to Donna before*
- h. Additive Particles
TOM got hired by *Mutiny* **too**.
↪ *Someone other than Tom got hired by Mutiny*
- i. Scalar Particles
Ryan **even** quit his job.
↪ *Ryan quitting his job was unexpected or noteworthy*
- j. Clefts
It was Katie who found Gordon.
↪ *Someone found Gordon*

Each trigger *type* may be comprised of different lexical expressions based on their similar semantics, following previous practices. For instance, both *stop* and *continue* fall into the category of aspectual verbs based on the fact that they both presuppose a previous eventuality of a certain kind, but may differ in other ways. The term trigger *class* will henceforth be reserved for theoretical distinctions made that cut across these types. In order to keep the following discussion comprehensive, however, priority will be given to examples necessary to illustrating the relevant contrasts.

The classifications to be discussed are the soft vs hard distinction by [Abusch \(2002, 2010\)](#), entailed vs non-entailed presuppositions ([Sudo, 2012](#)), weak vs strong presuppositions ([Glanzberg, 2005](#); [Tiemann, 2014](#)), lexical vs resolution triggers ([Zeevat, 1992, 1994, 2002](#)), anaphoric vs non-anaphoric triggers ([Kripke, 2009](#); [Beck, 2007](#)), the four-way distinction of projective meaning by [Tonhauser et al. \(2013\)](#), and the distinction based on different mechanisms governing obligatoriness ef-

facts of presuppositions by [Bade \(2016\)](#).

2.4.1 Soft vs Hard: [Abusch \(2002, 2010\)](#)

The potentially most widely cited distinction of trigger types is that proposed by [Abusch \(2002, 2010\)](#), building on [Simons \(2001\)](#), between **soft** and **hard** triggers. The empirical basis for the distinction concerns differences in projection behavior, as noted earlier. Since projection covers a broad range of phenomena, it is worthwhile adopting some terminology to distinguish four relevant sub-cases, following [Abbott \(2006\)](#). The first, **filtering**, was already discussed in Section 2.3.1 and concerns cases where a relevant presupposition is entailed by a previous clause. The second case is **contextual neutralization**, where it is the context as a whole that renders a presupposition implausible and thus prevents it from projecting. A famous example from [Beaver \(2010\)](#) is given in (2.41) where the fact that the speaker requests to be informed about the truth of the presupposition is incompatible with its truth already being established. Another example with *too* from [Abusch \(2010\)](#) is given in (2.42). However, to my knowledge, no arguments have been made that triggers differ with respect to these two types of cases.

(2.41) ...if anyone **discovers** that the method is also wombat-proof, I'd really like to know! (BEAVER 2010, (32))

(2.42) I'm worried that Tom might have gone to the climbing wall. Of course if Katie is there **too**, there's no reason for concern. She is experienced and safety-conscious. (ABUSCH 2010, (24))

The third case, which [Abusch \(2010\)](#) is primarily concerned with, is **suspension**, as in (2.43) (repeated from (1.3) and (2.2)). A presupposition can be suspended when it is acceptable to use a trigger inside a conditional (or another hole) after

explicitly stating one's uncertainty regarding the presupposed content. As noted in previous discussions of this example, if the presupposition were to project in such contexts, we should expect the outcome to be inconsistent and resulting in markedness. However, such markedness is only observed for *too*, but not *win* in (2.43), suggesting that only *too* still projects whereas the presupposition of *win* is suspended.²⁰

- (2.43) a. I have no idea whether Ryan ended up participating in the Road Race yesterday. But if he **won** it, then he has more victories than anyone else in history. (ABUSCH 2010, (3d))
- b. ??I have no idea whether Joanie read that proposal. But if Haley read it **too**, let's ask them to confer and simply give us a yes-no response. (ABUSCH 2010, (5a))

Triggers whose presupposition is suspendable are called *soft* triggers, and include cognitive factives, aspectual verbs, achievement verbs, intonational Focus, questions, as well as a number of less discussed triggers like what Abusch calls affirmation/negation, contrastive stative predicates, inchoatives and predicates involving symmetric transfer like *sell*. In contrast, the class of hard triggers which resist suspension is comprised of *too*, *again*, *even*, *it*-clefts, and emotive factives. Definite descriptions have been argued to be hard by Abbott (2006) but soft by Walker (2012).

One superficial difference underlying the distinction worth noting here is that the majority of soft triggers are verbs, whereas hard triggers are mostly particles

²⁰See Jayez & Mongelli (2013); Jayez et al. (2015) for experimental results supporting the general contrast between soft and hard triggers in terms of projection, but also evidence that the empirical picture may be more complicated. See also Schwarz (2014) for psycholinguistic evidence that both soft and hard triggers are processed without notable delay.

Both suspension and cancellation are often described in terms of **Local Accommodation** (Heim, 1983) (see also Romoli & Sauerland 2017). In projection theories like Heim (1983), local accommodation serves as a repair mechanism that applies in cases like (2.44) to prevent the context from becoming defective. When a presupposition is locally accommodated, it is locally computed within the scope of the entailment cancelling operator and thus blocked from projecting and becoming part of the whole sentence.²³ The examples in (2.43a) and (2.44) above would thus be interpreted as (2.46) and (2.47) respectively. Although I am not aware of any work directly comparing different entailment-cancelling operators with respect to local accommodation, there seems to be a strong correlation between suspension and cancellation in terms of their availability for different triggers, as predicted on this view.²⁴ One way of describing the soft vs hard trigger distinction then would be as soft triggers allowing local accommodation while hard triggers do not.

(2.46) I have no idea whether Ryan ended up participating in the Road Race yesterday. But if *he participated and won* it, then he has more victories than anyone else in history.

(2.47) It is not the case that *there is a king of France and that he is bald*.

Abusch's (2010) own theoretical proposal however - while acknowledging this alternative description - argues that the extent to which triggers can be blocked from projecting can be traced back to the distinction between semantic and pragmatic

²³Note that despite the terminological similarity, local accommodation and global accommodation yield opposite results with respect to the inferred presupposition. If a presupposition is locally accommodated, it does not become part of the overall context. If it is globally accommodated, it does. Beaver & Zeevat (2007) also discuss a process of *intermediate* accommodation that I will put aside here.

²⁴A potential confound that is worth keeping in mind when applying these tests is that they depend on actually conveying the presupposed content in an adequate paraphrase. The result of the test might thus be affected by the relative clunkiness of such a paraphrase as well. For instance in the case of German discourse particles, the test thus becomes unusable because their content is difficult to capture (in the terminology of Potts 2007b, *ineffable*).

presuppositions, discussed in Section 2.2 earlier. While the presuppositions of hard triggers are encoded into the semantics of the various lexical items, soft triggers are generated by a pragmatic default mechanism that is easily defeasible and thus does not result in markedness in suspension contexts. This default mechanism is rooted in the presence of alternatives, either of a lexical nature or arising from the Question Under Discussion (QUD).

Abusch (2002) illustrates the former case with *know* and its alternative *be unaware*, as shown in (2.48). Since both *know* and *be unaware* entail the truth of the complement clause while differing with respect to the attitude the subject holds toward the complement clause, the truth of the complement clause is entailed by the disjunction of the two attitude verbs and thus ends up being pragmatically presupposed.

(2.48) Katie **knows** it is raining.

alternative: Katie is unaware it is raining.

$C = \{ \text{Katie knows it is raining, Katie is unaware it is raining} \}$

$= \{ \text{rain} \ \& \ k \ \text{believe rain}, \text{rain} \ \& \ \neg k \ \text{believe rain} \}$ (ABUSCH 2002, (29))

Similar reasoning applies in the case of intonational Focus, illustrated in (2.49). The assumption is that Focus indicates an implicit question represented as a set of propositions (more on this in Chapter 3). The disjunction of this set entails that Gordon likes someone, which thus gets generated as a pragmatic presupposition.

(2.49) Gordon likes [Katie]_F.

QUD: Who does Gordon like?

$C = \{ \text{Gordon likes } x \}$

An alternative take on the soft-hard distinction comes from Romoli (2012, 2015),

who argues that the presuppositions of soft triggers are simply scalar implicatures. That is, much like *some* and *every* form a Horn scale $\langle \textit{some}, \textit{every} \rangle$ and the use of the weaker *some* implicates the negation of the stronger *every*, a soft trigger like *win* forms a scale with its weaker alternative *participate*. Thus, when a stronger alternative is embedded under negation as in (2.50a), the scalar implicature generation mechanism - here exhaustification of alternatives via the EXH operator - outputs an inference that the weaker alternative still holds. The observation that the presumed presuppositions of soft triggers disappear easily in certain contexts is then analogous to the defeasibility of implicatures. However, research from first language acquisition and atypical populations suggests that soft triggers and scalar implicatures do not behave alike (Bill et al. 2016; Kennedy et al. 2015, more in Section 2.5), and that Romoli’s account thus requires modifications.

- (2.50) a. Diane didn’t **win**.
 b. $Alt = \{\neg \textit{won}(d), \neg \textit{participated}(d)\}$
 c. $\llbracket \text{EXH} \rrbracket [\neg \textit{won}(d)] = \neg \textit{won}(d) \ \& \ \neg \neg \textit{participated}(d) =$
 $\neg \textit{won}(d) \ \& \ \textit{participated}(d)$ (ROMOLI 2015, (35))

Criticism of Abusch’s account comes from Abrusán (2016), who emphasizes the role of different triggering mechanisms for the observed projection behavior. Both factives and additive particles are argued to be generated by the triggering mechanism proposed in (Abrusán, 2011), discussed earlier in Section 2.3.2. In the case of factives, lack of projection is then attributed to a failure of this triggering mechanism to generate a presupposition in the first place, specifically the way Focus draws attention to the main point of the utterance, similar to the account of Simons et al. (2010) discussed in the same Section. Additives, however, despite being generated by the same triggering mechanism as factives, cannot be blocked from projecting due to their anaphoric status (more on this further below) and the

inability to be Focused in the same way.

In contrast, for the presuppositions of *it*-clefts and intonational Focus, [Abrusán](#) adopts the triggering mechanism proposed by [Abusch](#). However, [Abrusán](#) argues that *it*-clefts resist suspension because the implicit question that triggers the presupposition is conveyed syntactically rather than pragmatically. Thus, she appeals to different triggering mechanisms that cut across the soft-hard distinction and explains the variability in projection in terms of idiosyncratic properties of the respective triggers in relation to those triggering mechanisms. However, given the concerns raised by [Schlenker](#) (2019) about [Abrusán's](#) (2011) triggering mechanism discussed in Section 2.3.2, the adequacy of [Abrusán's](#) (2016) proposal to account for projection variability depends on the severity of these concerns and how they affect the argument presented here.

Another account of the soft-hard distinction comes from [Klinedinst](#) (2016), who relates the contrast to a difference in triggers entailing or not entailing the content of their presupposition, in addition to presupposing it. Since the question of whether presuppositions are additionally entailed by certain triggers is a relevant distinction in its own right in the context of this section, it will be discussed next in proper detail.

2.4.2 Entailing vs Non-entailing: Sudo (2012)

The idea that some presupposition triggers may entail their presupposition goes back to [Fillmore](#) (1969) and has been alluded to in different places across the literature since then but not systematized until recently. [Sudo](#) (2012) discusses the idea in the context of projection properties of quantified sentences (see Section 2.3.1 for related discussion) in relation to the empirical difficulty of distinguishing between triggers with respect to their entailedness. To illustrate this issue, consider *stop* in (2.51). On the view implicit in the discussion thus far, *stop* has an at-issue entail-

ment that a certain state does not hold at a relevant time and a presupposition that the state used to hold before (2.51a). However, alternatively, this presupposition may also be part of the at-issue content, as in (2.51b).

(2.51) Raffael **stopped** using Mac. (SUDO 2012, (129))

- a. $\Rightarrow R$ is not using Mac at the moment
 $\sim R$ used to use Mac
- b. $\Rightarrow R$ is not using Mac at the moment & R used to use Mac
 $\sim R$ used to use Mac

Unfortunately, these two accounts make the same prediction in a simple case such as negation in (2.52) since the presupposed content is the same and expected to project. Based on these data, it would thus seem more economical to adopt the view in (2.51a) instead of assuming apparently redundant at-issue content.

(2.52) Raffael didn't **stop** using Mac. (SUDO 2012, (130))

- a. $\nRightarrow R$ is not using Mac at the moment
 $\sim R$ used to use Mac
- b. $\nRightarrow R$ is not using Mac at the moment & R used to use Mac
 $\sim R$ used to use Mac

However, Sudo identifies non-monotonic quantifiers like *exactly one* in (2.53) as an environment that makes it possible to tease apart the two approaches. In fact, he argues that (2.53a) is the preferred interpretation for *stop*, thus providing evidence for treating the presupposition as an extra at-issue entailment.

- (2.53) Exactly one student **stopped** using Mac.
- a. Exactly one student used Mac & does not use Mac now. ←*preferred*
 - b. Exactly one student does not use Mac now.

In contrast, the gender presupposition of the pronoun in (2.54) does not seem to project, thus suggesting that it is not part of the asserted content.

- (2.54) Exactly one student criticized **herself** (... namely Joanie).
- a. Exactly one student is a female who is self-critical.
 - b. Exactly one student was self-critical. ←*preferred*

Among the triggers Sudo discusses, the presupposition of *know*, both of the *X*, and certain verbs like *curtsy* or nouns like *widow* (both presupposing the respective argument to be female) are classified as being part of the asserted content, like *stop*. On the other end are the gender presupposition of pronouns, hard triggers like *even*, the uniqueness presupposition of definite descriptions, honorifics in languages like Japanese, and implicative verbs like *manage* that contribute a presupposition that is distinct from the at-issue content. Additionally, Zehr & Schwarz (2016) and Zehr & Schwarz (2018b) provide experimental evidence that *also*, *again*, *return*, and to a certain degree *back* are non-entailing triggers, whereas *stop* seems to be entailing, as argued by Sudo. With respect to a classification in terms of Focus-sensitivity, the overlap is much less clear than for the soft-hard distinction. Although all tested Focus-sensitive triggers - *even* and *also* - are non-entailing, there are various other triggers in the same class that lack Focus-sensitivity.

Going back to Zehr & Schwarz experimental results, the authors also report data that go against Sudo's account. For instance, the extent to which the presupposition of *stop* or *also* was interpreted as entailed or not was affected by whether participants encountered the two triggers randomly intermixed throughout the ex-

periment or encountering each trigger separated by blocks, with both triggers becoming more likely to receive an entailing interpretation when encountered in the later block. Since this tendency is surprising on Sudo's account, Zehr & Schwarz (2016) suggest an alternative explanation in terms of local accommodation, insofar as it seems plausible that participants might get used to the potentially associated cost of this repair mechanism over the course of an experiment.²⁵

The distinction of entailed vs non-entailed presuppositions has also been applied to the projection variability associated with the soft-hard distinction discussed previously by Klinedinst (2016), as noted earlier. Klinedinst proposes the hypothesis that soft triggers entail their (semantic) presupposition, whereas hard triggers do not. Additionally, he assumes that presuppositions are not meant to be "idle" but that invoking a presupposition has to be justified since semantic presuppositions are costly.²⁶

In the case of a hard trigger, suspending its presupposition therefore deprives the use of the trigger of such justification while still incurring a cost, thus resulting in the observed markedness. In contrast, soft triggers still contribute their entailments such that the use of the trigger remains justified. One consequence of this view is that there is no local accommodation in Heim's (1983) sense but rather that suspension is the violation of a constraint that semantic presuppositions have to be Common Ground. As such, the account seems to predict a correlation between - descriptively - local and global accommodation, which we will come back to later.

Independently of this prediction, Klinedinst's proposal thus constitutes an attempt to use one classification - entailing vs non-entailing - to explain another - soft vs hard - and the empirical properties that go along with it. An open question,

²⁵Another experimental investigation that is phrased in terms of entailed vs non-entailed presuppositions is Djärv et al. (2017), focusing on the contrast between emotive and cognitive factives. Since their experimental paradigm is more closely related to one to be discussed later in a different context, we will put aside a proper discussion for now.

²⁶Note that this view contrasts with accounts by Schlenker (2008, 2019) that use the idea that presuppositions are supposed to be idle to address the projection and the triggering problem.

however, is whether it makes accurate predictions for the ease of local accommodation for triggers that have been shown to be entailing or non-entailing. For instance, based on Zehr & Schwarz's (2018b) results, *back* should be non-entailing, and therefore predicted to be marked in suspension context. An example to test this prediction is given in (2.55), but judgments seem to vary such that quantitative data may be necessary to resolve this issue.

(2.55) I have no idea whether Cameron has been to COMDEX before.

But if she went **back** this year to help Joe, he's gonna be very grateful.

As a correlate of Klinedinst's (2016) attempt to define soft and hard triggers in terms of entailing and non-entailing triggers, there is also a question how to identify entailing and non-entailing triggers beyond their projection behavior with respect to non-monotonic quantifiers and whether there is something fundamental about how triggers are mapped to each class. Zehr & Schwarz (2018b) address this question by proposing the Removeability/Independence Hypothesis in (2.56).

(2.56) The Removeability/Independence Hypothesis

Presuppositions are NOT entailed if and only if removing triggering material yields (non-strictly) weaker interpretations of sentences.

(ZEHR & SCHWARZ 2018, (21))

The idea behind this hypothesis is relatively simple. If it is possible to delete a given trigger from a sentence without the sentence becoming an illicit string, the trigger is non-entailing; if not, it is entailing.²⁷ Although the hypothesis was not supported by the data (e.g. *return* behaved like a non-entailing trigger despite being not removeable), it thus picks up on the impression that it is verbal triggers - which would not pass the removability test - that often contrast with presupposi-

²⁷See Abbott (2006) for a similar idea.

tional particles - which do. Moreover, this contrast may even arise when what is being presupposed is quite similar, for instance in the case of *stop* versus *again*. One account - or really two variants of one - that highlights this aspect of presupposition triggers will be discussed next.

2.4.3 Weak vs Strong: Glanzberg (2005); Tiemann (2014)

At the heart of Glanzberg's (2005) and Tiemann's (2014) distinction between triggers - coined weak vs strong by Domaneschi et al. (2014) - is the question which presuppositions are independent from the at-issue content, which can be considered a different perspective on the entailing vs non-entailing trigger distinction. Glanzberg (2005) is primarily concerned with situations in which a trigger is used despite its presupposition not being satisfied on the one hand and the status of the conversational moves available to repair such a violation on the other.

Consider first the existence presupposition associated with a demonstrative NP, such as *that palm tree*. Glanzberg proposes two tests, shown in (2.57) and (2.58), to diagnose the status of a conversational repair a trigger gives rise to. For a demonstrative NP, negating the statement is insufficient as a repair (2.57a); instead, the speaker has to choose a more roundabout way of denying the presupposition (2.57b).²⁸

(2.57) Echo-Assessment Test

Is **that palm tree** about to fall? (*uttered in a context where there is no palm tree*)

- a. # No, that palm tree is not about to fall. (GLANZBERG 2005, (6b))
- b. Er . . . no . . . , there is no palm tree. (GLANZBERG 2005, (10b))

²⁸A related property is the extent to which trigger background their presuppositions (Cummins et al., 2013), which will be discussed below.

Additionally, an indirect speech report is insufficient to distance the speaker from a given presupposition (2.58a); rather, the speaker has to directly quote a previous statement (2.58b).²⁹ Based on this pattern, Glanzberg attributes demonstrative NPs the property of requiring an obligatory repair when its presupposition is not for the context to not become defective. Other triggers of this sort are *it*-clefts and factive verbs.

(2.58) Indirect Speech Report Test

- a. # George said that **that palm tree** is going to fall.
- b. George uttered '**That palm tree** is going to fall', but there is no palm tree. (GLANZBERG 2005, (12))

In contrast, triggers such as *even* or *too* only require an optional repair, that is, the speaker can choose to directly accept or reject a previous statement (2.59) or report it using indirect speech (2.60) without the context becoming defective.³⁰ Glanzberg links this difference back to the observation (or assumption) that the presuppositional content of *even* and *too* is independent of the at-issue content and formalizes the difference within update semantics, which will be skipped here for space reasons.

(2.59) **Even** [Joanie]_F solved the problem.

Yes, Joanie did...but why did you say 'even'? (GLANZBERG 2005, (22))

(2.60) **Even** [I]_F solved the problem. (*Said by Joanie*)

- a. Joanie said that even [he]_F solved the problem...but of course, that's a bit odd, as he would have if anyone did.

²⁹This test also has a correlate in a different place in the literature, namely Tonhauser et al.'s (2013) obligatory local effect, which will be discussed below as well.

³⁰Note that the contrasting examples (2.57)-(2.58) and (2.59)-(2.60) do not constitute perfect minimal pairs, but the intuition seems to be reliable even if the examples were properly constructed.

- b. #Joanie said 'Even [I]_F solved the problem', but that doesn't make sense, because he was most likely to have done it.

(GLANZBERG 2005, (23))

Again taking stock how Glanzberg's classification relates to Focus-sensitivity before moving on to Tiemann's (2014)'s proposal, all Focus-sensitive triggers - *even* and *too* - are again in the same class, namely the one which allows separating the presupposition from the at-issue content according to the proposed diagnostics. Even more so, they are the *only* triggers in this class - at least for those Glanzberg mentions. On the other hand, *it*-clefts, which Abusch (2010) classified as hard triggers - like other Focus-sensitive triggers - and for which it was consequently suggested that they involved some relation to Focus as well, are now in a separate class. The reason *it*-clefts behave differently with respect to the echo-assessment test, however, may be because their presupposition is entailed by the at-issue content. That is, the unclefted proposition in 2.61 - that Katie found Gordon - entails that someone found Gordon. This apparent mismatch across classifications may therefore be due to other properties of the triggering expression/construction.

(2.61) **It was Katie** who found Gordon.

↷ *Someone found Gordon*

Tiemann (2014) also focuses on the independence of certain triggers from the at-issue content, but with respect to how the distinction affects (global) accommodation. Motivated by experimental results on German *wieder* ('again') that indicated a lack of accommodation in a context that did neither explicitly satisfy nor deny the presupposition – a detailed discussion of the results will be provided in Chapter 5 – she argues that triggers that only convey a presupposition without affecting the at-issue content, as is supposed to be the case for *again*, can be ignored in those

contexts.

Tiemann relates this view to the proposed maxim in (2.62), assuming that accommodating a presupposition is costly and consequently avoided whenever possible. Since purely presuppositional triggers like *again* do not affect the computation of the at-issue content, ignoring the trigger rather than accommodating it would therefore be preferable. Note that the idea that triggers can be ignored under such circumstances resembles the reasoning behind the Zehr & Schwarz's (2018b) Removability/Independence Hypothesis. Another related argument relating a triggers independence to yet a different empirical property, namely backgroundedness, will be discussed in the next subsection in the context of the lexical vs resolution trigger distinction.

(2.62) Minimize Accommodation

Do not accommodate a presupposition unless missing accommodation will lead to uninterpretability of the assertion! (TIEMANN 2014, p.43)

2.4.4 Lexical vs Resolution: Zeevat (1992, 1994, 2002, 2004)

One of the earliest distinctions between trigger types - at least in terms of those that received a particular label - is Zeevat's (1992) distinction between lexical triggers and resolution triggers. Rather than providing linguistic diagnostics as basis for the distinction, it is mostly based on conceptual notions regarding the different functions that are at play. Lexical triggers concern the preconditions for interpretation such as sortal restrictions of verbs and nouns (e.g. *bachelorette*) but also emotive factives like *regret*. Resolution triggers, on the other hand, are characterized as identifying entities in the discourse in order to predicate something of them, for example definite descriptions as well as factive *when*- and *after*-clauses and possibly clefts. Interestingly, neither class includes any Focus-sensitive triggers, which

belong to a third class we will get to below.

Although Zeevat (1992) does not provide any empirical diagnostics for identifying whether a trigger belongs to one class or the other beyond the description of their functions, I want to propose such a diagnostic for lexical presuppositions, namely *even*-denial. Francis (2018) observes that *even* in combination with negation can be used to deny a presupposition, as in (2.63). Interestingly, not all triggers seem to be equally suitable for denial with *even*. For instance, (2.64), despite considered felicitous by Francis, seems degraded relative to (2.63).

(2.63) A: When did Marisa **stop** smoking?

B: She didn't even smoke! (FRANCIS 2018, (1))

(2.64) A: I hear Maida was late for class **again**.

B: ?She's never even been late before! (FRANCIS 2018, (3), *my judgment*)

What this suggests is that *even*-denial is particularly useful - by virtue of the scalar meaning of *even* - for identifying presuppositions that arise through some sort of ranking relationship between a triggers at-issue content and its presupposition. Relationships of this sort include certain preconditions for actions we derive from world-knowledge (i.e. to win, you need to participate), which fit Zeevat's characterization of lexical presuppositions, but also the class of soft triggers Romoli (2015) treats as instances of scalar implicatures. I will thus assume *even*-denial as a possible diagnostic for identifying these classes of triggers.

Another approach to relating Zeevat's (1992) distinction to empirical properties comes from Cummins et al. (2013), who propose a hypothesis about the degree with which different triggers background their presuppositions. Their reasoning, however, is more based on whether the presupposition of a given trigger is independent of the at-issue content, as was discussed previously, as well as the extent to

which a presupposition is able to address a Question Under Discussion (although an implicit assumption seems to be that these two properties are related; see also the discussion of [Simons et al. 2010](#) in Section 2.3.2). To illustrate the latter property, consider *quit* and *again* in (2.65). The idea is that for *quit*, the continuation does address the QUD, whereas for *again*, it fails to do so.

- (2.65) a. Haley didn't **quit** smoking, because she never used to smoke.
QUD: *Why didn't Haley quit smoking?* → addressed by continuation
(CUMMINS ET AL. 2013, (11))
- b. ?Rob didn't see Amy **again** today, because he had never seen her before.
QUD: *Why didn't Rob see Amy again today?* → not addressed
(CUMMINS ET AL. 2013, (13))

Based on this reasoning, [Cummins et al. \(2013\)](#) conducted a rating experiment comparing different triggers in the design in (2.66), varying acceptance/rejection and whether the continuation targets the at-issue content or the presupposition. While (2.66a)-(2.66c) served as controls, [Cummins et al.](#) predicted (2.66b) to be more acceptable for triggers whose presupposition is independent of the at-issue content (e.g. *again*) than for a triggers that also contribute at-issue content (e.g. *stop*) since it should be easier to dissociate at-issue content from presupposition and therefore accept the former without the latter. For (2.66d), the prediction was the reverse insofar as rejecting the presupposition should provide a justification for rejecting the whole sentence if the trigger contributes both at-issue and presuppositional content, but not if it is purely presuppositional.

- (2.66) Did Brian lose his wallet **again**? (CUMMINS ET AL. 2013, (18))
- a. Yes, he did lose his wallet again.

- b. Yes, although he never lost it before.
- c. No, he didn't lose it this time.
- d. No, because he never lost it before.

Cummins et al. tested *regret*, *still*, *continue*, and *stop* as assumed lexical triggers (on their interpretation, those where a false presupposition entails the falsity of the whole sentence), and *again* and *too* as resolution triggers (those which are independent of the at-issue content). All lexical triggers showed a significant difference between (2.66b) and (2.66d), with (2.66d) being rated higher, whereas this difference was not significant for *again* and numerically reversed for *too*. Amaral & Cummins (2015) replicated this pattern with similar triggers in Spanish.

While the results thus provide evidence for the assumed difference between lexical and resolution triggers - at least with respect to the conceptualization of Cummins et al. (2013) - and a novel empirical correlate of the distinction, they also raise additional questions. First, note that *still* patterned like *stop* rather than *again*, despite the fact that *still* is purely presuppositional. This discrepancy, much like the results from Zehr & Schwarz (2018b) discussed earlier, suggest that it might be necessary to look at additional properties of aspectual triggers, which I will come back to in the summary of this section. Second, while Cummins et al. describe the observed difference in (2.66) in terms of local accommodation, the manipulation seems to crucially rely on the properties of the response particles under consideration rather than the connectives. A different way of describing the empirical phenomenon of backgrounding as tested here might then be in terms of the extent to which response particles are able to pick up both at-issue and presuppositional content at once in relation to the trigger under consideration.

Moreover, Cummins et al. (2013) categorize *again* and *too* as resolution triggers, incorrectly so insofar as Zeevat (1992) mentions a third class - elaborated on

in (Zeevat, 1994, 2002, 2004) - comprised of *too*, *also*, *another*, *again*, and later clefts, pseudo-clefts and intonational contours associated with topic-focus structure. Zeevat (1992) notes this class to behave differently with respect to the structures from which it can be licensed, for instance from the complement clause of *believe* as in (2.67),³¹ as well as their inability to accommodate. This latter observation is often brought up as reason to treat this class of triggers as anaphoric, which will be discussed in the next subsection.

(2.67) Donna believes that Joanie was in Egypt.

Haley was there **too**. (ZEEVAT 1992, (30))

In terms of how the proposed distinction and the experimental results relate to other classes, *too/also* and *again* pattern together as in every previous classification that featured both of them. Since *too* and *also* are the only Focus-sensitive triggers mentioned here, however, there is little basis for an evaluation with respect to Focus-sensitivity, at least regarding superficial overlap or mismatches between classes. On the other hand, a cluster that emerges from Cummins et al.'s (2013) investigation and the classifications discussed up to this point is the contrast between verbal triggers and presuppositional particles and adverbs. This pattern was already noted for the soft-hard distinction, but was also featured in Zehr & Schwarz's (2018b) Removability Hypothesis to account for the entailing vs non-entailing distinction, the weak-strong distinction, and now Cummins et al.'s reinterpretation of the lexical vs resolution trigger distinction. I will come back to the question what might be underlying this cluster at the end of this section.

³¹This claim is common in one part of the literature, but not all - if any - native speakers I have consulted find (2.67) completely felicitous, such that the data should be taken with a grain of salt.

2.4.5 Anaphoricity: Kripke (2009), Beck (2007)

The idea that certain triggers are anaphoric in some sense is not uncommon in the literature (e.g. Roberts 2006). For example, as discussed in Section 2.2, all presuppositions are treated like anaphors in DRT (van der Sandt, 1992). However, the term ‘anaphoric’ has also been used to account for different, logically independent empirical properties, namely (global) accommodation difficulty on the one hand and quantifier binding on the other, which will be discussed below. Additionally, accounts of these properties also vary in the formal framework in which they are implemented. Consequently, it is particularly crucial to be precise about what the term is intended to cover to not render it meaningless.

The characterization of certain triggers as anaphoric - outside of DRT - is commonly associated with Kripke (2009). Kripke argues against the existential account of triggers like *too* and *again* by Karttunen & Peters (1979). On this account, the presupposition of *too* in (2.68) would simply be that someone other than Sam is having dinner in New York tonight. However, given the millions of people living in New York, this presupposition should be trivially satisfied, and yet would be infelicitous as an out-of-the-blue utterance.

(2.68) #SAM is having dinner in New York tonight, **too**. (KRIPKE 2009, (14))

Kripke therefore argues that the presupposition of *too*, as well as that of *again* and *it*-clefts, and in contrast to *stop*, includes an anaphoric element that requires an referent in the context. The notion of anaphoric used here is thus meant to contrast with a conception of presuppositions as existential (how we might conceive of indefinite noun phrases), and appeals to an analogy with pronouns, which also usually require an antecedent in the context to be interpretable. Empirically, Kripke’s argument has been taken as a claim about (global) accommodation difficulty asso-

ciated with certain triggers. More research on accommodation will be discussed in detail in Chapter 5.

However, the analogy with pronouns comes with other theoretical implications, which have been highlighted in other accounts and diverge from the identification with accommodation difficulty. In a Heim & Kratzer (1998) semantics, pronouns are stereotypical examples for free variables, which are either interpreted as denoting an entity in the discourse context or as being bound by a quantifier in the sentence they occur in. Crucially, there are other instances of free variables in natural language that do not result in infelicity when used out-of-the-blue such as *wh*-words, which implies that interpreting the “presuppositions as anaphors” analogy in terms of free variables yields a different classification.

The most in-depth attempt at conceiving of anaphoric presuppositions in terms of free variables comes from Beck (2007), focusing on *again*. As an instance of *again*’s variable being interpreted contextually, Beck provides the example in (2.69), which gives rise to the inference that Tom’s birthday precedes Katie’s birthday (see also Heim 1990 for a similar example, cited by Beck). Crucially, this inference disappears if *again* is omitted. Additionally, Beck argues that *again* can also be bound by a quantifier, based on the example in (2.70) using analogous reasoning. Other triggers she considers anaphoric in this sense are *also* and *stop*, as well as *still* in later work (Beck, 2020). The existence of quantifier-dependent readings has also been argued for in the case of definite descriptions by Schwarz (2009).

- (2.69) We will have pizza on Tom’s birthday, so we shouldn’t have pizza **again** on Katie’s birthday. (BECK 2007, (8a))
→ Tom’s birthday is before Katie’s birthday

(2.70) In 1995, 1996 and 1998, Diane was sick on the day of the department party.

In each of these years, she was sick **again** on Thanksgiving.

(BECK 2007, (3))

→ In each of these years the department party was before Thanksgiving.

Notably, Beck's (2007) categorization of *stop* as anaphoric contrasts with Kripke's (2009), which shows why describing certain presupposition triggers as anaphoric in the absence of further qualification can be misleading. I will thus avoid the term and focus on the empirical properties that have been discussed in the respective context, namely global accommodation difficulty and variable-binding type inferences. What is notable, however, is that yet again *too* and *again* are part of the same class, on both accounts. Outside of research on presuppositions, accommodation difficulty has also been labeled more theory-neutrally Strong Contextual Felicity by Tonhauser et al. (2013), which will be discussed next.

2.4.6 Strong Contextual Felicity & Obligatory Local Effect: Tonhauser et al. (2013)

Tonhauser et al.'s (2013) classification is the only one to be discussed here that is not restricted to presupposition triggers but rather projective meaning in general, including Potts's (2005) category of conventional implicatures. It is also one of the few instances of research on understudied languages in this area, testing a broad range of triggers in English as well as Paraguayan Guaraní. Tonhauser et al. investigate two properties for each expression, namely Strong Contextual Felicity and Obligatory Local Effect. The former can be equated with what we labeled accommodation difficulty previously, namely the extent to which an expression is felicitous in a context that does not explicitly license a certain inference.

The second property concerns the extent to which inferences associated with expressions embedded under belief-verbs are necessarily beliefs of the attitude holder, or whether they can be attributed to the speaker. As an example, consider *stop* in (2.71a), which is associated with the presupposition that Bill smoked before, and the appositive relative clause in (2.71b). If the inference that Bill smoked before could be attributed to the speaker rather than to Jane in (2.71a), it would be possible to attribute Jane the belief that Bill has never been a smoker. However, given that the sentence is infelicitous, *stop* can be categorized as having obligatory local effect. In contrast, interpreting the content of the complement clause as part of the attitude holder’s beliefs seems to be optional in the case of the appositive relative clause in (2.71b), since the sentence does not result in a contradiction.

- (2.71) a. #Jane believes that Bill has **stopped** smoking and that he has never been a smoker.
- b. Jane believes that Bill, **who is Sue’s cousin**, is Sue’s brother.

(TONHAUSER ET AL. 2013, (39))

Combined, Strong Contextual Felicity (SCF) and Obligatory Local Effect (OLE) yield four classes of projective content, shown below in Table 2.2 (restricted to the English data and with presupposition triggers in boldface)³². Notably, Tonhauser et al.’s (2013) classification is purely empirical without any theoretical claims about what underlies each class. Nonetheless, the discussed properties are worth taking into account as desiderata of a theory of presupposition triggers. The next subsection introduces the last property to be discussed here, obligatoriness.

³²*Only* is not bolded here, even though it will be featured as a Focus-sensitive presupposition trigger later in the thesis, because the current investigation is concerned with its scalar presupposition, rather than the prejacent implication that Tonhauser et al. tested.

	+SCF	-SCF
+OLE	pronoun (<i>existence of referent</i>), too (<i>existence of referent</i>)	<i>almost</i> (<i>polar implication</i>), know (<i>content of complement</i>), <i>only</i> (<i>prejacent implication</i>), stop (<i>prestate holds</i>)
-OLE	too (<i>salience of established alternative</i>), Focus (<i>salience of alternative</i>), <i>that N</i> (<i>speaker indicates suitable entity</i>)	Expressive, Appositive, Non-restrictive relative clause, <i>that N</i> (<i>property attribution</i>), Possessive NP (<i>possessive relation</i>)

Table 2.2: Taxonomy of projective meaning, [Tonhauser et al. \(2013\)](#) (IBID., Table 2).

2.4.7 Obligatoriness: [Bade \(2016\)](#)

Despite the fact that presuppositions constitute a secondary kind of meaning by virtue of being backgrounded and are often conveyed by closed lexical categories such as particles that seem non-essential, it has long been observed that omitting a presupposition trigger if its presupposition is satisfied can result in unacceptability. The observation that triggers can be obligatory in this sense goes back to [Heim's \(1991\)](#) work on definites and is illustrated in (2.72), where using the indefinite seems odd given that a person can only have one (biological) father. [Heim](#) proposes the pragmatic principle in (2.73) to capture this pattern.

(2.72) {#A / **The** } father of the victim arrived at the crime scene.

(2.73) Maximize Presupposition ([Heim, 1990](#))

Make your contribution presuppose as much as possible!

Although a similar pattern can be found for other triggers, such as *too* in (2.74), [Bade \(2016\)](#) argues against attributing this effect to Maximize Presupposition, and instead that the oddity in the case of *too* - and some other triggers - stems from an obligatory exhaustivity implicature that occurs when *too* is omitted. More pre-

cisely, if *too* is omitted, *Mary* receives Focus by virtue of being the only new information in the sentence, which in turn triggers an exhaustivity implicature that *Mary* is the only one at the party. Since this implicature is inconsistent with the preceding context, the sentence becomes odd. In contrast, if *too* is inserted, it prevents the exhaustivity implicature by using the Focus itself.

- (2.74) Peter was at the party.
MARY was at the party #(too).

A critical prediction of [Bade's \(2016\)](#) account is that triggers like *too* should not be obligatory in environments in which the exhaustivity implicature is blocked on independent grounds. In contrast, if Maximize Presupposition was responsible for the obligatoriness of triggers like *too*, their insertion should be required whenever the respective presupposition is satisfied. One environment that therefore makes it possible to differentiate the two accounts is embedding under negation, since no implicature arises here. Manipulating the presence or absence of negation, as well as the presence or absence of *too* in items like (2.75), [Bade](#) provides experimental evidence from a rating study that omitting *too* only decreases ratings when no negation is present, but that ratings for *too* being omitted or not are indistinguishable when negation is present. The same pattern was found for *again*, rendering the two triggers class-mates as in previous classifications.

- (2.75) Context: *Lukas and Melanie like to go to the cinema together. They agreed to go to the cinema on Friday, if both have time. Lukas has time to go on Friday.*
It is (not) the case that Melanie has time to go on Friday(, too).

(BADE 2016, p.58)

In contrast, using a similar design for definites, comparing the definite with the

indefinite article in addition to varying negation in items like (2.76), ratings uniformly decreased with the indefinite independently of negation.³³ Bade (2016) thus provides convincing evidence for a distinction between presupposition triggers in terms of the mechanism underlying their obligatoriness effects, as well as an empirical diagnostic for categorization. The next subsection provides a summary of the preceding discussion of trigger classes and relevant empirical properties.

(2.76) *Context: Tina was looking for an apartment last weekend.*

An/**The** apartment was (not) expensive. (BADE 2016, p.140)

2.4.8 SUMMARY

One conclusion to be drawn from the preceding discussion is that presupposition is in fact a heterogeneous phenomenon that requires taking into account a broad range of empirical properties beyond those used to identify presuppositional content. This heterogeneity becomes less surprising in light of the ubiquity of presuppositional expressions in natural language and the differences between trigger types that become apparent immediately. Even with the comparatively small set of triggers that was featured in the classifications above, there was no account of a given empirical property that did not have to allow for some exceptions, such that one is almost guaranteed to encounter counterexamples once any distinction is extended to a broader range of triggers. Consequently, the final solution to a typology of presupposition triggers is going to be unlikely to have a simple answer but rather consist of a multi-faceted approach that is comprised of a number of different factors.

Rather than leaving this issue completely unresolved, however, it is worth high-

³³Additional experimental evidence supporting Bade's proposal come from *too* in conditionals by Bade (2017) and a decision time study on *both, the, too* and *again* by Aravind & Hackl (2017).

lighting some clusters that have emerged from the previous discussion.³⁴ One such cluster can be found in the contrast between verbal triggers like *stop* and presuppositional particles like *again* and *too*. For example, *stop* has been classified as soft (easily suspended and cancelled), entailing (projecting from *exactly one*), less backgrounding (hard to dissociate from at-issue content with response particles), and easy to accommodate globally. In contrast, *again* is hard, non-entailing, more backgrounding, and hard to accommodate globally.

Although this difference in syntactic category is quite apparent in itself without requiring further tests, a much harder question is why it would correlate with this set of other properties. A possible solution I want to suggest here is that at least some of these correlates may receive a processing explanation. From the perspective of semantic composition, it should not matter for the final outcome whether presuppositional content is added via a particle or adverb to an otherwise complete sentence or whether it is a verb that is part of the spine of the sentence-structure conveys a presupposition. However, a verbal trigger necessarily conveys at-issue content in addition to its presupposition, which have to be processed together once the verb is encountered and integrated into the global structure and meaning of the sentence. As a result, it may be harder to dissociate the two types of meanings, which may affect a presupposition's degree of backgrounding and even lead to a grammaticalization of presuppositions as additional at-issue content. Particles and adverbs, on the other hand, are more easily dissociated by virtue of their presuppositional content being processed separately.

However, as noted above, there are also exceptions to generalizing the verbal vs particle cluster to the set of classifications on both sides. Among verbal triggers, *return* is non-entailing, while *still* is less backgrounding despite its particle status. This divergence suggests that it may be necessary to delve into potentially

³⁴For a tabulated overview, see [Appendix A.2](#).

idiosyncratic properties of individual triggers in order to account for everything.

Another pattern worth noting from the previous discussion concerns *again* and *too/also*. In all classifications that featured both triggers, they belonged to the same class. From the perspective of the present proposal, this overlap may be concerning given that *again* is argued to be not Focus-sensitive while *too/also* are (as will be shown later in Chapter 3). However, as will be shown later, the two triggers do differ with respect to other properties once the difference in Focus-sensitivity is taken into account.

A methodological note in this regard that will emerge from Chapter 5 is that the binariness of the above classifications may conceal non-trivial variation among triggers within the same class. For instance, while *again* and *too* differed from all other triggers in Cummins et al.'s (2013) experimental results, they also differed slightly from each other. In the absence of quantitative data for some of the other classifications and their empirical correlates, the apparent overlap between *again* and *too/also* may then be due to *again* being more like *too/also* than like other triggers, but nonetheless sufficiently different to resolve the apparent tension.

Regarding the question how Focus-sensitivity fit into previous classifications more generally, there was no classification in which Focus-sensitive triggers were in separate classes. A minor caveat may be the case of *it*-clefts - given that they involve Focus in a certain sense - which patterned like *too/also* and *even* with respect to the soft-hard distinction but fell into separate classes in terms of the weak-strong distinction. I will come back to *it*-clefts in Chapter 6. Overall, there were only few classifications that featured more than one Focus-sensitive trigger, despite *too/also* being among the most frequently discussed triggers. This lack of other Focus-sensitive triggers makes a larger assessment difficult, but the existing data is nonetheless encouraging. Regarding the deeper question to what extent the present proposal might account for properties central to other classifications and

potentially replace them, further discussion will be postponed until later in Chapter 6.

While providing an explanation that takes idiosyncratic properties of individual triggers into account constitutes a long-term project, the contribution of the present work lies in emphasizing the representational components of different triggers and how a difference in underlying representations relates to a difference in processing behavior. A step in this direction has been appealed to by Zehr & Schwarz (2018b) in relation to the unexpected behavior of *return*. Zehr & Schwarz suggest that it may be necessary to consider whether aspectual triggers appeal to continuous or discontinuous eventualities. I will come back to this idea in relation to the results presented in Chapter 5, and provide a more detailed discussion of the implications the present dissertation has for a typology of presupposition triggers in Chapter 6. The next section concludes the background on presuppositions with a review of psycholinguistic work on the topic.

2.5 Issues in Processing Presuppositions

Psycholinguistic interest in presuppositions goes back to at least Haviland & Clark (1974) but had been until recently skewed towards investigating definite descriptions. Recent years have seen a surge in experimental work on presuppositions covering a broad range of phenomena and triggers, and integrating various proposals from the formal theoretical literature, some of which was already discussed in the previous section as far as it concerned differences between triggering expressions. The main focus of the current section will be on psycholinguistic work, putting aside a large part of the by now extensive literature using experimental methods to investigate issues in linguistic theory. The goal will be to provide an overview of the research that has been done on presupposition processing and the insights that have been gained in the course of it, as well open questions.

The specific issues the discussion will focus on are (i) how presuppositions are processed online, (ii) how the processing profile of presuppositions compares to other kinds of meaning, and (iii) processing effects of presupposition projection (see also Schwarz 2015b, 2019 for relevant overviews), followed by a summary of the findings. Other relevant work that directly pertains to the topics covered in the experimental Chapters 4 and 5, namely Focus-sensitive triggers and the QUD, and (global) accommodation will be discussed in the respective chapters, although some unavoidable overlap will be noted. Additionally, sticking with the theme of the previous section, special attention will be given to results with implications for a typology of presupposition triggers.

2.5.1 The Time Course of Presupposition Processing

By now, there is ample evidence from a variety of methodologies that presuppositions are processed rapidly in unembedded contexts. The majority of evidence here comes from studies investigating the time course of detecting presupposition failure, that is, comparing a trigger in a context that satisfies the respective presupposition with a context where the presupposition is not satisfied. For example, Schwarz (2007) shows slower reading times in chunked self-paced reading for *also* in English and in German if its presupposition is not satisfied.³⁵ Similar patterns have been reported for the stops-making-sense task for *too* in English by Singh et al. (2016), chunked self-paced reading and eye-tracking while reading for definite descriptions in English by Clifton (2013), and word-by-word self-paced reading and eye-tracking while reading for German *again* by Tiemann (2014) and Schwarz & Tiemann (2017) respectively, showing effects of presupposition violation as early as first fixations on the part of the sentence fully specifying the presupposition.

³⁵Note that these results may also be interpreted in the context of processing Focus, given that we are dealing with a Focus-sensitive presupposition trigger here (as well as in other studies to be discussed). While this is worth keeping in mind, the studies will be discussed in the context they were aimed at in order to minimize confusion.

One worry this set of studies might raise in light of the preceding discussion of differences between presupposition triggers is that they are restricted to a comparatively small set of triggers. While this restriction seems justified insofar as this set of triggers has been taken to be hard to accommodate and could thus maximize any processing cost incurred from a presupposition failure, it raises the question whether the effects can be generalized to presuppositions in general or originate from other properties specific to this set of triggers.

Addressing this issue, [Tiemann \(2014\)](#) tests a broader set of triggers in German, most relevantly *stop* and *know* in addition to those featured in previous studies, namely *again*, *too*, and *the*. [Tiemann](#) compared each trigger in a context that either satisfied, negated, or remained neutral with respect to the presupposition, as illustrated for *again* in (2.77), in a combined self-paced reading and rating study. For *know*, there was an increase in reading times on the critical word (= the word at which the presupposition is fully specified, in this case the end of the complement clause) if the context was agnostic compared to the presupposition being satisfied. For *stop*, the reverse pattern was found, with reading times being slower at the critical word when the presupposition was satisfied compared to the context being agnostic.

(2.77) [Tiemann \(2014\)](#), *Exp 2*, *Sample Item for again*

- a. *Positive*: Susanne had bought red gloves before.
- b. *Negative*: Susanne had never bought red gloves until now.
- c. *Neutral*: Inge had never bought red gloves until now.

TARGET: Today, Susanne bought red gloves **again** and put them on right away.

To account for this latter pattern, [Tiemann](#) appeals to [Beck's \(2007\)](#) idea that *stop* may contain a free variable - that is, is anaphoric - and suggests that resolving this

variable when the presupposition is satisfied incurs a processing cost that is responsible for the longer reading times. In contrast, when the presupposition needs to be accommodated, the variable will be interpreted existentially rather than referentially such that no equivalent processing cost arises. In combination with the assumption that accommodating the presupposition of *stop* is comparatively easy, Tiemann is thus able to account for the reading time pattern. This explanation would furthermore suggest a way to use psycholinguistic evidence for investigating trigger classifications, specifically the notion of anaphoric triggers.

However, given that *know* showed a pattern consistent with an online cost for accommodating its presupposition, despite both *stop* and *know* having been considered easy to accommodate, it raises further question about the status of accommodation in online processing in relation to offline felicity judgments. In fact, both *stop* and *know* showed decreased acceptability ratings in the agnostic condition.³⁶ An answer to the question whether all presuppositions are processed quickly or only those that are difficult to accommodate thus has to remain tentative. Since these results all relate to the issue of accommodation, they will be discussed in more detail in Chapter 5.

If we assume that the studies reported thus far provide strong support for the view that at least some triggers are computed as soon as the parser has sufficient evidence to identify the presupposition, another question to be asked is whether presuppositions can also be used to make predictions about upcoming linguistic material. The notion that language processing is predictive has received much attention in recent years and become a focal point of psycholinguistic research (Futrell et al., 2020; Levy, 2008). A limitation of the methodologies featured thus far is that observable effects are restricted to how the bottom-up input is encountered during reading, which makes it difficult to find evidence for prediction proper. In

³⁶However, it is worth noting that there is reason to be suspicious whether the rating results actually reflect accommodation difficulty, see Chapter 5 for discussion.

contrast, visual world eye-tracking, where participants listen to auditory stimuli while looking at pictures on a screen, avoids this issue and make it possible to investigate effects of language processing that are not strictly tied to the bottom-up input.

Romoli et al. (2015) report two visual-world studies investigating *also* - to which we will restrict our discussion here - and *only*. Participants listened to contexts like (2.78) while looking at a visual display with their eye-movements being recorded. Crucially, the use of *also* in the target sentence presupposes that Sarah has something that Mark also has. The results showed that participants were able to use this information to predict upcoming material ahead of time, as indicated by significantly more looks toward the target in sentences with *also* compared to sentences without it starting 200-500ms after encountering the trigger and prior to the target noun.

- (2.78) Mark and Jane are friends.
 Mark has some candies and some watches.
 Sarah **also** has some candies.

Neuroscientific evidence supporting the predictive power of presuppositions comes from an EEG study on factive verbs by Shetreet et al. (2019). The question the authors were interested in was to what extent the presupposition of a verb like *was aware* in (2.79) (namely that the conference room was unused or busy respectively) would restrict participants' expectation to situations compatible with the presupposition, relative to the non-presuppositional counterpart *presumed*, as indicated on the target word *vacant* (underlined). ERPs showed a P600 for factive verbs if the target was inconsistent with the previous information (*busy-vacant*), but not for non-factive verbs, supporting the authors' hypothesis that presuppositions can

guide expectations of upcoming material in a discourse.³⁷

- (2.79) Calvin needed to meet with his team members in the conference room.
He {**was aware** / *presumed*} that it was { unused / busy }.
He checked and it was vacant and dark.

2.5.2 Presuppositions vs. other kinds of Meaning

Much like presuppositions are defined in terms of the empirical properties that differentiate them from other kinds of meaning, one source of insights for a theory of presupposition processing comes from comparisons with the processing behavior of other content such as at-issue content or scalar implicatures. Regarding the former contrast, Schwarz (2015c) reports two visual-world studies comparing *also* and the at-issue exhaustivity inference associated with *only*. His Experiment 2 used stimuli as in (2.80) to see whether participants are able to use (stressed) *also* and *only* to make predictions about ways the sentence could be completed by measuring looks to a matching target picture.

- (2.80) a. *Context*: One of the boys is carrying a fork.
Critical Target: Click on the girl who **ALSO** is carrying a fork.
b. *Context*: One of the boys is carrying a fork and a knife.
Critical Target: Click on the girl who **only** is carrying a fork.

While looks converged on the target picture for *also* 400ms after the onset of the trigger, convergence was delayed by an additional 400ms for *only*. This finding suggests that presuppositions are not only processed rapidly but potentially faster than the at-issue content of other particles. However, the effect might have also

³⁷It is worth noting that the results are compatible with alternative accounts, given that measures were taken on a target word after the presupposition was processed, which could also be indicative of an increased integration cost, for instance due to repairing the Common Ground.

been due to the fact that *also* received stress, whereas *only* did not, which I will come back to later.

Regarding the comparison between presuppositions and scalar implicatures, Bill et al. (2016) provide evidence from acquisition with a direct comparison between scalar implicatures and presuppositions - specifically soft triggers in the sense of Abusch (2010) - in a covered box task, mentioned earlier. Target sentences were as in (2.81), targeting both the standard *some but not all* inference (direct scalar implicature) and the reverse *not all but some* inference under negation (indirect scalar implicature) in addition to *win* presupposing *participate*. Participants were given a picture violating the respective inference (e.g. all of the lions holding a balloon, or the bear baking cookies at home) in addition to a covered box, and had to choose between the picture and the covered box, on the premise that one would match the sentence. Covered box choices thus can be viewed as rejecting the target sentence in the depicted scenario.

- (2.81)
- a. Some of the lions got balloons.
 - b. Not all of the rabbits brought balls.
 - c. The bear didn't win the race.

While adults mostly chose the covered box over the target picture for both kinds of implicatures and vice versa for presuppositions, the opposite was true for children, who mostly accepted the target picture for implicatures but chose the covered box for presuppositions. The results thus provide evidence for a difference between scalar implicatures and presuppositions both in terms of their treatment in the task as well as their acquisition path. (A similar pattern has been reported by Kennedy et al. 2015 for a comparison between neuro-typical adults and individuals with Broca's aphasia.)

In contrast, Romoli & Schwarz (2015) provide positive evidence from another

covered box study by focusing on the indirect scalar implicature of *always* and *stop* under negation, see (2.82) for a sample item. For both types of inferences, the authors compared two target pictures, with both matching the literal content but only one also matching the respective inference. Participants almost exclusively chose the target picture when the inference matched but only accepted it a quarter of the time when it did not for both presuppositions and indirect scalar implicatures. Moreover, the analysis of reaction times indicated that this inference came with a slowdown in both cases. Even though the authors take this as evidence that there is some similarity between the two types of inferences after all, given that they did not investigate direct scalar implicatures - and in light of the previous results - this conclusion has to be tentative.

- (2.82) a. Benjamin didn't **always** go to the movies last week.
 → *Benjamin went to the movies sometimes last week*
- b. Benjamin didn't **stop** going to the movies on Wednesday.
 → *Benjamin went to the movies before Wednesday*

Finally, Schwarz (2014) reports two visual-world studies comparing the hard trigger *again* and the soft trigger *stop*. Given that on Abusch's (2010) account, soft triggers arise as a defeasible pragmatic inference while hard triggers are lexically encoded, this account might translate into the processing of soft triggers being delayed relative to hard triggers, on the assumption that pragmatic inferences such as scalar implicatures have been shown to take time (e.g. Bott & Noveck 2004). However, Schwarz finds that both *stop* and *again* are processed practically immediately. While this finding does not contradict Abusch's account, given that pragmatic inferences are not necessarily processed with a delay (see Degen & Tanenhaus 2019 for a recent overview), it nonetheless discourages an equation of certain triggers with scalar implicature-like inferences.

2.5.3 The Processing of Presupposition Projection

To come to the final issue, the processing behavior of presuppositions with respect to projection has been investigated in a number of embedded environments. Schwarz & Tiemann (2017) provide evidence from eye-tracking, offline acceptability judgments and the stops-making-sense task that processing the presupposition of German *wieder* ('again') when embedded under negation adds a cost. Moreover, an additional eye-tracking while reading study investigated the length of the projection path - that is, loosely the number of embeddings a presupposition has to go through to be checked at the global level, as measured by DRT - in pseudo-German discourses like (2.83).

- (2.83)
- a. Tina was ice-skating last week.
If she *wasn't* ice-skating yesterday, ...
 - b. Tina *wasn't* ice-skating last week.
If she was ice-skating yesterday, ...
 - c. ...she'll certainly go { **again not** / not **again** } today.

The discourses varied whether the context sentence specified that an ice-skating event occurred or not, followed by a conditional that contained the respective reverse in its antecedent (compare (2.83a) vs (2.83b)) and additionally manipulated the order of *again* and *not* in its consequent (2.83c). For example, the length of the projection path of (2.83a) followed by *again not* would be one, since the presupposed negative swimming event is satisfied by the antecedent clause of the conditional. In contrast, the projection path length of (2.83a) followed by *not again* is three, since the presupposed (positive) swimming event has to "pass through" negation, the conditional and its negation. Reading times on the verb following the *again-not* sequence at which the presupposition was fully specified were directly

predicted by projection path length, further suggesting that projection incurs processing cost, as well as providing evidence for DRT as a model of the cognitive processes underlying presuppositions.

Moving from negation and conditionals to disjunction, [Hirsch et al. \(2017\)](#) investigated sentences like (2.84) with a presupposition trigger in the first disjunct (their experiment 2) in the visual-world paradigm combined with a covered box task. Target sentences were matched with three kinds of pictures: one that would make the presupposition be true and two others in which the presupposition was false. Fixations on the target picture - compared to the covered box - after the second disjunct was encountered were more likely when the presupposition was true, indicating that participants were rapidly able to process the presupposition as well as the projection rules for disjunction.

(2.84) Either Henry **stopped** going to the aquarium on Wednesday, or he waited until Saturday to go to the movies.

Finally, experimental evidence on conjunction comes from [Mandelkern et al. \(2019\)](#). Their results bear on the question whether asymmetries in the order of conjuncts with respect to presupposition projection - specifically filtering - are due to more general properties of how we process sentences or encoded in the linguistic representation of conjunction. Focusing on their experiment 3 - an acceptability rating study - the authors looked at conjunction embedded in a conditional, as in (2.85a) comparing a presuppositional expression with a non-presuppositional control, as well as varying the order of the conjuncts (cf. (2.85b)), in addition to a control without conjunction (2.85c).

(2.85) a. If Mary {has **stopped** / now frowns on} doing yoga and she used to do Jivamukti yoga, then Matthew will interview her for his story.

- b. If Mary used to do Jivamukti yoga and she {**stopped** / now frowns on} doing yoga, then Matthew will interview her for his story.
- c. If Mary {has **stopped** / now frowns on} doing yoga, then Matthew will interview her for his story.

These target sentences were preceded by a context that either satisfied the presupposition (2.86a) or expressed ignorance toward (i.e. suspended) it (2.86b). The only conditions for which ratings were decreased were the conjunct-first condition and the conjunction-less control if they contained a presuppositional expression and were preceded by the ignorance context. Crucially, if the asymmetry of filtering is merely a processing preference that could be overridden to rescue an otherwise infelicitous sentence - as in the case of the suspension contexts here - we would expect the conjunct-first condition to make use of this option, contrary to what was found. The results thus suggest that asymmetries in projection from conjunction should be attributed to the semantics of the connective rather than a general processing preference.

- (2.86)
- a. Mary always was involved in a lot of sports, and she used to do yoga, too.
 - b. Mary always was involved in a lot of sports, but I don't know whether she ever did any yoga.

2.5.4 SUMMARY

One conclusion to be drawn from the studies mentioned above is that there is little to no evidence for the processing of presuppositions being delayed in any relevant sense, both in simple and complex sentences and for a relatively broad range of triggers. Rather, presuppositions seem to be computed as soon as there is sufficient linguistic material to identify its content. This rapid calculation may

even lead to anticipatory effects, where the linguistic context in combination with the visual input - and the assumption that the speaker uses presupposition triggers felicitously - enables the parser to make predictions about upcoming material in a sentence.

While presuppositions being processed incrementally may not be surprising given the vast amount of research in psycholinguistics making similar arguments for a broad range of semantic and pragmatic phenomena, this characterization was far from trivial just 15 years ago. Moreover, when taking into account the conceptual role of presuppositions as being backgrounded and by definition not contributing the main point of an utterance, the findings remain to be noteworthy. From this perspective, one could have easily imagined that presuppositions are evaluated at a later point and that at-issue content takes precedence for conceptual reasons.

However, if we take presuppositions as preconditions for the felicity of an utterance, it might be expected that presuppositions are computed as quickly as possible insofar as the main point of an utterance depends on them being met despite their ultimately secondary status. On this view, the finding from Schwarz (2015c) that the presupposition of *also* is processed quicker than the at-issue contribution of *only* is less surprising. A caveat to these results though is that the comparison between *also* and *only* was only indirect. In order to make an argument that presuppositions take precedence over at-issue content in online processing one would have to find a way to let the point at which a presupposition is evaluated coincide with the point at which the at-issue content is being evaluated for the same sentence and manipulate truth and falsity of each meaning component.

Another caveat regarding Schwarz's (2015c)'s finding is that the observed difference could also stem from other differences between *also* and *only* beyond the kind of meaning they contribute. For instance, *only* is sometimes argued to have a

scalar component, which may add another layer of processing complexity to the computation and result in a delay. Although this issue of drawing conclusions about a larger class of meaning from its individual instantiations is not specific to research on presuppositions, it might be more severe given the previously discussed differences between trigger types.

Evidence that some of these issues carry over to how presuppositions are processed has already been noted above, for instance in the comparison between *know* and *stop* by Tiemann (2014). In this regard particularly relevant seems to be an extension to a broader range of triggers, specifically those like *know* that have been claimed to be easy to accommodate, to be able to differentiate accommodation from more general processing. Developing a processing theory of presuppositions will thus have to happen simultaneously with investigations of the processing effects of potentially idiosyncratic properties of individual trigger types, much like the research in linguistic theory. The present dissertation aims to contribute to this endeavor by examining how Focus-sensitivity impacts the processing of presupposition triggers, which the next chapter will present the relevant background on.

CHAPTER 3

BACKGROUND ON FOCUS

This chapter provides the counterpart to the previous chapter with respect to Focus, introducing the relevant background on the topic that the upcoming experimental chapters are grounded in. The chapter begins with a broad introduction to the notion of Focus in Section 3.1, followed by a more specific introduction to Focus as formalized in Alternative Semantics in Section 3.2. Section 3.3 then zooms in on the issue of Focus and its interaction with other expressions, which will be central to this thesis, and introduces relevant diagnostics. Section 3.4 discusses the Question Under Discussion framework as it relates to Focus, and Section 3.5 concludes the chapter with a review of relevant psycholinguistic work on these topics.

3.1 General Introduction

Much like in the case of presuppositions, the notion of Focus has been used in a variety of ways, for instance in terms of which part of a sentence contains new or highlighted information (Halliday, 1967), or as one half of the focus-background or focus-topic distinction (von Stechow, 1990; Gundel & Fretheim, 2008). On the most fundamental, pre-theoretical level, Focus - in intonational languages like English and German - describes effects of stress placement. Emphasizing this correlate of Focus has come to be known as *prosodic* or *linguistic* Focus, which is the one I will

be concerned with here.

Prosodic Focus is one common way in which intonation contributes pragmatic effects about the discourse conditions in which an utterance - a string in combination with its prosodification - is appropriate. For instance, the utterance in (3.1a) (small capitals indicating stress) is a felicitous response to the question in (3.1), whereas (3.1b) is not. Vice versa, the same responses can become (in)felicitous when preceded by a different question (3.2). This phenomenon is known as *question-answer congruence*: the location of Focus has to align with the wh-word in the preceding question.¹

- (3.1) A: Where did Cloud grow up?
- a. B: He grew up in NIBELHEIM.
 - b. B: #He GREW UP in Nibelheim.
- (3.2) A: What did Cloud do in Nibelheim?
- a. B: #He grew up in NIBELHEIM.
 - b. B: He GREW UP in Nibelheim.

However, if we only take into account stress placement, utterances can be underspecified with respect to the questions they can be a response to. For example, all questions in (3.3) are compatible with the indicated prosody of B's response.

- (3.3) a. A: Where did Cloud grow up?
- b. A: What is something that happened to Cloud?
 - c. A: What happened?
- B: Cloud grew up in NIBELHEIM.

¹An alternative characterization of this pattern could be in terms of the flipside to Focus, namely deaccenting. Rather than attributing the infelicity of examples like (3.1b)-(3.2a) to a lack of Focus on what the question is about, one could instead argue that it is the lack of deaccenting on the elements of the sentence that are already given in the question. A formal account in this vein is Schwarzschild's (1999) GIVENness theory, which I will leave aside here for reasons of space.

To avoid this underspecification and make a connection between the prosodic representation of a sentence and its syntactic structure, it is commonly assumed that Focus is syntactically marked (Jackendoff, 1972). That is, prosodic Focus is a correlate of syntactic F(ocus)-marking. The same utterance can thus map to different underlying structures, as illustrated in (3.4). The question how accenting relates to the syntactic F-marking of constituents is the subject of Focus projection theories (e.g. Selkirk 1995; Büring 2016), which will not be discussed here.

- (3.4) a. Where did Cloud grow up?
 B: Cloud grew up in [NIBELHEIM]_F.
- b. What is something that happened to Cloud?
 B: Cloud [grew up in NIBELHEIM]_F.
- c. What happened?
 B: [Cloud grew up in NIBELHEIM]_F.

Beyond its role for question-answer congruence, Focus has also been associated with corrective exchanges as in (3.5). Here, prosodic Focus has to fall on the part of the sentence that the speaker disagrees with. This type of Focus is sometimes referred to as *corrective* or *contrastive* Focus, in opposition to its *informational* or *presentational* use in question-answer pairs.

- (3.5) A: Tifa owns a bar in Wutai.
- a. B: No, she owns a bar [in MIDGAR]_F.
- b. B: #No, she [OWNS]_F a bar in Midgar.

While this distinction is seemingly expressed the same way in English and solely defined through the discourse context, Kiss (1998) provides evidence from Hungarian that other languages may use different means to express different Focus

types. In fact, it has also been argued that contrastive and informational Focus may vary in their prosodic realization in English, with contrastive Focus being expressed with a more pronounced pitch accent (in Pierrehumbert & Hirschberg 1990's terms, an L+H* rather than an H*). Additionally, contrastive Focus has been argued to contribute an exhaustive inference, namely in the case of (3.5a) that Midgar is the only place Tifa owns a bar at (see Gotzner 2019 for recent experimental work on this issue).

Another kind of intonationally conveyed meaning that should be distinguished from prosodic Focus are *Contrastive Topics*. Contrastive Topic is expressed via a rising tone in English and often precedes a Focus to give rise to a *hat* or *bridge contour* (Büring, 1997), illustrated in (3.6) (the rising tone indicated by a '/'). Informally, a contrastive topic conveys a sense of incompleteness, for instance in the case of (3.6) that someone else fights with a different weapon. Formal accounts vary in whether they treat Contrastive Topic as a primitive notion (Constant, 2014) or derive Contrastive Topic from Focus (Tomioka, 2010; Wagner, 2012a). For the purposes of this dissertation, I will put aside Contrastive Topics, as well as questions regarding the specific prosodic realization of Focus and make the simplifying assumption that the instances of stress we will be concerned with are in fact cases of prosodic Focus.

(3.6) /AERITH fights with a STAFF.

An obvious question that the previous discussion raises is how to characterize Focus in a way that captures these different uses. Following Krifka (2008), I will assume that the core function of Focus is evoking alternatives, which brings us to the formalization of Focus in Alternative Semantics presented in the next section.

3.2 Focus in Alternative Semantics

The formal account of the previously introduced notion of Focus adopted in this thesis will be Alternative Semantics (Rooth, 1985, 1992). Alternative Semantics provides a framework to interpret syntactic F-marking semantically. In order to do so, Rooth proposes distinct dimensions of meaning for a given expression, namely its ordinary semantic value, where F-features can be ignored, and a focus-semantic value, where the F-feature gets substituted for a variable to generate a set of alternatives. This effect is illustrated in (3.7) for the sentence in (3.1a) above. The ordinary semantic value is simply the proposition that Cloud grew up in Nibelheim (3.7a), whereas the focus-semantic value is a *set* consisting of all propositions of the form *Cloud grew up in x*.

- (3.7) a. $\llbracket \text{Cloud grew up in [NIBELHEIM]}_F \rrbracket^o =$
 $\lambda w . \text{Cloud grew up in Nibelheim in } w$
- b. $\llbracket \text{Cloud grew up in [NIBELHEIM]}_F \rrbracket^f =$
 $\{ \lambda w . \text{Cloud grew up in Nibelheim in } w,$
 $\lambda w . \text{Cloud grew up in Cosmo Canyon in } w,$
 $\lambda w . \text{Cloud grew up in Corel in } w, \dots \}$

For the focus-semantic value to enter the semantic composition, Rooth (1992) implements the semantic effects of Focus via his squiggle operator ‘ \sim ’, which attaches to a sentence *S* and comes with a silent pronoun *C*, representing a set of propositions in the context, with respect to which the operator introduces the presuppositions outlined in (3.8): *C* has to be a subset of the focus-semantic value of *S*, containing *S* and at least one other proposition.²

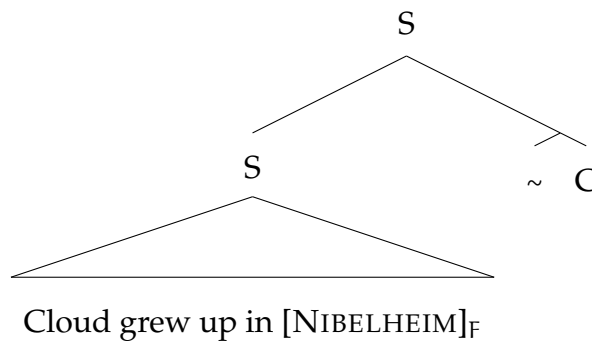
²Note that the characterization of Focus as presuppositional is directly relevant to the objective of this dissertation and will be picked up below.

(3.8) $\llbracket S \sim C \rrbracket$ presupposes:

- (i) $C \subseteq \llbracket S \rrbracket^f$ (*C is a subset of the focus-semantic value of S*)
- (ii) $\llbracket S \rrbracket^o \in C$ (*the ordinary value of S is an element of C*)
- (iii) $|C| > 1$ (*C has to contain at least 2 elements*)

How a derivation involving squiggle proceeds compositionally is shown in (3.9). For the purposes of this dissertation, it will be assumed that squiggle is a propositional operator attaching at the root level. However, it should be noted that relaxing the syntactic restrictions on where squiggle can attach in the structure, as well as ‘nesting’ of squiggle operators has been used elsewhere to account for effects of Contrastive Topic (e.g. Wagner 2012a) or multiple Foci (Büring, 2015).

(3.9)



To illustrate how this account captures the data discussed so far, consider first the corrective case in (3.5) mentioned earlier. The set of propositions provided in the context are A’s statement and B’s reply. Let’s assume that Focus on *Midgar* evokes the set of alternatives in (3.10b) by virtue of its focus-semantic value. Since A’s statement is a subset of this focus-semantic value, as is the bare prejacent, the two propositions jointly satisfy the conditions in (3.8) if we assume them to constitute the set of propositions in *C*, shown in (3.10c).

- (3.10) a. $\llbracket \text{Tifa owns a bar [in MIDGAR]}_F \rrbracket^o =$
 $\lambda w . \text{Tifa owns a bar in Midgar in } w$

- b. $\llbracket \text{Tifa owns a bar [in MIDGAR]}_F \rrbracket^f =$
 $\{\lambda w . \text{Tifa owns a bar in Midgar in } w,$
 $\lambda w . \text{Tifa owns a bar in Wutai in } w,$
 $\lambda w . \text{Tifa owns a bar in Junon in } w, \dots\}$
- c. $C = \{ \text{Tifa owns a bar in Midgar, Tifa owns a bar in Wutai} \}$

In contrast, what goes wrong with (3.5b), despite the same propositions - in terms of their ordinary value - being available in the context, is that Focus on the verb would evoke propositions ranging over relations that Tifa has with respect to a bar in Midgar, as in (3.11b). Consequently, A's statement is no longer a subset of the focus-semantic value such that C no longer satisfies (3.8)-(i), shown in (3.11c), or alternatively the bare prejacent would be the only proposition in C if one were to exclude A's statement (3.11d), thus violating (3.8)-(iii).

- (3.11)
- a. $\llbracket \text{Tifa [OWNS]}_F \text{ a bar in Midgar.} \rrbracket^o =$
 $\lambda w . \text{Tifa owns a bar in Midgar in } w$
 - b. $\llbracket \text{Tifa [OWNS]}_F \text{ a bar in Midgar.} \rrbracket^f =$
 $\{\lambda w . \text{Tifa owns a bar in Midgar in } w,$
 $\lambda w . \text{Tifa rents a bar in Midgar in } w, \dots\}$
 - c. $C_1 = \{ \text{Tifa owns a bar in Midgar, Tifa owns a bar in Wutai} \}$
 $\rightarrow \textit{violates (3.8)-(i)}$
 - d. $C_2 = \{ \text{Tifa owns a bar in Midgar} \}$
 $\rightarrow \textit{violates (3.8)-(iii)}$

In order to account for the question-answer case in (3.1) above, additional assumptions regarding the semantics of (*wh*-)questions are in order. Adopting a Hamblin-semantics for questions (Hamblin, 1973), assume that *wh*-questions denote the set of their true answers, which can be derived from substituting the *wh*-word with a

variable that ranges over type-appropriate alternatives, as in (3.12), yielding a set of propositions.

$$(3.12) \quad \llbracket \text{Where did Cloud grow up?} \rrbracket = \\ \{ \lambda w . \text{Cloud grew up in } x \text{ in } w \mid x \in D_e \}$$

The meaning of a wh-question thus matches the focus-semantic value such that we do not have to worry about (3.8)-(i). However, given that the question denotation is a set, there is actually an open issue regarding what another value of C could be. The answer given by Kadmon (2001) is that the specific value can be pragmatically inferred, given that asking the question would not be sensible if there were not at least two possible options available (also see the discussion of Abusch 2010 in Section 2.4).

Having shown that Alternative Semantics can account for the data regarding Focus that were previously introduced, there are two issues that warrant further discussion. The first concerns the status of Focus as presuppositional, the second the question what the set of alternatives consists of and how it relates to the content of C . I will discuss these issues in turn.

When characterizing Focus as presuppositional, it is important to distinguish between the squiggle operator being formalized in terms of a presupposition, and the idea that Focus triggers an existential presupposition that is derived from substituting the Focused element with an existential quantifier, e.g. (3.13) presupposes that *someone* fights with a staff.

$$(3.13) \quad [\text{AERITH}]_F \text{ fights with a staff.} \\ \text{"}\rightsquigarrow\text{" } \textit{Someone fights with a staff}$$

However, the status of this latter inference has been a matter of debate (see Kad-

mon 2001). For instance, while the inference may project from negation as in (3.14a), it is also easily cancellable, as in (3.14b).³ More severely, the at-issue content may directly contradict this assumed presupposition without resulting in infelicity when a negative quantifier is Focused, as in (3.15). I will thus assume that this existential inference associated with Focus should be treated as an implicature rather than a presupposition due to it being defeasible and will not discuss it further here, but come back to it in the discussion of the Question Under Discussion in Section 3.4.

- (3.14) a. [AERITH]_F doesn't fight with a staff, [VIVI]_F does.
b. [AERITH]_F doesn't fight with a staff, I don't think anyone does.

(3.15) [NOBODY]_F fights with a staff.

The matter regarding squiggle itself being presuppositional is more complex. A first question regarding Rooth's (1992) treatment of squiggle - and consequently the semantic and pragmatic effects that come with it - as presuppositional is whether his notion of presupposition matches the one assumed here. Recall that presuppositions were defined in Section 2.1 as being not directly targetable, not being defeasible, and being displaceable. The issue with applying these tests adequately, however, is that they assume that the meaning contribution of a certain expression can be paraphrased somewhat accurately. For example, the reason that B's denial in (3.16) is infelicitous might not be because Focus is not directly targetable, but because the paraphrase of its contribution simply does not make sense (the meaning of Focus is *ineffable* in Potts 2007b's terms).

- (3.16) A: Cloud grew up in [NIBELHEIM]_F.
B: #That's not true, there is no alternative to "Nibelheim".

³The contrast here may also correlate with a subtle difference in pitch accent, see Meyer (2015) for related examples and ideas.

Given these issues, I conjecture that the formalization of squiggle as a presupposition should be taken to contrast its contribution with at-issue meaning, namely as a contextual requirement. That is, the infelicity of previous examples such as (3.1b) and (3.5b) is a result of a presupposition failure insofar as the requirements of squiggle are not met by the free variable *C*. Crucially, this approach is only explanatory on the assumption that the respective presupposition is hard to accommodate, or in other terms has the property of Strong Contextual Felicity, as in fact argued for by Tonhauser et al. (2013). This behavior is part of the reason why Focus has been described as anaphoric, with *C* acting similar to personal pronouns, only on the propositional level.

Put differently, what Focus presupposes is *salience* (Wagner, 2020) or *activation* (Dryer, 1996) of certain material rather than it being shared knowledge in the (Stalnaker, 1974) sense. These characterizations thus resemble the description of Focus-sensitive presupposition triggers in the Focus Presupposition Antecedent Hypothesis proposed in Chapter 1, and not by accident. However, Focus per se - that is, Focus in the absence of a Focus-sensitive triggering expression - is intentionally not included in the hypothesis, for reasons to be discussed later once more details on association with Focus and the Question Under Discussion have been introduced.

Of course, this interpretation of the nature of squiggle's presupposition depends on the assumption we make regarding the content of *C* in a given discourse, which brings us to the second issue previously mentioned, namely what the set of alternatives that Focus evokes consists of and how the evoked alternatives relate to *C*.

This issue has again multiple facets to it. First, there is the question of what to assume about the content of *C* in a given discourse. In the preceding discussion, the assumption was that *C* consists minimally of all propositions explicitly given in the discourse, at least for sufficiently short discourses. Additionally, it cannot be

the case that any (assumed) alternative evoked on the focus-semantic dimension becomes part of *C*, since the Strong Contextual Felicity of Focus would become a puzzle otherwise.

However, there are also cases where Focus is felicitous in the absence of an explicitly provided alternative, although such cases are restricted to specific circumstances. One factor making such cases possible is world-knowledge rendering an implicit alternative sufficiently salient, as in (3.17). Since the ball is supposed to be kicked into the goal in soccer, rather than thrown, *kick the ball* becomes available as a salient alternative satisfying squiggle's presupposition.

(3.17) A: Why do you think he hasn't played soccer before?

B: He [THREW]_F the ball into the goal. (WAGNER 2020, (48))

Another type of exception are lexical items that form a natural scale, for instance when Focusing a number word as in (3.18). These cases can be described from a formal perspective as an alternative evoked on the focus-semantic dimension becoming so salient that it can be added to *C* and thus meet the contextual requirements of squiggle.

(3.18) A: Why are you home so late?

B: I might have had [ONE]_F drink on the way home.

Shifting our attention to the question of what elements are included in the set of evoked alternatives - which is in principle distinct from *C* - a first uncontroversial conjecture is that alternatives are restricted in some way, since evoking literally every possible alternative to a Focused constituent would seem cognitively implausible. However, beyond this assumption, there are many possible options.

On Rooth's (1992) view, any type-appropriate substitution constitutes a possi-

ble alternative, and the actually relevant set is inferred via pragmatic reasoning. In contrast, Wagner (2012b) argues that alternatives have to be mutually exclusive. For example, Focus on *red* in (3.19a) - in interaction with *only*, which we will get to in the next section - is taken to exclude *blue* in (3.19b), but not necessarily *cheap* in (3.19c).

- (3.19) a. John only owns [RED]_F convertibles.
 b. John only owns [BLUE]_F convertibles.
 c. John only owns [CHEAP]_F convertibles. (GOTZNER 2015, p.89)

Assessing these accounts based on intuition is difficult, but a prime example where psycholinguistic evidence can be useful (e.g. Gotzner 2015a). I will accordingly come back to this issue during the discussion of psycholinguistic research on Focus in Section 3.5. For the current purposes, the exact nature of the set of alternatives is not essential such that assuming sets as in (3.7b) previously will be sufficient.

With these assumptions in place, we can move on to another central research topic featuring Focus, namely association with Focus.

3.3 Association with Focus & Focus-sensitivity

Thus far, Focus has been discussed in terms of its pragmatic effects on the felicity of an utterance in relation to the discourse context the utterance occurred in. That is, Focus had no easily detectable effect on truth conditions. However, it has been shown that Focus can in fact have truth-conditional effects in the presence of other operators (Rooth, 1985), such as *always* in (3.20) (von Stechow, 1994). The rendition in (3.20a) can truthfully describe a scenario in which Tiffany orders chicken tempura ten out of ten times she eats at Thai Garden, but would be false if she had pad thai instead on every tenth occasion. Vice versa, (3.20b) would be true in the latter

scenario, as long as Tiffany does not order chicken tempura from anywhere else. Such effects, where the meaning contributed by an expression - in this case *always* - varies with the Focus-structure of a sentence, have come to be known as *association with Focus*.

- (3.20) a. Tiffany always orders [CHICKEN TEMPURA]_F from Thai Garden.
 b. Tiffany always orders chicken tempura [FROM THAI GARDEN]_F.

Expressions that exhibit this kind of behavior are called *Focus-sensitive* (Beaver & Clark, 2008). The notion of Focus-sensitivity is central to this dissertation given that its main hypothesis, the Focus Presupposition Antecedent Hypothesis, repeated from (1.5) in (3.21), relies on distinguishing presupposition triggers based on this property. We will thus first look at diagnostics to categorize an expression as Focus-sensitive or not Focus-sensitive, and turn to the formal implementation of association with Focus afterwards.

(3.21) Focus Presupposition Antecedent Hypothesis (FoPAH)

Focus-sensitive presupposition triggers require a linguistic antecedent in the discourse model, whereas triggers lacking Focus-sensitivity require their presupposition to be entailed by the Common Ground.

The standard diagnostic with which Focus-sensitivity was introduced in Chapter 1 and used to illustrate its effects in relation to *always* in (3.20) is the *stress placement test*.⁴ Much like we varied the location of stress previously - and by assumption which constituent receives F-marking - to assess its pragmatic effects with respect to the contextual requirements of its appropriate use, the same reasoning applies when investigating Focus in the presence of another expression. What is crucial,

⁴This label for the test is my own, as the test has - to my knowledge - been used across the literature without it being attributed to anyone in particular nor received a specific label.

however, is that the test is concerned with how the meaning contributed by an expression of interest changes on top of whatever change comes with varying the location of Focus.

A semi-formal definition of the test is given in (3.22).⁵ To briefly illustrate how the definition relates to its previous application, consider the examples in (3.20) above. The expression of interest α in this case is *always*, and (3.20a) and (3.20b) stand for sentences S_1 and S_2 respectively that only differ in the location of Focus. Crucially, as shown in the discussion of the example above, the two sentences differ in their truth-conditions in a way that a change in the meaning of *always* is responsible for. Thus, we can conclude that *always* is Focus-sensitive.

(3.22) *Focus-sensitivity Diagnostic: Stress Placement Test*

An expression α is focus-sensitive iff, given two sentences S_1 and S_2 that only differ in the location of Focus as indicated by stress, the meaning contributed by α varies between S_1 and S_2 .

In the application of the test to the presupposition triggers we will be concerned with for the rest of the thesis, however, I will make two small changes relative to how this previous application (and how it is usually used in the literature). First, the scenarios with respect to which the sentences are going to be evaluated will be made explicit to reduce the need for inferring or imagining relevant scenarios. Second, each utterance will be embedded into a dialogue that licenses the use of Focus independently. This latter issue is crucial since we saw earlier that Focus has undeniable effects by virtue of putting restrictions on the context of use. Consequently, in order to assess whether an expression is Focus-sensitive, we have to look at what Focus does in addition to the usual contribution of Focus.

⁵Note that this test is underspecified with respect to the respective notion of Focus-sensitivity, as discussed by Beaver & Clark (2008). I will come back to this issue shortly.

The triggers this test will be applied to are *also/too*, *even*, *only*, (concessive) *at least*, *again*, (temporal) *still*, *continue*, *stop*, and *back*, insofar as they will be used in the following experimental chapters. Notably, given that these expressions vary more or less in the meaning they convey, the application of the test for each expression may require some modifications. To keep the present discussion manageable, we will restrict our attention to *also* and *again* as sample members of each class that will figure most prominently in the remainder of the thesis. The data applying the test to the remaining expressions can be found in [Appendix A.3](#).

Let's start with *again*, since the application of the test is more straightforward than for *also*. Plus, since we have gained some intuitive understanding of Focus-sensitivity, *again* serves as a contrasting illustration of what it looks like when the test fails - to preface the conclusion. First, it should be noted that I am not aware of any proposals in the literature that treat *again* as Focus-sensitive. Rather, what seems to be the most common treatment is that *again* modifying a sentence *S* presupposes that there is an eventuality like the one denoted by *S* at a time previous to the reference time of *S*.

A concrete formal implementation of this idea from [Beck \(2020\)](#) is shown in [\(3.23\)](#), where the previous presupposed time is represented as an anaphoric argument t^* and the eventuality as a property of type $\langle i, t \rangle$, with i being the type of time intervals. Applied to the sentence in [\(3.24\)](#), we thus predict that what is presupposed has to match what is at-issue, only differing in the respective times, independently of Focus.⁶

$$(3.23) \quad \llbracket \text{again} \rrbracket = \lambda t^*. \lambda t. \lambda P_{\langle i, t \rangle} : t^* < t \ \& \ P(t^*) . P(t) \quad (\text{BECK 2020, (29b)})$$

⁶A caveat concerns the so-called restitutive reading of *again* ([Beck & Johnson, 2004](#)), which does not require the subject to be the same, but we will only be concerned with the repetitive reading here.

- (3.24) [[Tiffany ordered chicken tempura from Thai Garden **again**]]
 is defined if Tiffany ordered chicken tempura from Thai Garden at a
 time t^* preceding t .
 If defined, the sentence is true iff Tiffany ordered chicken tempura from
 Thai Garden at t .

An alternative possibility might be that *again* is indeed Focus-sensitive and triggers a weaker presupposition derived from existentially closing over the Focus constituent.⁷ For example, the sentence in (3.25) with the indicated Focus-structure would no longer presuppose that Tiffany ordered chicken tempura from Thai Garden before, but merely that she ordered *something* from Thai Garden before. We can test the predictions of this Focus-sensitive account of *again* and the one based on (3.23) with the stress placement test.

- (3.25) Tiffany ordered [CHICKEN TEMPURA]_F from Thai Garden **again**.
 ? \rightsquigarrow *Tiffany ordered something from Thai Garden before*

For each expression, there will be two test contexts A and B, and two Focus-structures, which yields four discourses to consider. The first context is given in (3.26). The two Focus-structures of the same sentence are given as the last sentence in the dialogues in (3.27). To be maximally thorough, each dialogue repeats the content of the context in the italic part such that there will be two versions of the full dialogue of each Focus-structure for each context. Note that the question preceding each of the final sentences in (3.27a) and (3.27b) renders the target sentences felicitous and true if *again* is omitted, serving as a control. However, *again* itself is infelicitous in either Focus-structure in this context.

⁷In the absence of any proposals arguing for *again* being Focus-sensitive, this existential account is just one possibility to make such a proposal more concrete. There are other logically possible alternatives, but given the lack of arguments made in favor of any such alternative, the present discussion will be restricted to one such straw man.

(3.26) Context A

On Monday, Tiffany had pad thai from Thai Garden.

On Tuesday, she had chicken tempura from Thai Garden.

(3.27) a. (A: *What happened on Monday?*)

B: *Tiffany ordered pad thai from Thai Garden.*)

A: What did Tiffany order from Thai Garden on Tuesday?

B: She ordered [CHICKEN TEMPURA]_F from Thai Garden (**#again**).

b. (A: *What happened on Monday?*)

B: *Tiffany ordered pad thai from Thai Garden.*)

A: Where did Tiffany order chicken tempura from on Tuesday?

B: She ordered chicken tempura [FROM THAI GARDEN]_F (**#again**).

The second context, shown in (3.28), differs from Context A only in the first part such that the target sentences in (3.29a) and (3.29b) are again felicitous and true without *again*. However, as with Context A, it is infelicitous to use *again* here. This result stands in opposition to the proposed Focus-sensitive account of *again* where its presupposition is existential with respect to the Focused constituent. Rather, the infelicity of *again* is predicted by the formalization in (3.23), according to which *again* requires a previous eventuality that matches the sentence it modifies in full.

(3.28) a. Context B

On Monday, Tiffany had chicken tempura from Asian Taste.

On Tuesday, she had chicken tempura from Thai Garden.

(3.29) a. (A: *What happened on Monday?*)

B: *Tiffany ordered chicken tempura from Asian Taste.*)

A: What did Tiffany order from Thai Garden on Tuesday?

B: She ordered [CHICKEN TEMPURA]_F from Thai Garden (**#again**).

- b. (A: *What happened on Monday?*
 B: *Tiffany ordered chicken tempura from Asian Taste.*)
 A: Where did Tiffany order chicken tempura from on Tuesday?
 B: She ordered chicken tempura [FROM THAI GARDEN]_F (**#again**).

To further show that the not Focus-sensitive account makes the right predictions and the infelicity of *again* is not due to idiosyncratic properties of the dialogues, consider the control context in (3.30) and the corresponding dialogues in (3.31). If there is an eventuality that matches the content of the sentence that *again* modifies, *again* is felicitous in both Focus-structures in (3.31a) and (3.31b). Other presupposition triggers that show the same pattern as *again* in analogous examples - and thus do not qualify as Focus-sensitive according to (3.22) - are (temporal) *still*, *continue*, *stop*, and *back* (full data in Appendix A.3).

(3.30) Control Context

On Monday and Tuesday, Tiffany had chicken tempura from Thai Garden.

- (3.31) a. (A: *What happened on Monday?*
 B: *Tiffany ordered chicken tempura from Thai Garden.*)
 A: What did Tiffany order from Thai Garden on Tuesday?
 B: She ordered [CHICKEN TEMPURA]_F from Thai Garden (**again**).
- b. (A: *What happened on Monday?*
 B: *Tiffany ordered chicken tempura from Thai Garden.*)
 A: Where did Tiffany order chicken tempura from on Tuesday?
 B: She ordered chicken tempura [FROM THAI GARDEN]_F (**again**).

Having shown that *again* is not Focus-sensitive, we can come back to *also*. As before, we use two contexts that minimally vary so that each target sentence in the

dialogues is true, as well as have each target sentence be preceded by a question that licenses the Focus so that the target sentence is felicitous if *also* were omitted. The first context is given in (3.32) and the respective dialogues varying the Focus structure in (3.33).

(3.32) Context A

Tiffany ordered pad thai and chicken tempura from Thai Garden.

- (3.33) a. (A: *What is something Tiffany ordered?*
B: *She ordered pad thai from Thai Garden.*)
A: Did Tiffany order anything else from Thai Garden?
B: She (**also**) ordered [CHICKEN TEMPURA]_F from Thai Garden.
- b. (A: *What is something Tiffany ordered?*
B: *She ordered pad thai from Thai Garden.*)
A: Did Tiffany order chicken tempura from anywhere?
B: She (**#also**) ordered chicken tempura [FROM THAI GARDEN]_F.

There are two changes in the dialogues from the versions used for *again*. One minor change is that the italicized preambles ask about the object rather than the whole VP, since the variation between days necessary for the temporal nature of *again*'s presupposition was removed. A less innocent change concerns the question preceding the target sentence in (3.33a), which includes *else* as an additive element usually used in questions (Theiler, 2019).

Notably, *else* serves a function similar to *also*, such that the former usually cannot be used if the latter cannot, and conversely the latter often becomes marked as an answer to a question without *else*. In fact, if we were to omit *else* in the question in (3.33a), *also* would not become completely infelicitous, but it seems like its presupposition would have to be accommodated. However, since what is central

here is assessing whether the felicity of *also* varies with the context in relation to the Focus-structure of the sentence it occurs in, the outcome of the test is insightful despite these concerns. With respect to the results for Context A above, *also* is felicitous in (3.33a) but not in (3.33b).

Critically, for the second context, shown in (3.34), the results are reversed. While *also* is no longer felicitous when *chicken tempura* is Focused, as in (3.35a), it is now felicitous in (3.35b) when *Thai Garden* is focused (including the added *else* in the question).

(3.34) Context B

Tiffany ordered chicken tempura from Asian Taste and Thai Garden.

(3.35) a. (A: *What is something Tiffany ordered?*)

B: *She ordered chicken tempura from Asian Taste.*)

A: Did Tiffany order anything from Thai Garden?

B: She (**#also**) ordered [CHICKEN TEMPURA]_F from Thai Garden.

b. (A: *What is something Tiffany ordered?*)

B: *She ordered chicken tempura from Asian Taste.*)

A: Did Tiffany order chicken tempura from anywhere else?

B: She (**also**) ordered chicken tempura [FROM THAI GARDEN]_F.

To relate this outcome back to our definition of the stress placement test in (3.22), we have two sentences S_1 and S_2 that only vary in their Focus, namely (3.33a)-(3.35a) and (3.33b)-(3.35b) respectively, both/all of which are true and felicitous if *also* were omitted, thus showing that independent effects of Focus are accounted for. With respect to these sentences, *also* serves as expression α whose felicity varies by context within the same Focus-structure. Consequently, the resulting (in)felicity can only be attributed to the meaning of *also* interacting with the Focus-structure,

and *also* thus qualifying as Focus-sensitive. Other expressions that show the same pattern and will be used later in the thesis are *even*, *only*, and concessive *at least* (full data again in [Appendix A.3](#)).

Although the stress placement test can be considered the standard test for Focus-sensitivity, it is worth asking whether there are any other diagnostics that could be used to validate the present results. One candidate for such a diagnostic comes from so-called intervention effects in *wh*-questions (Pesetsky, 2000; Kotek, 2017). Beck (2006b) argues that intervention effects result from a Focus-sensitive operator intervening between a *wh*-phrase and the question operator evaluating the *wh*-phrase. The effect is illustrated for *only* by the contrast in (3.36). The occurrence of intervention effects in similar examples may thus be used to test whether the results of the stress placement test hold up.

- (3.36) a. Which girl did **only** Mary introduce to __ which boy?
b. ??Which boy did **only** Mary introduce which girl to __?
(BECK 2006, (23))

Applying the test to *again* in (3.37), there is tentative support for this idea insofar as the contrast between the two examples seems less strong than for *only* in (3.36). However, both examples involve a reasonable amount of complexity, which makes the outcome difficult to assess in the absence of quantitative data. I will thus avoid using intervention effects as a diagnostic, but note that they provide a potential locus of additional evidence for classifying an expression as Focus-sensitive or not.

- (3.37) a. Which girl did Mary **again** introduce to __ which boy?
b. ?Which boy did Mary **again** introduce which girl to __?

Before concluding the discussion of Focus-sensitivity and turn to its formal imple-

mentation, it is worth noting that not all Focus-sensitive expressions are created alike. As discussed by Beaver & Clark (2008), an expression may pass the test in (3.22) without this Focus-sensitivity being a conventionalized aspect of its meaning. More specifically, Beaver & Clark argue for a distinction between three types of Focus-sensitivity.

The first class is what the authors refer to as *Quasi-association*, and can be illustrated with the case of negation in (3.38). The relevant difference in inferences here supporting a treatment of negation as Focus-sensitive according to (3.22) is that (3.38a) seems to convey that Emma ordered *something* from Red Robin, but that it wasn't onion rings, whereas (3.38b) conveys that Emma ordered onion rings from *somewhere*, but not from Red Robin.

- (3.38) a. Emma **didn't** order [ONION RINGS]_F from Red Robin.
b. Emma **didn't** order onion rings [FROM RED ROBIN]_F.

Beaver & Clark (2008) characterize this difference in meaning as a pragmatic inference that arises indirectly by taking into account the circumstances under which a speaker would utter (3.38a) or (3.38b). Given the contextual requirements of Focus discussed previously, Beaver & Clark argue that what would have to be under discussion to license either utterance is what Emma ordered from Red Robin or where she ordered onion rings from, respectively. Raising either of these issues would only be sensible if there is in fact something that Emma ordered or someplace Emma ordered onion rings from, respectively, similar to the explanation we gave for how a question can license the Roothian presuppositions of Focus. The inference arising in the context of negation is therefore merely a side-effect of an independently motivated contribution of Focus. Beaver & Clark furthermore argue that this Quasi-association is restricted to non-veridical propositional operators, others of which include disjunction or certain modals, since the relevant inference

would already be entailed if the operator was veridical.

The second type of Focus-sensitivity is *Free Association*, which we have already witnessed in the case of *always* in (3.20), repeated in (3.39). This kind of Focus-sensitivity is a result from restricting the implicit domain of a quantifier such as *always*. That such implicit domain restriction is called for becomes obvious when we consider that a sentence like (3.39a) does not mean that during every point in her life, Tiffany can be witnessed ordering chicken tempura from Thai Garden. At the very least, she would have to be sleeping every once in a while. Thus, we may ask what mechanisms guide implicit domain restriction.

- (3.39) a. Tiffany **always** orders [CHICKEN TEMPURA]_F from Thai Garden.
 b. Tiffany **always** orders chicken tempura [FROM THAI GARDEN]_F.

Based on previous work such as (von Stechow, 1994), Beaver & Clark argue that the Focus-structure is one of those mechanisms, in order to account for the Focus-sensitivity exhibited by *always*. Given an utterance like (3.39a), we may ask what the situations are that *always* is restricted to. The answer is that in light of the Focus structure, what *always* quantifies over are all situations in which Tiffany ordered *something* from Thai Garden, asserting that in all those situations, she ordered chicken tempura. Conversely, in the case of (3.39b), what is at stake are situations in which Tiffany ordered chicken tempura, in all of which she ordered it from Thai Garden. Consequently, Focus-sensitivity arises due to the effects Focus has on the implicit domain of *always* rather than being a conventionalized part of the meaning of *always*.

What we are left now is the third kind, namely *Conventional Association*, which is a grammaticalized dependency on Focus that includes Focus-particles like *only*, *even* and *also*. While the difference between Conventional Association and Free Association - for instance when comparing *only* and *always* as expressions from

each class that are close to each other in meaning - may be difficult conceptually, Beaver & Clark discuss a range of empirical diagnostics where the two expressions diverge. Since, however, not all their diagnostics easily extend to other particles (e.g. *only* licenses NPIs, whereas *always* doesn't, but neither does *even*), I will restrict the discussion to one diagnostic that seems reliable in its generality, namely the observation that conventionally associating expressions require their associate to be able to carry a pitch accent, whereas freely associating expressions can associate with reduced material.

This contrast is illustrated in (3.40) for what Beaver & Clark call *leaners*. As shown in (3.40a), *always* is felicitous whether the pronoun is reduced or stressed, whereas *only* in (3.40b) becomes infelicitous in the reduced case. To generalize this argument, in fact all expressions that passed the stress placement test pattern like *only* in this respect (3.40c)-(3.40e).

- (3.40) I can see AOC, but can you see Bernie? (after BEAVER & CLARK 2008, (6.44))
- a. I **always** see'im/ see [HIM]_F.
 - b. I can **only** #see'im/ see [HIM]_F.
 - c. I can **also** #see'im/ see [HIM]_F.
 - d. I can **even** #see'im/ see [HIM]_F.
 - e. I don't see AOC but **at least** I can #see'im/ see [HIM]_F.

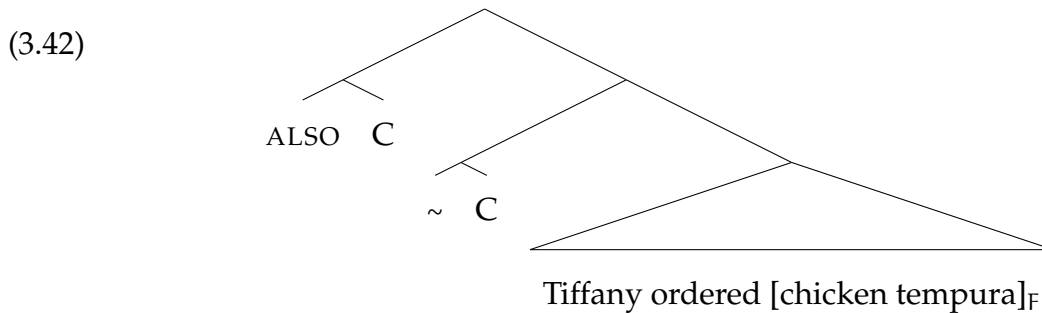
What the preceding discussion shows then is that all the Focus-sensitive expressions we will be concerned with fall into the category of conventional association. Note, however, that the previous formulation of the Focus Presupposition Antecedent Hypothesis in Chapter 1 was not restricted to a specific type of Focus-sensitivity. Nonetheless, there may be reason to assume that only conventionally associating expressions require an antecedent in the discourse model, for instance

by virtue of only this type of Focus-sensitivity being formalized in terms of the free variable C , as we will see in a moment. Moreover, restricting the investigation to one notion of Focus-sensitivity has the methodological advantage of avoiding confounds due to mixing different types. I will come back to the question how the FoPAH relates to other types of Focus-sensitivity and how the results to be presented in the upcoming experimental chapters may extend to these types in Chapter 6.

With this background on Focus-sensitivity in mind, we can turn to how (conventional) association with Focus can be formalized. On the account proposed by Rooth (1992), which will be adopted here, a Focus-sensitive expression like *also* comes with its own silent free variable C , which serves as the first argument to *also*. Additionally - although not part of Rooth's (1992) original theory - Focus-particles are mostly treated as propositional-level operators in contemporary formal semantic theory, which will be adopted here as well as a simplification (but see for instance Hirsch 2017 for an alternative proposal for *only*).

A sample lexical entry for *also*, modeled after Bade (2016), and its application to an example are given in (3.41)-(3.42). *Also* has moved out of its surface position at LF, thus modifying the whole sentence. It is through C and the restrictions imposed by squiggle that the contribution of *also* is specified to the Focus-structure of its propositional argument, in this case to the set of propositions of the form *Tiffany ordered x* . The final contribution of *also* is that it presupposes the existence of a true proposition in C that is not entailed by the prejacent, and leaves the bare prejacent as at-issue content.

$$(3.41) \quad \llbracket \text{ALSO} \rrbracket = \lambda C. \lambda p. \lambda w: \exists q [q \in C(w) \ \& \ p \not\Rightarrow q \wedge q(w) = 1]. p(w)$$



Notably, by virtue of a Focus-sensitive operator coming with its own *C* variable however, the relation between the operator and Focus is only indirect (see [Wold 1996](#) for an alternative). That is, the two *C*s in (3.42) may or may not have the same value. Even though this flexibility may be taken as rendering association with Focus too weak, [Rooth \(1992\)](#) provides empirical arguments for an indirect view of association with Focus (see also [Wagner 2020](#)). For instance in example (3.43), if *only* were to associate with *eat* instead of the deaccented *rice*, it would result in a contradiction, since the sentence is meant to comment on people doing something else with rice, namely growing it.

(3.43) People who [GROW]_F rice generally **only** [EAT]_F rice. ([Rooth 1992](#), (70))

This indirect association also makes it possible for the Focus Presupposition Antecedent Hypothesis to be restricted to Focus-sensitive expressions without necessarily making claims about bare Focus per se. Moreover, there may be reason to assume that Focus serves a function that may require distinct mechanisms for bare Focus and Focus-sensitive expressions, namely in relation to the Question Under Discussion, which we will turn to next.

3.4 Focus and the Question Under Discussion

The Question Under Discussion (QUD) framework originating from [Roberts \(2012\)](#) has been applied to a broad range of phenomena in semantics and pragmatics since

its conception and become a prominent approach to discourse coherence by placing questions at the center of how communication proceeds (see Benz & Jasinskaja 2017 for an overview). Moreover, and most relevant to the current investigation, Roberts's framework views the role of Focus in terms of how a sentence relates to the QUD. Before delving into this aspect of the theory however, the formal details behind the idea that questions serve as discourse structuring devices will be presented, which will be necessary background for the experiments in Chapter 4.

Thus far, the discussion has only been concerned with simple question-answer pairs, as in (3.1) above. However, natural conversation is rarely as simple as answering a single isolated question. Rather, most conversations revolve around a number of different topics, the discussion of which may involve longer stretches of discourse for each topic. On Roberts' view, such stretches of discourse all work toward an answer to the big question "*What is the way the world is?*", adopting a gameified approach in the spirit of (Stalnaker, 1978; Lewis, 1979).

However, what makes it possible for us to say that a stretch of discourse revolves around a certain topic is that humans tend to organize conversation in a way that maximizes the coherence of a discourse on a local level, rather than trying to answer the big question by answering one question at a time followed by a completely unrelated one. The QUD-framework provides a formalization for capturing intuitions about how sentences relate to an overarching topic by using questions - explicit and implicit - as discourse structuring devices.

To illustrate the intuition behind questions structuring discourse with a concrete example, consider the overly explicit discourse in (3.44). The discourse as a whole constitutes a *strategy of inquiry* to answer the overarching question at the top. This question is then broken down into the subquestions in (3.44a)-(3.44b), which are in turn broken down into the subsubquestions in (3.44a-i)-(3.44b-ii). Each act of raising or answering a question constitutes a *move* in the discourse game. An-

swering a question, if accepted, updates the Common Ground with the respective proposition, much like in the dynamic semantic theories discussed in Chapter 2. Additionally, the model is augmented by a QUD-stack, which is where a question is placed, if accepted. The idea then is that the discourse progresses in a way that continuously resolves questions from the stack in an orderly fashion.

(3.44) Who can cast which spells? (after ROBERTS 2012, p.16)

a. What spells can Cid cast?

(i) Can Cid cast Cure?

Yes, Cid can cast Cure

(ii) Can Cid cast Ultima?

No, Cid cannot cast Ultima

b. What spells can Yuffie cast?

(i) Can Yuffie cast Cure?

Yes, Yuffie can cast Cure

(ii) Can Yuffie cast Ultima?

Yes, Yuffie can cast Cure

In order to understand what it means to resolve questions in an orderly fashion and what it is about (3.44) that makes the discourse qualify as coherent, it is first necessary to say more about the semantics of questions as assumed by Roberts (2012). The assumption for *wh*-questions we saw already in (3.12), repeated in (3.45a), where the meaning of a *wh*-question is the set of propositions generated from substituting the *wh*-word with a variable. A polar question simply denotes the proposition it asks about as a singleton set (3.45b).

- (3.45) a. Wh-question
 [[Where did Cloud grow up?]] =
 $\{ \lambda w . \text{Cloud grew up in } x \text{ in } w \mid x \in D_e \}$
- b. Polar Question
 [[Did Cloud grow up in Nibelheim?]] =
 $\{ \lambda w . \text{Cloud grew up in Nibelheim in } w \}$

With these assumptions in place, we can define what it means for a proposition to constitute an answer to a question. Roberts distinguishes between partial and complete answers in this respect, as stated in (3.46) (in the framing of Kadmon 2001).

- (3.46) a. Partial Answerhood
 A proposition p is a *partial answer* to a question Q iff p contextually entails the truth-value of at least one element of the denotation of Q .
- b. Complete Answerhood
 A proposition p is a *complete answer* to a question Q iff p contextually entails the truth-value of each element of the denotation of Q .

Applied to the discourse in (3.44), the answer in (3.44a-i) thus constitutes a complete answer to its preceding polar question, since it entails the truth of all elements of the denotation of this polar question, namely the singleton proposition denoted by the polar question itself. With respect to the next higher *wh*-question in (3.44a), however, the answer only constitutes a partial answer, since it leaves other propositions denoted by the *wh*-question - such as (3.44a-ii) - open.

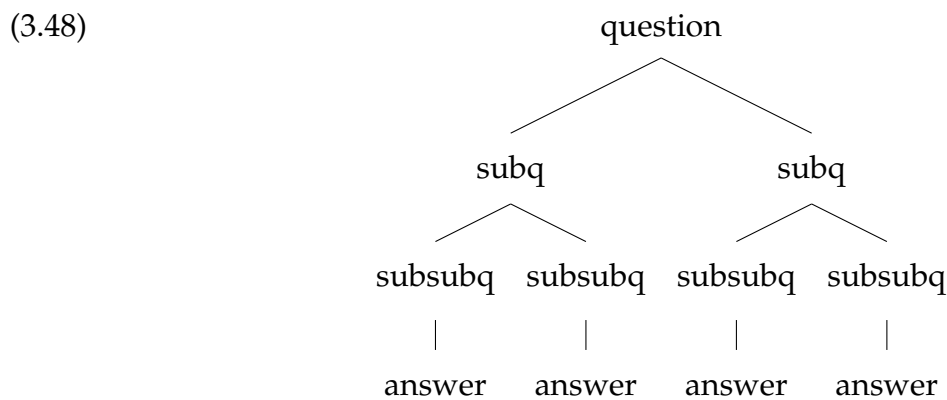
Building on the notions of partial and complete answerhood, we can now capture how questions can be related to each other to form a strategy of inquiry,

namely in terms of what it means for a question to be a super- or sub-question to another question, as shown in (3.47) (again from Kadmon 2001).

(3.47) Subquestionhood (KADMON 2001, p.341)

A question Q_2 is a subquestion to a question Q_1 iff the complete answer to Q_2 contextually entails a partial answer to Q_1 .

Using the dialogue in (3.44) again as illustration, the polar question in (3.44a-i) would thus constitute a subquestion to the *wh*-question in (3.44a), since its complete answer - "*Cid cannot cast Cure*" - is a partial answer to (3.44a). In turn, the *wh*-questions in (3.44a)-(3.44b) would themselves be subquestions to the multiple *wh*-question at the top of (3.44). One way to represent the hierarchical structure of such a strategy more comprehensively is in terms of *d(iscourse)-trees* (Büring, 2003), as in (3.48), with each node corresponding to a discourse move.



Conceiving of a discourse as being structured by questions does not only allow us to model dialogues such as (3.44), but also restricts the shape of possible discourses by making it possible to state a notion of relevance that unifies assertions and questions, namely by relating moves to the last QUD on the stack, as in (3.49). As mentioned earlier, a move can either answer a question - an assertion - or raise a question - a question. Last(QUD(m)) stands for the most recent question under

discussion at the time the move is made.

(3.49) Relevance (ROBERTS 2012, (15))

A move m is **Relevant** to the question under discussion q , i.e. to $\text{last}(\text{QUD}(m))$, iff m either introduces a partial answer to q (m is an assertion) or is part of a strategy to answer q (m is a question).

An assertion would then be relevant iff it is a partial answer to the last QUD, so (3.50a) would be relevant, but (3.50b) would not, as supported by the contrast in acceptability. For a question to be relevant, it has to be part of a strategy of inquiry relative to the last QUD, i.e. be a subquestion to it. Given the question in (3.51) then, (3.51a) would meet this restriction but (3.51b) would not.

(3.50) Who grew up in Nibelheim?

- a. Cloud grew up in Nibelheim.
- b. #Cloud worked for *Avalanche*.

(3.51) Who grew up in Nibelheim?

- a. Did Cloud grow up in Nibelheim?
- b. #Did Cloud work for *Avalanche*?

In light of the previous discussion in Section 3.2, however, we can think of alternative explanations for the infelicity of (3.50b) and (3.51b), which brings us to the role of Focus in Roberts's (2012) theory. Roberts follows Rooth (1992) in assuming that Focus invokes alternatives via its focus-semantic value, but extends this idea to questions. That is, *wh*-words in questions make the same contribution as F-marking in assertions such that the *wh*-word gets substituted with a variable for its focus-semantic value. Restrictions on Focus structure can thus be captured by the constraint in (3.52) (adopted from Kadmon 2001) to not only previously dis-

cussed cases of question-answer congruence in (3.53) (repeated from (3.1)) but also question-*question* congruence as in (3.54).

(3.52) The QUD constraint on Focus (KADMON 2001, p.344)

An utterance B whose logical translation is of the form β or $?\beta$, where β is a formula, is felicitous only if $\llbracket \beta \rrbracket^f = \text{last}(\text{QUD}(\llbracket B \rrbracket^o))$.

(3.53) A: Where did Cloud grow up?

- a. B: He grew up in [NIBELHEIM]_F.
- b. B: #He [GREW UP]_F in Nibelheim.

(3.54) A: Where did Cloud grow up?

- a. B: Did Cloud grow up in [NIBELHEIM]_F?
- b. B: #Did [CLOUD]_F grow up in Nibelheim?

Additionally, Focus plays a crucial role for Roberts's theory by virtue of serving as a cue for what the current QUD is. In the examples thus far, questions were always made explicit, which is of course an oversimplification, since natural conversation rarely behaves like a quiz-show. Due to that situation, an important issue is how to deal with discourses where questions are not made explicit. Roberts's answer is that questions may also be - and in fact mostly are - left implicit. In such cases, it is the Focus structure of an utterance that indicates what the current QUD is. Roberts captures this idea as the presupposition in (3.55) (see Büring 2003; Constant 2014 for modified versions and additional discussion). That is, in the absence of an overt question, hearers rely on the Focus-structure as a cue to identify the QUD and accommodate it (in the sense of Lewis 1979, for possible constraints on accommodation of this type see Beaver & Clark 2008).

- (3.55) Presupposition of prosodic focus in an utterance β^* (ROBERTS 2012, (26))
 β is congruent to the question under discussion at the time of utterance.

The notion of presupposition that (3.55) appeals to should be viewed as being close, if not identical to the one discussed for squiggle in the previous section, namely one in terms of the contextual requirements of Focus. That is, although the Focus-structure is meant to help a hearer accommodate an otherwise implicit QUD, it also accounts for the Strong Contextual Felicity of Focus. Treating the relation to questions as the primary function of Focus also allows us to do away with the explanation for how a question satisfies the requirements of squiggle, which - adopting the explanation from Kadmon (2001) - relied on inferring the member of C from the pragmatic requirements on asking a question, namely that there are at least two possible true answers.

Assuming (bare) Focus to be about QUDs also allows us to keep bare Focus separate from association with Focus with respect to the Focus Presupposition Antecedent Hypothesis. That is, while Focus serves the function assumed in Roberts framework, association with Focus may still be viewed as proposed by Rooth (1992).

A(n) - to my knowledge novel - empirical argument for treating bare Focus and association with Focus separately comes from a comparison of squiggle with the widely assumed semantics of additive particles like *also*. Recall from Section 3.2 that squiggle, loosely speaking, required there to be two distinct propositions as elements of C, one being the prejacent. Interestingly, according to the entry for *also* in (3.56), repeated from (3.41), an additive particle presupposes that C contains one proposition not entailed by the prejacent, which is the almost identical requirement. Additionally, both bare Focus and additives have the property of Strong Contextual Felicity such that this requirement has to be met for them to be

felicitous.

$$(3.56) \quad \llbracket \text{ALSO} \rrbracket = \lambda C. \lambda p. \lambda w: \exists q [q \in C(w) \ \& \ p \not\Rightarrow q \wedge q(w) = 1]. \ p(w)$$

However, while a question seems to be able to satisfy this requirement for bare Focus, as in (3.57a), it does not license the use of an additive (3.57b) (see Chapter 5 for experimental evidence for this contrast). If we assume that the requirements of Focus are satisfied because Focus carries the presupposition in (3.55), while the additive does in fact require a proposition of the form specified in (3.56), we do not have to stipulate that the element inferred from using the question - again adopting Kadmon's explanation - is able to satisfy bare Focus but not the additive, and can keep the requirements of the additive as is. Consequently, bare Focus does not involve the same notion of antecedent as Focus-sensitive particles do, which justifies leaving bare Focus out of the Focus Presupposition Antecedent Hypothesis.

- (3.57) A: Where did Barret live over the course of his life?
- a. B: Barret lived in [Corel]_F.
- b. B: #Barret **also** lived in [Corel]_F

Before concluding this section, it is worth noting that - despite rigorous formal definitions outlined above - the notion of a QUD has been used in ways that goes far beyond and outside of Roberts's (2012) framework, by being assimilated to the less strict concept of a discourse topic, without Focus playing the central role it does for Roberts. It is therefore important to be aware of possible confusions and equivocations and be precise in the application of the concepts at play. These extensions of Roberts's theory have been particularly prominent in experimental work, which we will turn to next.

3.5 Processing Focus and QUDs

This section reviews psycholinguistic research on Focus and QUDs. For Focus, after providing a broad overview of important findings, special attention will be given to work on the representation of alternatives and the time course of processing Focus-sensitive expressions. For QUDs, the discussion will be grouped into its application to semantic and pragmatic phenomena on the one hand, and syntactic phenomena on the other.

3.5.1 Focus

(i) Broad Overview

There has been a considerable amount of research on the role of Focus for language comprehension, although the adopted notion has mostly been in terms of Focus as new or highlighted information, until relatively recently. [Cutler & Fodor \(1979\)](#) provided evidence for the role of Focus in allocating attention by showing that Focused material in relation to a preceding question was facilitated in a phoneme detection task. In line with this finding, [Bredart & Modolo \(1988\)](#) showed that the extent to which certain semantic illusions arise (e.g. the so-called Moses illusion, [Erickson & Mattson 1981](#)) is modulated by whether the critical word (e.g. *Moses*) is Focused (see also [Sturt et al. 2004](#)).

Furthermore, there is evidence that Focused words have a privileged status in memory. Using syntactic constructions such as clefts to manipulate Focus, [Birch & Garnsey \(1995\)](#) showed that phonological information of a Focused word was remembered better in a naming and in a recall task, although for the latter only with a delay. Moreover, Focused material is referred back to more often in a sentence continuation task and recognized faster in a probe recognition task, but again only when the probe occurs with a delay ([Birch et al., 2000](#)). Relatedly, [Foraker &](#)

McElree (2007) showed that Focusing the antecedent of a pronoun leads to faster resolution.

Regarding the issue of how Focus affects reading, results are more mixed however. While Birch & Rayner (1997) report Focused material being read slower in eye-tracking, Birch & Rayner (2010) found the opposite effect. Benatar & Clifton (2014) note that this apparent inconsistency may be due to differences in how Focus was manipulated - via a preceding question, clefting, or syntactic position - and more crucially how Focus was conceptualized theoretically. Adopting Schwarzschild's (1999) notion of Focus as the counterpart to givenness, they provide evidence that Focused - or new - information is in fact read slower, whereas what is Given shows facilitation in reading. In relation to the previous studies, the additional time spent on reading Focused material may thus be causal in the noted benefits of Focus across different tasks. Taken together, these studies suggest that Focus leads to an enhanced memory representation, potentially due to more attention being allocated to Focused material, which results in facilitation of encoding and integration processes.

Focus has also been shown to affect syntactic processing. Using *only* to investigate temporary structural ambiguities such as the main-verb/reduced-relative-clause analysis (e.g. *The horse raced past the barn fell.*), Ni et al. (1996) provided evidence from self-paced reading and eye-tracking while reading that the presence of *only* reduced garden path effects. In a follow-up to this study, Paterson et al. (1999) argued that *only* facilitated reanalysis processes rather than initial parsing behavior however. With respect to another structural ambiguity, namely relative clause attachment to a complex NP (e.g. *The daughter of the colonel who...*), Schafer et al. (1996) showed that an accented noun increased the likelihood of the corresponding NP to become the head of the relative clause.

Beyond syntactic parsing, Focus also plays a role for the processing of ellipsis

constructions. For example, [Frazier et al. \(2007\)](#) showed that in a situation where VP-ellipsis can either be resolved to the predicate in a matrix or an embedded clause (e.g. *Julie said Maria went to the rally and Greg did too.*), accenting the subject of a given clause increases the likelihood for the ellipsis to be resolved to the predicate of this clause. For ellipsis in coordinating structures (e.g. *Danielle couldn't pass the quiz, let alone the final/Kayla.*), [Harris & Carlson \(2018\)](#) find a similar pattern, namely that accenting a non-local constituent renders resolution of the ellipsis to this constituent more likely. However, this accenting effect does not fully overturn a bias for the local constituent, which the authors attribute to a default preference for material occurring late in a clause to receive informational Focus ([Carlson et al., 2009](#)).

One way to interpret these findings by relating it to the results on attention and memory would be to assume that the enhanced memory representations induced by Focus affect how syntactic representations are accessed during parsing. When the parser has to retrieve syntactic information while building the structure, Focused material may increase the activation of the corresponding representations such that they are more likely to be chosen for attachment or retrieved for ellipsis. The psycholinguistic research thus supports a characterization of Focus in terms of its effects on underlying memory representations. A different question concerns whether the effects of Focus go beyond the representation of the Focused word or constituent, which we will turn to next.

(ii) The Representation of Alternatives

According to [Rooth's \(1985\)](#) theory of Alternative Semantics, the essential role of Focus is to evoke alternatives. However, given that alternatives are left implicit - that is, Focusing *Tifa* does not tell you what specific alternatives are being evoked - there are limits to the kind of evidence linguistic theory can provide to support

this view. Psycholinguistic evidence, on the other hand, may be able to provide important insights to this issue.

One source of evidence comes from studies showing effects of Focus on alternatives mentioned in the discourse. [Fraundorf et al. \(2010\)](#) showed that a contrastive accent not only improves recognition of the Focused words (e.g. BRITISH) but also of related words that were previously mentioned (e.g. French). Moreover, no such effect was found for related words that were not mentioned in the context (e.g. Portuguese).

Contrastive accents have also been shown to influence processing in the visual-world paradigm. Comparing a contrastive with a non-contrastive accent (nuclear L+H* vs H+L*) in either a broad or a narrow Focus condition in German, [Braun et al. \(2018\)](#) show that narrow Focus leads to more looks to contrastive associates (e.g. *swimmer* vs *diver*, displayed as words rather than pictures) than to non-contrastive but semantically related ones (e.g. *swimmer* vs *bath*), but only when the narrow Focus is conveyed with a contrastive accent. Additionally, a second pair of experiments showed that the same pattern occurs in the presence of an additive particle, suggesting that it is the accent that is responsible for the increased activation rather than the particle activating alternatives on its own. In a related study, [Braun & Biezma \(2019\)](#) replicate this qualitative pattern for a different comparison in accents, namely between prenuclear L*+H - assumed to indicate a contrastive topic - and nuclear L+H*, suggesting that activation of alternatives is not restricted to a single accent type in German.

In two cross-modal priming studies in Dutch, where participants that are listening to a sentence have to indicate whether a visually presented prime is a word or a non-word, [Braun & Tagliapietra \(2010\)](#) investigated how different intonational contours affected the performance of different primes. The contour was either neutral or contrastive, with the latter placing a contrastive accent on the final word of

the test sentence, after which the prime was presented. Participants were faster to respond to primes that were contrastively related to the final word of the test sentence (e.g. flamingo - pelican) than to non-contrastive but related primes (e.g. flamingo - pink) when the test sentence carried a contrastive contour, but not when it was presented with a neutral contour.

Following up on this result, Husband & Ferreira (2016) showed facilitation relative to an unrelated control prime for both contrastive and non-contrastive primes if a contrastive accent was present, opposed to Braun & Tagliapietra's lack of facilitation for non-contrastive primes. Husband & Ferreira attribute this apparent tension to differences in the degree of semantic relatedness in Braun & Tagliapietra's stimuli. However, Husband & Ferreira furthermore provide evidence on the time course of activating alternatives. In a second experiment, in which the target words were presented 750ms after the offset of the prime carrying the neutral or contrastive accent, rather than immediately after, only the contrastive prime showed facilitation, suggesting that Focus initially activates a larger set of alternatives which is restricted to relevant ones at a later stage.

These findings provide evidence that the alternative sets evoked by Focus are in fact cognitively real. A subsequent issue is what the set consists of and what alternatives are being evoked. One factor that seems to play a role in light of Fraundorf et al.'s (2010) results is whether an alternative is explicitly mentioned in the context, since mentioned alternatives showed an advantage in terms of recognition relative to unmentioned ones even when both were otherwise contrastive.

However, in a follow-up study, Fraundorf et al. (2013) showed that this advantage to mentioned alternatives is only present when the alternative is plausible or relevant. In discourses like (3.58), both *Saturn* and *Neptune* are contrastively related to *Jupiter*, but only the former constitutes a plausible alternative, given that *Neptune* had not been visited yet. While recognition was improved for mentioned

and plausible alternatives (e.g. Saturn), there was no such effect for mentioned but implausible ones (e.g. Neptune). This finding suggests that participants take details of the discourse into account when computing alternatives, at least in a late measure such as recognition performance.

(3.58) Originally, the space probe Cosmo III was designed to fly past **Jupiter** and Saturn and send photos and measurements back to NASA from both planets. NASA needed this information to guide the videos they were going to take of *Neptune* on a future mission.

However, due to a glitch in the programming of the Cosmo III, it lost the photos taken of JUPITER and put the future mission in trouble.

In contrast, the facilitation for contrastive items with respect to cross-modal priming and the visual-world reported earlier did not rely on alternatives being mentioned. This apparent tension, however, may be due to task differences, given that these online methodologies are able to tap into the incremental processes underlying the generation of alternatives, whereas the recognition task may only detect the most privileged alternatives, in line with Husband & Ferreira's (2016) finding that the set of alternatives may be restricted quickly.

An alternative explanation for the contrast may be found in relation to Rooth's (1992) theory, which distinguishes between the alternatives evoked in the focus-semantic dimension and the propositions that are part of C. The recognition benefit for plausible mentioned alternatives could thus be conceived of as resulting from those alternatives being included in the set of propositions C, whereas early facilitation in priming and the visual-world may be related to the activation of focus-semantic alternatives that may not necessarily be part of C.

With respect to advantages in online measures, it is worth emphasizing that what was referred to as non-contrastive primes or associates were still semanti-

cally related to the target word (e.g. swimmer-bath or flamingo-pink). However, as Gotzner (2015b) notes (see also Gotzner 2015a, Ch. 5 and Gotzner & Spalek 2017), studies varied in whether the non-contrastive associate constituted as proper replacement for the target word in the sentence it occurred in, often between items. For example, for the sample item in (3.59) from Husband & Ferreira (2016), substituting the non-contrastive associate *extinct* with the target word *mammoths* would result in ungrammaticality. The observation that non-contrastive associates might not be facilitated even though they are semantically related would thus be in line with Rooth's (1992) proposal that alternatives are restricted to appropriate types.

(3.59) Scientists found the fossils of several MAMMOTHS during their excavation.

Contrastive: *dinosaurs*; non-contrastive: *extinct*, unrelated control: *corporate*

On the other hand, Rooth also argued for a permissive view according to which a type-match is all that is required to constitute a viable alternative, contrasting with Wagner's (2012b) restrictive view that alternatives have to be mutually exclusive, discussed in Section 3.2. Gotzner (2015b) provides evidence in favor of Rooth's account by showing that semantically unrelated primes may still receive facilitation if they constitute a possible replacement. That is, while *lychees* in (3.60a) was indistinguishable from the related prime *socks*, the unrelated prime *sofas* in (3.60b) was slower than the related prime *beetles*. This difference thus show that the set of alternatives may in fact be quite broad, once their replaceability is taken into account.

(3.60) a. Possible replacement

He (only) bought JACKETS.

prime: *lychees*

b. No Possible replacement

He (only) caught FLIES.

prime: *sofas*

To sum up the findings regarding the nature of the alternative set, there are a few notable factors that play a role for the alternative computation. First, being mentioned in the discourse results in a privileged status, but for recognition effects only for plausible alternatives. Second, semantic relatedness is not sufficient for facilitation in cross-modal priming or the visual-world paradigm, but potentially only as long as the related alternative is not replaceable. When comparing replaceable alternatives in terms of relatedness, even unrelated alternatives are facilitated.

However, notably not all factors have been tested within the same methodology such that more work needs to be done to dissociate the relevance of certain factors from the context of the task in which they were assessed. Furthermore, it was pointed out that different effects may also relate to different aspect of the underlying theory, namely what alternatives are being evoked on the focus-semantic dimension and which may be part of the free variable *C*.

The last aspect to be discussed in the present context pertains to how Focus-particles affect the computation of the alternative set. The studies discussed thus far were primarily concerned with bare Focus expressed via a contrastive accent, with the exception of [Braun et al. \(2018\)](#), who investigated the influence of additive particles on the retrieval of alternatives in the visual-world paradigm but found no effect.

In contrast, [Kim et al. \(2015\)](#) (see also [Kim 2012](#)) showed in a visual-world study that the presence of *only* in target sentences as in (3.61) increased the proportion of looks to a target display containing some apples faster than when *only* is not present. Additionally, when *apples* was previously mentioned (rather than *lanterns*), resolution toward the target display occurred earlier, but even more so

with *only*. This finding not only constitutes another example of the benefits of previous mention for the computation of alternatives, but adds to this picture by providing evidence that Focus-particles may facilitate accessing alternatives available in the discourse.

- (3.61) Neil has some {apples/lanterns} and some cards.
Jane (**only**) has some [apples]_F.

Additional evidence for the facilitatory effects of Focus-particles comes from two recall studies on German by Spalek et al. (2014) (see also Gotzner 2015a, Ch. 3). The authors compared *even* and *only* to a bare Focus condition in a target sentence preceded by a context sentence introducing a set of alternatives, as in (3.62). While there was no difference between the conditions for the recall of the Focused element, the presence of a Focus-particle resulted in better recall rates of alternatives relative to the bare condition. These results thus extend the findings of Fraundorf et al. (2010, 2013), suggesting that Focus-particles require deeper processing of the alternative set, which may boost the independent memory benefits of Focus.

- (3.62) Matthias receives a package with shirts, trousers and jackets.
He considered what he liked.
He kept { **only** / **even** / \emptyset } the shirts.

In contrast, Focus-particles may also lead to interference. In two experiments using items similar to (3.62), Gotzner et al. (2016) (see also Gotzner 2015a, Ch. 4) found that the presence of a Focus-particle - in this case *only* or *even* - slowed down the acceptance of mentioned alternatives and the rejection of unmentioned alternatives in a probe recognition study, as well as slowed down response times to mentioned, unmentioned or unrelated alternatives in a lexical decision task. The authors argue

that these interference effects are due to Focus-particles activating additional alternatives, which leads to competition among alternatives in the alternative set and inhibited computation.

Gotzner 2015a, Ch. 6 adds to this finding by investigating the effects of different Focus-particles in combination with a contrastive accent in two probe recognition studies. The first study used items as in (3.63), comparing four conditions: a bare neutral accent, a bare contrastive accent, and either *only* or *also* combined with a contrastive accent. The probe would always be the alternative to the Focused word mentioned in the first sentence of the discourse, here *witness*, and appear either after the target sentence (the second sentence in (3.63)) or after the filler sentence (the third sentence in (3.63)). Reaction times to the probe showed no difference between any condition when presented right after the target sentence. However, with the delay of the additional filler sentence, there was facilitation for contrastive accents relative to the neutral accent, but less so when the accent was combined with *only* or *also* rather than being bare.

- (3.63) The judge and the witness followed the argument.
{ The [judge]_F / { **Only** / **Also** / ∅ } the [JUDGE]_F } } believed the defendant.
He announced the verdict.

A follow-up experiment used the same basic design, but instead of manipulating the timing of the probe, participants had to do a simple math problem after listening to the target sentence (filler sentences were excluded) and before being presented with the probe. Diverging from the first experiment, it was the contrastive accent in combination with *only* leading to interference relative to a neutral accent. The bare contrastive accent and its combination with *also*, on the other hand, were numerically slower than the neutral accent but not significantly different.

This finding further supports the view that Focus-particles lead to interference, potentially due to competition, but also shows that not all particles behave alike and that the time course of the alternatives generation process may not be linear, but rather exhibit facilitation early and interference later.

Relating these findings to Rooth's (1992) theory again, the fact that Focus-particles exhibit different effects than bare Focus may be due to - or even support for - the indirect relationship between squiggle and the particle, which both come with their own hidden C variable. The co-presence of these variables may also account for Focus-particles leading to interference rather than facilitation, since gauging the contents of each set could result in competition. Alternatively, the observed interference effects may arise from the additional semantic contribution of a Focus-particle, which requires establishing a specific relationship among members of the alternative set, in contrast to alternatives being evoked but not operated on. Differences between particles, as observed by Gotzner (2015a), may constitute an important source of evidence for addressing this latter possibility. The next subsection adds to this point by reviewing results on the incremental processing of Focus-particles.

(iii) The Time Course of Processing Focus-particles

Regarding the question whether and how Focus-particles are processed incrementally, there has already been substantial evidence in the studies presented above. For instance, Kim et al. (2015) showed that *only* facilitated looks to a target display more so than a bare contrastive accent. This finding provides initial evidence that Focus-particles are in fact computed quite rapidly. Similar studies discussed in the previous chapter in Section 2.5 in the context of presuppositions further consolidate this result, such as Romoli et al. (2015) for *also*. However, both of these studies used the visual-world paradigm, which might exaggerate certain effects due to

the special task demands and a restricted linguistic context, and may therefore not carry over easily to language comprehension in a more naturalistic setting.

A notable exception to these methodological choices comes from an eye-tracking while reading study by Filik et al. (2009), comparing *only* and *even*. In sentences like (3.64) (‘|’ indicating analysis regions), first-pass reading times in the region containing *passed the examination* were slower when *only* was present and followed by an unlikely event (=worst teacher). The reverse pattern - slower reading times for a likely event (=best teacher) - was found for *even*, but only in the final region of the sentence. This contrast suggests that, although *even* may be processed incrementally, its processing may be delayed relative to *only*.

(3.64) { **Only / Even** } students taught | by the {worst / best } teacher | passed
the examination | in the summer.

Interestingly, in another study from Section 2.5, Schwarz (2015c) found that anticipatory looks to a target display in the visual-world paradigm occurred earlier for *also* than for *only*. This difference was interpreted in terms of *also* being presuppositional, whereas the exhaustive inference contributed by *only* is at-issue. The same contrast holds for *only* and *even*, with the contribution of the latter being presupposed. However, while presuppositions may take precedence over at-issue content in the visual-world paradigm, potentially due to presuppositions being necessary to assess the truth of a proposition to meet specific task demands, computing the presupposition of *even* may have been more costly in a more naturalistic reading task. Alternatively, the differences may be due to *even* requiring the calculation of a scale.

What these results thus show is that Focus-particles, despite sharing certain properties that may be reflected in similarities in their processing behavior, also exhibit points of idiosyncratic variation that may affect processing in distinct ways. I

will come back to these idiosyncrasies in the context of the results on accommodation in Ch. 5. The next subsection moves on to experimental research on the QUD.

3.5.2 QUDs

(i) Semantic & Pragmatic Phenomena

The concept of a QUD has been used in experimental work on a wide variety of phenomena in semantics and pragmatics. One of the earliest set of studies comes from Zondervan (2009) (see also Zondervan 2010), who investigated the scalar implicature of *or* in Dutch (= *X or Y* implicates *either X or Y, but not both*). Zondervan manipulated whether the disjunct was Focused or not, either via explicit questions, as in (3.65), or with an implicit question raised in the context. The rate of implicature calculation was significantly increased when the disjunct was Focused, relative to when it was deaccented. Zondervan interpreted these results in terms of QUDs determining the Focus-structure of a sentence, which in turn determines what parts of the sentence receive an exhaustive interpretation, corresponding to a scalar implicature. If the disjunct containing the weak scalar element *or* is Focused, the likelihood of scalar inferences is therefore increased.

- (3.65) a. A: What did Katja find? (Focus)
 b. A: Who found a crab or a starfish? (Non-focus)
 B: Katja found a crab or a starfish.

Directly related to these findings, Ronai & Xiang (2019) elaborate on the relationship between questions and scalar inferences with an elicitation task and a timed sentence-picture verification task on *some*. The results from the elicitation task, which had participants indicate what question preceding a sentence containing *some* matched a picture that was either compatible with the scalar inference or not,

showed that a broad range of questions was compatible with either interpretation, the most common of which are given in (3.66).

- (3.66) a. What color are the shapes?
b. Are any of the shapes blue?
c. Are all shapes blue?

Target: Some of the shapes are blue.

With respect to these questions, the sentence-picture verification task showed that *any*-questions were more likely to be interpreted literally - that is, without the scalar inference - compared to *all*-questions, which leaned stronger towards the implicature enriched interpretation. Additionally, response times for *any*-questions were slower when rejecting a literal interpretation, providing evidence for the role of QUDs for implicature processing.

QUDs have also been used to study the interpretation of modal expressions like *might* and *must*. Jeong (2018) presents experimental evidence that scopally ambiguous sentences containing a modal (*every x might have a y*), which have been argued to only allow the reading where the modal takes wide scope, can be interpreted with a narrow scope of the modal if the QUD makes this reading relevant (for other QUD-effects on scope ambiguities, see also Zondervan et al. 2008 on quantifiers and negation, and Chen et al. 2019 on comparatives).

Investigating the issue of whether *might* is best described as being interpreted in relation to a contextually determined body of knowledge or relative to an individual assessor, Beddor & Egan (2018) provide evidence for the latter view based on experimental results showing that the truth-value of a modal statement is sensitive to the implicit QUD set up by the context. Taken together, these results provide strong evidence for the role of QUDs for sentence interpretation.

One set of studies that is particularly relevant in the present context is reported

in Tian & Breheny (2016). Their studies addressed previous research on the processing of negative sentences, showing that the positive argument of a negative sentence (=the prejacent) is often represented in early stages of processing, as well as processing difficulty associated with negative sentences. In a sentence-picture matching task, Tian & Breheny compared clefted to unclefted negative sentences (e.g. *(It was) Jane (who) didn't cook spaghetti*) and had participants indicate whether it matched a given picture, which either showed raw spaghetti or cooked spaghetti. While replicating the finding that participants are faster to respond to a mismatching picture for unclefted negative sentences (i.e. the cooked spaghetti), clefted sentences showed the opposite pattern, with faster response times for the matching picture.

Using the same task, the authors kept the target sentence the same (e.g. *The banana isn't peeled*) but added a factor to the picture manipulation, namely either presenting - to illustrate their sample item - a peeled banana or an unpeeled banana on its own, or next to an apple that mismatches the banana's state. For the single-object picture, there was a training effect such that a matching sentence takes longer than a mismatching sentence at the beginning of the experiment but less so toward the end. In contrast, the two-object picture condition showed no such training effect, with matching sentences consistently taking longer. Finally, a visual-world study comparing positive and negative sentences in their clefted or unclefted version showed that negative sentences are delayed relative to positive ones in their unclefted form, but indistinguishable in their cleft form.

The reason Tian & Breheny's (2016) studies are relevant here is because they implicitly provide support for the connection between Focus and QUDs. What the cleft manipulation may have done is indicate the Focus-structure, when the unclefted version would not have provided any clues to that effect and consequently been interpreted with broad Focus. Similarly, the two-object pictures provided a set

of alternatives that justifies Focus on the subject, whereas the single-object picture would have been most natural with broad Focus in the absence of further context cues. The studies thus not only illustrate the role of implicit QUDs for the processing of negation, but also how they can be evoked, with Focus being a crucial cue, in line with Roberts (2012). The question what other cues there might be is also going to be central for a number of studies presented in the following subsection.

(ii) Syntactic Phenomena

In the domain of psycholinguistic work on syntax, QUDs have been primarily brought to bear on issues related to ellipsis. A set of studies by Malt (1985) - which preceded the QUD-framework but still yields important insights - showed that questions facilitate processing of VP-ellipsis relative to assertions. In discourses like (3.67), the final sentence containing the ellipsis was read faster when the antecedent was presented in a question (i) compared to an assertion (ii). In the context of the current discussion, this finding may be interpreted in terms of the raised question being left open on the stack and thereby keeping the syntactic form of the question active in memory and accessible for ellipsis resolution. In contrast, whichever question may be accommodated by the corresponding assertion would be immediately resolved and render its content less accessible.

- (3.67) Everyone was returning from vacation.
- (i) "Did Greg see Maureen and Marjorie last night?" Helen asked.
 - (ii) "Greg saw Maureen and Marjorie last night" Helen remarked.
"I think they just got back in town."
"Yes, he did" Sophia replied.

In a more recent investigation, Grant et al. (2012) examined so-called non-actuality implicatures triggered by modal verbs like *want*, *should* or *need*. By virtue of ex-

pressing possibilities rather than actual states of affairs, expressions of this sort are taken to implicate that this actual state of affairs does not hold. Interestingly, the authors show that presence of a non-actuality implicature decreases the penalty of a voice mismatching VP-ellipsis relative to a non-modal control in sentences like (3.68) in terms of acceptability ratings and eye-tracking while reading (see also Experiments 2 and 3 of Clifton & Frazier 2012). Grant et al. argue that this effect is due to non-actuality implicatures indicating an implicit QUD - with respect to the given example, *Did the information get released?* - which highlights the antecedent of ellipsis and facilitates its repair. Non-actuality implicatures may thus be viewed as cues for finding or accommodating an appropriate QUD, much like Focus in Roberts's (2012) original proposal.

- (3.68) a. This information was released but Gorbachev didn't.
 b. This information needed to be released but Gorbachev didn't.

Miller & Hemforth (2014) suggest that another kind of cue for accommodating a QUD are polar nouns like *participation*, which are argued to behave like concealed polar questions in certain contexts. For instance, the polar noun in (3.69) raises the question *Did Kate participate?*.

- (3.69) The outcome depends on Kate's participation.

Initial support for this idea comes from a norming study, where participants had to indicate the similarity between a manner paraphrase (*how Kate participated*) and a polar paraphrase (*whether Kate participated*), and polar paraphrases for assumed polar nouns received high similarity ratings. Additionally, an acceptability rating, manipulating whether the polar noun occurred in a context that made its underlying question salient (3.70a) or not (3.70b) as well as VP-ellipsis versus

do it-anaphora⁸, showed that a salient question improved ratings of VP-ellipsis, whereas ratings decreased for *do it*-anaphora.⁹

- (3.70) a. It is impossible to predict Andrew's participation in the chess tournament.
He is sure to win if he does/does it.
- b. Everyone was annoyed by Andrew's participation in the chess tournament.
His fans could not understand why he did/did it.

These results are in line with previous results insofar as they support the view that QUDs affect the salience of linguistic representations in memory, which in turn may make them more accessible as an antecedent for ellipsis or provide material for repair. The contrast between VP-ellipsis and *do it*-anaphora can be interpreted in terms of questions containing sufficient material to provide an appropriate antecedents for ellipsis, whereas anaphora to entities does not match well with the content of a question.

The findings furthermore adds to the list of means with which implicit QUDs can be accommodated through linguistic cues beyond Focus in the absence of an explicit question. As Grant et al. (2012) show, such cues may even be computed quickly enough to guide incremental processing, as indicated by the eye-tracking while reading results. There is thus extensive evidence that QUDs play an important role in language comprehension. The next chapter turns to the contribution this thesis makes to this issue by investigating the structural role of QUDs with respect to presupposition triggers varying in terms of Focus-sensitivity.

⁸The experiment additionally compared nominal with verbal antecedents, which is omitted here to keep the discussion comprehensive.

⁹For related unpublished results on the role of QUDs for VP-ellipsis, as well as sluicing, see (Miller & Hemforth, 2020) and (Poppels & Kehler, 2019) respectively.

CHAPTER 4

QUDS

4.1 Introduction

This chapter tests the first prediction made by the Focus Presupposition Antecedent Hypothesis (FoPAH), which states that Focus-sensitive presupposition triggers require a linguistic antecedent in the discourse model to be satisfied, whereas non-Focus presupposition triggers require their presupposition to be entailed by the Common Ground. The prediction to be tested here is that Focus-sensitive triggers should be sensitive to the salience of a linguistic antecedent, similar to for example pronouns.

In contrast, triggers lacking Focus-sensitivity by virtue of being entailments should be indifferent to the salience of the linguistic material that ultimately satisfies the respective presupposition, at least when it comes to assessing their grammaticality, even if salience may affect their processing in other ways. To illustrate this characterization, imagine a syllogism with a set of premises. For a conclusion to be valid in this case solely depends on whether it follows from the premises, irrespective of the order in which they occur or the particular syntactic form.¹ Put differently, anything prior to the conclusion becomes part of a uniform body of

¹Note that this analogy is primarily used as an illustration here, given that how people draw inferences from a syllogism may be subject to other factors (see [Johnson-Laird & Bara 1984](#)). I will come back to this issue in [Chapter 6](#).

knowledge with respect to which the validity of the conclusion is assessed.

The way salience will be operationalized here is in relation to the QUD-structure. As shown in Subsection 3.5.2 of the previous chapter, there is ample evidence for the relevance of QUDs for language comprehension. However, little work has been done investigating its role as a discourse-structuring device that goes beyond single question-answer pairs. Thus, a secondary contribution of the present chapter in addition to testing the prediction of the FoPAH is to explore the idea that QUDs constitute *processing domains*, where a processing domain is to be understood as regulating which representations in memory remain actively accessible and which decrease in activation. This concept has been explored in a variety of ways in psycholinguistics, but less so in relation to work in formal linguistic theory, specifically for discourse processing.

Finally, the present chapter also bears on a formal theoretical issue, namely the relationship between QUDs and Focus. As discussed in Section 3.4 of the previous chapter, there exists a tight connection between approaches to Focus and questions, as instantiated by for instance Roberts (2012) and Beaver & Clark (2008).

One characterization emerging from this work is that the QUD determines the set of alternatives generated by Focus by restricting it to all *relevant* alternatives. Although this characterization is primarily intended to capture the requirement that the set of Focus alternatives matches that of the QUD (e.g. “*Who designed Chrono Trigger?*” and “[*Akira Toriyama*]_F *designed Chrono Trigger.*” both invoke the set “*x designed Chrono Trigger*”), it can be extended to address the question of what the invoked set actually consists of, in relation to the discussion in Section 3.5. That is, much like “*Crono survived every battle*” cannot plausibly be meant to include battles prior to Crono’s birth, “*Only [Lucca]_F lives in Guardia*” can truthfully describe a scenario where some people live somewhere else without requiring the population of Guardia - a fictional kingdom - to be literally one.

As such, the present work may therefore also yield insight into the role of the QUD with respect to determining what material in the discourse becomes part of the calculation of alternatives. Moreover, using the QUD to operationalize the salience of a linguistic antecedent becomes less arbitrary given that the antecedents we will be concerned with are those of Focus-sensitive presupposition triggers.

4.2 Previous research

The concept of processing domains is a rather general one in psycholinguistics that has been applied to a variety of phenomena. The phenomenon I want to use here as an illustration is that of verbatim memory, or memory for the surface form of linguistic material. This issue has been studied extensively in psycholinguistic research, going back to [Sachs \(1967\)](#), who found that it can take as little as 80 syllables for comprehenders to no longer be able to reliably recall whether an auditorily presented sentence occurred in its active or its passive form (but see [Sachs 1974](#) for a lack of forgetting with written materials; see [Fodor et al. 1974](#) for related discussion). However, it has been shown that there are many factors that can affect verbatim memory and enhance recall (see [Gurevich et al. 2010](#) for an overview). One such factor that serves as an example of the role of processing domains for memory comes from the work of [Gernsbacher \(1985\)](#) in the form of what she labels processing shifts.

[Gernsbacher's \(1985\)](#) idea is that memory consists of substructures, with incoming information that is congruent to an already existing structure getting integrated, while non-congruent information will result in the construction of a new substructure - a processing shift. While building a given substructure, information within this substructure will be active and thus more accessible, whereas shifting to a new substructure decreases activation of material from a previous one. On this view, the rapid loss of surface form is accounted for by appealing to process-

ing shifts happening in the time between a target is encountered and the time it is recalled.

Evidence for Gernsbacher's theory comes from two of her experiments, one testing memory for spatial orientation of objects on a picture-sequence and the other memory for word order of sentences in written stories. The narratives were presented either as a coherent sequence or in a scrambled random order, and participants were asked after each narrative to recall the relevant surface information. For both modalities, recall in the coherent sequence was improved relative to the random one. These results support Gernsbacher's account of processing shifts insofar as random sequences are more likely to involve processing shifts and thus decrease activation of relevant material, whereas a coherent sequence minimizes the number of required substructures.

While I do not want to claim that these results can be rephrased in terms of QUDs - especially since it is unclear whether QUDs should be applied to non-verbal stimuli - QUDs may nonetheless serve a similar purpose by providing the processing domains in which material remains accessible or decreases in activation once a QUD has been resolved and a new QUD gets raised. Put differently, material within the same QUD-domain would remain co-active, whereas material outside the QUD-domain would get shunted or decrease in activation. However, there may also be gradience within co-active material based on other factors such as recency.

Moving from the concept of processing domains to a concrete example investigating some related issues, Kim (2015) addresses the question how *also* finds its antecedent in discourses like (4.1).

- (4.1)
- a. The roommates often go to the farmer's market together.
 - b. Beth always buys bread.
 - c. Andy usually buys some celery.

- d. His doctor told him he needs to eat more vegetables.
- e. Today Andy treated himself to a croissant.
- f. He **also** bought some [NECTARINES]_F.

The final sentence in (4.1f) presupposes that Andy bought something other than nectarines, but what this other thing might be has to be inferred from the context. Crucially, the preceding discourse context contains a number of objects that could in principle serve as an antecedent (underlined).² Moreover, the discourse also varies in its structure and consequently the way in which the material is introduced. Adopting a looser QUD-approach, Kim assumes that (4.1b) and (4.1c) share a superquestion, whereas (4.1d) and (4.1e)-(4.1f) address subquestions to (4.1c).

The first two experiments simply asked participants what Andy bought to target the interpretation of *also* in discourses like (4.1) - and (4.2) further below - and provided different interpretative options corresponding to possible combinations of objects mentioned in the discourse. For discourses like (4.1), participants chose the local option (nectarines+croissants) around 65% of the time, with an intermediate option including celery at around 30%. While these results do not warrant strong conclusions about the source of the interpretation, given that *celery* simply may have been included due to the generic phrasing of (4.1c), it at least shows that *also* does not have to include all possible alternatives mentioned in the discourse.

For discourses like (4.2) below, results were more varied. While the linearly local option (nectarines+croissants) was still chosen most frequently with around 30%, the second most frequent choice at around 18% was one including items that were structurally local with respect to the QUD (nectarines+carrots+bread). Intermediate interpretations comprised of either nectarines+carrots or nectarines+croissants+carrots received slightly less responses with 10% and 5% respectively. While

²Note that only (4.1e) asserts that someone bought something, whereas (4.1b)-(4.1c) only suggest it to various degrees.

the non-factive status of (4.2d) again compromises any stronger conclusions, the results suggest that discourse-structural may indeed play a role for finding alternatives of *also* and that linear distance - albeit a strong cue - is only one cue among many.³

- (4.2)
- a. The roommates went to the farmer' s market together.
 - b. Beth bought some bread.
 - c. Frank bought some carrots.
 - d. When his girlfriend is there, she always gets some croissants.
 - e. Andy **also** bought some [NECTARINES]_F.

In addition to the interpretation data, Kim (2015) also provides evidence about the incremental processing of discourses like (4.3) from a visual-world eye-tracking study. The experimental manipulation included three different types of visual displays: one where the linearly-local interpretation (nectarines+carrots+apples) was the only image consistent with the discourse, one where the structured-local interpretation (nectarines+apples+carrots+bread) was the only viable image, and one that contained images corresponding to both the linearly-local and the structured-local interpretation (=competition display).

First comparing the linearly-local and the structured-local display, fixations converged on the target image earlier in the structured-local display than the linearly-local display, with this difference already being present in the time window between the onset of *also* and the onset of the target word. This preference for a structured-local interpretations was also present in response times for each display type, with linearly-local taking longer than structured-local, as well as proportion

³As an additional caveat, note that the target in (4.2) introduces Andy as discourse-new, which would require accenting and potentially entail Focus-marking, such that the Focus-structure and consequently what *also* associates with is more ambiguous than indicated by Kim. A likely interpretation might be that *Andy* serves as a contrastive topic (Constant, 2014), which therefore confounds the interpretation of the experimental results here.

of responses in the competition display, with the structured-local paraphrase being chosen around 70% compared to around 20% for the linearly-local. Finally, in line with these offline data, fixations on the structured-local target image in the competition display were more likely than fixations on the linearly-local target image in the window 500ms after the target word. Taken together, the results thus provide - albeit suggestive (see caveat in previous footnote) - evidence that discourse-structural factors can override a preference for linear distance when it comes to finding Focus-alternatives for *also*.

- (4.3) a. The roommates went to the farmer's market together.
b. Beth bought some bread.
c. Frank bought some carrots and some apples.
d. Andy **also** got some [NECTARINES]_F.

Another study on the processing of additive particles, this time on *too*, comes from Chen & Husband (2018), who investigated sentences as in (4.4). They manipulated whether the antecedent of the conditional matched the presupposition of *too*, as well as the distance between the antecedent and the trigger, using a speeded binary forced-choice task.

- (4.4) If the editor {resigned / plagiarized}, then
(everyone from the publishing house would be shocked to hear that)
the critics resigned **too**.

In the acceptance rates, adding distance led to a decrease in accuracy (i.e. less 'yes' responses for the match condition and less 'no' responses for the mismatch condition), in addition to an overall decrease in accuracy in mismatch conditions. Moreover, response times in the mismatch condition were longer than in the match con-

dition, and there was a marginal interaction between the two factors such that distance increased response times in the match condition but decreased response times in the mismatch conditions.⁴ In the context of the present discussion, these results can be taken as evidence that decreasing the activation of the antecedent for a Focus-sensitive trigger by adding intervening material results in decreased acceptability.

To sum up, there is evidence that the structure of a discourse has effects on the availability of representations in memory. More specifically, the QUD has been shown to play a role in the way *also* retrieves its Focus alternatives in the discourse beyond linear distance, which nonetheless affects the acceptability of a Focus-sensitive trigger. The following experiments will elaborate on these findings by investigating another Focus-sensitive trigger, namely *even*, in Experiments 1a/b, and directly comparing a Focus-sensitive with a non Focus-sensitive trigger, namely *also* and *again*, in Experiment 2.

4.3 Experiment 1a

The goal of this experiment was to test whether the QUD-structure as a proxy for salience affects the accessibility of a linguistic antecedent for a Focus-sensitive presupposition trigger. The test case for this prediction was the scalar presupposition of *even*. In a case such as (4.5), *even* conveys that Marle making first place was a relatively unlikely or noteworthy outcome.⁵ This contribution is formalized as in (4.6), where *even* presupposes of all non-entailed alternative propositions q that they be weaker than the prejacent p on some contextually inferred scale, and leaves the

⁴Chen & Husband additionally report results from a drift diffusion model fitted against the data from the speeded acceptability task, which I will not go into here as it would require additional background that is tangential to the current discussion.

⁵While the relevant scale is most commonly framed in terms of likelihood, such a restriction would lead to difficulty for the wide range of contexts *even* can occur in (see for instance Kay 1990; see also Greenberg 2016) such that I will not commit to a particular view here (see also the following).

bare prejacent as at-issue.⁶ Interestingly, relevant scalar alternatives to *even* seem to be relatively easily inferable (e.g. *made first place* vs *made second place* etc.) and do not need to be given explicitly, as shown by the felicity of (4.5) out-of-the-blue.

(4.5) Marle participated in the race and **even** [made first place]_F.

(4.6) $[[\text{EVEN}]] = \lambda C. \lambda p. \lambda w: \forall q[(q \in C(w) \ \& \ p \not\Rightarrow q) \rightarrow q > p]. p(w)$

Nonetheless, if *even* associates with a value that is relatively low on an inferable scale, as in (4.7), where *making it to the finish line* should be ranked low on a scale of possible outcomes, there is a notable decrease in acceptability. However, once a lower ranked alternative is explicitly provided in the context, as the negation of the prejacent in (4.8), the use of *even* becomes acceptable again. The following two experiments will use this property of *even* to address the question about the accessibility of linguistic antecedents in relation to the QUD-structure.

(4.7) ?Marle participated in the race and **even** [made it to the finish line]_F.

(4.8) Ayla participated in the race but didn't make it to the finish line.
Marle participated too and **even** [made it to the finish line]_F.

4.3.1 Materials & Design

The experiment operationalized the relevant properties of *even* sketched above in short question-answer dialogues as in (4.9a). The target sentence was modeled after cases like (4.7) and always contained *even* associating with a relatively common event and therefore expected to be less than maximally felicitous without any contextual support, serving as a baseline. The first manipulation then involved providing this contextual support by either having B₁'s utterance indicate a value

⁶I will ignore the debate about *even* also having an additive presupposition here for simplicity's sake, but see (Greenberg, 2016; Francis, 2018, 2019). The same goes for the debate regarding the quantificational force assumed for *even*.

ranked above the one in the target sentence as in (4.9a), or ranked below it, as in (4.9b) (relevant parts in italics), with the latter expected to ameliorate the relative infelicity of the target sentence, as in (4.8). Secondly, to investigate how the QUD-structure might affect the salience of the material in B₁'s utterance, A₁'s question either differed only in the subject from A₂'s question (4.9a)-(4.9b), or additionally varied the object, as in (4.9c)-(4.9d).⁷

(4.9) Sample Item Experiment 1a

a. IMMEDIATE SUPER-QUD + *High Value*

A₁: Did Anne participate in the BIKE RACE?

B₁: She did but she didn't *win a medal*.

A₂: Did Beth participate in the bike race?

B₂: Yes. She **even** made it to the finish line.

b. IMMEDIATE SUPER-QUD + *Low Value*

A₁: Did Anne participate in the BIKE RACE?

B₁: She did but she *didn't make it to the finish line*.

A₂: Did Beth participate in the bike race?

B₂: Yes. She **even** made it to the finish line.

c. REMOTE SUPER-QUD + *High Value*

A₁: Did Anne participate in the ROWING CONTEST?

B₁: She did but she didn't *win a medal*.

A₂: Did Beth participate in the bike race?

B₂: Yes. She **even** made it to the finish line.

⁷This manipulation is a simplification insofar as the target sentence containing *even* comments on a new QUD, which might be construed as a sub-question to the *yes*-response. However, this caveat applies to all conditions equally.

Additionally, given that the REMOTE conditions change both the subject and the object in A₂, the responses may be more susceptible to a Contrastive Topic interpretation, which may affect the prosody of the target sentence, specifically on *she*. Given that the present study relied on silent reading, resolving concerns regarding prosodic effects will have to be put aside here.

d. REMOTE SUPER-QUD + *Low Value*

A₁: Did Anne participate in the ROWING CONTEST?

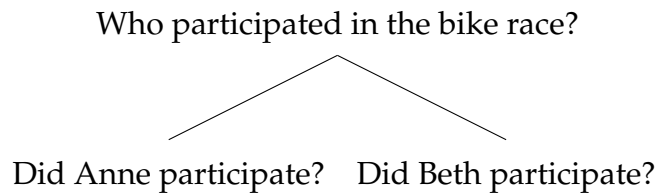
B₁: She did but she didn't *make it to the finish line*.

A₂: Did Beth participate in the bike race?

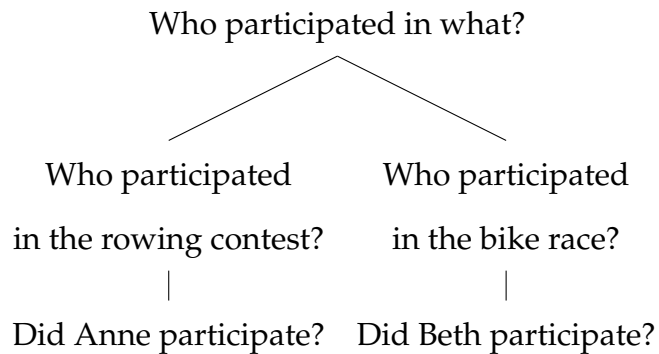
B₂: Yes. She **even** made it to the finish line.

The resulting QUD-structures were thus such that A₁ and A₂ were immediate sub-questions to the question “*Who participated in the bike race?*”, or were apart by an additional level, addressing the remote superquestion “*Who participated in what?*”. The assumed structures are shown in (4.10).

(4.10) a. IMMEDIATE SUPER-QUD Structure



b. REMOTE SUPER-QUD Structure



There were 16 items like (4.9) (the full set being listed in [Appendix A.4.1](#)), in addition to 12 fillers, all of which contained various presupposition triggers that were not supported by the context or a non-presuppositional control in a within-item design.

4.3.2 Procedure

The experiment was implemented via Ibexfarm and conducted online. Each trial started with a dash on the screen, after which participants pressed the space bar to move from sentence to sentence through the dialogue, with each sentence being displayed in full on its own in the center of the screen. After the final sentence of each dialogue, participants were presented with a 7-point Likert scale and asked *"How easy was it for you to comprehend the final sentence of this dialogue?"*, with the 1-end marked as *"Very hard"* and the 7-end as *"Very easy"*. Participants were instructed to think of comprehension difficulty in terms of *"to what extent [the sentence] requires additional background knowledge"*. After filling out a consent form, a demographic form and receiving instructions, participants saw three practice items of varying acceptability to familiarize them with the procedure and illustrate the intended use of the scale. The experiment concluded with a post-experiment survey that asked participants to indicate on a four-point scale for two sentences *"how hard is it for you to imagine a context in which you would use or hear such a sentence"*. This survey was meant to serve as a proxy for a participant's accommodation abilities but did not yield any insights and will thus not be discussed further. The experiment took about 10 minutes.

4.3.3 Subjects

A total of 48 participants were recruited via Amazon Mechanical Turk and each received \$1.50. 12 subjects were excluded because they either rated fillers containing a presupposition failure on average better than the non-presuppositional control (six people), or more than 25% of their sentence reading times were below 500ms (ten people, four of which overlapped with the previous criterion), leaving 36 participants for data analysis.

4.3.4 Predictions

According to the Focus Presupposition Antecedent Hypothesis, Focus-sensitive triggers require a linguistic antecedent rather than being entailed by the Common Ground, which predicts that the salience of such a linguistic antecedent should affect how a Focus-sensitive trigger is comprehended. On the assumption that the QUD-structure affects the salience of linguistic material, the critical prediction is that the presence of a *Low Value* should improve the acceptability of *even* relative to the *High Value* more when it occurs in an IMMEDIATE SUPER-QUD than in the REMOTE SUPER-QUD, resulting in an interaction.

4.3.5 Results

Prior to data analysis, we first excluded one trial for which the reading time for one sentence was more than 50 standard deviations above the average in order to avoid this trial skewing the overall standard deviations for following data exclusion. Trials with a reading time below 400ms or three standard deviations above the mean were furthermore excluded, which affected 5.1% of the total data.

Ratings. Mean ratings per condition are shown in Figure 4.1. The data were analyzed using an ordinal mixed effects model with a maximal random effects structure. There was a marginal effect of QUD with IMMEDIATE rated higher than REMOTE ($z=1.95, p<.1^*$), a significant effect of SCALE VALUE with *low* rated higher than *high* ($z=-4.57, p<.001^{***}$), and a significant interaction such that a *low* value increased ratings more in the IMMEDIATE condition than in the REMOTE condition ($z=-2.01, p<.05^*$).⁸

Reading Times. In addition to the rating data, full sentence reading times of the target sentence were analyzed, means per condition of which are shown in Figure

⁸The same analysis was also run on the data set that included all data points without the noted exclusions (henceforth *raw data*) to ensure the exclusions did not affect the outcome. This analysis yielded the same qualitative results.

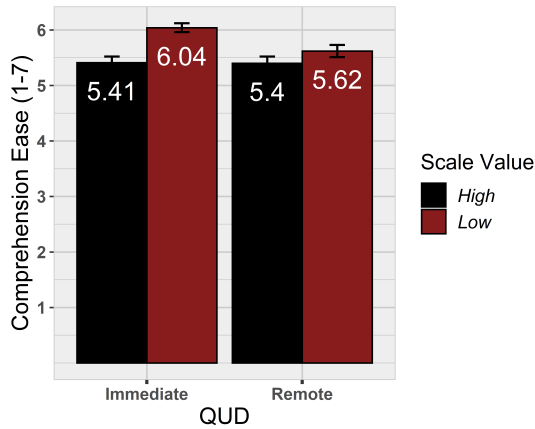


Figure 4.1: Mean ratings per condition

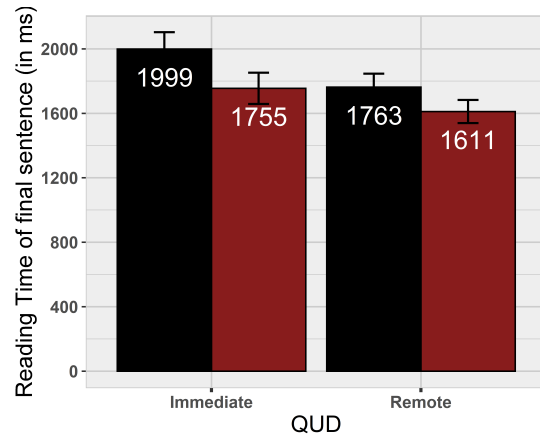


Figure 4.2: Mean RTs of target sentence per condition

4.2. Using linear mixed effects models with a maximal random effects structure - following (Barr et al., 2013) - on the log-transformed reading times, we found a significant effect of QUD with IMMEDIATE being read slower than REMOTE ($t=3.16$, $p<.01^{**}$) and a significant effect of SCALE VALUE with *low* being read faster than *high* ($t=2.78$, $p<.05^{*}$). The interaction was not significant ($t=0.61$, $p=.55$).⁹

4.3.6 Discussion

The prediction that the QUD-structure should affect the accessibility of Focus-alternatives to *even* was borne out in the rating data: providing contextual support for an otherwise degraded use of *even* due to it associating with a low ranked value by providing an even lower ranked value improved the acceptability of *even* relative to a context with a higher ranked value. Crucially, however, this effect was more pronounced when the low value occurred in response to a question that shared an immediate super-question with the target sentence compared to the response being an additional layer of structure away.

In contrast, reading times of the target sentence containing *even* showed a somewhat different pattern. While reading times decreased in the presence of a low

⁹The same qualitative pattern was also found for the raw data set.

value providing contextual support in line with the rating results, reading times in the IMMEDIATE SUPER-QUESTION conditions were longer than in the REMOTE SUPER-QUESTION conditions, thus diverging from the IMMEDIATE condition marginally improving ratings. Moreover, there was no interaction between the two factors in the reading times.

A possible explanation for the increased reading times for the IMMEDIATE conditions could be that the closer QUD-structure requires additional integration processes due to previous material being still active in memory, whereas there is less material to integrate in the remote condition as the target sentence is more separated from the previous discourse. We will put aside further discussion of this finding for now, as it is tangential to the current investigation.

Leaving the reading times pattern aside however, a more serious concern with respect to the experiment as a whole would be an alternative explanation that attributes the rating pattern to more general reasoning from world-knowledge rather than the accessibility of alternatives for *even*. To illustrate this explanation, consider the - condensed - sample item in (4.11) repeated from (4.9). On this view, the reason the target sentence improved more when the questions match might have been because learning that someone did not reach the finish line could be taken as evidence that the bike race is particularly difficult and as such make it more likely for other participants to do poorly. In turn, the content of the prejacent may become more informative, which might also affect acceptability.

- (4.11) A₁: Did Anne participate in the { BIKE RACE / ROWING CONTEST }?
 B₁: She did but she didn't { *win a medal / make it to the finish line* }.
 A₂: Did Beth participate in the bike race?
 B₂: Yes. She **even** made it to the finish line.

An initial reply to this alternative explanation would be that not all items allowed

such reasoning. For instance with respect to the item in (4.12), it seems less plausible that knowing about Frank not getting a date would lead to adjusting our preconceptions regarding the prom, but rather tells us something about Frank that should be independent of how Jake is doing. However, in order to properly address this concern, we conducted a follow-up experiment that tested the same discourses without *even*.

(4.12) A₁: Did Frank go to the { PROM / CHARITY GALA }?

B₁: He did but he didn't get { *a limousine / a date* }.

A₂: Did Jake go to the prom?

B₂: Yes. He **even** had a date.

4.4 Experiment 1b

In order to test whether the pattern of results found in Experiment 1a was indeed due to the QUD-structure affecting the salience of linguistic material that serves as antecedent for the computation of the scalar presupposition of *even*, rather than general world-knowledge reasoning invited by the QUD manipulation, the current experiment used the same stimuli and design but replaced *even* with a non-presuppositional control.

4.4.1 Materials & Design

As Experiment 1a, this experiment used a 2x2 design manipulating SCALE VALUE and QUD. The only thing different from Experiment 1a was the target sentence, which instead of *even* either contained *might've*, as in (4.13), or *apparently*, as in (4.14). These substitutions were chosen since they allowed for overall acceptable discourses, and simply removing *even* might have resulted in decreased acceptability due to pressure to insert the trigger when it is licensed, particularly in the *Low*

Value condition. Additionally, we used two substitutions, split evenly across items, in order to avoid any accidental issues specific to either one of them, for instance *apparently* by virtue of being able to express mirativity being Focus-sensitive.¹⁰ There were again 16 critical items (full set listed again in [Appendix A.4.1](#)), in addition to 16 fillers, which were items for another experiment not reported here.

(4.13) Sample Item Experiment 1b, Type I

A₁: Did Anne participate in the { BIKE RACE / ROWING CONTEST }?

B₁: She did but she didn't { *win a medal / make it to the finish line* }.

A₂: Did Beth participate in the bike race?

B₂: Yes, and she **might've** made it to the finish line.

(4.14) Sample Item Experiment 1b, Type II

A₁: Did Frank go to the { PROM / CHARITY GALA }?

B₁: He did but he didn't get { *a limousine / a date* }.

A₂: Did Jake go to the prom?

B₂: Yes. **Apparently** he had a date.

4.4.2 Procedure

The procedure was the same as for Experiment 1a, aside from two minor changes: (i) two additional items were included to gather pilot data following the main experiment; and (ii) the post-experiment survey now asked participants for a justification of their rating regarding a sample filler item and included an open response question to screen for bots. The experiment took about 12 minutes.

¹⁰Thanks to Seth Cable (p.c.) for pointing out this possibility.

4.4.3 Subjects

A total of 58 participants were recruited via Amazon Mechanical Turk and each received \$1.75. 10 subjects were excluded because either they failed the bot-check (two people), or more than 25% of their sentence reading times were below 500ms (nine people, two of which also failed the bot-check). An additional subject was excluded to balance the lists, chosen based on the highest number of reading times below the 500ms threshold, leaving 48 participants for data analysis.

4.4.4 Predictions

If the pattern found in Experiment 1a - ratings improved more when the low value was in an immediate super-question to the target sentence compared to the low value being an extra layer in the QUD-structure apart - was due to the linguistic antecedent of *even* becoming more salient rather than general reasoning based on world-knowledge, we expect to find no significant interaction of the kind reported for Experiment 1a. Additionally, we thus predict the interaction to be modulated by EXPERIMENT, which should result in a three-way interaction for an analysis on the combined data set of Experiment 1a and 1b.

4.4.5 Results

As in Experiment 1a, the data was trimmed based on trials containing reading times three standard deviations above the mean, which affected 7.2% of trials. (A low-end cutoff was ignored due to filler items containing a number of comparatively shorter segments such that an absolute threshold was hard to justify.)

Ratings. Mean ratings per condition are shown in Figure 4.3. Data were first analyzed using ordinal mixed effects models with a maximal random effects structure and QUD and SCALE VALUE plus their interaction as fixed effects. QUD was highly significant with IMMEDIATE conditions rated higher than REMOTE condi-

tions ($z=3.48$, $p<.001^{***}$), whereas scale value did not show a significant effect ($z=-0.42$, $p<.67$). Moreover, there was a marginally significant cross-over interaction with the *low* condition rated higher than the *high* condition when the superquestion was IMMEDIATE, but *low* rated lower than *high* in the REMOTE QUD condition ($z=-1.69$, $p<.1^{\bullet}$).¹¹

In a next step, the data were split up by item type to investigate whether the pattern was consistent for both *might've* and *apparently*. Mean ratings by condition for each subset are shown in Figure 4.5. We first ran the same analysis as employed for the total data on each subset. Whereas none of the factors reached significance for the subset containing *might've* (QUD: $z=1.64$, $p=.10$; SCALE VALUE: $z=-0.93$, $p=.35$; INTERACTION: $z=-0.92$, $p=.36$), the results for *apparently* matched those for the total data (QUD: $z=2.67$, $p<.01^{**}$; SCALE VALUE: $z=-0.48$, $p=.63$; INTERACTION: $z=-1.78$, $p<.1^{\bullet}$). We also ran an analysis on the full data set with ITEM TYPE included as a fixed effect (with a smaller model to allow convergence), showing the same pattern as the total data and the *apparently* subset, without any of the interaction terms involving ITEM TYPE reaching significance (all $p>.5$).

Finally, we combined the data from Experiments 1a and 1b and included EXPERIMENT as a fixed effect to test whether the critical interaction of QUD and SCALE VALUE was modulated by the experiment. The three-way interaction did not reach significance however ($z=-0.47$, $p=.64$), with the interaction between EXPERIMENT and SCALE VALUE being the only term involving EXPERIMENT that was significant ($z=-2.62$, $p<.01^{**}$).

Reading Times. As for Experiment 1a, we used linear mixed effects models on log-transformed reading times to analyze full sentence reading times of the target sentence. Mean reading times are shown in Figure 4.4. The only term that approached significance was SCALE VALUE with *high* conditions being read faster

¹¹The same pattern was present found for the raw data.

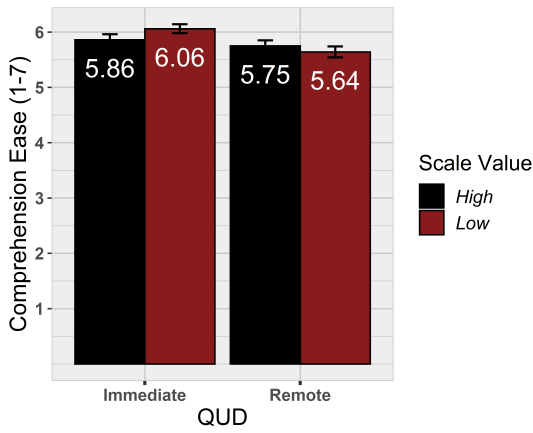


Figure 4.3: Mean ratings per condition.

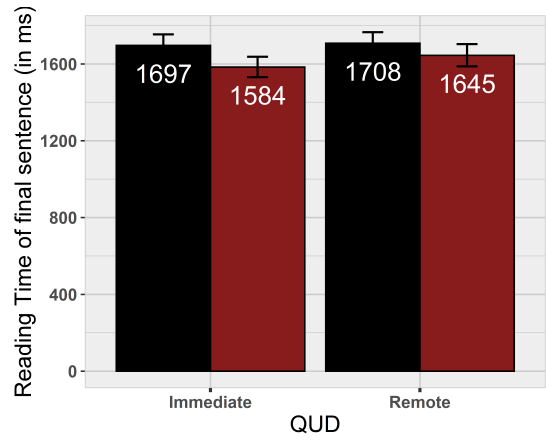


Figure 4.4: Mean RTs of target sentence per condition.

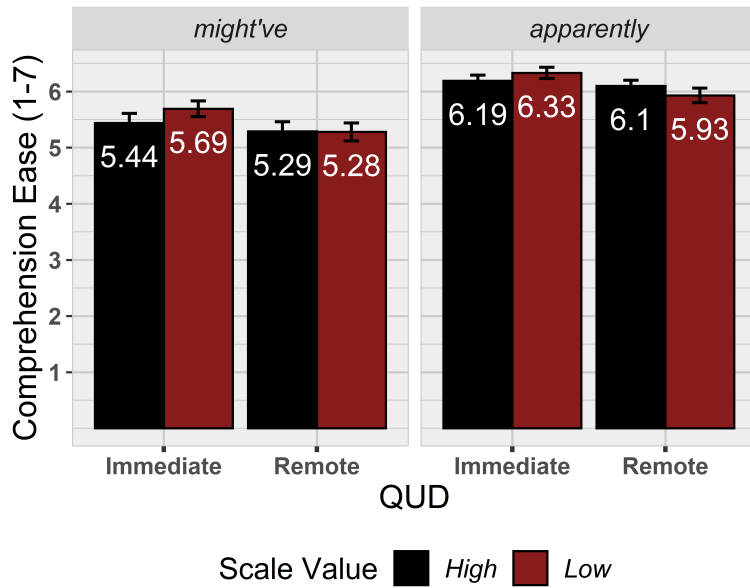


Figure 4.5: Mean ratings per condition split by Item Type.

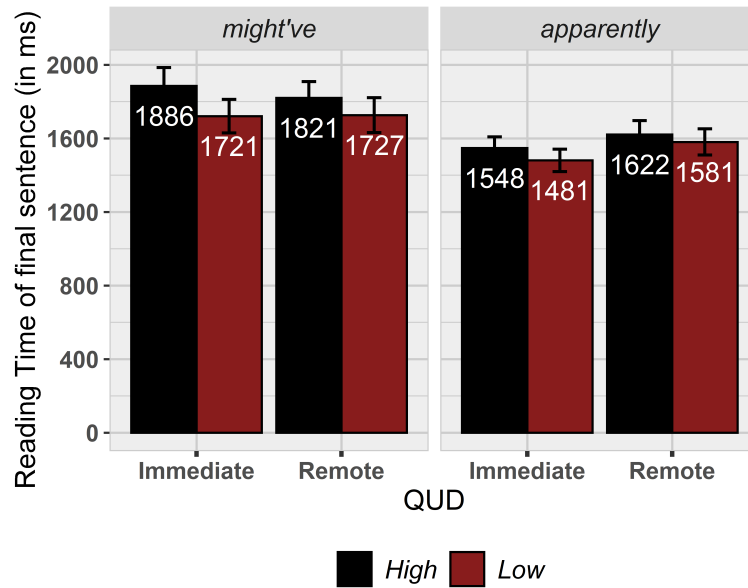


Figure 4.6: Mean RTs per condition split by Item Type.

than *low* conditions ($z=1.84$, $p<.1^*$), both QUD and the interaction were not significant ($z=-0.47$, $p=.65$; and $z=-0.08$, $p=.94$ respectively).¹²

A look at the reading times for each item type, shown in Figure 4.6, revealed that the effect of SCALE VALUE was driven by the subset containing *might've*, the corresponding term being the only significant effect for models run on both subsets ($z=2.83$, $p<.01^{**}$). However, the corresponding interaction term in a model including ITEM TYPE as fixed effect was only marginally significant, with SCALE VALUE being the only other term reaching significance ($z=2.03$, $p<.05^*$). (A model comparing Experiments 1a and 1b was left aside given that the critical interaction of Experiment 1a was only present in the rating data.)

4.4.6 Discussion

The experimental results provided tentative support for the interpretation of Experiment 1a as evidence for the Focus Presupposition Antecedent Hypothesis insofar as the pattern differed in the absence of *even*. Although we found a marginally

¹²For the raw data, SCALE VALUE was also non-significant.

significant interaction in the ratings, its underlying pattern was different from that of Experiment 1a. While the interaction in Experiment 1a was super-additive, that is, increased ratings for *low* relative to *high* values but more so for IMMEDIATE than REMOTE, Experiment 1b exhibited a cross-over interaction, with *low* (numerically) rated higher than *high* for IMMEDIATE but *high* (numerically) rated higher than *low* for REMOTE. As such, the contrast speaks in favor of attributing the pattern of Experiment 1a to the availability of *even*'s antecedent being modulated by the QUD-structure rather than general reasoning about the kinds of discourses under consideration, given we did not find the same pattern when substituting *even* with a modal auxiliary or epistemic adverb.

On the other hand, the analysis on the combined data set failed to provide evidence in favor of the critical interaction being different between the two experiments. Thus, the evidence from Experiment 1a has to remain tentative. While the pattern matched the prediction of the Focus Presupposition Antecedent Hypothesis, the evidence is not conclusive to completely rule out an alternative explanation.

The next experiment is meant to provide evidence for the FoPAH from a different paradigm that avoids the concerns raised here. Additionally, since Experiments 1a/b were only concerned with one half of the hypothesis - namely Focus-sensitive triggers requiring linguistic antecedents but without a contrast to triggers lacking Focus-sensitivity - the manipulation will include a direct comparison between a contrasting trigger-pair, namely *also* and *again*.

4.5 Experiment 2

This experiment used a different paradigm than the previous two experiments to test the prediction of the Focus Presupposition Antecedent Hypothesis that Focus-sensitive triggers should be subject to the salience of their antecedent in the discourse, whereas non Focus-sensitive triggers should not. Rather than manipulate

the QUD-structure itself and the position of the antecedent relative to it, the experiment investigated whether accessing an antecedent that is further away in the QUD-structure but governed by the same super-question would lead to difficulty for Focus-sensitive triggers but not those lacking Focus-sensitivity.

Anecdotal evidence for this prediction comes from cases like (4.15), where *too* seems degraded due to the sentence intervening between its prejacent and the antecedent sentence.

- (4.15) Crono has very strong physical attacks.
Marle's attacks are rather weak.
?[Ayla]_F is very strong **too**.

Moreover, in order to generalize to both classes of triggers, one trigger from each class was compared directly, namely *also* and *again*. This comparison is possible due to the two triggers conveying almost equivalent meanings when *also* associates with a temporal phrase, as in (4.16) (with the only difference being that *again* adds a temporal precedence relation, whereas *also* does not).

- (4.16) Lucca developed a new invention last week.
a. She **also** developed a new invention [this week]_F.
b. She developed a new invention **again** this week.

4.5.1 Materials & Design

As for previous experiments, items were set up as short question-answer pairs to make the QUD-structure explicit and fix the Focus. The response to the first question B_{1st} (henceforth *antecedent sentence*) always provided the content satisfying the presupposition of the final target sentence B_{last} , which either contained *also* or *again*. The second factor was whether there was a question-answer pair interven-

ing between the target sentence and the antecedent sentence, with (4.17a)-(4.17b) as the baseline being compared to (4.17c)-(4.17d).¹³

(4.17) Sample Item Experiment 2

a. *no intervener* + **also**

A_{1st}: Where did Amber stay when she was in LA?

B_{1st}: She stayed at a motel.

A_{last}: Where did she stay when she was in Boston?

B_{last}: She **also** stayed at a motel in Boston.

b. *no intervener* + **again**

A_{1st}: Where did Amber stay when she was in LA?

B_{1st}: She stayed at a motel.

A_{last}: Where did she stay when she was in Boston?

B_{last}: She stayed at a motel **again** in Boston.

c. *intervener* + **also**

A_{1st}: Where did Amber stay when she was in LA?

B_{1st}: She stayed at a motel.

A_{int}: Where did she stay when she was in Chicago?

B_{int}: She crashed at a friend's house.

A_{last}: Where did she stay when she was in Boston?

B_{last}: She **also** stayed at a motel in Boston.

d. *intervener* + **again**

A_{1st}: Where did Amber stay when she was in LA?

B_{1st}: She stayed at a motel.

¹³An obvious difference between *also* and *again* here lies in their syntactic position. Although this difference should not matter given it is kept constant across the QUD-conditions, one way in which it might have an indirect effect is through (implicit) prosody (see Beck 2006a on Focused *again*). However, given that materials were presented in written form, addressing this issue will be left for future research.

A_{int} : Where did she stay when she was in Chicago?

B_{int} : She crashed at a friend's house.

A_{last} : Where did she stay when she was in Boston?

B_{last} : She stayed at a motel **again** in Boston.

Notably, all questions only varied in one place, thus being dominated by the same super-question, as shown in (4.18).

(4.18) Assumed QUD Structure for Sample Item

Where did Amber stay when she was where?



Additionally, based on the intuition that the intervening material might matter, there was an informal and exploratory between-item manipulation based on how much the intervening material contrasted with the antecedent sentence. Contrast was assessed based on intuition rather than formally defined. For example, the intervener in (4.19) implicitly negates that Derek visited anyone rather than contrast with respect to who he visited, whereas the sample item in (4.17) merely contrasts with respect to the manner of Amber's lodging.

(4.19) Sample of Contrasting Item

$A_{1\text{st}}$: What did Derek do on Thanksgiving?

$B_{1\text{st}}$: He visited his parents in Idaho.

(A_{int}) : What did he do for Christmas?

B_{int} : He stayed home because his flight got cancelled.)

A_{last} : What did he do for Easter?

B_{last} : He (**also**) visited his parents (**again**) for Easter.

There were 16 critical items, evenly split with respect to contrast (full list accessible in [Appendix A.4.2](#)), in addition to 12 filler items, which varied the presence or absence of other presuppositional expressions and served as catch trials, in addition to some exploratory factors.

4.5.2 Procedure

The procedure was essentially the same as for Experiments 1a/b in that participants read each dialogue in a self-paced fashion one utterance at a time, followed by a rating screen. However, there was no additional post-experiment survey or debriefing screen included this time. The experiment took about 10 minutes.

4.5.3 Subjects

A total of 52 subjects was recruited from Amazon Mechanical Turk and compensated with \$1.50 each. 17 subjects were excluded because they either rated fillers containing a presupposition failure on average better than the non-presuppositional control (15 people), or more than 25% of their sentence reading times were below 500ms (two people), which left 35 participants for data analysis.

4.5.4 Predictions

The Focus Presupposition Antecedent Hypothesis predicted that adding intervening material between the target sentence and the antecedent sentence should incur processing difficulty for *also*, since the antecedent is no longer the most salient proposition available within the super-question, but not for *again*. If *again* only requires its presupposition to be entailed by the Common Ground, it should not matter where the sentence satisfying the presupposition is located in the discourse. We thus predict an interaction between INTERVENER and TRIGGER.

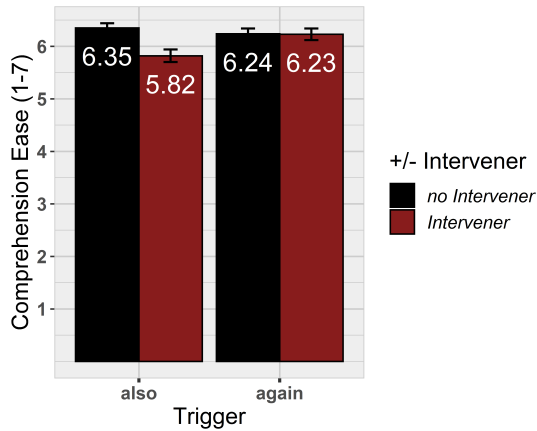


Figure 4.7: Mean ratings per condition.

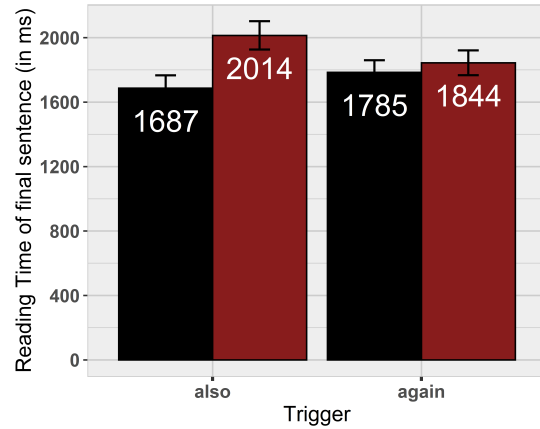


Figure 4.8: Mean RTs of target sentence per condition.

4.5.5 Results

As in previous experiments, data was trimmed such that trials with at least one reading time three standard deviations above the mean were excluded (6.2% of total trials).

Ratings. Mean ratings per condition are shown in Figure 4.7. An ordinal mixed effects model indicated a significant effect of INTERVENER with the presence of intervening material decreasing ratings ($z=-3.04$, $p<.01^{**}$) and no effect of TRIGGER ($z=-1.54$, $p=.12$). Moreover, there was a significant interaction such that intervening material led to a decrease for *also* but not *again* ($z=-2.47$, $p<.05^{*}$).¹⁴

An additional model included CONTRAST as a between-item factor to assess whether the intuition that the extent to which the intervener contrasts with the antecedent sentence, discussed with respect to (4.19), is supported by the data. The mean ratings split by this factor are shown in Figure 4.9. There was a numerical trend in the expected direction such that the decrease for *also* was larger for items that had a strong contrast, but the crucial three-way interaction was not significant ($z=-0.41$, $p=.68$). The only significant effects were INTERVENER ($z=-2.97$, $p<.01^{**}$) and the interaction between INTERVENER and TRIGGER ($z=-2.98$, $p<.01^{**}$), as in the

¹⁴The same qualitative pattern was found for the raw data.

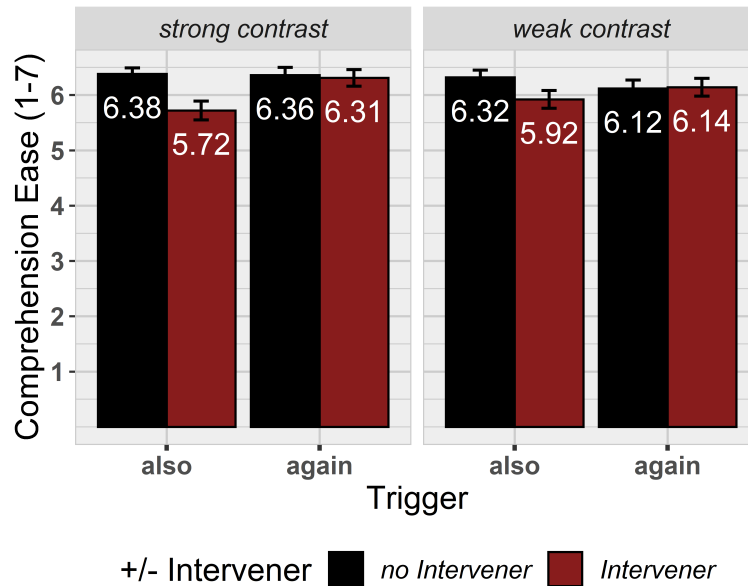


Figure 4.9: Mean ratings per condition split by Item Type.

original model. Given this null result, CONTRAST will not be discussed further.

Reading Times. Full sentence reading times of the target utterance were log-transformed and analyzed using linear mixed effects models. Means per condition are given in Figure 4.8. The results matched those of the ratings: there was a significant effect of INTERVENER with longer reading times when intervening material was present ($t=2.9$, $p<.01^{**}$), no effect of TRIGGER ($t=0.05$, $p=.96$), and a significant interaction such that reading times increased with intervening material for *also* but not *again* ($t=2.66$, $p<.05^{*}$).¹⁵

4.5.6 Discussion

The results of the experiment supported the Focus Presupposition Antecedent Hypothesis both in ratings and full sentence reading times. For *also*, when there was intervening material between the target sentence and the antecedent sentence, there was a decrease in ratings as well as an increase in reading times indicative of a processing cost. On the view advocated here, this processing cost arises due

¹⁵The same qualitative pattern was again found for the raw data.

to *also* trying to access a linguistic antecedent in the discourse that satisfies its presupposition, but the antecedent being less salient in the INTERVENER condition.

Notably, the notion of salience involved here depends on the QUD-structure. The reason intervening material causes difficulty is because it is part of the same super-question as the antecedent sentence and the target sentence. However, the pattern found here could also be accounted for by a simple recency effect, in that *also* requires its antecedent to be in the immediately preceding sentence.

While the experimental data here does not distinguish between these possibilities, the results reported in Kim (2015) discussed earlier point toward an important role of the QUD-structure for determining alternatives to *also*. Moreover, there is anecdotal evidence against a strict recency restriction from the corpus example in (4.20), where the antecedent of *also* is located several sentences prior to its prejacent (both underlined).

(4.20) You know, before I came here, I had been in a cage. It was a nice cage;
I can't complain. Being in Russia in the 1970s and 1980s was great. But
of course I wanted to breathe the air of the free world. Everything I
recorded up to Radio Silence was basically a bridge between Russia and
the West. When I got to the West, I felt the need to build a bridge back. A
lot of people are arguing right now that contemporary Russia is also a
cage, comparing it to the Soviet times. (COCA)

A potential way to follow-up on this issue properly would be to manipulate where intervening material occurred relative to the QUD-structure, as in (4.21). While the intervener in (4.21a) occurs within the same super-question as before, the intervening question-answer pair in (4.21b) is one level removed from the target in that the super-question is no longer “*Where did Amber stay when she was where?*” but “*Who stayed where when they were where?*”. This change should render the intervener less

salient and decrease the observed penalty. I will have to leave an investigation of this sort for future research however.

(4.21) a. *local intervener*

A_{1st} : Where did Amber stay when she was in LA?

B_{1st} : She stayed at a motel.

A_{int} : *Where did she stay when she was in Chicago?*

B_{int} : *She crashed at a friend's house.*

A_{last} : Where did she stay when she was in Boston?

B_{last} : She **also** stayed at a motel in Boston.

b. *non-local intervener*

A_{1st} : Where did Amber stay when she was in LA?

B_{1st} : She stayed at a motel.

A_{int} : *Where did Beth stay when she was in LA?*

B_{int} : *She crashed at a friend's house.*

A_{last} : Where did Amber stay when she was in Boston?

B_{last} : She **also** stayed at a motel in Boston.

Assuming that the QUD does in fact matter for *also* specifically and other Focus-sensitive triggers more generally, a deeper question is where this relation should come from. On the view adopted here, Focus invokes a set of propositions such that what *also* is looking for is a matching proposition within this set. In the cases considered here where all utterances are governed by a larger super-question, the intervening material will consequently be a subset of that super-question together with the antecedent sentence and the target sentence, thus creating interference. In contrast, if the intervening material is not part of the same super-question, as in (4.21b), it is not part of the relevant set of alternatives and does not lead to (as much) interference. This view might serve as a starting point for fleshing out a

retrieval mechanism underlying the processing of Focus-sensitive expressions in discourse that is able to account for more fine-grained properties of the sentences the discourse is comprised of.

Turning to *again*, there was no effect of intervening material on ratings or reading times. The lack of a difference is predicted by the hypothesis that *again* requires its presupposition to be entailed by the Common Ground. The results consequently also provide evidence for a particular notion of the Common Ground, namely one where it lacks the internal structure to keep track of the order of propositions with which it gets updated.

However, this view should not be taken to claim that the extent to which material within the Common Ground becomes uniform is infinite such that *again* would behave the same when checked against a two-sentence discourse or at the end of a two-hundred page novel. The claim is merely that checking whether the presupposition of *again* is satisfied is analogous to assessing the truth of an utterance without a presupposition trigger.

One further prediction that this view makes is that the presupposition of *again* and other triggers like it should show the same memory retrieval pattern like noticing a contradiction. That is, when a sentence without any presupposition triggers is asserted as a proposal to update the Common Ground with its propositional content, its truth-value has to be evaluated relative to the Common Ground at the time of utterance. This process is tantamount to checking whether a given presupposition is true in the Common Ground. To illustrate this with an example, consider the discourse in (4.22):

(4.22) *Context: Crono never spoke to Ayla during the whole time they knew each other.*

(Intervening material: They had met each other when Crono was thrown into a time gate that brought him back to a pre-historic age. Together, they defeated the Reptites, and eventually Lavos, which was about to destroy the world.)

- a. Crono spoke to Ayla yesterday.
- b. Crono didn't speak to Ayla **again** yesterday.

The statement in (4.22a) contradicts what was stated previously in the context sentence so in order to recognize that the statement constitutes a contradiction it becomes necessary to access the content of the Common Ground (see O'Brien & Albrecht 1992; Albrecht & O'Brien 1993 and subsequent work for similar designs; more on these studies in Chapter 6). This situation is thus equivalent to what is necessary for evaluating the (falsity of the) presupposition in (4.22b). The effect intervening material might have on this process is therefore predicted to be the same. However, this prediction should not be taken to mean that processing the presupposition in (4.22b) is the same as the assertion in (4.22a), but that the way they relate to the context and access the Common Ground should be.

Lastly, it is worth emphasizing that the observed contrast between *also* and *again* is unique with respect to the previous classifications of presupposition triggers reviewed in Section 2.4. *Also(/too)* and *again* are grouped together according to Abusch's (2010) soft-hard distinction, Zehr & Schwarz's (2018b) experimental results on the entailing vs non-entailing distinction, Cummins et al.'s (2013) results on backgrounding of lexical vs resolution triggers, Kripke's (2009) judgments on global accommodation difficulty and Beck's (2007) notion of anaphoricity, and Bade's (2016) obligatoriness mechanism. The present results thus constitute a novel finding by virtue of highlighting a property with respect to *also* and *again* differ. A

broader discussion of implications for the typology of presupposition triggers, as well as issues regarding the underlying processing mechanism and the nature of the Common Ground discussed above, will be provided in Chapter 6.

4.6 Chapter Summary

This chapter presented three offline dialogue rating experiments to test the prediction of the Focus Presupposition Antecedent Hypothesis (FoPAH) that Focus-sensitive triggers should be subject to the salience of their antecedent, whereas triggers lacking Focus-sensitivity should be indifferent to the salience of the content satisfying their presupposition by virtue of being Common Ground entailments. Salience was operationalized through the QUD.

The first two experiments tested whether the position of an antecedent licensing an otherwise degraded use of *even* in the QUD-structure would affect its accessibility. This prediction was borne out in Experiment 1a insofar as ratings improved more when the utterance containing the intended antecedent and the utterance containing *even* were responses to questions forming an immediate superquestion than when the questions were an additional layer apart.

In order to assess an alternative explanation for the results in terms of general world-knowledge reasoning, Experiment 1b used the same design and items but replaced *even* with either the modal auxiliary *might've* or the epistemic adverb *apparently*. While this change yielded a slightly different pattern of results, there was no evidence that the critical interaction differed across experiments. The evidence from Experiment 1a in favor of the FoPAH therefore has to be considered tentative insofar as the design was not able to fully exclude an alternative explanation.

Experiment 2 used a different paradigm, comparing *also* and *again* with respect to their sensitivity to material intervening between the utterance satisfying their presupposition and the prejacent. Crucially, the intervening material was part of

the same super-question as the utterance satisfying the presupposition and the pre-jacent. While the intervener led to a decrease in ratings and longer reading times for *also*, there was no such effect for *again*. This result provides evidence for the hypothesized contrast between presupposition triggers with respect to their Focus-sensitivity and the resulting difference in their representations.

To conclude, the experimental results presented in this chapter provided support for the Focus Presupposition Antecedent Hypothesis and contributed novel evidence for a distinction between presupposition triggers in terms of Focus-sensitivity. However, the evidence thus far has been restricted to a small set of triggers, and offline dialogue rating studies (including full sentence reading times). One goal of the next chapter will therefore be to find evidence that warrants a generalization to a broader set of triggers, in addition to investigating the online processing properties of the distinction made.

CHAPTER 5

ACCOMMODATION

5.1 Introduction

This chapter tests the second prediction of the Focus Presupposition Antecedent Hypothesis (FoPAH), repeated in (5.1), which draws a distinction between presupposition triggers based on their (lack of) Focus-sensitivity in terms of the representations they are grounded in, either requiring a linguistic antecedent in the discourse model or being entailed by the Common Ground. The prediction is concerned with the extent to which the two classes of presupposition triggers can be used felicitously when their presupposition is not satisfied in the context, that is, can be globally accommodated.

(5.1) Focus Presupposition Antecedent Hypothesis (FoPAH)

Focus-sensitive presupposition triggers require a linguistic antecedent in the discourse model, whereas triggers lacking Focus-sensitivity merely require their presupposition to be entailed by the Common Ground.

As discussed in Section 2.2, the notion of accommodation is an essential component of a theory of speaker presuppositions, according to (Stalnaker, 1998, 2002, 2014). If a speaker presupposes something that is not part of the Common Ground

prior to her utterance, the hearer can decide to accept the presupposition, assuming it is fully specified and uncontroversial, thereby avoiding a violation that would result in an infelicitous discourse. That is, accommodation is governed by cooperative principles of language use in line with those proposed by Grice (1989). This process has been coined *Presupposition Accommodation*¹ by Lewis (1979), see (5.2).

(5.2) Rule for Accommodation of Presupposition

If at time *t* something is said that requires presupposition *P* to be acceptable, and if *P* is not presupposed right before *t*, then – ceteris paribus and within certain limits – presupposition *P* comes into existence at *t*.

Part of the theoretical significance of accommodation is that whether the contextual requirements that a presupposition is supposed to embody are met or not does not have a strict one-to-one mapping to whether its use is felicitous. Despite this significance, the factors governing the noted variability regarding when a presupposition can be accommodated or not are not well understood. Aside from factors like controversiality/plausibility (Beaver & Zeevat, 2007), it has been observed that the kind of presupposition trigger plays a crucial part for the extent to which accommodation is available (Kripke, 2009), as discussed in Section 2.4. However, this trigger variation has not been systematically investigated. The FoPAH predicts that at least some differences between triggers can be accounted for by appealing to Focus-sensitivity, by virtue of the difference in underlying representations this property is hypothesized to correspond to.

Triggers lacking Focus-sensitivity are taken to be Common Ground entailments

¹The notion of accommodation in a semi-technical use has been applied to a variety of phenomena in linguistics and psycholinguistics such as perspective or - as seen in Section 3.4 - QUDs, the former of which is also discussed by Lewis. While there are clear commonalities among these different uses of the term, there may also be differences that make the risk of an equivocation likely. To avoid this issue, I will implicitly restrict the notion of accommodation used here to presuppositions, describing situations where a presupposition is not explicitly satisfied in the context.

and thus predicted to behave according to [Stalnaker's](#) theory. Crucially, on his view, accommodation is not a repair process in a strict sense but part of the way people communicate. Consequently, accommodating a trigger that is not Focus-sensitive is predicted to be easy.

In contrast, if a trigger is Focus-sensitive, the presupposition is hypothesized to require a linguistic antecedent in the discourse model, which is assumed to not be subject to Gricean principles. Rather, if parts of the discourse model are missing, they need to be supplemented, that is, the model needs to be repaired, incurring a cost. This process could thus be described more aptly as *supplementation* rather than accommodation in the sense used so far. The next section discusses formal theoretical and experimental research on accommodation, some of which was already mentioned in [Sections 2.4 and 2.5](#), with a specific emphasis on evidence regarding differences among triggers.

5.2 Previous research

[Kripke \(2009\)](#) was among the first to note that the extent to which presupposition triggers can be used felicitously in contexts in which their presupposition is not satisfied (i.e. can be accommodated) varies with the type of trigger under consideration. Triggers like *too* ([5.3a](#)), *either* ([5.3b](#)), *again* ([5.3c](#)) and *it*-clefts ([5.3d](#)) are judged to be infelicitous when their presupposition is not present in what [Kripke](#) calls the "active context", in contrast to *stop* ([5.3e](#)).

- (5.3) a. #SAM is having dinner in New York tonight, **too**. (KRIPKE 2009, (14))
b. #SAM is not having dinner in New York tonight, **either**. (IBID., (34))
c. #Priscilla is eating supper, **again**. (IBID., (15))
d. #**It was** JOHN who solved the projection problem. (IBID., (25))
e. Jill has **stopped** smoking. (IBID., (24))

Kripke attributes this difference to triggers of the former class including an anaphoric element, using pronouns as an analogue (see Heim 1992; van der Sandt & Geurts 2001 for an analysis of *too* in this vein). Notably, with the exception of *again*, all hard-to-accommodate triggers are Focus-sensitive (*too*, *either*) or involve Focus in some other way (*it*-clefts), in line with the prediction of our hypothesis.

A more elaborate - and slightly diverging - list of triggers is discussed in Beaver & Zeevat (2007). Here, the class of hard-to-accommodate triggers consists of demonstratives (*that*), pronouns (*she*, *it*), short definite descriptions, names, *another*, *too*, *indeed*, politeness markers such as the French *tu*, and intonational Focus, in contrast to long definite descriptions (*the author of Waverley*), long names (*Peter Fleming*), factives (*realize*, *regret*), implicatives (*manage*), verbs of judging (*accuse*, *praise for*), aspectual verbs (*stop*, *continue*), sortal restrictions (*bachelorette*), clefts (!), and pseudo-clefts.

Beaver & Zeevat furthermore discuss - and discard - two potential explanations for these differences. The first proposes that triggers that are not sufficiently descriptively rich are hard to accommodate.² This view is argued to fall short in cases like *too*, which - taking (5.3a) as an example - can presuppose an elaborate and specific scenario such as having dinner in New York. The second proposal is that triggers are hard to accommodate if they have a simple lexical alternative without a presupposition. The counterexample Beaver & Zeevat note here is that implicatives such as *manage* are easily accommodated but possess non-presuppositional alternatives. As an alternative proposal, Beaver & Zeevat suggest that accommodation difficulty is determined via the extent to which a trigger appeals to content in the discourse record such as the entities that are salient to the discourse partici-

²Although this idea at first glance seems similar to Aravind's (2018) notion of identifiability, the two are in fact quite distinct. On my interpretation of Aravind (2018), a trigger like *too* may be hard to accommodate because in the absence of an alternative in the discourse, its presupposition cannot be identified. However, it is unclear to me how this might differ from the notion of anaphoricity also mentioned there such that I will not discuss it any further.

pants, which is in fact close to the idea investigated here (see also von Fintel 2000, 2008).

Independently of the noted trigger differences, accommodation is known to be subject to the extent to which what is presupposed is controversial or noteworthy. Part of what renders the presupposition that the speaker owns a cat in Stalnaker's (1998) example in (5.4a) easy to accommodate is that owning a cat is not anything uncommon. In contrast, uttering (5.4b) instead - without the presupposition that the speaker owns a sloth being part of the Common Ground - is much more likely to cause confusion.

(5.4) a. I can't come to the meeting - I have to pick up **my cat** at the veterinarian.

(STALNAKER 1998, (1))

b. I can't come to the meeting - I have to pick up **my sloth** at the veterinarian.

In addition to formal theoretical work, there have been a few offline experiments providing qualitative evidence regarding differences among triggers with respect to accommodation difficulty. One acceptability judgment study - combined with a self-paced reading study which will be discussed in more detail below - comparing a broad range of triggers in German is reported in Tiemann et al. (2011) (see also Tiemann 2014, Ch. 3). The set of triggers was comprised of *too*, *again*, *stop*, *know* and possessives, which were tested in three kinds of contexts. A *positive* context in which the presupposition is satisfied (5.5a), one in which the presupposition is negated (5.5b), and one that is neutral with respect to the presupposition (5.5c). Tiemann reports positive contexts being rated higher than neutral contexts, which are in turn rated higher than negative contexts, for all trigger types with the exception of possessives (which is attributed to items mixing existence violations -

which behave like other triggers - with uniqueness violations - which do not).

(5.5) Tiemann (2014), Exp 2, Sample Item for *again*

- a. *Positive*: Susanne had bought red gloves before.
- b. *Negative*: Susanne had never bought red gloves until now.
- c. *Neutral*: Inge had never bought red gloves until now.

TARGET: Today, Susanne bought red gloves **again** and put them on right away.

Although differences between triggers were not statistically evaluated, numerical trends showed that the decrease from positive to neutral contexts - which we might take as the relevant contrast to measure accommodation difficulty - was largest for *too*, in line with our prediction. However, taken at face value, the results would also suggest that all triggers show a reasonable amount of accommodation difficulty, contrary to what has been argued for instance for *know*. One reason for *not* taking the results at face value in this regard is a concern about the acceptability of the neutral conditions in the absence of a presupposition trigger. Consider the neutral condition in the example (5.5c) above, which contains an unmotivated topic shift from *Inge* to *Susanne* independently of the presupposition trigger. The extent to which the neutral condition provides the necessary baseline to compare the positive case against is therefore questionable.

Another set of rating studies comes from Grubic & Wierzba (2019), who investigated possessives and additives. Their main objective was to test whether the claimed accommodation difficulty of additives was due to its presupposition requiring a salient individual or a salient proposition. Grubic & Wierzba used three types of contexts: a positive context, which provided a salient proposition (thus entailing a salient individual) as well as implied the possession relation presupposed by the possessive (5.6a), a neutral context, which did not satisfy any possible pre-

supposition (5.6b), and a mixed context, which provided an individual but not a proposition, nor was the possession relation made explicit (5.6c). Each type of context was then paired with one target sentence for each trigger.

- (5.6) a. *Positive*: Hannes met his new classmate Isa. He wears glasses, and is sometimes teased because of them. She seemed very likeable...
- b. *Neutral*: Yesterday, there was a new student in class. She seemed very likeable...
- c. *Mixed*: Hannes met his new classmate Isa. She seemed very likeable...
POSSESSIVE TARGET: ...because she complimented **his glasses**.
ADDITIVE TARGET: ...because she wears glasses, **too**.

Regarding possessives, accommodating the possession relation led to no discernible decrease, whereas accommodating a referent did, in line with reported judgments. In contrast, in their first experiment, additives did not show any accommodation difficulty in either the mixed or the neutral condition, despite the assumed knowledge that additives are hard to accommodate (see also [Gotzner 2019](#) for similar results).

To address this unexpected finding, a second experiment manipulated whether the presupposition was essential for the coherence of the discourse or not as an additional between-item factor.³ An example of each discourse-type in the crucial mixed condition is shown in (5.7). To illustrate the facilitating condition for the additive continuation in (5.7a), the intended presupposition - *someone other than Alfred (namely his new colleague) has ambitions to become the boss* - explains why Alfred and the new colleague would be rivals now. In contrast, the presupposition in the non-facilitating discourse in (5.7b) does not contribute to the coherence of the

³The full design - in addition to a non-facilitating condition and a facilitating coherence condition - also included a condition in which the individual satisfying the presupposition in the discourse constituted the perspective center, which will be put aside here for reasons of space.

discourse in any crucial way.

(5.7) a. Facilitating

Mixed: Alfred liked his new colleague when she started. Now they are rivals ...

POSSESSIVE TARGET: ...because he wants to thwart **her ambitions to become the boss.**"

ADDITIVE TARGET: ...because he has ambitions to become the boss, **too.**

b. Non-facilitating

Mixed: Paula is going on a winter excursion with her son today. She is taking care to stay on snow-covered paths, ...

POSSESSIVE TARGET: ...so that **his sled** does not get scratched.

ADDITIVE TARGET: ...because she has a sled, **too.**

The results showed that non-facilitating discourses yielded the pattern expected in light of the literature, with additives being significantly decreased for both the mixed and the neutral condition relative to the positive condition. Interestingly, in contexts where accommodating the presupposition contributed to the coherence of the discourse, ratings were overall improved, but particularly for the mixed condition such that it was no longer distinguishable from the positive condition. These results thus show that the relation of the presupposition to the discourse can play an important role with respect to accommodation. Grubic & Wierzba attribute this finding to the presupposition being easier identifiable when relevant for the coherence of the discourse.⁴

What about processing evidence on the characterization of accommodation as

⁴An alternative idea might be that the presupposition became relevant to the QUD of the discourses, rendering it at-issue, which might facilitate accommodation.

a costly process? An early study investigating the processing of presuppositions in different contexts comes from [Haviland & Clark \(1974\)](#), who measured full sentence reading times of sentences containing a presupposition trigger following a context sentence, as in (5.8).

(5.8) Haviland & Clark (1974), Exp 1 & 2, Sample Item

- a. *Direct Antecedent*: Ed was given an alligator for his birthday.
- b. *Indirect Antecedent, Exp 1*: Ed was given lots of things for his birthday.
- c. *Indirect Antecedent, Exp 2*: Ed wanted an alligator for his birthday.

TARGET: **The alligator** was his favorite present.

Their Experiments 1 and 2 focused on the existence presupposition of singular definite NPs. For both experiments, one condition contained a context sentence that satisfied the presupposition by introducing the required referent via an indefinite NP, as in (5.8a). The other condition either provided a supportive context without explicitly introducing a referent (5.8b), or embedded the indefinite under a modal verb (5.8c). In both experiments, reading times in the Indirect Antecedent condition was longer than in the Direct Antecedent condition.

In their Experiment 3, [Haviland & Clark](#) extended their investigation to the presuppositions of *still*, *either*, *again* and *too*. In addition to the Direct Antecedent condition and an Indirect Antecedent condition similar to (5.8b), a third condition masked the relevant presupposition with negation to add an extra inferential step. The different contexts are illustrated for *again* in (5.9). Both the Indirect Antecedent and the Negative Antecedent condition took longer than the Direct Antecedent condition for all triggers, without a significant difference between the former two (with the exception of *either*, which showed longer reading times for the Indirect Antecedent condition).

(5.9) Haviland & Clark (1974), Exp 3, Sample Item

- a. *Direct Antecedent*: Last Christmas Eugene became absolutely smashed.
- b. *Indirect Antecedent*: Last Christmas Eugene went to a lot of parties
- c. *Indirect Antecedent*: Last Christmas Eugene couldn't stay sober.

TARGET: This Christmas he got very drunk **again**.

In order to interpret the results by Haviland & Clark (1974) with respect to accommodation difficulty, it is worth highlighting differences between the context manipulation here and for instance that by Tiemann (2014) discussed earlier. While both the Positive condition in (5.5a) and the Direct Antecedent condition in (5.8a)-(5.9a) are comparable by virtue of explicitly satisfying the relevant presupposition, their respective critical conditions differed in whether - as the condition labels suggest - the context was neutral and did not bear on whether the presupposition might be satisfied (5.5c), or whether it provided some indirect support without making the presupposition explicit, see (5.8b)-(5.8c) and (5.9b)-(5.9c) respectively.

Although both Neutral contexts and Indirect Antecedent contexts can be viewed as involving accommodation insofar as the presupposition is not explicitly satisfied, it is worthwhile distinguishing between instances of accommodation proper as those exemplified by Tiemann's Neutral context, and so-called *bridging* inferences (Clark 1977, see Irmer 2009 for a recent discussion) where the context provides some kind of indirect support for the presupposition as a sub-class of accommodation.⁵

Drawing this distinction is motivated by the fact that the underlying mechanisms for accommodation proper and for bridging may in fact be quite different given the distinction between presupposition triggers in terms of their underlying

⁵Bridging inferences have been studied particularly in the context of definite descriptions, as in Haviland & Clark's first two experiments (see also Burkhardt 2006 for evidence from EEGs), which are less central to this thesis such that I will not go into too much detail here.

representations proposed here. That is, if accommodation proper is difficult for Focus-sensitive triggers because it requires supplementing a missing antecedent in the discourse model, material in the discourse model that may help with constructing such an antecedent may benefit Focus-sensitive triggers more than triggers lacking Focus-sensitivity, which already rely on cooperative principles rather than the discourse model. Put differently, "neutral" contexts for bridging are not entirely neutral in that the information that is available in the discourse offers auxiliary albeit incomplete information rather than the discourse model being empty. Haviland & Clark's results should thus be viewed as providing evidence for a processing cost of bridging inferences rather than accommodation proper, with the current discussion being primarily concerned with the latter.

One of the first studies on the processing of accommodation proper manipulating within-sentence material rather than the context comes from Schwarz (2007). In his Experiment 1, participants read two types of stimuli with relative clauses in German that were ambiguous due to case marking. For example, the sentence in (5.10) can be interpreted as the woman seeing the girl or the girl seeing the woman. However, it is only the latter interpretation that would satisfy the presupposition of *auch* ('also') - which was compared to a non-presuppositional alternative, here *vorher* ('before') - in this case, but German has been shown to have a strong parsing preference against this object relative clause interpretation. An additional manipulation included items where it was the main clause that was ambiguous rather than the relative clause. Participants then had to indicate their interpretation via a questionnaire.

- (5.10) Die Frau, die das Mädchen sah, hatte { **auch** / vorher } der
 The woman_{N/A} who_{N/A} the girl_{N/A} saw had also before the
 Mann gesehen.
 man_N seen
 ‘The woman that (saw the girl/the girl saw) had {**also**/before} been seen
 by the man.’

The results indicated a higher proportion of object relative clause interpretations when *auch* was present compared to the non-presuppositional control. This finding suggests that participants rather violate their parsing preferences than not accommodate a presupposition, or, viewed differently, that the pressure to accommodate was able to override the parsing preference. Moreover, this effect of *auch* was stronger when the ambiguity was triggered by case marking in the relative clause than when it was triggered in the matrix clause, suggesting that pragmatic/semantic and syntactic factors were in fact interacting with each other rather than functioning separately.

Experiments 2 and 3 tested the online effects of presupposition satisfaction in a chunked self-paced reading paradigm in German and English. For ease of exposition, I focus on the English experiment here. Participants again read sentences with relative clauses that were either subject or object relative clauses, as in (5.11), only one of which would satisfy the presupposition of *auch* following the relative clause, again with a non-presuppositional control.

- (5.11) Schwarz (2007), Exp 3, Sample Item
 The congressman / who { wrote to John / John wrote to } / had { **also** /
 just } written to the mayor/ to schedule a meeting/ for the fundraiser.

Reading times were significantly slower in the region containing the trigger when

the presupposition was not satisfied compared to when it was, which was not the case for the control items, both for English and for German. Thus, Schwarz' results suggest that presuppositions are evaluated online, impacting reading times when a presupposition is not satisfied. However, the tested regions were quite large such that there was no way to tell at what point the unsatisfied presupposition had its impact.

Tiemann et al. (2015) (see also Tiemann 2014, Ch. 2) extends these findings to another trigger, namely the iterative particle *wieder* ('again') in German, in a word-by-word self-paced reading, which allows more fine-grained resolution of the unfolding of interpretation over time, in combination with a simultaneous acceptability rating task. She compared the effect of *wieder* in a context that satisfied its presupposition with a neutral context that neither satisfies nor falsifies it, as encountered earlier. In the sample item shown in (5.12)⁶ this contrast was achieved by varying the subject of the target sentence.

(5.12) Tiemann (2014), Exp 1, Sample Item

Context: Last week, Linda bought Judith a pink lamp for a room.

TARGET: Two days ago, { Linda / Judith } received a pink lamp **again**, when she was out with a friend.

Neutral contexts were correlated with significantly lower ratings, as well as slower reading times on the critical word which indicated the point when the presupposition associated with the trigger was fully specified (i.e. the end of the clause). These results suggest that online effects of presuppositions are not restricted to additive particles, and also that they arise as soon as the presupposition can be identified.

For more self-paced reading data, we can now come back to the Tiemann et al. (2011) study, the rating results of which were reviewed above (see also (Tiemann,

⁶In the original German, *again* preceded the object.

2014, Ch. 3) for a more elaborate discussion). As a reminder, this experiment tested *too*, *again*, *stop*, *know* and possessives in German, comparing each trigger across a positive and a neutral context - as in Tiemann et al.'s (2015) study right above - as well as a negative context in which the presupposition was explicitly negated (see (5.5) above for a sample item).

Negative contexts turned out to be read fastest for almost all triggers, which Tiemann attributes to the explicitness of the status of the presupposition allowing the parser to sidestep additional processing. For *know* and the possessive, there was an early but not lasting increase in reading times in the neutral contexts compared to the positive contexts. Similar effects were found for *again* on the trigger and *too* on the critical word. For *too*, there were furthermore slower reading times on the word following the trigger (and one before the critical word) in positive contexts. Finally, *stop* displayed *faster* reading times on the critical word in the neutral context. This variation among triggers with respect to when they show signs of accommodation difficulty, if at all, further emphasizes the need to take multiple factors into account when it comes to developing a theory of presupposition accommodation.

Additional evidence for accommodation happening rapidly comes from two experiments by Singh et al. (2016) using the stops-making-sense task. In their Experiment 1, they compared singular indefinites to definites in contexts that made the existence presupposition of the definite either plausible or implausible (5.13a). Acceptance rates in implausible contexts decreased as soon as the target word was encountered for both indefinites and definites, but marginally more so for definites. The same paradigm was used to investigate the presupposition of *too* in their Experiment 2, see (5.13b), again showing an effect of implausibility and a - this time fully significant - larger decrease for *too* relative to a control.

(5.13) Singh et al. (2016), Exp 1 & 2, Sample Items

- a. Bill went to { a club / the circus } on Friday night.
 { A / **The** } bouncer argued with him there for a while.
- b. John will go to { the pool / the mall } this morning.
 Peter will go swimming { tomorrow / **too** } after he gets back from school.

One last study investigating the online processing of accommodation is Clifton (2013) investigating definites. Similar to Singh et al. (2016), Clifton compared definites to indefinites in one kind of context that rendered the uniqueness presupposition plausible, i.e. *kitchen* in (5.14), but made sure the other context went the opposite way by making plausible the existence of multiple entities such that the indefinite would be felicitous.

(5.14) Clifton (2013), Sample Item

In the { kitchen / appliance store }, Jason checked out { a / the } stove very carefully.

In addition to providing further evidence that a cost for accommodation can be detected rapidly, using both self-paced reading and eye-tracking while reading, this study is noteworthy in that it does not only speak to the question of whether accommodation is an online process but also under what circumstances it is: for both methodologies, a processing cost was only detected when the experiment included a secondary math task to tax working memory. This finding thus suggests that accommodation may require deeper processing, potentially due to its inherent connection to the discourse.

Finally, evidence from acquisition comes from Aravind (2018), investigating the extent to which children take presuppositions to be part of the shared context. In

two experiments investigating singular definites and *too* respectively, children listened to a story featuring three characters, with only one character sharing privileged knowledge with the main character, as illustrated in (5.15) for the definite.

(5.15) Aravind (2018), Exp 1B, Sample Item, Target Condition

Susie, Jane and Mike were hanging out together. But Jane had to go and run some errands so she left. Then it was just Susie and Mike. The two of them decided to go to an animal shelter. At the shelter, Mike got himself a pet bird. Then, Susie decided to go home. After she left, the bird flew right out of its cage! Later, Mike was on the phone with one of the girls and he said, "Guess what, **the bird** that I got flew away!"

The task was to guess which character the main character is talking to, the idea being that if presuppositional content is being treated as shared knowledge rather than conveying new information, participants should choose the knowledgeable character, in this case Susie. Children were at ceiling and did not differ from an adult control group with respect to the success rate at guessing the knowledgeable character, indicating that children are aware of presuppositions being used to indicate shared knowledge.

Additionally, another experiment tested the extent to which children are able or willing to accommodate a presupposition by pitting accommodation against the desire to make an utterance not redundant. To illustrate this design with the sample item in (5.16) (parts overlapping with (5.15) in parenthesis), the target sentence containing the definite either requires its presupposition to be accommodated, if Mike were talking to Jane, or results in conveying information that is already shared if Mike was talking to Susie. Choosing the knowledgeable character - in this case Susie - would thus correspond to rendering the utterance uninformative but containing a satisfied presupposition, whereas choosing the other character -

Jane - would mean endorsing accommodation to maintain informativeness.

(5.16) Aravind (2018), Exp 3, Sample Item, Target Condition

(Susie, Jane and Mike were hanging out together. But Jane had to go and run some errands so she left. Then it was just Susie and Mike. The two of them decided to go to an animal shelter. At the shelter, Mike got himself a pet bird.)

Right afterwards, the bird flew right out of its cage! Then she had to go home, too. Later, Mike was on the phone with one of the girls and he said, "Guess what, **the bird** that I got flew away!"

Adults in fact overwhelmingly preferred accommodation to redundancy, with the target responses being statistically indistinguishable from a non-presuppositional control for which there would be no pressure to accommodate (rate of knowledgeable character $\approx 20\%$ in critical condition vs $\approx 5\%$ in control). In contrast, the willingness to accommodate was lower for the child participants, with the choice of the knowledgeable character being significantly more likely than in a control condition ($\approx 40\%$ vs $\approx 10\%$), although avoiding redundancy was still numerically preferred.

Moreover, there was a clear developmental trajectory visible such that 4-year-olds showed a numerical preference for redundancy over accommodation, whereas 6-year-olds patterned like adults. These results suggest either that the cost of accommodation is greater for young children such that they avoid it more than adults, or that they consider redundant utterances less problematic than adults, or some of both. Either way, the finding constitutes evidence in favor of conceiving of presuppositions as contextual requirements, which children at a very young age seem to be already aware of.

To sum up, the majority of studies investigating presupposition accommodation thus far has focused on definites and additive particles, providing evidence

that accommodation costs arise rapidly online, but may require deeper processing. Additionally, the relation of the accommodated presupposition to the discourse context may facilitate accommodation. Finally, children recognize presuppositions early on as indicating shared knowledge, but may not learn how to accommodate such information until later.

With respect to differences between triggers in terms of accommodation, it has been difficult to confirm intuitive judgments in quantitative studies. Relevant findings in this regard were that even supposedly easily accommodatable triggers like *stop* and *know* show decreased ratings in [Tiemann et al.'s \(2011\)](#) study and a supposedly hard to accommodate trigger like (German) *too* fails to receive low ratings under certain circumstances in [Grubic & Wierzba's \(2019\)](#) study, both of which manipulated prior context to examine accommodation. Moreover, with the exception of [Grubic & Wierzba's](#) comparison between additive particles and possessives - although the investigation was primarily concerned with the former - differences between classes of triggers have not been systematically studied in a way that explicitly contrasts triggers based on a given classification. The following section addresses this issue with an offline rating study that compares four pairs of triggers that differ in terms of Focus-sensitivity.

5.3 Experiment 3

The goal of this experiment was to test the prediction of the FoPAH that Focus-sensitive triggers are harder to accommodate than triggers lacking Focus-sensitivity, using an offline acceptability judgment task. Additionally, the experiment used a broader set of triggers from each class to show that the hypothesis is not restricted to the contrast between *also* and *again* found in [Experiment 2](#) of Chapter 4.

5.3.1 Materials & Design

As the previous section showed, quantifying accommodation difficulty experimentally is not trivial, insofar as it is crucial to control for effects of discourse coherence as well as lexical material. To do so, trigger pairs with one trigger of each type - one Focus-sensitive and one lacking Focus-sensitivity - were used within the same frame-sentence preceded by a question to create a minimal context and fix the Focus, as in shown in (5.17).⁷ The frame-sentence without any trigger was used as a control condition such that accommodation difficulty could be measured as any decrease in acceptability of the trigger sentence relative to the bare frame-sentence.

(5.17) Sample Items Experiment 3

a. AGAIN VS TOO (4 items)

A: Who is having dinner in New York tomorrow?

- | | | |
|-------|---|---------|
| (i) | B: Saul is having dinner in New York. | CONTROL |
| (ii) | B: Saul is having dinner in New York again . | -FOCUS |
| (iii) | B: Saul is having dinner in New York too . | +FOCUS |

b. STILL VS EVEN (5 items)

A: What's Mary been up to recently?

- | | | |
|-------|------------------------------------|---------|
| (i) | B: She's on vacation. | CONTROL |
| (ii) | B: She's still on vacation. | -FOCUS |
| (iii) | B: She's even on vacation. | +FOCUS |

⁷An alternative design would be to compare each trigger and its frame-sentence in a context that either satisfies its presupposition or is neutral. However, the issue with such a design is that the trigger-less conditions might not serve as a baseline because omitting the trigger in a context in which the presupposition is satisfied may lead to decreased acceptability (see the discussion of obligatoriness in Section 2.4).

- c. BACK VS AT LEAST (4 items)
- A: What did Jack do last winter?
- | | | |
|-------|--|---------|
| (i) | B: He flew to Chicago for Christmas. | CONTROL |
| (ii) | B: He flew back to Chicago for Christmas. | -FOCUS |
| (iii) | B: At least he flew to Chicago for Christmas. | +FOCUS |
- d. CONTINUE VS ONLY (5 items)
- A: What did Sue do yesterday?
- | | | |
|-------|--|---------|
| (i) | B: She built a tree house. | CONTROL |
| (ii) | B: She continued building a tree house. | -FOCUS |
| (iii) | B: She only built a tree house. | +FOCUS |

Aside from *again* and *too* (5.17a), which can be close in meaning to each other, as shown previously - although their presuppositions differed here due to *too* associating with the subject - the remaining pairs were chosen somewhat arbitrarily since there was no way to create minimal pairs in terms of their meaning. Using the same frame-sentence however at least allowed to control for lexical content. The remaining pairs were (temporal) *still* vs *even* (5.17b), *back* vs (concessive) *at least*⁸ (5.17c), and *continue* vs *only*⁹ (5.17d), all of which have been shown to contrast in terms of Focus-sensitivity (see Section 3.3 and Appendix A.3). Aside from the first pair *again* and *too*, for which the context question targeted the subject, the context question was intended to induce VP Focus for the remaining trigger pairs.

There was a total number of 18 items (see Appendix A.4.3 for full list), split across pairs as equally as possible as indicated in (5.17), in addition to 62 fillers, 56 from other experiments and 6 catch trials.

⁸The concessive reading of *at least* was indicated by placing *at least* sentence-initially (Kay, 1992).

⁹The presuppositional aspect of *only* the experiment was concerned with was its scalar presupposition (Alxatib, 2017) rather than the status of its prejacent, since - although having been studied experimentally before (Kim, 2007) - whether the prejacent is in fact presuppositional is controversial (see Roberts 2006, 2011), as well as more crucially not Focus-sensitive in any relevant sense.

5.3.2 Procedure

The experiment was implemented via PennController (Zehr & Schwarz, 2018a) and conducted online. The first sentence of each item (A's question) was initially displayed on its own on the screen, with the second sentence (B's reply) appearing in a new line below it after pressing the space bar once. After pressing the space bar a second time, a rating screen (without the item) would appear, with the question "How acceptable was B's response for you?" at the top and a rating scale from 1 to 7 at the bottom, with the 1-end marked as "Terrible" and the 7-end as "Perfect". Participants were instructed to think of acceptability as "whether B is being consistent or to what extent B's utterance requires additional background knowledge". After filling out a consent form, a demographic form and receiving instructions, participants saw three practice items of varying acceptability to familiarize them with the procedure and illustrate the intended use of the scale. The experiment concluded with an open response question that was meant to screen for bots. The experiment took about 15 minutes.

5.3.3 Subjects

48 participants were recruited via Prolific.ac and reimbursed with \$3.00 each. All participants passed the bot-check, as well as catch-trials.

5.3.4 Predictions

The FoPAH predicts +FOCUS triggers to be harder to accommodate than -FOCUS triggers. In the given design, this should be reflected in lower ratings of the +FOCUS condition relative to the -FOCUS condition. Regarding differences relative to the CONTROL condition, at least some of the -FOCUS triggers, such as *again*, have been claimed to be hard to accommodate, in contrast to others, such as *continue*. We thus are not committed to finding a decrease of the -FOCUS condition relative to

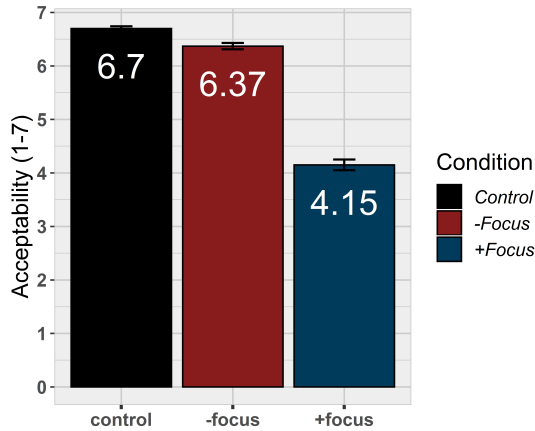


Figure 5.1:
Ratings collapsed across trigger pairs.

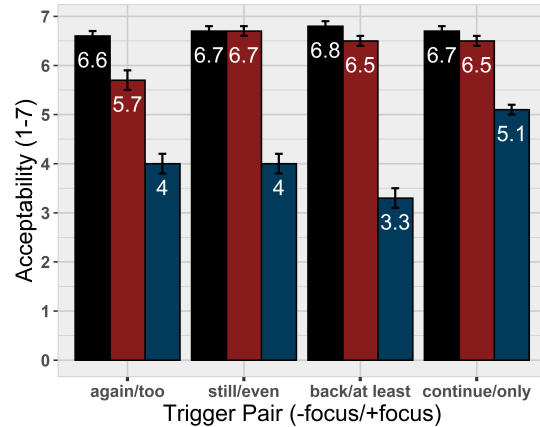


Figure 5.2:
Ratings for each trigger pair.

the CONTROL condition overall, especially given that items were not normed for plausibility, but by virtue of transitivity, the +FOCUS should be decreased relative to the CONTROL condition.

5.3.5 Results

The mean ratings per condition collapsed across trigger pairs are shown in 5.1. Using ordinal mixed effects models, simple effects showed that both the -FOCUS condition and the +FOCUS condition received significantly lower ratings than the CONTROL condition ($p < .01^{**}$ and $p < .001^{***}$ respectively). Additionally, Helmert contrasts showed that the +FOCUS was rated lower than the -FOCUS condition ($p < .001^{***}$).

Mean ratings for each trigger pair are shown in 5.2. There were no statistical tests performed on the patterns for each pair since there were no prior predictions made on an individual basis and to avoid conflation of Type I errors, but the numerical pattern of +FOCUS triggers receiving lower ratings than -FOCUS triggers was present for each pair. Within the +FOCUS triggers, *at least* received the numerically lowest ratings, whereas *only* received the highest. Within the -FOCUS triggers, *again* seemed to show a considerable decrease relative to the CONTROL.

5.3.6 Discussion

The prediction of the FoPAH was borne out in the results of the experiment: triggers that are Focus-sensitive received lower ratings than triggers that are not Focus-sensitive in contexts where their presuppositions are not satisfied. This pattern was present for all trigger pairs, providing support for the hypothesis across a broader range of triggers. According to the FoPAH, these results are accounted for because -FOCUS triggers are entailments of the Common Ground, which is itself governed by Gricean principles. If the presupposition of a -FOCUS trigger is considered uncontroversial by the hearer, the Common Ground is adjusted accordingly with little to no effort. In contrast, +FOCUS triggers require a linguistic antecedent independently of the Common Ground, which cannot be constructed out of the blue as easily, resulting in a cost reflected by lower ratings.

How do the results match previous research on accommodation difficulty? First, both *again* and *too* received lower ratings than the bare control, while *continue* - which falls into the same category as *stop* - did not, in line with Kripke's (2009) intuition. Secondly, while the decrease of *too* relative to *again* is also present in Tiemann's (2014) data, there is no apparent difference between *again* and *stop*, in contrast to the decrease of *again* relative to *continue* here. Thus, the finding that *too* received lower ratings than *again* in a carefully controlled setting constitutes an improvement on Kripke and research building on his insights: while there seems to be a cut between triggers that are hard to accommodate - as reflected in decreased acceptability - and triggers that seem to accommodate without notable effort, there is additional variation within the former class in that some triggers can be particularly difficult to accommodate, as shown here for a range of Focus-sensitive triggers.

Although there were no specific predictions regarding variation within each class of triggers, it is worth commenting on the notable numerical trends present in

the data. First, within the class of triggers lacking Focus-sensitivity, *again* seemed to be the only trigger with a considerable decrease relative to the CONTROL, in line with claims in the literature about *again* being hard to accommodate. In previous research, this accommodation difficulty has been attributed to *again* having an anaphoric component (see Section 2.4). However, the same reasoning has been applied to account for the accommodation difficulty of *too*, which would render the relative difference between the two triggers unexplained.

One possibility to overcome this issue would be to look for an additional factor in addition to anaphoricity that makes *too* particularly difficult to accommodate. One such factor could be that by virtue of being Focus-sensitive, the comprehender needs to accurately identify what part of the sentence is Focus-marked in order to compute the right presupposition. In the absence of sufficient cues, this requirement might lead to uncertainty regarding what it is that needs to be accommodated, which would be reflected in decreased acceptability. Although we do not want to suggest that identifying the right Focus-structure is a trivial task, this issue should have been avoided by virtue of using a preceding question to fix the Focus. While this does not rule out the possibility that participants added additional Foci during silent reading, it seems unlikely that participants would go out of their way to arrive at an unsupported interpretation. However, to fully discard this option, an auditory study would be required, which will be left for future research at this point.

A second factor potentially responsible for the larger decrease of *too* relative to *again* might be that Focus-sensitivity comes with an additional cost due to increased complexity. Crucially, on this view Focus-sensitive triggers like *too* should have this cost at all times, even in contexts where their presupposition is satisfied. Intuitively, this prediction does not seem to be borne out in judgments however. Additionally, rating results from Experiment 2 in Chapter 4 showed that *also* was

rated better than *again* when there was no material intervening, which further discourages such an explanation, at least for offline ratings.

Alternatively, rather than attributing the lower ratings of *too* relative to *again* to the additional complexity of *too*, it might also be due to a difference in the semantic types of their presupposition. According to the lexical entries for additive particles and for *again* adopted in Section 3.3, repeated in (5.18) and (5.19) respectively, *too* presupposes an alternative proposition, whereas *again* presupposes a previous time. Thus, in order to account for the observed accommodation difficulty of *again* despite it being not Focus-sensitive, one could concede that *again* also requires some kind of antecedent in the discourse, but that this antecedent is of a different kind than what is required by *too*, the latter of which is by assumption more costly.

$$(5.18) \quad \llbracket \text{ADD} \rrbracket = \lambda C. \lambda p. \lambda w: \exists q[q \in C(w) \ \& \ p \not\Rightarrow q \wedge q(w) = 1]. p(w)$$

$$(5.19) \quad \llbracket \text{again} \rrbracket = \lambda t^*. \lambda t. \lambda P_{\langle i, t \rangle} : t^* < t \ \& \ P(t^*) . P(t) \quad (\text{BECK 2020, (29b)})$$

However, this explanation would also raise a number of further questions. First and foremost, it begs the question how to account for the contrast between *again* and *also* found in Experiment 2 in Chapter 4. If *again* requires an antecedent as well, why is its antecedent not sensitive to salience determined by the QUD-structure in the same way *also* is? Secondly, assuming that *again* presupposes a previous time does not distinguish it from the other non Focus-sensitive triggers tested here, namely *continue*, *back* and *still*, which may be and have been analyzed analogously by virtue of being aspectual triggers.

The preliminary answer to the question how to account for the intermediate status of *again* with respect to accommodation I want to suggest here is twofold. First, any theory that wants to be able to capture potentially subtle differences between individual triggers - specifically in the domain of aspectual triggers - has

to include a representational component in order to distinguish how triggers relate to the narrative structure or event structure of the discourse. Secondly, given that triggers differ in the semantic objects they presuppose formally - propositions or eventualities - such a theory must be able to represent propositions relative to this representational component in a way that allows them to have structure.

To illustrate the first part of this answer, consider the lexical entry for *still* in (5.20), which only differs from that of *again* in (5.19) in the precedence relation of the presupposed time having to be immediate ('<') rather than not specified ('<'). Taken at face-value, these entries would make it difficult to capture that *again* is harder to accommodate than *still*. On the other hand, the entries can also be interpreted relative to the underlying representations in the discourse, namely such that the immediate precedence relation of *still* may not require the introduction of an additional eventuality into the discourse, in contrast to *again*. The relative cost associated with *again* may then be attributed to this difference in the event structure.

$$(5.20) \quad \llbracket \text{still} \rrbracket = \lambda t^*. \lambda t. \lambda P_{\langle i, t \rangle} : t^* < t \ \& \ P(t^*) . P(t) \quad (\text{BECK 2020, (19)})$$

Regarding the question of how to represent propositions in such a theory, one possibility could be that propositions are not primitives but assembled from parts of the discourse representation. That is, rather than referring to a proposition as a simplex entity in the discourse - as one would in the case of a personal pronoun - propositions are composed of predicates and their arguments, much like the psychological notion of proposition used by for instance [Anderson \(1974\)](#). This idea has recently been employed in cognitive modeling work by [Brasoveanu & Dotlačil \(2020\)](#) and applied to capture experimental data from [Anderson](#).

I want to argue here that conceiving of propositions in this way, rather than as possible worlds as used in the formalization of Focus by [Rooth \(1992\)](#), provides

a path for grounding the processing account proposed here in formal representations already applied to similar phenomena. However, given that the present investigation is primarily concerned with the contrast between Focus-sensitive and not Focus-sensitive triggers - which was supported by the data without exception - I will postpone spelling out an account along those lines until the concluding Chapter 6.

Another pattern of variation within each class worth discussing concern *only* and *at least*. *Only* received comparatively higher ratings than the other +FOCUS triggers, whereas *at least* was somewhat lower. The higher ratings for *only* could be due to the exhaustive inference it contributes being at-issue rather than presupposed, as noted in Section 2.5. To assess this possibility, it would be necessary to further investigate the relationship between the exhaustive inference and the scalar component that was targeted here and how a comprehender would choose between these interpretations, if they turned out to be distinct. Additionally, processing evidence that *only*'s contribution behaves differently from that of *even* comes from Filik et al.'s (2009) finding that *only* leads to processing difficulty earlier than *even* in illicit contexts, as discussed in Section 3.5.¹⁰

Regarding the slightly lower ratings for *at least*, one simple explanation might be that *at least* is degraded in response to a question even if there is a suitable antecedent given in the context, as shown in (5.21). Another reason might have been that due to its sentence-initial position, the Focus-structure might have been harder to determine than for the other particles.

¹⁰Another explanation for the slightly higher ratings for *only*, particularly in contrast to *even*, suggested to me by Athulya Aravind (p.c.), might be that *only* is not able to associate with material preceding it, whereas *even* has this option (see Erlewine 2014). This restriction might make it easier for participants in silent reading to determine the set of alternatives for *only* and could thus result in higher ratings.

(5.21) A: Jack has only been traveling to boring cities recently.

What did he do last winter?

B: ?**At least** he flew to Chicago for Christmas.

To sum up, the prediction of the FoPAH was directly confirmed by the data. However, there was also additional variation within each class of triggers, notably comparatively low ratings for *again* for the -FOCUS class, and comparatively higher and lower ratings for *only* and *at least* respectively for the +FOCUS class. Thus, although the experiment showed that Focus-sensitivity plays a crucial role in determining the accommodation difficulty of a trigger, there are a number of additional factors that need to be considered in future work.

An open question is to what extent the patterns in the ratings carry over to online processing. To investigate this issue, the next section presents a self-paced reading experiment focusing on a comparison between *again* and *too*.

5.4 Experiment 4

Building on the rating results of the previous experiment, which showed a larger decrease in acceptability for Focus-sensitive triggers in contexts in which their presupposition is not satisfied relative to triggers lacking Focus-sensitivity, the following experiment investigates the question whether these effects extend to online processing, using a self-paced reading paradigm. As a secondary goal, the experiment was meant to address the concern that the previous results might have been due to Focus-sensitivity adding complexity. That is, Focus-sensitive triggers may have been harder to accommodate and result in lower ratings because processing their Focus-sensitivity may have added a layer of complexity that triggers lacking Focus-sensitivity do not have. While the discussion pointed out reasons to be skeptical of this explanation, given that the previous experiment did not in-

clude a condition which compared triggers in contexts where their presupposition was satisfied, this alternative cannot be fully discarded. The following experiment therefore changes the design to compare triggers relative to contexts that satisfy or do not satisfy the presupposition, rather than use a non-presuppositional variant as control.

5.4.1 Materials & Design

The study employed a 2x2 Latin-squared design crossing TRIGGER (*again* as -FOCUS vs *too* as +FOCUS) and CONTEXT (context present or absent). *Again* and *too* were chosen since they allow a comparison within the same context by virtue of the same context sentence being able to satisfy both respective presuppositions if *too* associates with times, as in Experiment 2. The items were set up as dialogues, as in previous experiments, with each utterance introduced as direct speech from generic interlocutors A and B. To fix the Focus, the target sentence was again preceded by a question. CONTEXT was manipulated by having the question be preceded by an utterance of A's that satisfies the respective presupposition (+CONTEXT) or omitting such an utterance and begin with B's question (-CONTEXT).

A sample item illustrating the resulting four conditions is shown in (5.22). Slashes indicate the presentation regions. Phrases introducing the utterances as well as the +CONTEXT sentence and B's question were presented in full, with only the target sentence being split into pre-critical region, target region containing *again* or *too* (full underline), and spillover (dashed underline). Phrase-by-phrase presentation was chosen instead of word-by-word since *again* and *too* occur in different positions to be fully natural. There were 20 items like (5.22) (full list given in Appendix A.4.4).

(5.22) Sample Item Experiment 4

a. +CONTEXT, AGAIN

A says: / Jenny saw a movie with her boyfriend last weekend. /

B asks: / What did Jenny do this weekend? /

A replies: / She went / to the movies **again** this weekend / I think.

b. +CONTEXT, TOO

A says: / Jenny saw a movie with her boyfriend last weekend. /

B asks: / What did Jenny do this weekend? /

A replies: / She went / to the movies this weekend **too** / I think.

c. -CONTEXT, AGAIN

B asks: / What did Jenny do this weekend? /

A replies: / She went / to the movies **again** this weekend / I think.

d. -CONTEXT, TOO

B asks: / What did Jenny do this weekend? /

A replies: / She went / to the movies this weekend **too** / I think.

In addition to the critical stimuli, there were 20 fillers of two types. The first type consisted of 8 neutral fillers, all with a context sentence, but without any trigger and different lexical material, to discourage strategic reading that expects the target sentence to repeat parts of the context sentence. A sample filler is shown in (5.23).

(5.23) Filler Type I, Accommodation Self-paced reading Experiment

A says: / Jess brought cookies to the office on Thursday /

B asks: / What did Jess do on Friday? /

A replies: / She went / shopping with a friend on Friday / to catch a sale.

The second filler type were 12 items adapted from Experiment 3 using the same

three condition design, half comparing *still* and *even* and half *continue* and *only*, both relative to a bare CONTROL condition but without a context sentence. These fillers were for one part exploratory with respect to the question of how the rating results translate into reading times, and for another meant to provide a broader variety of triggers so that participants were not expecting *again* or *too* in case the trial started with B's question. Moreover, the bare condition additionally balanced the expectation that all items without a context sentence would be infelicitous. Sample items are shown in (5.24).

(5.24) Filler Type II, Accommodation Self-paced reading Experiment

a. STILL VS EVEN

B asks: / What was Marissa up to in June? /

(i) A replies: / She was / traveling in Bali / from what I recall.

(ii) A replies: / She was / **still** traveling in Bali / from what I recall.

(iii) A replies: / She was / **even** traveling in Bali / from what I recall.

b. CONTINUE VS ONLY

B asks: / What is Sue doing today? /

(i) A replies: / She is / building a tree house / to her neighbor's surprise.

(ii) A replies: / She is / **continuing** to build a tree house / to her neighbor's surprise.

(iii) A replies: / She is / **only** building a tree house / to her neighbor's surprise.

Of the total 40 items, 28 were followed by a comprehension question targeting either the context sentence - if existent - or the target sentence. A sample question

corresponding to the item in (5.22) is shown in (5.25).

(5.25) Sample Question, Accommodation Self-paced reading Experiment

Who went swimming?

Mary - Sue

Of the 28 questions, only four targeted the content of the presupposition in the main stimuli. These were included in order to prevent participants from ignoring the presuppositions and only focus on the at-issue content that is relevant to answering the questions, but kept at a low number so participants would not catch on to the purpose of the experiment quickly. These questions were treated separately and not included in the calculation of accuracy since there was no unambiguously correct answer when there was no context sentence present and the presupposition needed to be accommodated. A sample question including item is given in (5.26).

(5.26) Sample Item with Accommodation Question

(A says: / Yolanda went hiking in Vermont last Sunday. /)

B asks: / What did Yolanda do on Saturday? /

A replies: / She went / hiking (again) on Saturday (too) / since the weather was nice.

Comprehension Question: Did Yolanda go hiking before Saturday?

Yes - No

5.4.2 Procedure

The experiment was implemented via Ibexfarm and conducted online. Each trial started with a dash on the screen. Participants were instructed to press the space bar to move from region to region (as indicated by '/' in the sample items shown above), which were displayed on their own in the center of the screen, followed

by a comprehension question for 70% of the trials. After filling out a consent form, a demographic form and receiving instructions, participants saw three practice items to familiarize them with the procedure. The experiment concluded with an open response question that was meant to screen for bots and took about 15 minutes to complete.

5.4.3 Subjects

64 participants were recruited via Prolific.ac and reimbursed with \$2.50 each. All but one participant passed the bot-check. An additional four subjects were excluded due to less than 80% accuracy. Total accuracy for the remaining 59 participants was at 92%.

5.4.4 Predictions

I will focus here on the predictions for the main set of stimuli. According to the FoPAH, accommodation should be harder for *too* than for *again*, as supported by the rating results of the previous study. This prediction should translate into a larger increase in reading times for *too* in the -CONTEXT condition than for *again*. This effect is expected to occur in the critical region or in the spillover, given the variable localization of processing costs in self-paced reading. We additionally expect a general effect of context for each trigger, given the rating results as well as previous studies by Schwarz (2007) on *also* and Tiemann (2014) on *again*.

5.4.5 Results

Main Stimuli. Due to the variation in size of the different regions, reading times were trimmed based on divergence from the median for each region individually, excluding reading times above 4 median absolute deviations from the median (Leys et al., 2013), which affected 5.2% of the total data. Mean reading times per

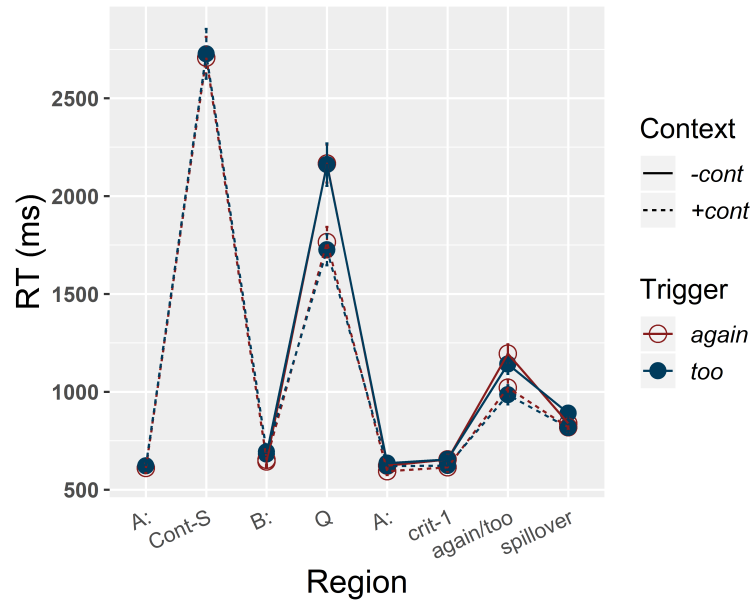


Figure 5.3: Mean reading times per region.

region are shown in Figure 5.3, with regions restricted to the target sentence shown in Figure 5.4.

Linear mixed effects models with maximal random slopes for subjects and items were used to analyze the data, with log-transformed reading times as dependent variable. In the critical region, an initial model consisting of CONTEXT, TRIGGER and their interaction as fixed effects showed a significant effect of CONTEXT ($t=-5.6$, $p<.001^{***}$), with slower reading times if the context sentence is omitted, and TRIGGER ($t=2.33$, $p<.05^*$), with *again* being read slower, but no significant interaction ($t=-.05$, $p=.96$).¹¹ However, given the - albeit small - length difference between the two triggers, a second model included LENGTH, calculated as number of characters in the region, as a fixed effect. The effect of TRIGGER was no longer significant in this model, suggesting that the longer reading times for *again* were due to its length difference relative to *too* rather than a difference in processing.

In the spillover region, there was again a significant effect of CONTEXT ($t=-2.99$, $p<.01^{**}$), with absence of context leading to slower reading times, but neither TRIG-

¹¹The same pattern was present in an analysis of the untrimmed data.

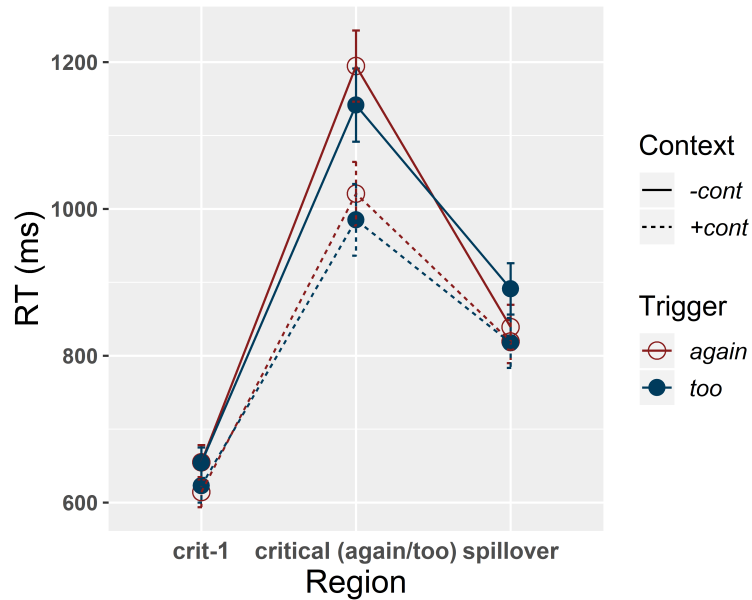


Figure 5.4: Mean RT per region for target sentence.

GER nor their interaction reaching significance ($t=-1.26$, $p=.22$ and $t=1.71$, $p=.11$ respectively). However, since the interaction term was close to marginal (and in fact marginal in the untrimmed data), a post-hoc analysis was conducted to test for order effects, based on the intuition that accommodation may have gotten easier with sufficient exposure. While an initial analysis that included TRIAL ORDER - with trial number (1-5) as levels - as a fixed effect did not differ qualitatively from the original model, a second model that treated TRIAL ORDER as a two-level factor (early = trials 1-2 vs late = trials 3-5) revealed a significant interaction between CONTEXT and TRIGGER ($t=2.04$, $p<.05^*$), with there being a larger slowdown in the absence of context for *too* than for *again*, as well as an effect of TRIAL ORDER ($t=-6.76$, $p<.001^{***}$). The size of the interaction per trial is given in Figure 5.5, showing that a large difference on the very first trial is most likely responsible for this effect. Since the model used the default treatment coding, the interaction is only restricted to early trials, however. No other effect was significant.

Fillers. The raw reading times were again trimmed using 4 median absolute devia-

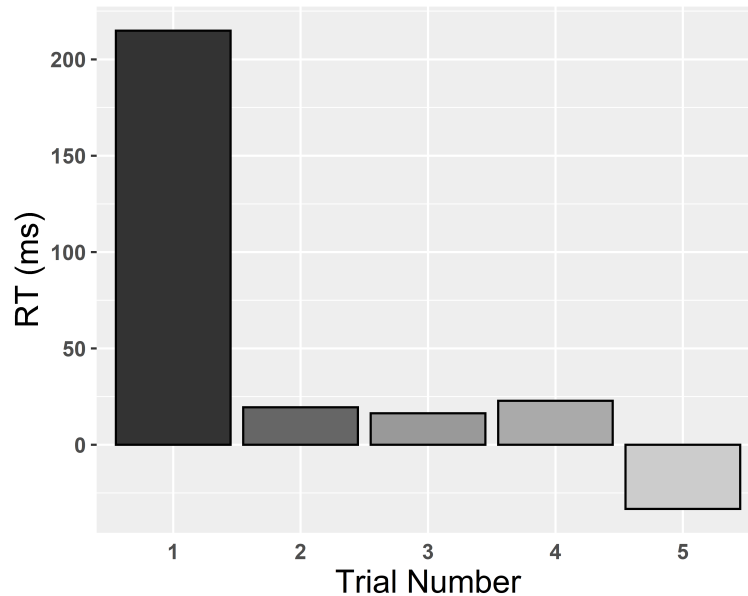


Figure 5.5: Size of interaction (difference between -CONTEXT and +CONTEXT for *too* minus difference between -CONTEXT and +CONTEXT for *again*) in spillover region per trial.

tions as cut-off, affecting 4.7% for the *still-even* subset and 6.1% for the *continue-only* subset. The mean reading times per region of the target sentence for each subset are shown in Figures 5.6 and 5.7 respectively.

We again employed linear mixed effects models on log-transformed reading times, focusing on the critical region, using simple effects and Helmert contrasts, as for the rating data. Since there were obvious length differences in the critical region, LENGTH was added to the model as a fixed factor. For the *still-even* subset, simple effects showed that *still* did not differ significantly from the control ($t=0.16$, $p=.88$), whereas *even* led to significantly longer reading times relative to the control ($t=4.09$, $p<.01^{**}$). Additionally, the comparison between *still* and *even* in the Helmert contrasts was significant as well ($t=-7.21$, $p<.001^{***}$), with slower reading times for *even*, while the difference between both particles combined relative to the control was only marginal ($t=-2.18$, $p<.1^{\bullet}$).¹²

For the *continue-only* subset, none of the simple effects were significant ($t=-0.59$,

¹²The same pattern was observed for the raw data.

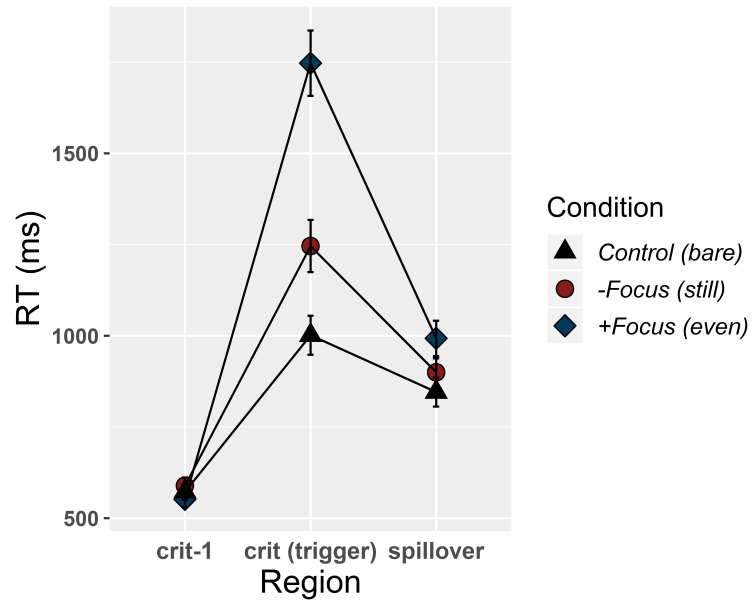


Figure 5.6: Mean RT per region for target sentence of *still-even* fillers.

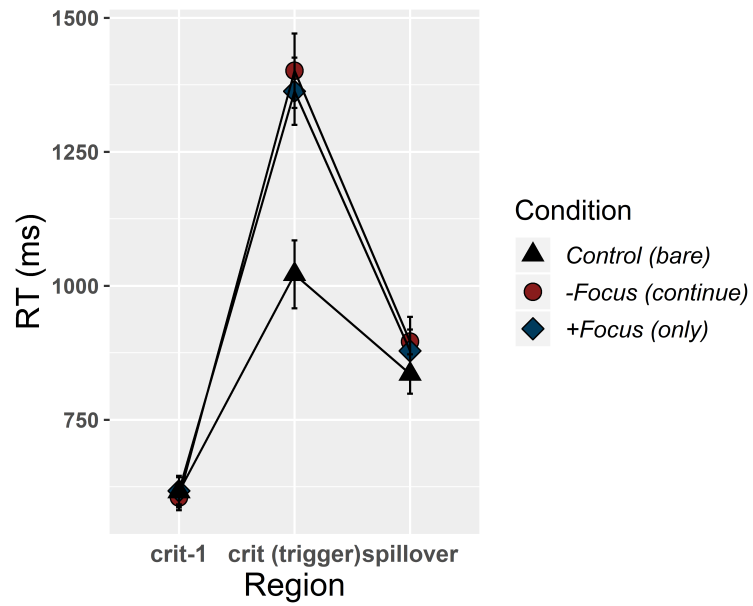


Figure 5.7: Mean RT per region for target sentence of *continue-only* fillers.

$p=.56$ for *continue* and $t=1.96$, $p=.11$ for *only*). There was also no significant difference between *continue* and *only* in the Helmert contrasts ($t=-1.04$, $p=.31$).¹³

Accommodation Questions. The results for the exploratory questions targeting the presupposed content are shown in Table 5.1. Participants overall accommodated the respective presuppositions in the -CONTEXT conditions to a similar extent for both triggers. Somewhat surprisingly, *yes* responses were lower than overall accuracy in +CONTEXT conditions as well, despite the presupposition being satisfied here, with a slightly higher proportion of *yes* responses for *again*.

	-CONTEXT	+CONTEXT
<i>again</i>	66.1%	76.3%
<i>too</i>	67.8%	69.5%

Table 5.1: Percentage of *Yes* responses to Accommodation Questions by condition.

5.4.6 Discussion

The experiment provided evidence that both *again* and *too* incur a processing cost that occurs quickly during online comprehension if their presupposition is not satisfied, as supported by the significant increase in reading times on the critical region if the context sentence was omitted. This effect is in line with previous research on these triggers (Schwarz, 2007; Tiemann, 2014; Singh et al., 2016). Additionally, although there was no reliable evidence that this cost differed for the two triggers if the entirety of the experiment was considered, *too* showed the predicted increased penalty relative to *again* once trial order was taken into account. More specifically, in the spillover region reading times for *too* slowed down more in the absence of a supporting context than for *again* for trials at the beginning of the experiment.

¹³The same pattern was again found in the raw data.

Although the relativization to early trials should be taken as a caveat, the results nonetheless constitute a novel finding insofar as no previous study has explicitly compared effects of different triggers in online processing directly. While Tiemann (2014) investigated multiple triggers at once, a comparison was not implemented as a factor within the same design. The relevance of trial order suggests that participants do detect a difference between *again* and *too* early on, but get used to the illicit use over the course of the experiment such that the difference is no longer noticeable towards the end of the experiment. The reason this effect occurs in the spillover region rather than in the critical region can be attributed to the variable localization of self-paced reading.

We may nonetheless wonder why the difference between *again* and *too* was not more pronounced in this experiment, given the stark contrast in ratings in Experiment 3. One way in which the experiments differed was that *too* associated with the subject in Experiment 3, whereas it associated with the VP in the current experiment, due to the way the respective context question was phrased. A possible explanation could then be that the accommodation difficulty of *too*'s presupposition varies with the shape of the proposition it requires as an antecedent. If true, such a finding would provide a further argument for representing propositions that allows them to have structure, as suggested in the discussion of Experiment 3.

The current results also bear on the issue of whether Focus-sensitivity per se is costly and as such could be responsible for the rating data presented in the previous experiment. Notably, there was no effect of TRIGGER in the critical region nor the spillover region, suggesting that *too* does not contribute a cost if its presupposition is satisfied relative to *again*. This pattern therefore renders the alternative explanation for the rating data discussed previously less plausible.

Additional evidence - albeit tentative - for the relevance of Focus-sensitivity carrying over from ratings to online processing comes from one filler subset com-

paring *still* and *even*. Reading times for *even* were slower than for *still* in the critical region, mirroring the decrease in ratings found in Experiment 3. Given the small sample size, this effect is notable and promising as a starting point for a full-fledged experiment. In contrast, the rating pattern did not carry over into reading times for the difference between *continue* and *only*, potentially due to *only* showing the weakest effect in the ratings.

Finally, the responses to the accommodation question, specifically in -CONTEXT conditions, suggests that participants do process the presupposition and accommodate it in the majority of cases.¹⁴ These results speak directly - and stand in opposition - to results by Tiemann (2014), who found that people respond negatively to a question intended to target the presupposition of *again* in contexts that do not satisfy its presupposition. This contrast is less surprising once the specific questions by Tiemann are taken into account. A sample item with corresponding question is given in (5.27). Since the question targets the presupposition rather indirectly, choosing *one* as a response may have been simply due to participants restricting the question to the information provided in the context. In contrast, given the results presented here, participants do recognize the presupposition of both *again* and *too*, if the question targets their content directly.

(5.27) Last week, Linda bought Judith a pink lamp for a room.

Two days ago, Linda received a pink lamp **again**, when she was out with a friend.

How many pink lamps did Linda receive?

One - At least two - Cannot be answered

¹⁴The slight increase of positive responses for *again* relative to *too* in +CONTEXT conditions was likely due to an error in phrasing the questions, since they asked whether a relevant event had occurred *before*, which is not necessarily the case with *too*.

5.5 Chapter Summary

This chapter presented two experiments - an offline rating study and a self-paced reading study - to test the prediction of the FoPAH that Focus-sensitive triggers should be harder to accommodate than triggers lacking Focus-sensitivity. The rating experiment compared four trigger pairs with one instance of each class (*again vs too*, *still vs even*, *back vs at least*, *continue vs only*) within the same frame-sentence relative to a bare variant without any trigger as control condition, preceded by a question, and had participants rate the acceptability of the target sentence. As predicted, Focus-sensitive triggers received lower ratings than triggers lacking Focus-sensitivity, which was true for each trigger pair.

The self-paced reading experiment centered on a comparison between *again* and *too*, manipulating the presence or absence of a context sentence satisfying the respective presuppositions, rather than use a trigger-less variant as control. In addition to an increase in reading times for both triggers in the critical region containing the trigger if the context sentence was absent, the slowdown in the spillover region was more pronounced for *too*, although only for trials at the beginning of the experiment.

The experiments thus provide evidence in favor of the FoPAH from two distinct methodologies and - at least uncontroversially for ratings - across a broad range of triggers. Focus-sensitive triggers lead to a larger decrease in ratings in out-of-the-blue contexts than triggers lacking Focus-sensitivity, and *too* leads to a larger increase in reading times when its presupposition is not satisfied than *again* under the same conditions. These effects crucially show that accommodation difficulty affects both offline ratings as a potentially more deliberative measure, and incremental comprehension, and differentially so depending on the kind of trigger involved. Additionally, the rating data show - and the reading data to some extent, given the exploratory status of the *still-even* comparison - that this is not an arti-

fact of *again* and *too* but generalizes to a broader set of triggers depending on their behavior with respect to Focus.

To sum up, the data presented here provide novel evidence for a systematic difference in accommodation difficulty, both in offline and online measures, depending on whether a given trigger is Focus-sensitive or not, and improves on previous claims in the literature (e.g. Kripke 2009) regarding trigger differences with respect to accommodation. That is, while confirming that both *again* and *too* are hard to accommodate, this difficulty is greater for the latter. Additionally, some of the noted variation across triggers within each class, specifically with respect to the rating data, may serve as a starting point for a more comprehensive theory of accommodation that takes multiple factors into account.

Relating the findings of this chapter back to the previous chapter, there is converging evidence for the FoPAH from different properties, triggers, and methodologies. Particularly the contrast between *again* and *also* in Experiment 2 dovetails with the results in Experiments 3 and - to some extent - 4 presented here. The next and final chapter provides a broader summary of the findings and a discussion of their implications.

CHAPTER 6

CONCLUSION

This chapter concludes the present thesis with a summary of the findings and main conclusions (6.1), some further discussion of the notions relevant to the tested hypothesis (6.2), implications of the findings for linguistic and psycholinguistic theory (6.3), and a discussion of possible extensions and future work (6.4).

6.1 Summary of Findings & Main Conclusions

The goal of this thesis was to investigate representations of context through the lens of presuppositions, specifically differences among presupposition triggers. The property examined here was Focus-sensitivity, as diagnosed with the stress placement test in Section 3.3. Focus-sensitivity was hypothesized to correlate with a distinction in terms of the representations that different triggers are grounded in. Triggers lacking Focus-sensitivity (-FOCUS) were hypothesized to require their presupposition to be entailed by the Common Ground, whereas Focus-sensitive triggers (+FOCUS) access a linguistic antecedent in the discourse model, as stated by the Focus Presupposition Antecedent Hypothesis (FoPAH) in (6.1).

(6.1) Focus Presupposition Antecedent Hypothesis (FoPAH)

Focus-sensitive presupposition triggers require a linguistic antecedent in the discourse model, whereas triggers lacking Focus-sensitivity merely require their presupposition to be entailed by the Common Ground.

Chapters 4 and 5 tested two predictions of the FoPAH. The first prediction concerned the extent to which triggers are sensitive to the salience of the content by which their presupposition is satisfied. +FOCUS triggers, by virtue of accessing a linguistic antecedent in the discourse model, are predicted to be sensitive to the salience properties of that antecedent. In contrast, -FOCUS triggers should be indifferent to the salience of the utterance satisfying their presupposition insofar as the presupposition of such triggers constitute Common Ground entailments, comparable to the extent to which the order of premises is irrelevant to the conclusion of a syllogism. Salience was manipulated in terms of accessibility with respect to the structure set up by the Question Under Discussion (QUD).

Experiment 1a used the scalar presupposition of *even* and the way its scale is sensitive to what has been mentioned in the discourse to probe how parts of the discourse are being accessed. That is, when associating with a comparatively low value, the resulting degraded acceptability of *even* can be ameliorated due to the presence of an even lower value. The crucial manipulation was whether the utterance contributing the lower value was part of the immediate super-QUD or remote by an extra step in the QUD-structure. Results from acceptability judgments showed that the extent to which the presence of a lower value improved ratings was greater when the lower value was part of the immediate super-QUD relative to the remote super-QUD, in line with the predictions. However, an alternative explanation for the results may have been that the pattern was due to general reasoning about the plausibility of relevant events and the way the QUD-manipulation

affected them, rather than the results being due to a change in accessibility of the antecedent.

To address this issue, Experiment 1b used the same stimuli as Experiment 1a, but replaced *even* with either *might've* or *apparently*, since the advantage from general reasoning should persist in this case independently of the presence of *even*. The critical interaction was no longer significant, as expected if the results of Experiment 1a were specific to properties of *even*, but an additional model failed to provide evidence that the interaction differed between experiments, thus weakening the overall support.

Experiment 2 directly compared one trigger from each class, namely *also* and *again*, in a slightly different design. Rather than changing the relation between the sentence providing the antecedent and the target sentence in the QUD-structure, the salience of the antecedent was manipulated via the presence or absence of material intervening between the utterance contributing the content satisfying the respective presupposition and the target sentence containing the trigger. Additionally, all utterances were part of the same super-QUD. The specific prediction was that intervening material should decrease the accessibility of the antecedent for *also* and lead to interference, whereas *again* should be unaffected by the intervener. This prediction was borne out in that the presence of the intervener incurred a penalty for *also* both in ratings and full sentence reading times of the target sentence, whereas it did not for *again*. The results thus provided initial evidence for a contrast between presupposition triggers in terms of Focus-sensitivity in line with the prediction of the FoPAH.

The second prediction tested concerned accommodation difficulty, that is, the extent to which a trigger can be used felicitously if its presupposition is not explicitly satisfied in the context. On [Stalnaker's \(1998\)](#) view of the Common Ground, accommodating a presupposition is not a repair process in the strict sense but

constitutes an essential part of communication. If a hearer recognizes a speaker presupposing something without it being entailed by the Common Ground, the presupposition can be accommodated without difficulty, as long as what is being presupposed is uncontroversial/plausible and interlocutors are cooperative. Consequently, -FOCUS triggers are predicted to be comparatively easy to accommodate. In contrast, a linguistic antecedent in the discourse model is not taken to be subject to such cooperative principles but involves proper repair of the discourse model, which is costly. Thus, +FOCUS triggers are predicted to be hard to accommodate.

Experiment 3 compared four triggers from each class in pairs - *too/again, even/still, only/continue, at least/back* - in the same frame-sentence relative to a control condition that did not contain a presupposition trigger in contexts where the respective presupposition was not satisfied. Both +FOCUS and -FOCUS triggers were rated lower than the control, but crucially +FOCUS triggers were rated lower than -FOCUS triggers, as predicted. Moreover, lower ratings for +FOCUS triggers relative to -FOCUS triggers were numerically present for all pairs, providing support for the FoPAH from a broader range of expressions beyond the contrast between *also* and *again* shown in Experiment 2.

Experiment 4 followed up on this finding with a chunked self-paced reading study to test whether the observed effect extended to online processing. The main set of stimuli restricted the comparison of triggers to *too* and *again*, but changed the design such that what was manipulated was the presence or absence of a context sentence satisfying the presupposition rather than measuring accommodation difficulty relative to a trigger-less control. The experiment also included exploratory fillers comparing *even-still* and *only-continue* respectively, using the design from Experiment 3.

The data for the main stimuli showed a slowdown for both *too* and *again* in the target region containing the trigger when the presupposition was not satisfied,

but no difference between the triggers in the degree of this slowdown. However, a significant interaction in the spillover region was present for trials at the beginning of the experiment, indicating a larger slowdown for *too* than for *again*, as predicted. Additionally, data for the exploratory fillers showed a larger slowdown in the region containing the trigger for *even* than for *still* relative to the control, but no difference for *only-continue*. The results thus provide tentative evidence that the difference in accommodation difficulty with respect to Focus-sensitivity is not restricted to offline judgments but carries over to online processing.

Taken together, the findings of this thesis provide converging evidence in favor of the FoPAH. The strongest support comes from Experiment 2, with *also* but not *again* being sensitive to intervening material within the QUD-structure, and Experiment 3, which showed +FOCUS triggers to be harder to accommodate than -FOCUS triggers. More tentative support comes from Experiment 1a with the rating data suggesting that the way *even* accesses its antecedent is sensitive to the QUD-structure, and the self-paced reading data from Experiment 4 showing that *too* incurs a larger penalty than *again* at an early stage of the experiment when their presuppositions are not satisfied.

In terms of the main conclusions to be drawn from this thesis, the FoPAH thus provides novel empirical evidence for a difference between presupposition triggers based on their Focus-sensitivity. The implications of this finding for a typology of presupposition triggers will be discussed in more detail in section 6.3. On a more fundamental level, the thesis provides evidence for distinct representations of context, the Common Ground and the discourse model. While the psychological reality of each of these notions has been supported independently, as well as their usefulness for formal linguistic theory, their application is usually restricted to distinct phenomena rather than them being compared directly. The importance of what I have shown here then is that expressions that share the same kind of

meaning - presuppositions - may still differ in the kind of representation they are grounded in depending on a contingent property, namely Focus-sensitivity.

One direct advantage this contingency has is that it simplifies how the properties following from the FoPAH are acquired. The language learner would only be required to determine whether a trigger is Focus-sensitive or not, and infer relevant properties from there, rather than having to acquire each property independently. This view would additionally make a prediction about the timing of acquisition regarding properties like accommodation difficulty. For example, once the language learner has recognized a trigger as being Focus-sensitive, its accommodation difficulty should follow. I will leave an assessment of this prediction for future research.

In spite of these contributions the thesis makes, there are also further questions regarding the notions that are central to the FoPAH, namely the nature of the Common Ground, the discourse model and how to conceive of a linguistic antecedent. The following section provides further discussion of these issues to see which remain open and what additional predictions can be made.

6.2 Further Discussion

This section elaborates on the notion of Common Ground adopted here, as well as the discourse model and antecedent. The goal is to pick up loose ends from previous parts of the thesis, and clarify or extend them along the way.

6.2.1 Common Ground

One assumption that is central to the conception of the Common Ground adopted here, particularly for Chapter 4, has been that the Common Ground is indifferent to salience with respect to how its contents satisfy the presupposition of a - FOCUS trigger. That is, by virtue of -FOCUS triggers being hypothesized to depend

on entailments of the Common Ground, the only relevant factor for comprehending such a trigger is whether its presupposition is in fact entailed by the set of propositions that make up the Common Ground, independently of the salience of the linguistic material with which the propositions were introduced. As an analogy, it was suggested to think of this process as being comparable to determining the validity of a conclusion in a syllogism. As long as a conclusion follows from the premises, it does not matter in what order the premises were encountered for the conclusion to be valid or not.

There are several ways in which this view requires further qualification, however. First, the analogy with syllogisms should be seen as an idealization insofar as there is evidence from Johnson-Laird & Bara (1984) that the “figure” of the premises does affect the availability of the possible conclusions. The authors manipulated the order in which relevant terms occurred in quantified sentences like (6.2) that served as premises. (For example, the figure in (6.2) would be A-B, B-C.) The proportions with which participants drew valid conclusions from the set of premises revealed a figural bias in that certain figures were privileged in terms of the valid conclusions participants drew from them. It is thus worth distinguishing between the logical properties of a syllogism - or, in the case of presuppositions, the grammar - and the processes of reasoning that are part of the comprehension system.

(6.2) Some of the architects are vegetarians.

Some of the vegetarians are not notaries.

However, these results should also not be taken as directly contradicting the analogy made here. Firstly, the experiment relied on a range of quantifiers, which may exacerbate or even cause the observed performance issues. Moreover, the comparison with syllogisms was intended as an idealized analogy rather than a commit-

ment to the comprehension of -FOCUS triggers behaving in the exact same way. Using the idea of how inferences are made logically may therefore nonetheless serve as a useful illustration of how certain aspects of salience are eliminated or reduced in light of the conception of the Common Ground as a body of knowledge.

This clarification brings us to the second issue worth commenting on, namely what notion of salience is relevant for the Common Ground. Salience itself is an ill-defined term that has been used to describe a variety of factors. The present claims should thus not be taken to mean that the Common Ground is completely indifferent to any notion of salience. For instance, [Wason \(1966\)](#) showed that participants were better at detecting errors when the task was framed in terms of catching cheaters rather than in a more neutral way. Instructions of this kind and the change in goals they might result in might naturally affect how accurately or quickly participants detect a presupposition failure.

More generally, there may still be general memory processes such as memory decay that differentiate the activation of material that entered the Common Ground seconds ago from material that was accepted years ago. What is crucial here is that salience in the Common Ground is not determined in relation to the QUD. In this regard, it is worth noting that this notion of Common Ground is a simplification intended to model the processing of presupposition triggers and diverges from more complex conceptions in which Common Ground and QUDs are more tightly linked (e.g. [Biezma & Rawlins 2017](#)).

Despite these clarifying caveats, one claim regarding an extension of the present view that has been made in [Chapter 4](#) and is worth elaborating on concerns the connection between -FOCUS triggers and the detection contradictions. Specifically, I suggested that checking whether the presupposition of such a trigger is satisfied should behave similar to determining the truth of an utterance in the discourse. That is, much like a -FOCUS trigger requires its presupposition to be entailed by

the Common Ground to be used felicitously, determining the appropriateness of an assertion can be viewed as checking whether the asserted proposition is entailed by the Common Ground. One prediction this view would make is that noting that an assertion is contradictory to information in the preceding discourse should be insensitive to - a certain kind of - salience the same way the satisfaction of a -FOCUS trigger is.

Initial evidence in favor of this prediction comes from a set of studies by O'Brien & Albrecht (1992). The authors manipulated whether a target sentence was consistent or inconsistent with information in the preceding context, in addition to whether the relevant information occurred in the sentence immediately preceding the target sentence or with several sentences intervening, as shown in 6.3.

- (6.3) As Kim stood { inside / outside } the health club she felt a little sluggish.
(Workouts always made her feel better. Today she was particularly looking forward to the exercise class because it had been a long, hard day at work. Her boss had just been fired and she had to fill in for him on top of her own work.)
She decided to go outside and stretch her legs a little.

Reading times for the target sentence were increased when there was an inconsistency, as well as when there was material intervening, but without the two factors interacting. That is, there was no evidence that the penalty for an inconsistency was larger in the absence of intervening material. This behavior thus resembles what was observed for *again* in Experiment 2, where an intervening question-answer pair did not affect the ratings for *again*. Although there are notable differences between this experiment and O'Brien & Albrecht's (1992) design, as well as other factors that affect how inconsistencies are detected (see Albrecht & O'Brien 1993; O'Brien et al. 1998, 2010), these results are promising with respect to the predicted

similarity between -FOCUS triggers and contradictions.

Another aspect of the notion of Common Ground applied here that is worth discussing concerns the conditions under which propositions become part of the Common Ground. On the view adopted here, the Common Ground consists of all propositions that are mutually accepted by all interlocutors. With respect to the FoPAH, this view yields another prediction regarding the contrast between +FOCUS and -FOCUS triggers, namely that the latter should be infelicitous if their presupposition has not been mutually accepted. In contrast, linguistic antecedents are not evaluated with respect to the epistemic attitude an interlocutor has toward them. As long as there is a representation in the discourse model that can serve as a linguistic antecedent, it should be able to license the use of a Focus-sensitive presupposition trigger.

As an analogy, consider the behavior of an anaphor like *that* in (6.4). The pronoun simply picks out A's previous statement without indicating whether B takes it to be true. Otherwise, B's reply would be contradictory, which is not the case.

(6.4) A: Jason Zimmermann is the best *Smash* player ever.

B: **That's** not true! Kevin Nanney was way better.

Bare Focus seems to behave much like *that*-anaphora in this respect. Consider the response in (6.5a). Focus on *first* is felicitous - and in fact obligatory - even though the relevant alternative to *first* - *second* in A's statement - is rejected by speaker B. This behavior is in line with Wagner's (2020) characterization of Focus as presupposing salience rather than truth. When considering Focus-sensitive expressions such as *even* in (6.5b) then, we see the same pattern insofar as *even* is felicitous even if the proposition licensing its use is not accepted by speaker B.¹ In contrast, for a

¹A potential confound here might be that a different antecedent is being accommodated here. However, the results from Experiment 3 in Chapter 5 showed that accommodating *even* leads to a decrease in acceptability. Nonetheless, it is worth keeping this confound in mind for the upcoming

trigger lacking Focus-sensitivity such as *again*, what is being presupposed has to be accepted for *again* to be felicitous, as shown by the contrast between (6.5c) and (6.5d).²

- (6.5) A: Juan DeBiedma made second place at Evo 2016.
- a. B: No, he made [FIRST]_F place.
 - b. B: No, he **even** made [FIRST]_F place.
 - c. B: #No, but he made second place **again** the next year.
 - d. B: Yes, and he made second place **again** the next year.

The prediction that +FOCUS triggers should be acceptable as long there is an available - albeit not mutually accepted - antecedent in the context, whereas the same conditions should result in unacceptability for -FOCUS triggers was tested in a pilot experiment reported in Appendix A.5. The experiment compared four triggers of each class in a between-item design and manipulated whether its presupposition is mutually accepted by varying the response particle used in the target sentence between *yes* and *maybe*. A sample item for *even* and *again* is shown in (6.6).

(6.6) Sample Items, Pilot Experiment

- a. EVEN

A: Jesse rented an old pickup truck for her roadtrip.

- (i) B: Yes, that's right. Helen **even** rented a Saab.
- (ii) B: Maybe that's right. Helen **even** rented a Saab.

experiment.

²However, note that additive particles, despite being Focus-sensitive, seem to pattern like *again* in this respect, as shown in (i). There may thus be variation in terms of whether Focus-sensitive particles additionally care about mutual acceptance or not.

- (i) A: Juan DeBiedma made second place at Evo 2016.
B: #No, but he **also** made second place in 2015.

b. AGAIN

A: Yesterday, Francine went swimming.

(i) B: Yes, that's right. Today, she went swimming **again**.

(ii) B: Maybe that's right. Today, she went swimming **again**.

The prediction was that *maybe* should result in a larger decrease for -FOCUS triggers than for +FOCUS triggers. Contrary to this prediction, the data showed an overall decrease for *maybe* relative to *yes*, but without this decrease differing for the two classes of triggers. However, the results may have been confounded by the change in response particles affecting discourse coherence independently of the requirements of use for the respective triggers. The experiment thus remains inconclusive, but offers an additional avenue for future research.

The next subsection turns to a discussion of the notion of discourse model and a potential avenue for a more formal representation of a linguistic antecedent within such a model.

6.2.2 Discourse Model and Antecedent

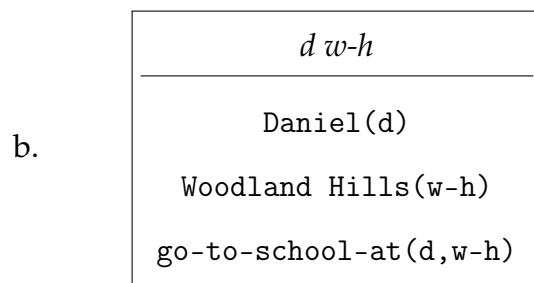
Up to this point, the notion of discourse model and antecedent have been kept relatively informal. To make things more precise, it was suggested to think of the discourse model in terms of the discourse representation structures of DRT. In contrast, the standard analysis of Focus within Alternative Semantics - which was also adopted here - treats antecedents for Focus as propositions, consisting of sets of possible worlds. Moreover, Alternative Semantics is less concerned with the aspects of interpretation that are central to dynamic semantic approaches, namely the issue of how to represent the contents of the previous discourse (but see [Krifka 1993](#)). The formal approaches thus appear to create a tension here.

However, the use of DRT in the following primarily serves expository purposes

rather than a formal commitment, especially since dynamic semantics has been argued to be isomorphic to a classical possible worlds semantics (Charlow, 2015). The main reason for choosing DRT here is that it offers a simple way for representing an alternative perspective on the results from Experiment 2 in terms of interference effects, which will be discussed in Subsection 6.3.5 below. There may nonetheless be empirical advantages of choosing DRT for modeling accommodation that will be touched upon in Subsection 6.3.2.

To represent propositions in DRT, I will use a simplified purely extensional first-order logic, inspired by Brasoveanu & Dotlačil (2020), that allows a proposition to be derived from the content of a DRS, which is closer to the psychological notion of proposition. As an illustration, first consider the example in (6.7a). Recall that DRT distinguishes between discourse referents and predications, with the former serving as arguments for the latter, shown in (6.7b). The corresponding proposition here would then be *go-to-school-at(d,w-h)*.

(6.7) a. Daniel goes to school in Woodland Hills.



Analogously, the DRS for a sentence containing *also* (6.8a) would look as in (6.8b). Adopting the previous characterization of *also* as looking for an antecedent that differs with respect to the Focused element, the respective (set of) proposition(s) would be of the form *go-to-school-at(x,w-h)*. Since the DRS in (6.7b) can be used to derive a proposition that is part of this set, it can thus serve as an antecedent to satisfy the presupposition of *also* here.

(6.8) a. [Ali]_F ALSO goes to school in Woodland Hills.

b.

<i>d w-h</i>
Ali (a)
Woodland Hills (w-h)
go-to-school-at (a, w-h)

Another issue that is somewhat independent of how the antecedent is formalized but requires further discussion concerns the status of the antecedent as stated in the FoPAH. The FoPAH states that Focus-sensitive triggers require a *linguistic* antecedent to satisfy their presupposition. However, as already mentioned in Chapter 1, the presupposition of Focus-sensitive expressions may also be satisfied by non-linguistic material, as shown in (6.9), repeated from (1.6). The question then is whether those non-linguistic counterexamples can receive another explanation, or whether the FoPAH as currently stated is inaccurate and requires revising.

(6.9) *Context: Lindsay sees Edgar use cilantro while making breakfast nachos and says:*
Paul ALSO uses cilantro for making nachos.

As an argument in defense of the FoPAH, one might take examples like (6.9), despite their apparent acceptability, to require more effort than if the antecedent were provided linguistically. This - potentially subtle - contrast may be due to the relevant content having to be inferred post-hoc after the utterance is made, prompted by the way the utterance draws attention to relevant parts of the visual scene, and then added to the discourse model. However, to fully assess the extent to which the existence of non-linguistic antecedent examples raises doubt about the validity of the FoPAH, it would be necessary to explicitly compare linguistic and non-linguistic antecedents in an experimental setting.

More generally, cases of non-linguistic antecedents may not pose a serious problem in light of similar issues arising for personal pronouns. As with presupposition triggers, the antecedent of a personal pronoun does not have to be provided via linguistic means but can also be provided in a visual scene as long as the antecedent is sufficiently salient. Nonetheless, it is well known that different inherently linguistic factors such as grammatical role affect the pronoun resolution process. The predictions of the FoPAH and the FoPAH itself therefore do not necessarily have to be at odds with the existence of cases where an antecedent is provided non-linguistically. Linguistic utterances may simply appear to be privileged as antecedents because they automatically render their content salient.

With these qualifications in place, the next section now turns to a discussion of further implications of the findings of this thesis.

6.3 Implications for Linguistic & Psycholinguistic Theory

This section discusses the implications of this thesis for linguistic theory and psycholinguistic theory, which will be discussed together since some issues are at the intersection of these two fields. Specific issues to be discussed are the typology of presupposition triggers, accommodation, presupposition theory more broadly, theories of Focus and QUDs and the idea of QUDs as processing domains, as well as discourse processing more generally.

6.3.1 Trigger Typology

The first issue to be discussed is how the current findings and the contrast between presupposition triggers in terms of Focus-sensitivity relates to previous proposals that distinguish between classes of triggers. As reviewed in detail in Section 2.4, there have been numerous distinctions made between classes of presupposition

triggers based on a number of different properties. Given that not all proposals are concerned with the same triggers however, and in order to keep this subsection comprehensive, the present discussion will be restricted to the two potentially most prominent proposals, namely [Abusch's \(2010\)](#) soft vs hard distinction and [Sudo's \(2012\)](#) entailing vs non-entailing distinction (see also [Klinedinst 2016](#) and the respective review in [Section 2.4](#) for a connection between the two).

The question to be addressed is to what extent the present proposal can account for the central data of these proposals or even replace them. An overview regarding the respective proposals is shown in [Table 6.1](#), restricted to those triggers that have been explicitly discussed or tested in all three proposal (see [Appendix A.2](#) for the full overview). (I will also comment on one other property that is part of the trigger typology during the discussion, namely anaphoricity.)

	soft/hard	entailing/non-entailing	+/-Focus-sensitive
<i>stop/continue</i>	soft	entailing	-
<i>again</i>	hard	non-entailing	-
<i>too/also, even</i>	hard	non-entailing	+

Table 6.1: Trigger Typology Overview.

In terms of empirical properties, [Abusch's \(2010\)](#) distinction is primarily concerned with the degree to which different triggers project when their presupposition is unsupported, or - in theoretical terms - the ease with which a trigger can be locally accommodated. To account for this contrast, [Abusch](#) argues for soft and hard triggers differing in their triggering mechanism, with soft triggers being pragmatically triggered and therefore easily suspended, whereas hard triggers are lexically encoded and therefore more persistent.

As an initial observation, [Abusch's](#) proposal and the one made here do in fact seem to overlap quite substantially, as noted in [Section 2.4](#). None of her soft triggers qualify as Focus-sensitive - insofar as the existential presupposition of bare Focus

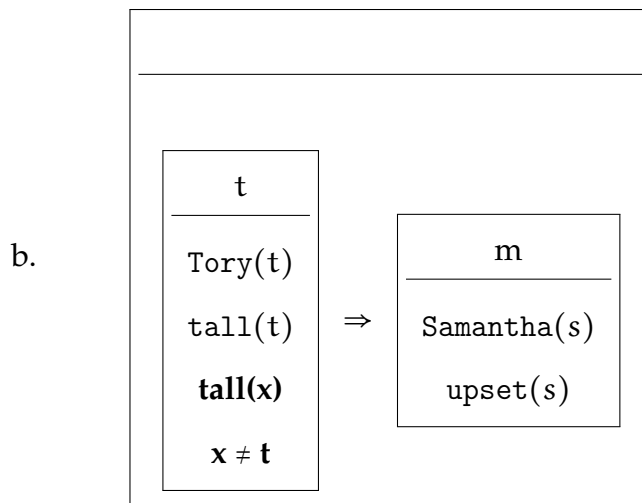
can be argued to be a special case, see Section 3.4 - and all her hard triggers, such as *also*, *even*, and *it*-clefts, - with one notable exception I will come back to shortly - can be argued for to involve some dependency on Focus.³ Beyond this superficial overlap however, a more crucial question is whether appealing to Focus-sensitivity could account for the noted difference in projection behavior that are the central data Abusch's proposal is designed to capture.

One option would be to argue that local accommodation is subject to the same principles as global accommodation. On this view, only Focus-sensitive triggers, which require a linguistic antecedent for their presupposition to be satisfied, are expected to incur any difficulty. As an additional assumption to account for the intuition that locally accommodating a presupposition is easier than globally accommodating, the relevant structures could be conceptualized within DRT - which has been independently supported as a way to capture processing behavior in projective environments by (Schwarz & Tiemann, 2017) - such that the antecedent would only have to be accommodated at a sub-level of the discourse model. This feature may alleviate processing cost, given that an additional projection step could be avoided.

To illustrate this idea, consider the Abusch-style suspension context in (6.10a). A DRT representation for the initial stage of the discourse prior to accommodation is shown in (6.10b), with the presupposition of *too* in bold.

- (6.10) a. (I don't know whether Samantha is tall, but...)
 ...if Tory is tall **too**, Samantha will be upset.

³*It*-clefts have not been discussed in detail so far and therefore constitute the potentially most controversial case, but will receive more attention in Section 6.4 below.



What is crucial here is that, for the discourse to be consistent in light of the speaker's suspended belief regarding the content of the presupposition, it is sufficient for the presupposition to be part of the box associated with the antecedent of the conditional rather than the global structure. That is, although there is still an antecedent to be accommodated, the additional step of moving up the antecedent could be avoided and the commitment remain hypothetical, resulting in less processing costs than if the antecedent were to be accommodated globally. However, this explanation relies on the assumption that local and global accommodation do in fact pattern together with respect to trigger classes, which would have to be quantitatively validated.

As an additional but separate caveat, *again* constitutes an exception to the overlap between the soft-hard distinction and whether a trigger is Focus-sensitive or not, insofar as *again* is considered to be a hard trigger by [Abusch](#) but does not qualify as Focus-sensitive with respect to the stress placement test from Section 3.3. However, *again* also took an intermediate position regarding the rating results of Experiment 3, with it being rated higher than Focus-sensitive triggers, but somewhat lower than other triggers lacking Focus-sensitivity. It might thus be possible to rectify the apparent divergence if *again* turned out to be harder to locally accommodate than other non Focus-sensitive triggers, but still easier than Focus-

sensitive triggers like *too*, in line with the pattern for global accommodation. Thus, a quantitative assessment of the relationship between local and global accommodation seems necessary to decide whether the present proposal could serve as a replacement of [Abusch's \(2010\)](#)'s soft-hard distinction.

The second proposal to be discussed here is [Sudo's \(2012\)](#) distinction between triggers that entail their presupposition and those that are purely presuppositional. In addition to the narrow set of representative examples in [Table 6.1](#), other triggers relevant to the discussion from experimental work by [Zehr & Schwarz \(2018b\)](#) - to which I will come back to shortly - include *return* and *back*, both of which pattern with non-entailing triggers.⁴ First considering the overlap between the entailing vs non-entailing distinction and a trigger's Focus-sensitivity, it becomes apparent that there is more divergence than for the soft-hard distinction. The relevant triggers here are *return* and *back*, neither of which are entailing despite not being Focus-sensitive, in addition to the previous culprit *again*.

Additionally, regarding the question how to relate the present account to the distinction between entailing and non-entailing triggers, it is not obvious how such a connection could be made. One possibility would be to adopt [Klinedinst's \(2016\)](#)'s proposal that whether a trigger entails its presupposition or not can be derived from whether it is soft or hard, which would allow us to appeal to the ideas regarding the soft-hard distinction discussed above. However, equating the two distinctions faces independent empirical challenges insofar as the two classes diverge for a few triggers. For instance, *return* and *back* seem to behave like soft triggers, but do not entail their presupposition, in contrast to *stop*, which is soft but does entail its presupposition. This divergence therefore renders an attempt to equate the two distinctions problematic.

⁴In [Zehr & Schwarz's \(2018b\)](#) results, *back* was interpreted as entailing its presupposition more so than strictly non-entailing triggers such as *also* and *again*, but still much less than a strictly entailing trigger like *stop* (*also*: <10% entailing, *back*: ≈25%, *stop*: >75%). Thus, for the purposes of discussion, *back* will be treated as non-entailing.

However, an alternative path toward an explanation for what makes - at least certain - triggers entail their presupposition has already been hinted at by Zehr & Schwarz (2018b). As a reminder, their hypothesis regarding this question was that triggers that cannot be removed from the sentence without resulting in ungrammaticality entail their presupposition, while those which can be removed do not - essentially contrasting verbal triggers and particles. Since particularly the case of *return* as behaving like a non-entailing trigger despite not being removable was inconsistent with this hypothesis, Zehr & Schwarz suggest that one other potentially relevant factor might be how the eventualities that are being presupposed relate to the eventualities at-issue. For instance, *stop* as an entailing trigger requires the presupposed eventuality to overlap with the at-issue eventuality, whereas the eventuality presupposed by *return* and *back* have to be distinct from the at-issue eventuality.

This contrast is illustrated in (6.11), where *stop* in (6.11a) is infelicitous because Mr Miyagi was not asleep right before, even though he was asleep at a previously mentioned time, while *return* and *back* in (6.11b)-(6.11c) are felicitous with - and may even require - the intermediate contrasting state.

- (6.11) Mr Miyagi fell asleep at 2am and woke up at 2pm.
- a. #Five minutes later, he **stopped** sleeping.
 - b. Five minutes later, he **returned** to sleep.
 - c. Five minutes later, he went **back** to sleep.

Appealing to these fine-grained representational properties of the respective triggers might already be necessary to account for other data such as the difference between *again* and *still* in Experiment 3 in terms of accommodation difficulty, which will be discussed in more detail the next subsection. Despite both triggers lacking Focus-sensitivity, the data showed that *still* could be accommodated with little

to no effort, similar to *continue*, while *again* seemed to incur some - albeit minor - difficulty. As argued for in Chapter 5, this contrast might be due to the eventuality presupposed by *again* being distinct from the at-issue eventuality, while *still* merely presupposes that the at-issue eventuality extends further into the past, as illustrated in (6.12). This contrast is thus analogous to the one between *return* and *back* on the one hand and *stop* on the other mentioned above.

- (6.12) Mr Miyagi fell asleep at 2am and woke up at 2pm.
- a. Five minutes later, he was asleep **again**.
 - b. #Five minutes later, he was **still** asleep.

Additionally, the contrast between *still* and *again* further highlights the need to distinguish between different uses of the notion of anaphoricity, as hinted at in Section 2.4. Both *again* and *still* are anaphoric according to Beck (2007, 2020) in terms of their lexical entry including a free variable that can be resolved contextually, but while *still* is easy to accommodate, *again* is not, contrary to Kripke's (2009) terminology.

To conclude, these findings can be taken as an argument that a formal account of presuppositions has to include a representational component. That is, in order to understand a wider range of properties of a given presupposition trigger, it is necessary to consider what the discourse representation consists of and what parts of the representation presuppositions relate to. Combining such a perspective with the present account might then be able to capture data from both Abusch's (2010) and Sudo's (2012) proposals. Furthermore, emphasizing the representational component seems particularly crucial for a theory of (global) accommodation, which will be discussed in the next subsection.

6.3.2 Accommodation

Accommodation, both as a formal mechanism in semantic theory and as a cognitive process employed by the discourse processing system, is relevant to many areas of research in linguistics and psycholinguistics. In light of this relevance, studying accommodation in terms of the conditions under which what is treated as contextual requirements leads or does not lead to unacceptability when those requirements are not met can yield important insights into the nature of the underlying representations and the means the discourse processor has available to adjust them.

However, the limits of accommodation are comparatively less well understood, beyond the recognition of factors such as controversiality/plausibility.⁵ Particularly the variation between presupposition triggers with respect to their accommodation difficulty has been known for many years but not received much attention. While the notion of anaphoricity - despite its terminological issues discussed in Section 2.4 - has proven useful in this area by highlighting the analogy with pronominal expressions, which have been more extensively studied, it is conceptually inadequate due to the fact that it only yields two classes: anaphoric triggers and non-anaphoric triggers. The present results show why a two-way distinction is insufficient, or even inaccurate. While *again* causes some difficulty, *too* causes more, in addition to *still* being easy to accommodate despite being anaphoric like *again*.

To capture these differences, I want to argue that it is necessary to take into account how triggers differ in terms of their event-structure, elaborating on the ideas from the previous subsection. Additionally, using the proposed way of formaliz-

⁵Note that this statement concerns *global* accommodation exclusively. While research on accommodation with respect to projection properties has also been sparse, there are noteworthy proposals available, such as Beaver & Zeevat (2007) and Romoli & Sauerland (2017), which are not directly relevant here, however.

ing the antecedent required by Focus-sensitive triggers with DRT may offer a way to quantify accommodation difficulty more accurately. Each of these arguments relates to one relevant contrast of the results of Experiment 3 namely the difference between *again* and *still*, and the difference between *again* and *too*.

Recall that Experiment 3 showed a larger decrease in acceptability for *too* when its presupposition was not satisfied then for *again*, but *again* still showed some decrease relative to the presuppositionless control, which was different for other triggers lacking Focus-sensitivity, such as *still*. The hypothesized contrast between Focus-sensitive triggers requiring a linguistic antecedent and not Focus-sensitive triggers accessing the Common Ground would thus leave the decrease for *again* unaccounted for.

As a first step to capture these contrasts, I propose that aspectual triggers like *again* and *still* whose presuppositions are concerned with eventualities - events and states - should be conceptualized in terms of a narrative timeline that represents when events and states take place and how they are temporally related. Furthermore, I want to suggest that eventualities on this timeline can be treated as discourse referents in DRT-like structures. Recall that DRT separates its contents into discourse referents and predications using discourse referents as arguments. On this account, a personal pronoun would simply pick up an individual-level discourse referent. *Again* would function analogously, only that its discourse referent is an eventuality rather than an individual.

Assuming such a type is independently necessary in order to capture phenomena related to tense and aspect in a narrative structure. This formal choice should however not be taken as a commitment to equating the narrative timeline with what is represented in what I have been referring to as the discourse model, since such an equation would risk the previously endorsed mapping between triggers lacking Focus-sensitivity and the Common Ground on the one hand and Focus-

sensitive triggers and the discourse model on the other.

On this account, the contrast between *again* and *still* can be captured as follows. In the case of *again*, what is being presupposed is a previous eventuality that cannot overlap with the eventuality denoted by the prejacent. That is, there has to be something in between the presupposed eventuality and the at-issue eventuality for *again* to be felicitous, similar to the cases discussed earlier in (6.11) and (6.12), repeated in (6.13a).

- (6.13) Mr Miyagi fell asleep at 2am and woke up at 2pm.
- a. Five minutes later, he was asleep **again**.
 - b. #Five minutes later, he was **still** asleep.

In contrast, *still* presupposes that the eventuality denoted by the prejacent extends further into the past, that is, there cannot be something intervening between what is presupposed and what is at-issue, as supported by the data in (6.13b). In order to accommodate *again*, it is thus necessary to introduce a new discourse referent on the narrative timeline, which incurs some processing cost. In contrast, *still* does not require the introduction of a new discourse referent such that accommodating its presupposition can take place without major adjustments to the timeline.

Secondly, turning to the contrast between *again* and *too*, what is being accessed by *too*, as sketched above for *also*, are propositions, which are composed of discourse referents and their predications rather than being primitive propositional type discourse referents, as illustrated earlier in Subsection 6.2.2. Thus, when the presupposition of *too* - or other Focus-sensitive expressions for that matter - is not satisfied, the repair process involves adding more parts to the discourse model. The observed penalty may have been further exacerbated by the presence of a preceding question, since the content of the question may be accessed automatically due to its relation to Focus, but wrongly so.

One prediction that the view that propositions are assembled from their parts makes is that the accommodation difficulty of *too*'s presupposition may vary depending on what *too* associates with. That is, if supplementing missing discourse referents, for instance, is more costly than supplementing predications, the antecedent presupposed by *too* may be harder to accommodate when *too* associates with a DP compared to when it associates with a verb. A illustrative test case is shown in (6.14). However, given that both instances are unacceptable, a proper assessment of this issue might require quantitative data.

- (6.14) a. Who practiced karate yesterday?
b. What did Aisha do yesterday?
Aisha practiced karate **too**.

Although the account sketched here needs to be developed further, I hope to have shown that including a representational component into our approaches to presuppositions may yield insights for a theory of accommodation, and can be made precise within a framework like DRT. For the time being, I will leave it at the sketch provided here, but have already pointed out several ways in which such an account makes further predictions to be tested in future work. The next subsection serves as a kind of wrap-up of the discussion on presupposition by turning to implications for a theory of presupposition more generally.

6.3.3 Presupposition Theory

One main issue for a theory of presuppositions is to reconcile the idea that there is a unique notion of meaning we identify as presuppositions with the noted variation among triggers. The prevalence of this issue is reflected in the way approaches differ with respect to which aspects of presuppositions are taken as essential and what constitutes the primary desiderata for a successful theory.

The position I want to take here is that an attempt at a unified theory of presuppositions may be misguided, in line with [Karttunen's \(2016\)](#) conclusion that the heterogeneity of presupposition triggers is due to not all triggers being of the same "species". That is, differences between triggers may be due to differences in their underlying representations, which may carry over to a need for using different formal approaches for different triggers. Specifically, the idea of +FOCUS triggers requiring a linguistic antecedent may be best captured in a theory like DRT, whereas the treatment of presuppositions in terms of the Common Ground à la [Heim \(1983\)](#) may be most appropriate for -FOCUS triggers.⁶

While developing a formal theory along those lines goes beyond the scope of the current thesis, the previous subsections offered initial ideas that may serve as jumping-off points in this respect. Relatedly, it is also worth keeping in mind that some properties in which triggers differ may also have a psycholinguistic explanation rather than require locating them as part of the grammar, which will also be elaborated on in the next section. This perspective furthermore highlights the role psycholinguistic research can have by providing arguments for or against formal linguistic theories.

6.3.4 Focus & QUDs

The question to be discussed in this subsection is how the findings relate to formal accounts of Focus, as well as QUDs. Starting with the former, one hitherto disregarded aspect of the results are their implications for the difference between bare Focus and Focus in the context of Focus-sensitive expressions. Most notably Experiments 2 and 3 used questions to indicate the Focus-structure of their respective target sentences while simultaneously manipulating the kind of presupposition trigger occurring in the target sentence. That is, Focus was present even in sen-

⁶Along similar lines, [Zeevat \(1992\)](#) argued that the anaphoric approach of [van der Sandt \(1992\)](#) and [Heim's \(1983\)](#) approach may in fact be accurate for distinct sets of triggers.

tences containing triggers lacking Focus-sensitivity and remained constant across the compared conditions, but we still saw differences emerge depending on the respective trigger. From a theoretical perspective, the results can therefore not be attributed to how Focus-alternatives per se behave in the investigated discourses but instead to the way these alternatives are used by Focus-sensitive expressions.

With respect to formal theories of Focus such as Rooth (1985, 1992), the fact that Focus-sensitive triggers showed effects different from other triggers even when Focus was kept constant may furthermore be taken as evidence to keep the relationship between Focus and Focus-sensitive expressions independent. An argument in this respect was already made in Section 3.3 by noting that the conditions of additive particles and the squiggle operator should be indistinguishable otherwise. In light of this argument, it was assumed that the purpose of Focus is to indicate a QUD, whereas Focus-sensitivity is about a covert variable *C* specified by the context. With respect to the characterization of Focus as anaphoric, the above view could then be taken to mean that only Focus-sensitive expressions are anaphoric in the sense of requiring an antecedent. Alternatively, both bare Focus and Focus-sensitive expressions could be considered anaphoric, but to different aspects of the context, namely the content as it is shaped by the discourse structure - e.g. a proposition - or the discourse structure itself - e.g. the QUD.

Regarding implications for QUDs specifically, Experiments 1a and particularly Experiment 2 provided evidence for the role of QUDs in restricting the retrieval of alternatives for Focus-sensitive particles. These results may be taken as an argument in favor of relativizing alternatives of Focus-sensitive expressions to the QUD-structure, along the lines of Beaver & Clark (2008). Alternatively, the data could also be explained in terms of a more general way in which QUDs affect the salience of material in the discourse, which may extend to other anaphora-like expressions, given that the experiments did not compare the QUD-structure with

other accounts of discourse structure. The processing side of this issue will be discussed in the next subsection.

6.3.5 Discourse Processing

The first issue to be discussed in this subsection concerns the idea proposed in Chapter 4 that QUDs can be viewed as processing domains. That is, material that addresses the same or a closely related QUD is privileged in terms of its activation, whereas a change in QUD leads to material being shunted from memory, analogous to what Gernsbacher (1985) calls processing shifts. The experiments in Chapter 4 provided evidence that the QUD-structure matters for the way Focus-sensitive expressions find their antecedent in the discourse, in line with theoretical proposals such as Beaver & Clark (2008).

While the connection between Focus-sensitive expressions and the QUD-structure was previously made in terms of salience, we may nonetheless ask whether there is an alternative perspective on the results. That is, what it is about Focus-sensitive expressions that yields the observed connection with QUDs from a processing point of view? What I want to suggest here as a starting point for addressing this question is one that takes seriously the notion of *sets* that underlies the representation of Focus-alternatives in formal approaches. In order to address this question, I first want to elaborate on the proposed view of representing a linguistic antecedent in DRT and its connection to discourse processing more generally.

As noted at the very beginning of this thesis, there is a considerable amount of work on memory representations from syntactic processing. For instance, accounts in terms of cue-based retrieval (Van Dyke & Lewis, 2003; Lewis & Vasishth, 2005) - which treats representations in memory as content-addressable by virtue of them being marked by certain features - have been applied to a variety of different phenomena, such as agreement (Wagers et al., 2009), filler-gap processing (Kim et al.,

2020), reflexives (Sloggett, 2017), NPIs (Parker & Phillips, 2016), or ellipsis (Martin, 2018). However, work on how information is represented and accessed in discourse has been much more sparse in the psycholinguistics literature (but see e.g. Myers & O'Brien 1998 for relevant research from text processing). A notable exception in this regard is research on pronouns. What distinguishes the issues that arise for processing pronouns from those related to the work presented here though, is that insights regarding personal pronouns are restricted to individual-level entities rather than a more complete representation of the content of a sentence.

What I want to suggest here is that the previously proposed idea to conceptualize the antecedent Focus-sensitive presupposition triggers require in terms of a proposition that is composed of parts of the discourse model offers an alternative perspective on the results from Experiment 2. Specifically, the finding that intervening material led to processing difficulty for *also* could be viewed in terms of similarity-based interference. To illustrate this idea, consider the sample item in (6.15). The prejacent of *also* can be represented here as *stay(amber,motel,Boston)*, which yields *stay(amber,motel,x)*, with $x \neq \text{Boston}$, after substituting a variable for the constituent *also* associates with.⁷ Although the appropriate antecedent is contributed by B_{1st} , the proposition B_{int} - *stay(amber,friend's-house,Chicago)* - still partially matches this antecedent and thus leads to interference.

(6.15) *local intervener*

A_{1st} : Where did Amber stay when she was in LA?

B_{1st} : She stayed at a motel.

A_{int} : Where did she stay when she was in Chicago?

B_{int} : She crashed at a friend's house.

⁷Assuming the set of propositions to be of this form is a simplification here, given that the question actually Focuses *at a motel*. However, by virtue of the discourse structure, *in Boston* in A_{last} has to receive stress as well, and given that this week cannot be omitted in B_{last} 's response, *in Boston* seems to be what *also* associates with.

A_{last}: Where did she stay when she was in Boston?

B_{last}: She **also** stayed at a motel in Boston.

There are a few further predictions this view makes. First, the content of the intervening material should matter, independently of the QUD-structure. That is, even with leaving the questions in (6.15) unchanged, the amount of interference may vary depending on how semantically similar the object of B_{int} is in relation to *at a motel*. For instance, *motel* and *friend's house* may be more similar than *motel* and *five star hotel*. A related case may be the suggestive pattern in Experiment 2 of items with implicit negation showing a numerically larger rating decrease. These cases could be conceived of as entailing the negation of the required antecedent and thus matching perfectly except for the embedding operator.

Secondly, the interference view would - similar to the original salience view on QUDs - predict that changing the QUD of the intervening material should affect the processing of *also*, but for different reasons. To illustrate this point, consider the two dialogues in (6.16) (repeated from (4.21)), which only differ in the intervening question-answer pair.

(6.16) a. *local intervener*

A_{1st}: Where did Amber stay when she was in LA?

B_{1st}: She stayed at a motel.

A_{int}: *Where did she stay when she was in Chicago?*

B_{int}: *She crashed at a friend's house.*

A_{last}: Where did she stay when she was in Boston?

B_{last}: She **also** stayed at a motel in Boston.

b. *non-local intervener*

A_{1st}: Where did Amber stay when she was in LA?

B_{1st}: She stayed at a motel.

A_{int}: *Where did Beth stay when she was in LA?*

B_{int}: *She crashed at a friend's house.*

A_{last}: Where did Amber stay when she was in Boston?

B_{last}: She **also** stayed at a motel in Boston.

For the intervening question-answer pair in (6.16a), there is a global QUD available that spans the whole discourse, namely “*Where did Amber stay where?*”. In contrast, the intervener in (6.16b) instead sets up a distinct QUD of the form “*Who stayed where in LA?*”, connecting the intervener with the first question-answer pair. The intervener in (6.16b) thus has less semantic overlap with the antecedent *also* would be looking for. The prediction that changing the intervening QUD should cause less interference would thus receive deeper grounding. Additionally, interference itself could be understood in relation to Focus-alternatives being conceptualized formally as sets, with the relation between its members being causal to the interference effects. Developing a theory that treats the way Focus-sensitive expressions access propositional content in the discourse along those lines could therefore yield broader insights into discourse processing that are tightly linked to approaches in formal linguistic theory.

However, it is worth emphasizing that the present proposal at its current stage is not intended as an exhaustive account of discourse memory, but as a starting point for future research that offers further predictions to be tested. In a similar vein, the next section delves into some of the limitations of the present thesis and possible extensions.

6.4 Extensions and Future Work

In addition to its implications, there are also a few ways in which the current findings are limited. Three specific ones to be discussed here are its restriction to data from English, the broad but still limited set of triggers tested here, and the restriction to conventionalized Focus-sensitivity. I will elaborate on these issues in turn and discuss future extensions.

The first limitation concerns the fact that the data presented here was restricted to English. We might thus wonder to what extent the claims of the FoPAH have cross-linguistic validity. Minimally, the two main properties providing evidence for the FoPAH - discourse interference from Experiment 2 and accommodation difficulty from Experiment 3 - seem to carry over into German, based on my own intuitions as a native speaker. In the German variant of the sample item from Experiment 2 in (6.17), *auch* ('also') seems less acceptable than *wieder* ('again') when the intervening material is present.

- (6.17) A_{1st}: How did Martha get to work two weeks ago?
B_{1st}: She took the train.
(A_{int}: *How did she get to work last week?*
B_{int}: *She took the bus.*)
A_{last}: How did she get to work this week?
- a. B_{last}: Diese Woche hat sie **auch** den Zug genommen.
this week has she also the train taken
B_{last}: 'She also took the train this week.'
- b. B_{last}: Diese Woche hat sie **wieder** den Zug genommen.
this week has she again the train taken
B_{last}: 'She took the train again this week.'

Similarly, including *auch* in B's response in the German variant of a sample item

from Experiment 3 in (6.18) intuitively leads to a larger decrease in acceptability than including *wieder*. Although German and English are quite closely related, this pattern therefore provides evidence against restricting the claims made here to English exclusively.

- (6.18) A: Who is having dinner in Frankfurt tomorrow?
- a. B: (**Auch**) Jonas hat morgen (**wieder**) Abendessen in Frankfurt.
also J. has tomorrow again dinner in F.
B: 'Jonas has dinner in Frankfurt tomorrow (too/again).'

However, beyond this minimal extension, the question regarding the FoPAH's cross-linguistic applicability is non-trivial for two main reasons. The first concerns the realization and representation of Focus cross-linguistically. In intonational languages like English and German, Focus is primarily marked prosodically. However, languages use different means to indicate Focus, for instance syntactically, as in Hungarian (Szabolcsi, 1981), or morphologically, as in Gùrùntùm (Hartmann & Zimmermann, 2009). This variation raises deeper questions regarding whether the notion of Focus in terms of evoking alternatives assumed here covers other languages as well. Zimmermann & Onea (2011) argue that this characterization of Focus does in fact have cross-linguistic validity. However, languages may also differ in the way alternatives are being evoked, for instance whether they are pragmatically inferred or restricted to specific mentions in the context. Exploring cross-linguistic variation in this way will be left for future work.

The second reason a generalization across languages is difficult concerns the representation of presuppositions. As mentioned in Section 2.3, impressionistically it seems to be the case that at least some presuppositional expressions have cross-linguistic stability. That is, the equivalent of a trigger like *stop* in other languages is going to make the same cut with respect to which parts of its content are at-issue

and which are presupposed. However, to what extent presuppositions behave the same way across languages is an open question. Although there is some cross-linguistic work, it rarely goes beyond a small set of well-studied languages from similar language families, such as German (Schwarz, 2007; Tiemann, 2014), Spanish (Amaral & Cummins, 2015), French (Chemla, 2009), or Italian (Domaneschi, 2016). Notable exceptions to this restriction are Tonhauser et al. (2013) on Paraguayan Guaraní - which was discussed in Section 2.4 - and Matthewson (2006, 2008) on Lillooet.

The data on different presuppositional expressions reported by Tonhauser et al. (2013) can be taken as evidence that some crucial features of the present account carry over to other languages. The authors show for instance that the Guaraní equivalents of *too* and *stop* pattern as in English with respect to accommodation difficulty - or Strong Contextual Felicity in their terms. These data are therefore promising regarding an extension of the FoPAH to languages unrelated to English.

Matthewson (2006, 2008) on the other hand provides evidence for what might be considered parametric variation with respect to the representation of presuppositions across languages. Matthewson argues that presuppositions in Lillooet do not constitute contextual requirements based on data showing that speakers easily accept presuppositional expressions introducing new information. The triggers she tests include equivalents to *again*, *stop* and *also*, as well as pronouns. Her account of this variation is framed in terms of an alternative proposal toward presuppositions by Gauker (1998), according to which presuppositions do not have to be part of the Common Ground but simply the speaker's take on certain facts.

The crucial question here in order to assess how these findings might be in opposition to the FoPAH - to the extent that they are not already in opposition to other more fundamental issues - is how Focus-sensitivity is represented in Lillooet, or rather more specifically whether the equivalent to *also* can be considered

to be Focus-sensitive. However, Matthewson's data also already shows that the equivalent to *again* can easily introduce new information, despite it lacking Focus-sensitivity in English and contrary to the results of Experiment 3. On the other hand, the decrease for *again* in Experiment 3 might have been small enough to not be essentially different from its behavior in Lillooet. A potentially interesting path for further exploration could then be to test whether triggers in Lillooet give rise to the interference effects observed for *also* in Experiment 2. If such effects were absent, the behavior of presupposition triggers in Lillooet would fit with the treatment of triggers lacking Focus-sensitivity in the FoPAH.⁸ Overall, more data is needed to assess the scope of the FoPAH across languages.

The second aspect with respect to which the current thesis is limited concerns the set of triggers tested. Although the investigation was not restricted to just one trigger from each set and therefore relatively broad, there were also a few prominent trigger types not included here. The potentially most notable ones are factives and to a lesser degree *it*-clefts.

Regarding factives, the main reasons for not including them here was due to their obvious syntactic differences, insofar as their presupposition is expressed with a full clause. Additionally, at least some factives are known to easily allow for informative presuppositions, which means a factive might not require accessing the discourse in the same way and thus not allow us to probe the underlying mechanism. However, at least the claim that factives are easy to accommodate would be in line with the prediction of the FoPAH.

Concerning *it*-clefts, a crucial question that needs to be addressed before being able to evaluate how they would fit into the current picture is what their presupposition exactly is. It is usually argued that an *it*-cleft carries an existential presup-

⁸An alternative explanation would be that the assumed presuppositional expressions in Lillooet are not presuppositions in the first place but conventional implicatures, which would be consistent with Matthewson's (2006) argument to treat them as presuppositions based on their projection behavior.

position identical to the one assumed for bare Focus, as illustrated in (6.19).⁹

- (6.19) a. **It was Katie** who found Gordon.
b. [KATIE]_F found Gordon.
 ↪ *Someone found Gordon*

However, as discussed in Section 3.4, the assumed existential presupposition of bare Focus is quite weak and easily blocked - which was taken as an argument for treating the presupposition of Focus in terms of QUDs - whereas the presupposition of *it*-clefts seems stronger, as shown by the contrast in (6.20).

- (6.20) Who found Gordon?
a. #**It was nobody** who found Gordon.
b. [NOBODY]_F found Gordon.

(adapted from DRYER 1996, (12))

Nonetheless, the fact that Focus is involved might be taken as an argument that *it*-clefts fit the FoPAH. Thus, while the behavior of other triggers has to be investigated properly in order to assess the validity of the FoPAH, at least on first glance the predictions for other triggers seem to be met.

The third and final limitation that constitutes more of an intentional restriction concerns the type of Focus-sensitivity relevant to the FoPAH. As discussed in Section 3.3, Beaver & Clark (2008) distinguish between three different types of Focus-sensitivity: quasi-association, which covers non-veridical propositional operators like negation; free association, which is the restriction of a free variable for expressions like *always*; and conventionalized association, which is a grammatical-

⁹It has also been argued that the exhaustive inference associated with *it*-clefts is presuppositional (e.g. Büring & Kríž 2013). However, given that this claim remains controversial (see Drenhaus et al. 2011 for discussion as well as experimental results), it will be put aside here.

ized dependency on Focus exemplified by particles like *only* and *even*. Notably, all expressions tested here were of the conventionalized type. The motivation for in turn restricting the claims of the FoPAH to this type was that the formal treatment of these expressions involves an anaphoric dependency, analogous to the characterization of Focus-sensitive expressions requiring a linguistic antecedent.

However, it may still be the case that certain properties found for conventionalized Focus-sensitivity are present for other types as well. For example, the idea of QUDs as processing domains and the evidence from Chapter 4 supporting it may also apply to free association cases, insofar as such cases are about restricting the domain of quantification in some way. However, intuitively a case like *always* also differs from the expressions tested here with respect to accommodation, since they are acceptable without contextual support, possibly due to the availability of a default interpretation. It seems therefore reasonable to maintain the restriction of the claims of the FoPAH to conventionalized association with Focus, even if some properties may be shared with other types of Focus-sensitivity.

To conclude, there are quite a number of ways in which the scope of the present investigation can be extended to other languages, trigger types, and Focus-sensitive expressions. Additionally, the previous section sketched out ideas that may prove useful in the development of a theory of accommodation, as well as discourse processing more broadly and the question of how contextual information is represented and accessed. The thesis thus outlines several paths for future investigations specifically into the representations of propositional content in terms of the Common Ground and the discourse model.

APPENDIX:

ADDITIONAL DATA

A.1 Presuppositions in a Typology of Meaning - Diagnostics Data

This section presents data from the diagnostics for identifying presuppositional content - and contrastingly other kinds of meaning - proposed in Section 2.1. The example for each (type of) expression is ordered as follows: targetability, defeasibility, nondisplaceability. Data is organized with respect to the distinctions made in Section 2.1, followed by presupposition triggers discussed in Section 2.4, and lastly those triggers used in the experiments of this thesis that are not mentioned in this section.

Non-presuppositional Meaning

(A.1) At-issue content

Gordon is growing a beard.

⇒ *Gordon is growing a beard*

a. A: Gordon is growing a beard.

B: That's not true, he shaved this morning.

b. Gordon is growing a beard.

#In fact, he shaved this morning.

c. Whenever Gordon has a new idea, he is growing a beard.

→ False/infelicitous if there is any Gordon-having-a-new-idea situation in which he is not growing a beard.

(A.2) Conversational Implicatures

Donna acquired **some** of the shares of *Mutiny*.

↪ *Donna hasn't acquired all of the shares of Mutiny*

a. A: Donna acquired **some** of the shares of *Mutiny*.

B: #That's not true, she acquired all of the shares.

b. Donna acquired **some** of the shares of *Mutiny*.

In fact, she acquired all of them.

c. Whenever Donna gets enough money, she acquires **some** of the shares of *Mutiny*.

→ False/infelicitous if there is any Donna-getting-enough-money situation in which she acquires all of the shares.

(A.3) Conventional Implicatures - Epithets

That jerk Joe works at IBM.

↪ *The speaker has a negative attitude toward Joe*

a. A: **That jerk** Joe works at IBM.

B: #That's not true, you said he was super nice just yesterday.

b. **That jerk** Joe works at IBM.

#In fact, I really like him.

c. Whenever Cameron wants to leave, **that jerk** Joe convinces her to stay.

→ Not false/infelicitous if there is any Cameron-wanting-to-leave situation in which the speaker doesn't have a negative attitude toward Joe.

(A.4) Conventional Implicatures - Expressive Adjectives

Bos broke his **damn** contract.

→ *The speaker has a negative attitude with respect to Bos breaking his contract*

a. A: Bos broke his **damn** contract.

B: #That's not true, you were happy about the idea of Bos breaking his contract just yesterday.

b. Bos broke his **damn** contract.

#In fact, I feel quite happy about it.

c. Whenever Bos gets under pressure, he breaks his **damn** contract.

→ Not false/infelicitous if there is any Bos-getting-under-pressure situation in which the speaker doesn't have a negative attitude toward Bos breaking his contract.

Presupposition Triggers from Section 2.4

(A.5) Definite Descriptions

The TV-show *Halt and Catch Fire* was never nominated for an Emmy.

→ *There is a unique TV-show called Halt and Catch Fire*

a. A: **The TV-show *Halt and Catch Fire*** was never nominated for an Emmy.

B: #That's not true, there's no show with that name.

b. **The TV-show *Halt and Catch Fire*** was never nominated for an Emmy.

#In fact, there is no show with that name.

c. Whenever Alex texts Emma in the evening, he talks about **the TV-show *Halt and Catch Fire***.

→ False/infelicitous if there is any Alex-texting-Emma-in-the-evening situation in which there is no TV-show *Halt and Catch Fire*.

(A.6) Selectional Restrictions

Cameron is a **bachelorette**.

↪ *Cameron is female*

a. A: Cameron is a **bachelorette**.

B: #That's not true, Cameron is male.

b. Cameron is a **bachelorette**.

#In fact, (s)he's male.

c. Whenever Cameron drives out to the country, she celebrates being a **bachelorette**.

→ False/infelicitous if there is any Cameron-driving-to-the-country situation in which she is not female.

(A.7) Achievement Verbs

Haley **won** a science competition at school.

↪ *Haley participated in a science competition*

a. A: Haley **won** a science competition at school.

B: ?That's not true, she didn't participate in any competition.

b. Haley **won** a science competition at school.

#In fact, she didn't participate in the competition.

c. Whenever Haley gets inspired, she **wins** a science competition.

→ False/infelicitous if there is any Haley-getting-inspired situation in which she does not participate in a science competition.

(A.8) Cognitive Factives

Diane **discovered** that Bos hid something from her.

↪ *Bos hid something from Diane*

a. A: Diane **discovered** that Bos hid something from her.

B: #That's not true, Bos didn't hide anything from Diane.

- b. Diane **discovered** that Bos hid something from her.
#In fact, Bos didn't hide anything from Diane.
- c. Whenever Diane looks around the garage, she **discovers** that Bos hid something from her.
→ False/infelicitous if there is any Diane-looking-around-the-garage situation in which Bos didn't hide something from her.

(A.9) Emotive Factives

Joe **regrets** that he left Texas.

→ *Joe left Texas*

- a. A: Joe **regrets** that he left Texas.
B: #That's not true, Joe didn't leave Texas.
- b. Joe **regrets** that he left Texas.
#In fact, Joe didn't leave Texas.
- c. Whenever Joe thinks of Cameron, he **regrets** that he left Texas.
→ False/infelicitous if there is any Joe-thinking-of-Cameron situation in which he didn't leave Texas.

(A.10) Aspectual Verbs: stop

Joanie **stopped** going to school.

→ *Joanie went to school before*

- a. A: Joanie **stopped** going to school.
B: #That's not true, Joanie never went to school before.
- b. Joanie **stopped** going to school.
#In fact, Joanie never went to school before.
- c. A: Joanie went to school on Monday.
B: Whenever Joanie gets a bad grade, she **stops** going to school on Wednesday.

→ False/infelicitous if there is any Joanie-getting-a-bad-grade situation in which she didn't go to school on Monday.

(A.11) Aspectual Verbs: *return*

Lev **returned** to work at *Mutiny*.

↪ *Lev was working at Mutiny before*

a. A: Lev **returned** to work at *Mutiny*.

B: #That's not true, he never worked at *Mutiny* before.

b. Lev **returned** to work at *Mutiny*.

#In fact, he never worked at *Mutiny* before.

c. A: Lev went to work on Monday.

B: Whenever Lev takes a day off on Tuesday, he **returns** to work on Wednesday.

→ False/infelicitous if there is any Lev-taking-a-day-off situation in which he didn't go to work on Monday.

(A.12) Aspectual Particles: *back*

Donna went **back** to work.

↪ *Donna was at work before*

a. A: Donna went **back** to work.

B: #That's not true, she hasn't been working before.

b. Donna went **back** to work.

#In fact, she hasn't been working before.

c. A: Donna went to work on Monday.

B: Whenever Donna takes a day off on Tuesday, she goes **back** to work on Wednesday.

→ False/infelicitous if there is any Donna-taking-a-day-off situation in which she didn't go to work on Monday.

(A.13) Aspectual Particles: temporal *still*

Gordon is **still** growing a beard.

↪ *Gordon was growing a beard before*

a. A: Gordon is **still** growing a beard.

B: #That's not true, he wasn't growing a beard before.

b. Gordon is **still** growing a beard.

#In fact, he wasn't growing a beard before.

c. A: Gordon was cooking pasta at 6pm yesterday.

B: Whenever Gordon has a date, he's **still** cooking pasta at 7pm.

→ False/infelicitous if there is any Gordon-having-a-date situation in which he wasn't cooking pasta at 6pm before.

(A.14) Aspectual Particles: *again*

Gordon grew a beard **again**.

↪ *Gordon had a beard before*

a. A: Gordon grew a beard **again**.

B: #That's not true, he's never had a beard before.

b. Gordon grew a beard **again**.

#In fact, it was the first time he grew a beard.

c. A: Diane gave Bos a smile yesterday during the meeting.

B: Whenever she's at the gym, she smiles at him **again**.

→ False/infelicitous if there is any Diane-at-the-gym situation in which Diane hasn't smiled at Bos before during the meeting.

(A.15) Additive Particles

TOM got hired by *Mutiny* **too**.

↪ *Someone other than Tom got hired by Mutiny*

- a. A: TOM got hired by *Mutiny* **too**.
B: #That's not true, Tom was the only one who got hired at *Mutiny*.
- b. TOM got hired by *Mutiny* **too**.
#In fact, Tom was the only one who got hired at *Mutiny*.
- c. A: Cameron developed a new game.
B: Whenever he has a good night of sleep, TOM develops a new game **too**.
→ False/infelicitous if there is any Tom-getting-a-good-night-of-sleep situation in which Cameron didn't develop a new game.

(A.16) Scalar Particles

Ryan **even** [quit his job]_F.

↪ *Ryan quitting his job was unexpected or noteworthy*

- a. A: Ryan **even** [quit his job]_F.
B: #That's not true, quitting his job wasn't a noteworthy thing to do for Ryan.
- b. Ryan **even** [quit his job]_F.
#In fact, quitting his job wasn't a noteworthy thing to do for Ryan.
- c. Whenever Ryan feels unfulfilled, he **even** [quits his job]_F.
→ False/infelicitous if there is any Ryan-feeling-unfulfilled situation in which quitting his job isn't a noteworthy thing to do for Ryan.

(A.17) It-Clefts

It was Katie who found Gordon.

↪ *Someone found Gordon*

- a. A: **It was Katie** who found Gordon.
B: ??That's not true, Gordon is still missing.

- b. **It was Katie** who found Gordon.
#In fact, Gordon is still missing.
- c. Whenever Gordon goes missing, **it is Katie** who finds him.
→ False/infelicitous if there is any Gordon-going-missing situation in which nobody finds him.

Remaining Presupposition Triggers used in Experiments

(A.18) *continue*

Haley **continued** to work at *Comet*.

↷ *Haley worked at Comet before*

- a. A: Haley **continued** to work at *Comet*.
B: #That's not true, Haley never worked at *Comet* before.
- b. Haley **continued** to work at *Comet*.
#In fact, Haley never worked at *Comet* before.
- c. A: Haley went to work at *Comet* on Monday.
B: Whenever Haley gets sick on Tuesday, she **continues** going to work on Wednesday.
→ False/infelicitous if there is any Haley-getting-sick situation in which she didn't go to work on Monday.

(A.19) *only*

Joe **only** offered Gordon [1 million dollars]_F.

↷ *1 million dollars is a comparatively small amount*

- a. A: Joe **only** offered Gordon [1 million dollars]_F.
B: #That's not true, 1 million dollars is a lot of money.
- b. Joe **only** offered Gordon [1 million dollars]_F.
#In fact, 1 million dollars is a lot of money.

- c. Whenever Joe has a new idea for a project, he offers Gordon **only** [1 million dollars]_F.
→ False/infelicitous if there is any Joe-having-a-new-idea situation in which 1 million dollars is not a comparatively small amount.

(A.20) concessive at least

At least Cameron gets to travel.

↪ *There are worse things than traveling*

- a. A: **At least** Cameron gets to travel.
B: #That's not true, getting to travel doesn't make things better at all.
- b. **At least** Cameron gets to travel.
#In fact, getting to travel isn't good at all.
- c. Whenever Cameron has to attend a conference, **at least** she gets to travel.
→ False/infelicitous if there is any Cameron-attending-a-conference situation in which getting to travel isn't an improvement.

A.2 Typology of Presupposition Triggers - Overview Table

This section provides a summary table of each of the classifications and related experimental results discussed in Section 2.4 for a selected set of triggers. Although some classifications might mention other triggers as well, they were omitted here if those triggers have not received much attention elsewhere. The respective labels are based on Abusch (2002, 2010); Abbott (2006); Walker (2012) (soft/hard), Sudo (2012); Zehr & Schwarz (2016, 2018b) ((non-)entailing), Zehr & Schwarz (2018b) (removable), Glanzberg (2005); Domaneschi et al. (2014) (weak/strong), Tiemann (2014) (independent), Zeevat (1992, 1994, 2002, 2004), as well as Francis's (2018) *even*-denial (lexical/resolution), Cummins et al. (2013) (backgrounding), Kripke

(2009) (anaphoric), Beck (2007, 2020); Schwarz (2009) (contextual variable), Tonhauser et al. (2013) (SCF, OLE), Bade (2016) (obligatoriness), and the data in the following section for the present classification in terms of Focus-sensitivity (in parentheses, if tested intuitively but not included in the next section). For some of the intermediate labels, the reader is referred to the discussion in Section 2.4.

	soft/ hard	(non-)entailing	removable	weak/ strong	independent
Def. Descr. (<i>the N</i>)	~	non-entailing	no	(strong)	yes
Sel. Restr. (<i>bachelorette</i>)		entailing	no		
Ach. V (<i>win</i>)	soft		no		
Cogn. Fact. (<i>know</i>)	soft	entailing	no	strong	yes
Emot. Fact. (<i>regret</i>)	hard		no	strong	
Asp. V: <i>stop</i>	soft	entailing	no		yes
Asp. V: <i>return</i>		non-entailing	no		
Asp. Part.: <i>back</i>		(non-entailing)	yes		
Asp. Part.: <i>still</i>			yes		
Asp. Part.: <i>again</i>	hard	non-entailing	yes		no
Add. Part. (<i>too/also</i>)	hard	non-entailing	yes	weak	no
Scrl. Part. (<i>even</i>)	hard	non-entailing	yes	weak	
<i>It</i> -clefts	hard		yes	strong	

Table A.1: Trigger Typology Complete Overview, I

	lexical/ resolution	backgrounding	anaphoric à la Kripke	contextual variable
Def. Descr. (<i>the N</i>)	resolution			(yes)
Sel. Restr. (<i>bachelorette</i>)	lexical			
Ach. V (<i>win</i>)	(lexical)			
Cogn. Fact. (<i>know</i>)				
Emot. Fact. (<i>regret</i>)	lexical	no		
Asp. V: <i>stop</i>		no	no	yes
Asp. V: <i>return</i>				
Asp. Part.: <i>back</i>				
Asp. Part.: <i>still</i>		no		yes
Asp. Part.: <i>again</i>	3rd	yes	yes	yes
Add. Part. (<i>too/also</i>)	3rd	yes	yes	yes
Scrl. Part. (<i>even</i>)				
<i>It</i> -clefts	3rd		yes	

Table A.2: Trigger Typology Complete Overview, II

	SCF	OLE	obligatoriness	Focus-sensitive
Def. Descr. (<i>the N</i>)			Maximize PSP	(no)
Sel. Restr. (<i>bachelorette</i>)				(no)
Ach. V (<i>win</i>)				(no)
Cogn. Fact. (<i>know</i>)	no	yes	(Exhaust.)	(no)
Emot. Fact. (<i>regret</i>)				(no)
Asp. V: <i>stop</i>	no	yes		no
Asp. V: <i>return</i>				(no)
Asp. Part.: <i>back</i>				no
Asp. Part.: <i>still</i>				no
Asp. Part.: <i>again</i>			Exhaust.	no
Add. Part. (<i>too/also</i>)	yes	no	Exhaust.	yes
Scrl. Part. (<i>even</i>)				yes
<i>It</i> -clefts				(yes)

Table A.3: Trigger Typology Complete Overview, III

A.3 Association with Focus & Focus-sensitivity - Diagnostics Data

This section contains data applying the Stress Placement Test to the presupposition triggers used in the experiments of this thesis as evidence for classifying them as Focus-sensitive or not. Triggers qualifying as Focus-sensitive in addition to *also/too* are *even*, *only*, and concessive *at least*. Triggers showing no evidence of Focus-sensitivity in addition to *again* are *still*, *continue*, *stop*, and *back*.

+FOCUS

even

(A.21) a. Context A

Tiffany always orders pad thai, and always from Thai Garden.

b. Context B

Tiffany always orders chicken tempura, but never from Thai Garden.

(A.22) a. A: Did Tiffany order anything from Thai Garden yesterday?

B: Yes, she **even** ordered [CHICKEN TEMPURA]_F from Thai Garden.

b. A: Did Tiffany order chicken tempura yesterday?

B: Yes, she **even** ordered chicken tempura [FROM THAI GARDEN]_F.

→ (A.22a) acceptable in Context A but infelicitous in Context B, and vice versa for (A.22b)

only

(A.23) a. Context A

Tiffany orders chicken tempura from Thai Garden and from Asian Taste.

b. Context B

Tiffany orders chicken tempura and pad thai from Thai Garden.

(A.24) a. A: What did Tiffany order from Thai Garden?

B: She **only** ordered [CHICKEN TEMPURA]_F from Thai Garden.

b. A: Where did Tiffany order chicken tempura from?

B: She **only** ordered chicken tempura [FROM THAI GARDEN]_F.

→ (A.24a) acceptable in Context A but infelicitous in Context B, and vice versa for (A.24b)

Concessive at least

(A.25) a. Context A

Tiffany orders chicken tempura from Thai Garden - which is their best dish, but also worse than at any other restaurant - but hates the service.

b. Context B

Tiffany orders chicken tempura from Thai Garden - which is their worst dish, but better than at any other restaurant - but hates the service.

(A.26) A: Tiffany really hated the service at Thai Garden.

a. B: **At least** she ordered [CHICKEN TEMPURA]_F from Thai Garden.

b. B: **At least** she ordered chicken tempura [FROM THAI GARDEN]_F.

→ (A.26a) acceptable in Context A but infelicitous in Context B, and vice versa for (A.26b)

-FOCUS

Temporal *still*

(A.27) a. Context A

Tiffany used to order pad thai from Thai Garden.

Recently, she's been getting chicken tempura from Thai Garden instead.

b. Context B

Tiffany used to order chicken tempura from Asian Taste.

Recently, she's been getting chicken tempura from Thai Garden instead.

(A.28) a. A: What has Tiffany been ordering from Thai Garden recently?

B: She is **still** ordering [CHICKEN TEMPURA]_F from Thai Garden.

b. A: Where has Tiffany been ordering chicken tempura from recently?

B: She is **still** ordering chicken tempura [FROM THAI GARDEN]_F.

→ both (A.28a) and (A.28b) infelicitous in either context

(A.29) Control Context

Tiffany has been ordering pad thai from Thai Garden for a while.

→ both (A.28a) and (A.28b) felicitous in control context

continue

(A.30) a. Context A

On Monday, Tiffany had pad thai from Thai Garden.

On Tuesday, she had chicken tempura from Thai Garden.

b. Context B

On Monday, Tiffany had chicken tempura from Asian Taste.

On Tuesday, she had chicken tempura from Thai Garden.

(A.31) a. A: What did Tiffany order from Thai Garden on Tuesday?

B: She **continued** ordering [CHICKEN TEMPURA]_F from Thai Garden.

b. A: Where did Tiffany order chicken tempura from on Tuesday?

B: She **continued** ordering chicken tempura [FROM THAI GARDEN]_F.

→ both (A.31a) and (A.31b) infelicitous in either context

(A.32) Control Context

On Monday and Tuesday, Tiffany had chicken tempura from Thai Garden.

→ both (A.31a) and (A.31b) felicitous in control context

stop

- (A.33) a. Context A
On Monday, Tiffany had pad thai from Thai Garden.
On Tuesday, she had pineapple fried rice from Asian Taste.
- b. Context B
On Monday, Tiffany had chicken tempura from Asian Taste.
On Tuesday, she had pineapple fried rice from Asian Taste.
- (A.34) a. A: What did Tiffany order from Thai Garden on Tuesday?
B: She **stopped** ordering [CHICKEN TEMPURA]_F from Thai Garden, she got pineapple fried rice from Asian Taste instead.
- b. A: Where did Tiffany order chicken tempura from on Tuesday?
B: She **stopped** ordering chicken tempura [FROM THAI GARDEN]_F, she got pineapple fried rice from Asian Taste instead.

→ both (A.34a) and (A.34b) infelicitous in either context

- (A.35) Control Context
On Monday, Tiffany had chicken tempura from Thai Garden.
On Tuesday, she had pineapple fried rice from Asian Taste.

→ both (A.34a) and (A.34b) felicitous in control context

back

- (A.36) a. Context A
On Monday, Tiffany had pad thai from Thai Garden.
On Tuesday, she had banh mi from Miss Saigon.
On Wednesday, she had chicken tempura from Thai Garden.

b. Context B

On Monday, Tiffany had chicken tempura from Asian Taste.

On Tuesday, she had banh mi from Miss Saigon.

On Wednesday, she had chicken tempura from Thai Garden.

- (A.37) a. A: What did Tiffany order from Thai Garden on Wednesday?
B: She went **back** to ordering [CHICKEN TEMPURA]_F from Thai Garden.
- b. A: Where did Tiffany order chicken tempura from on Wednesday?
B: She went **back** to ordering chicken tempura [FROM THAI GARDEN]_F.

→ both (A.37a) and (A.37b) infelicitous in either context

(A.38) Control Context

On Monday, Tiffany had chicken tempura from Thai Garden.

On Tuesday, she had banh mi from Miss Saigon.

On Wednesday, she had chicken tempura from Thai Garden.

→ both (A.37a) and (A.37b) felicitous in control context

A.4 Experimental Items

A.4.1 Experiments 1a/1b

- (A.39) A₁: Did Anne participate in the { BIKE RACE / ROWING CONTEST }?
B₁: She did but she didn't { *win a medal / make it to the finish line* }.
- A₂: Did Beth participate in the bike race?
B₂: Yes. She **even** made it to the finish line.
- Experiment 1b*: Yes, and she might've made it to the finish line.

- (A.40) A₁: Did Sue attend the {HISTORY CLASS / CLASS ON GLOBALIZATION}?
 B₁: She did but she didn't { *get an A / do any background readings* }.
 A₂: Did Sabrina attend the history class?
 B₂: Yes. She **even** did all the background readings.
Experiment 1b: Yes, and she might've done all the background readings.
- (A.41) A₁: Did Jeff go shopping { AFTER CHRISTMAS / ON BLACK FRIDAY }?
 B₁: He did but he didn't buy { *a suit / any socks* }.
 A₂: Did Brett go shopping after Christmas?
 B₂: Yes. He **even** bought new socks.
Experiment 1b: Yes, and he might've bought new socks.
- (A.42) A₁: Did Frank go to the { CHARITY GALA / PROM }?
 B₁: He did but he didn't get a { *limousine / date* }.
 A₂: Did Jake go to the prom?
 B₂: Yes. He **even** had a date.
Experiment 1b: Yes. Apparently he had a date.
- (A.43) A₁: Did Bill play in the { SOCCER / BASKETBALL } game last weekend?
 B₁: He did but he { *wasn't player of the match / didn't score* }.
 A₂: Did Ray play in the basketball game?
 B₂: Yes. He **even** scored two points.
Experiment 1b: Yes. Apparently he scored two points.
- (A.44) A₁: Did Charlie { TAKE A COOKING CLASS / MAKE DINNER FOR HIS FRIENDS } recently?
 B₁: He did but he didn't use the { *ice cream maker / oven* }.
 A₂: Did Kevin make dinner for his friends?
 B₂: Yes. He **even** used the oven.
Experiment 1b: Yes. Apparently he used the new oven.

- (A.45) A₁: Is Maggie a member of the { RED CROSS / ACLU }?
 B₁: She is but she doesn't donate more than { \$100 / \$10 } a year.
 A₂: Is Jill a member of the ACLU?
 B₂: Yes. She **even** donates \$20 a year.
Experiment 1b: Yes. Apparently she donates \$20 a year.
- (A.46) A₁: Did Karen go to { THE MOVIES / CHURCH } last week?
 B₁: She did but she didn't stay {for the whole thing /longer than 5 minutes}.
 A₂: Did Susie go to church last week?
 B₂: Yes. She **even** stayed 10 minutes.
Experiment 1b: Yes. Apparently she stayed 10 minutes.
- (A.47) A₁: Did Mark go to the { ROCK CONCERT / FRAT PARTY } on Saturday?
 B₁: He did but he didn't drink { any hard liquor / anything }.
 A₂: Did Jim go to the frat party?
 B₂: Yes. He **even** had some beer.
Experiment 1b: Yes, and he might've had some beer.
- (A.48) A₁: Did Francine go to the { BEACH / SWIMMING POOL }?
 B₁: She did but she didn't { swim much / sit close to the water }.
 A₂: Did Meg go to the swimming pool?
 B₂: Yes. She **even** sat close to the water.
Experiment 1b: Yes. Apparently she sat close to the water.
- (A.49) A₁: Did Garry go out to dinner at the { COUNTRY CLUB / NEW ITALIAN PLACE }?
 B₁: He did but he left before the { dessert / main course }.
 A₂: Did Hank go out to dinner at the new Italian place?
 B₂: Yes. He **even** stayed for the main course.
Experiment 1b: Yes, and he might've stayed for the main course.

- (A.50) A₁: Did Mike go to the { GROCERY STORE / FARMER'S MARKET } on Sunday?
B₁: He did but he didn't buy any { *rhubarb / onions* }.
A₂: Did Joe go to the farmer's market?
B₂: Yes. He **even** bought onions.
Experiment 1b: Yes, and he might've bought onions.
- (A.51) A₁: Did Marina go to { EVERGLADES NATIONAL PARK / THE NATIONAL AQUARIUM }?
B₁: She did but she didn't see the { *great white shark / carp* }.
A₂: Did Phil go to the National Aquarium?
B₂: Yes. He **even** checked out the green frogs.
Experiment 1b: Yes. Apparently he checked out the green frogs.
- (A.52) A₁: Did Ron go to { NEW YORK / BOSTON } last weekend?
B₁: He did but he didn't { *take a bus your / go downtown* }.
A₂: Did Luke go to Boston?
B₂: Yes. He **even** walked around the downtown area.
Experiment 1b: Yes. Apparently he walked around the downtown area.
- (A.53) A₁: Did Greg visit { HARVARD / MIT } last Friday?
B₁: He did but he left { *before dinner / around 11am* }.
A₂: Did Luke visit MIT?
B₂: Yes. He **even** stayed for lunch.
Experiment 1b: Yes, and he might've stayed for lunch.
- (A.54) A₁: Did Mark go to { WHOLE FOODS / BUTCHER } on Friday?
B₁: He did but he didn't buy any { *filet mignon / ground beef* }.
A₂: Did Ginny go to the butcher?
B₂: Yes. He **even** bought ground beef.

Experiment 1b: Yes. Apparently she bought ground beef.

A.4.2 Experiment 2

Weak Contrast

- (A.55) A_{1st}: Where did Amber stay when she was in LA?
B_{1st}: She stayed at a motel.
(A_{int}: *Where did she stay when she was in Chicago?*
B_{int}: *She crashed at a friend's house.*)
A_{last}: Where did she stay when she was in Boston?
B_{last}: He (**also**) stayed at a motel (**again**) in Boston.
- (A.56) A_{1st}: How did Duane get to work two weeks ago?
B_{1st}: He took the train.
(A_{int}: *How did he get to work last week?*
B_{int}: *He took the bus.*)
A_{last}: How did he get to work this week?
B_{last}: He (**also**) took the train (**again**) this week.
- (A.57) A_{1st}: Where was Karim's office at his first job?
B_{1st}: It was right next to the kitchen.
(A_{int}: *Where was his office at his second job?*
B_{int}: *It was close to the bathroom.*)
A_{last}: Where was his office at his fourth job?
B_{last}: It was (**also**) next to the kitchen (**again**) at his fourth job.
- (A.58) A_{1st}: What did Jimmy have for breakfast?
B_{1st}: He had some fruit and a yogurt.
(A_{int}: *What did he have for lunch?*

B_{int}: He had a large meal with lots of protein.)

A_{last}: What did he have for dinner?

B_{last}: He (**also**) had fruit and yogurt (**again**) for dinner.

(A.59) A_{1st}: What was Eileen's favorite class in fifth grade?

B_{1st}: She was really into math.

(A_{int}: What was her favorite class in eight grade ?

B_{int}: She liked literature a lot.)

A_{last}: What was her favorite class as in college?

B_{last}: It was (**also**) math (**again**) in college.

(A.60) A_{1st}: Who did Jasper stay with in Denver?

B_{1st}: He stayed with a friend of his parents.

(A_{int}: Who did he stay with in New Orleans?

B_{int}: He stayed with his brother.)

A_{last}: Who did he stay with in Toronto?

B_{last}: He (**also**) stayed with a friend of his parents (**again**) in Toronto.

(A.61) A_{1st}: When did Deirdre go to bed on Sunday?

B_{1st}: She stayed up until midnight.

(A_{int}: When did she go to bed two days ago?

B_{int}: She went to bed around 10pm.)

A_{last}: When did she go to bed last night?

B_{last}: She (**also**) stayed up until midnight (**again**) last night.

(A.62) A_{1st}: How did the employees react to the pay cut?

B_{1st}: They went on strike.

(A_{int}: How did the employees react to the firings?

B_{int}: They spammed the manager's cell phone.)

A_{last}: How did the employees react to the increase in their insurance

rate?

B_{last}: They (**also**) went on strike (**again**) about their insurance.

Strong Contrast

(A.63) A_{1st}: What did Derek do on Thanksgiving?

B_{1st}: He visited his parents in Idaho.

(A_{int}: *What did he do for Christmas?*)

B_{int}: *He stayed home because his flight got cancelled.*)

A_{last}: What did he do for Easter?

B_{last}: He (**also**) visited his parents (**again**) for Easter.

(A.64) A_{1st}: What did Felicia have for dinner on Friday?

B_{1st}: She went to her favorite Thai restaurant.

(A_{int}: *What did she do for dinner the day after?*)

B_{int}: *She skipped dinner because of her diet.*)

A_{last}: What did she do for dinner on Sunday?

B_{last}: She (**also**) had Thai (**again**) on Sunday.

(A.65) A_{1st}: What did Janey do in December?

B_{1st}: She went skiing in the mountains.

(A_{int}: *What did she do in January?*)

B_{int}: *She had to stay home because of a foot injury.*)

A_{last}: What did she do in February?

B_{last}: She (**also**) went skiing (**again**) in February.

(A.66) A_{1st}: What did Mary do on Monday?

B_{1st}: She went to the gym for an hour.

(A_{int}: *What did she do on Wednesday?*)

B_{int}: *She had to stay late at work.*)

A_{last}: What did she do on Friday?

B_{last}: She (**also**) went to the gym (**again**) on Friday.

(A.67) A_{1st}: How many goals did Cassandra score in first half of the season?

B_{1st}: She scored five times.

(A_{int}: *How many goals did she score in the cup matches?*)

B_{int}: *She didn't score at all because she was injured.*)

A_{last}: How many goals did she score in the second half of the season?

B_{last}: She (**also**) scored five times (**again**) in the second half.

(A.68) A_{1st}: When did Robert leave for school on Tuesday?

B_{1st}: He left the house around 8am.

(A_{int}: *When did he leave on Thursday?*)

B_{int}: *He got a stomach ache and stayed home.*)

A_{last}: When did he leave on Friday?

B_{last}: He (**also**) left the house around 8am (**again**) on Friday.

(A.69) A_{1st}: Who did Leslie date as a freshman?

B_{1st}: She was going out with Dave.

(A_{int}: *Who did she date as a sophomore?*)

B_{int}: *She was single for that time.*)

A_{last}: Who did she date as a senior?

B_{last}: She (**also**) was going out with Dave (**again**) as a senior.

(A.70) A_{1st}: Who did the university hire to fix the roof?

B_{1st}: They hired an outside contractor.

(A_{int}: *Who did they hire to fix the wifi?*)

B_{int}: *There were no outside contractors available so the IT staff fixed it.*)

A_{last}: Who did they hire to fix the broken plugs?

B_{last}: They (**also**) hired an outside contractor (**again**) for the broken

plugs.

A.4.3 Experiment 3

again vs too

- (A.71) A: Who is having dinner in New York tomorrow?
B: Saul is having dinner in New York (again/too).
- (A.72) A: Who did Rose file a complaint about?
B: She filed a complaint about a co-worker (again/too).
- (A.73) A: Who mowed Mrs Robinson's lawn this morning?
B: Jenny mowed the lawn (again/too).
- (A.74) A: Who went to the mall during lunch break?
B: Ellen went to the mall during lunch break (again/too).

still vs even

- (A.75) A: What's Mary been up to recently?
B: She's (still/even) on vacation.
- (A.76) A: What is your colleague doing today?
B: He's (still/even) looking for a new apartment.
- (A.77) A: What is Beth doing this weekend?
B: She is (still/even) working on her dissertation.
- (A.78) A: Who is Carl living with currently?
B: He's (still/even) living by himself.
- (A.79) A: What is Marianne doing in the living room?
B: She's (still/even) watching a documentary.

back vs at least

- (A.80) A: What did Jack do last winter?
B: (At least) He flew (back) to Chicago for Christmas.
- (A.81) A: What did Zoe do over Thanksgiving break?
B: (At least) She drove (back) to Vermont for Thanksgiving break.
- (A.82) A: What did Jim do over spring break?
B: (At least) He took a trip (back) to LA.
- (A.83) A: What did Carmen do last spring?
B: (At least) She went (back) to Texas.

continue vs only

- (A.84) A: What did Sue do yesterday?
B: She {continued building / (only) built} a tree house.
- (A.85) A: What did Fred do last week?
B: He {continued painting / (only) painted} a self-portrait.
- (A.86) A: What did Doris do on her day off?
B: She {continued cutting / (only) cut} down the cherry tree in her back-yard.
- (A.87) A: What did Eric do on Tuesday?
B: He {continued prepping / (only) prepped} for Angela's birthday party.
- (A.88) A: What did Nikki do last evening?
B: She {continued reading / (only) read} Moby Dick.

A.4.4 Experiment 4

- (A.89) A says: / Mary went swimming on Sunday. /
B asks: / What did Mary do on Monday? /
A replies: / She went / swimming (again) on Monday (too) / according to Sue.
- (A.90) A says: / Saul had dinner in New York last week. /
B asks: / Where did Saul have dinner on Tuesday?
A replies: / He had dinner / in New York (again) on Tuesday (too) / from what I've heard.
- (A.91) A says: / Amber took a break at noon on Wednesday. /
B asks: / When did Amber take a break yesterday?
A replies: / She took a break / at noon (again) yesterday (too) / if I remember correctly.
- (A.92) A says: / Duane got to work by bus a few weeks ago. /
B asks: / How did Duane get to work last week?
A replies: / He got to work / by bus (again) last week (too) / as far as I know.
- (A.93) A says: / Jenny saw a movie with her boyfriend last weekend. /
B asks: / What did Jenny do this weekend?
A replies: / She went / to the movies (again) this weekend (too) / I think.
- (A.94) A says: / Rahul complained about his boss last week. /
B asks: / Who did Rahul complain about this week?
A replies: / He complained / about his boss (again) this week (too) / according to Meredith.

- (A.95) A says: / Cassandra stayed at a motel when she was in LA. /
B asks: / Where did Cassandra stay when she was in Chicago?
A replies: / She stayed / at a motel (again) in Chicago (too) / if Serene is to be believed.
- (A.96) A says: / Lee worked from home in March. /
B asks: / How did Lee work in May?
A replies: / He worked / from home (again) in May (too) / to save gas.
- (A.97) A says: / Yolanda went hiking in Vermont last Sunday. /
B asks: / What did Yolanda do on Saturday?
A replies: / She went / hiking (again) on Saturday (too) / since the weather was nice.
- (A.98) A says: / Henry biked twenty miles last weekend. /
B asks: / How far did Henry bike this weekend?
A replies: / He biked / twenty miles (again) this weekend (too) / according to his wife.
- (A.99) A says: / Rachel spent the fall in Vietnam. /
B asks: / Where did Rachel spend the summer?
A replies: / She spent the summer / in Vietnam (again/too) / if Gary is right.
- (A.100) A says: / Elton mowed the lawn in the evening last Saturday. /
B asks: / When did Elton mow the lawn this Saturday?
A replies: / He mowed the lawn / in the evening (again) this Saturday (too) / right before dinner.
- (A.101) A says: / Holly visited her parents in Idaho for Thanksgiving. /
B asks: / What did Holly do for Easter?

A replies: / She went / to Idaho (again) for Easter (too) / to see her family.

(A.102) A says: / Karim had pad thai for lunch earlier this week. /

B asks: / What did Karim have for lunch yesterday?

A replies: / He had / pad thai (again) yesterday (too) / as a treat.

(A.103) A says: / Deirdre stayed up until midnight on Monday. /

B asks: / When did Deirdre go to bed on Wednesday?

A replies: / She stayed up / until midnight (again) on Wednesday (too) / from what I've been told.

(A.104) A says: / Robert collaborated with Phyllis for the chemistry project. /

B asks: / Who did Robert collaborate with for the math project?

A replies: / He collaborated / with Phyllis (again) for the math project (too) / as far as I'm aware.

(A.105) A says: / Kelly drove to Colorado in October. /

B asks: / What did Kelly do over winter break?

A replies: / She drove / to Colorado (again) over winter break (too) / according to Sam.

(A.106) A says: / Stanley left for school at 7:30am on Tuesday. /

B asks: / When did Stanley leave for school on Thursday?

A replies: / He left for school / at 7:30am (again) on Thursday (too) / to catch the bus.

(A.107) A says: / Celeste ate her pasta with a fork at lunch. /

B asks: / How did Celeste eat her pasta at dinner?

A replies: / She ate her pasta / with a fork (again) at dinner (too) / for whatever reason.

- (A.108) A says: / Jared ordered his groceries from Amazon last month. /
B asks: / Where did Jared get his groceries this month?
A replies: / He got his groceries / from Amazon (again) this month (too)
/ out of laziness.

A.5 Pilot Experiment

The goal of this experiment was to test the prediction that Focus-sensitive triggers should be licensed by content present in the discourse independently of whether it is mutually accepted by all interlocutors or not, whereas triggers lacking Focus-sensitivity should only be felicitous if their presupposition is mutually accepted.

Materials & Design

In order to test the prediction, we used short dialogues as in (A.109)-(A.110). B's response always contained a presupposition trigger that was satisfied by A's preceding utterance. The crucial manipulation was that B either accepted A's statement by using the positive response particle *yes*, or remained neutral with respect to the statement by using *maybe*. Since it was not possible to use minimal pairs where the same content would satisfy the presupposition of both a Focus-sensitive and a non Focus-sensitive trigger for a broad range of triggers, triggers were manipulated between-items, with four items per trigger. The +FOCUS triggers were *also*, *even*, *only* and *at least*, with sample items shown in (A.109). For *also*, the presupposition to be satisfied by A's statement was that the subject did something additionally, for (A.109a) that Elena visited someone else. For *even* and *only*, we used a design similar to Experiment 1a in Chapter 4, namely using relatively low (for *even*) or high (for *only*) ranked scalar values in the target sentence that should be degraded on their own, but provided a higher or lower ranked value in A's statement that

should license their use. To illustrate this with (A.109b), renting a Saab is not particularly special, but more so when compared against renting an old pickup truck. The reasoning for *at least* was similar in that its prejacent was something notably positive that should be inconsistent with *at least's* settle-for-less meaning, but licensed by A's statement negating an even better outcome, in the case of (A.109d) winning gold being usually highest ranked, but not relative to also breaking the world record.

(A.109) Sample Items, Acceptance Experiment: +FOCUS Triggers

a. ALSO

A: Elena visited her brother during the holidays.

(i) B: Yes, that's right. She **also** visited her parents.

(ii) B: Maybe that's right. She **also** visited her parents.

b. EVEN

A: Jesse rented an old pickup truck for her roadtrip.

(i) B: Yes, that's right. Helen **even** rented a Saab.

(ii) B: Maybe that's right. Helen **even** rented a Saab.

c. ONLY

A: Sue got promoted to CEO.

(i) B: Yes, that's right. Dwight **only** got promoted to vice-president.

(ii) B: Maybe that's right. Dwight **only** got promoted to vice-president.

d. AT LEAST

A: Naomi didn't end up breaking the world record.

(i) B: Yes, that's right. **At least** she won gold.

(ii) B: Maybe that's right. **At least** she won gold.

The -FOCUS triggers used were *again*, *still*, *stop* and *continue*, shown in (A.110). In all cases, the presupposition satisfied by A's statement was that a previous event like

one in the preadjacent had occurred. The relevant events were set up in a way that they furthermore satisfied the specific restrictions of the triggers involved, e.g. for *still* in (A.110b) and *stop* in (A.110c) that the presupposed event directly preceded the current one, in contrast to *continue* in (A.110d) requiring a gap. Additionally, all relevant temporal adverbial phrases were put sentence-initially to minimize the risk of an unintended interpretation that the potential disagreement is not about whether a previous event had occurred, but when.

(A.110) Sample Items, Acceptance Experiment: -FOCUS Triggers

a. AGAIN

A: Yesterday, Francine went swimming.

(i) B: Yes, that's right. Today, she went swimming **again**.

(ii) B: Maybe that's right. Today, she went swimming **again**.

b. STILL

A: Earlier this week, Lindsey started working on her job presentation.

(i) B: Yes, that's right. On Friday, she was **still** working on it.

(ii) B: Maybe that's right. On Friday, she was **still** working on it.

c. STOP

A: At 10am, Henry started cleaning the apartment.

(i) B: Yes, that's right. At noon, he **stopped** cleaning.

(ii) B: Maybe that's right. At noon, he **stopped** cleaning.

d. CONTINUE

A: On Thursday, Stuart started painting the kitchen.

(i) B: Yes, that's right. The next day, he **continued** painting.

(ii) B: Maybe that's right. The next day, he **continued** painting.

There were 48 fillers in addition to the 32 target items, part of which were the items

for the accommodation rating study reported in Chapter 5.

Procedure

The procedure was the same as for the accommodation rating experiment in Chapter 5, given that the stimuli were part of the same experiment. The experiment was implemented via PennController (Zehr & Schwarz, 2018a) and conducted online. The first sentence of each item (A's question) was initially displayed on its own on the screen, with the second sentence (B's reply) appearing in a new line below it after pressing the space bar once. After pressing the space bar a second time, a rating screen (without the item) would appear, with the question "*How acceptable was B's response for you?*" at the top and a rating scale from 1 to 7 at the bottom, with 1 end marked as "*Terrible*" and the other as "*Perfect*". Participants were instructed to think of acceptability as "*whether B is being consistent or to what extent B's utterance requires additional background knowledge*". After filling out a consent form, a demographic form and receiving instructions, participants saw three practice items of varying acceptability to familiarize them with the procedure and illustrate the intended use of the scale. The experiment concluded with an open response question that was meant to screen for bots. The experiment took about 15 minutes.

Subjects

48 participants were recruited via Prolific.ac and reimbursed with \$3.00 each. All participants passed the bot-check, as well as catch-trials.

Predictions

On the hypothesis that -FOCUS triggers require their presupposition to be entailed by the Common Ground and thus mutually accepted, the *maybe* condition should lead to a decrease in ratings relative to the *yes* condition. If +FOCUS triggers in con-

trast are able to be satisfied by content merely present in the discourse regardless of it being accepted, there should be less of a decrease in the *maybe* condition for such triggers - taking into account that the *maybe* condition could lead to a decrease for reasons of coherence independent of presupposition satisfaction. The prediction therefore is an interaction between TRIGGER TYPE and RESPONSE.

Results

Mean ratings per condition collapsed across triggers of each class are shown in Figure A.1. The data were analyzed using ordinal mixed effects models, yielding a significant effect of RESPONSE with *maybe* conditions leading to a decrease relative to *yes* conditions ($z=-13.7, p<.001^{***}$) and a marginally significant effect of TRIGGER TYPE with +FOCUS triggers rated lower than -FOCUS triggers ($z=1.7, p<.01^{\bullet}$). The interaction was not significant ($z=-0.7, p=.49$). Mean ratings for each individual trigger are shown in Figures A.2 and A.3. Based on the numerical pattern, the marginal effect of TRIGGER TYPE seemed to be driven primarily by low ratings for *even* and *only*.

Discussion

The results showed that using a presupposition trigger when its respective presupposition is not mutually accepted led to a decrease in acceptability, but failed to provide evidence that this decrease varies depending on whether the trigger is Focus-sensitive or not, contrary to what the FoPAH predicted. Moreover, this pattern seemed to be quite consistent across the triggers under consideration, with *even* being the only notable exception with respect to the size of this decrease. The experiment also found a marginal decrease in acceptability for +focus triggers, which also seemed to be driven by *even*, in addition to *only*.

One potential reason for why the results diverge from what was predicted and

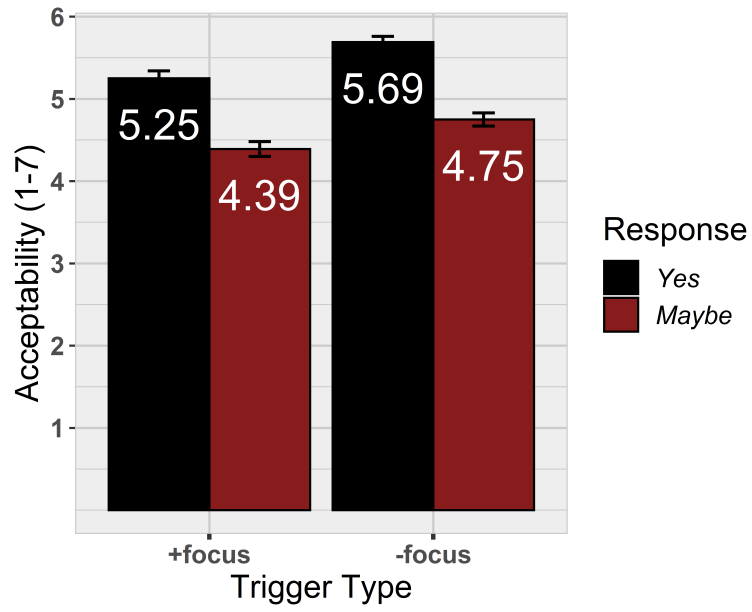


Figure A.1: Mean ratings per condition.

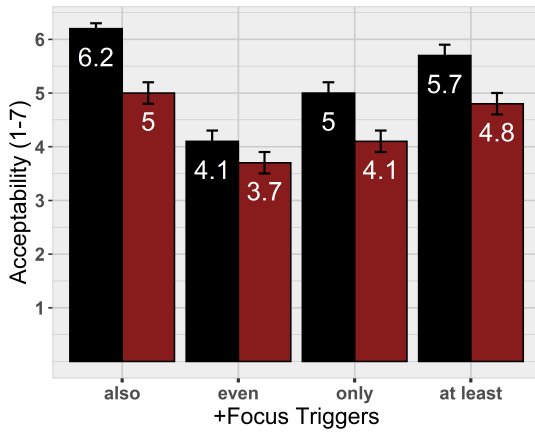


Figure A.2: Mean ratings for +Focus Triggers.

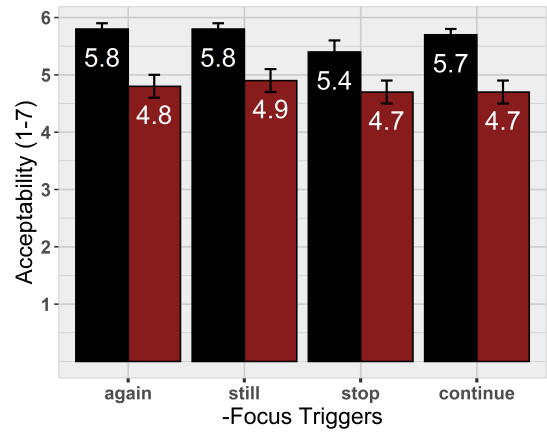


Figure A.3: Mean ratings for -Focus Triggers.

prior intuitions regarding examples discussed previously could have been that the ratings reflect other - tangential - properties of the tested dialogues rather than the extent to which the use of a certain trigger requires its presupposition to be part of the Common Ground. A possible culprit in this regard might have been how changing the response particle affected discourse coherence. A hint toward such a possibility would be the overall decrease in ratings for *even* and *only* in the YES condition, which was supposed to serve as a neutral baseline. By virtue of the triggers differing in meaning to varying degrees, it is unsurprising that the contributions they make in a discourse may differ as well. As illustration, consider the sample item for *even* in (A.111) repeated from (A.109b). Even in the YES condition, the comprehender would have to find a way to conceive of B's response as relevant in some way, which is not straightforward, and even less so in the MAYBE condition.

(A.111) EVEN

A: Jesse rented an old pickup truck for her roadtrip.

- a. B: Yes, that's right. Helen **even** rented a Saab.
- b. B: Maybe that's right. Helen **even** rented a Saab.

Moreover, the change in response particles might have affected how the following target sentence is integrated into the discourse beyond its presupposition. Intuitively, the target sentence in the MAYBE condition in (A.111) seems to be meant as providing evidence for why B does not believe A's previous statement, whereas the *yes* condition allows the target sentence to merely add some related information. This intuitive difference could be spelled out in terms of a difference in discourse relations between A's statement and B's response, in terms of *maybe* raising a new QUD of the form "Did Jesse rent an old pickup truck for her roadtrip?" that the sentence is meant to comment on, or in terms of Farkas & Bruce's (2010) Table model discussed previously, with *yes* resolving the issue on the table, in contrast to *maybe*

leaving it open.

One option to avoid this confound would be to change *maybe* to *no*, as in example 6.5, insofar neither agnosticism nor explicit denial qualify as acceptance. However, the previous example, (partially) repeated in (A.112), did not include a minimal pair corresponding to an acceptance condition for the Focus-sensitive trigger *even*. Adjusting the example directly as in (A.112d) would not work since the target sentence is still a correction. Similarly, changing the previous sample item to vary between *yes* and *no*, as in (A.113), would leave the target sentence after *no* seem even more out of place than *maybe*, potentially because the *no* response would still leave the issue open, albeit from a different direction.

(A.112) A: Juan DeBiedma made second place at Evo 2016.

- a. B: No, he **even** made [FIRST]_F place.
- b. B: #No, but he won **again** the next year.
- c. B: Yes, and he won **again** the next year.
- d. B: #Yes, he **even** made [FIRST]_F place.

(A.113) A: Jesse rented an old pickup truck for her roadtrip.

- a. B: Yes, that's right. Helen **even** rented a Saab.
- b. B: No, that's wrong. Helen **even** rented a Saab.

Since the problem of response particles differing in the extent to which they resolve an issue, an alternative might be to add a discourse marker that resolves the issue independently, such as *either way* or *anyway*. An adapted sample item is shown in (A.114). Intuitively, this addition seems to improve the *maybe* condition. A potential worry would be that it might also waive the contextual requirements for triggers lacking Focus-sensitivity, see (A.115).

- (A.114) A: Jesse rented an old pickup truck for her roadtrip.
- a. B: Yes, that's right. Either way, Helen **even** rented a Saab.
 - b. B: Maybe that's right. Either way, Helen **even** rented a Saab.
- (A.115) A: Yesterday, Francine went swimming.
- a. B: Yes, that's right. Either way, today, she went swimming **again**.
 - b. B: Maybe that's right. Either way, today, she went swimming **again**.

Another option addressing the problem regarding the raised issue might be to make a question overt for both conditions, as in (A.116). Rather than trying to fix the problem by solving the issue independently, this option would make sure that both conditions address an open issue. Intuitively, this might result in even supposedly good examples be rather marked however.

- (A.116) A: Do you think that Jesse rented an old pickup truck for her roadtrip?
- a. B: Yes, I think so. Helen **even** rented a Saab.
 - b. B: No, I don't think so. Helen **even** rented a Saab.

A quite different alternative way of testing the prediction of the FoPAH without confounds regarding discourse coherence would be to use a different experimental paradigm inspired by Aravind (2018), which was discussed in Chapter 5. Aravind used stories featuring two characters that differed in what information they shared with the main protagonist and had participants guess to whom a target sentence containing a presupposition trigger was addressed to in order to test whether participants would be able to infer the correct choice based on the contextual requirements of presuppositions. The same paradigm could be applied to the current issue by manipulating whether a character believes or does not believe a previous statement that is meant to license the use of a presupposition trigger. As a preliminary

example, consider the story in (A.117), where Peach is the skeptic and Zelda the believer. If *again* requires its presupposition to be mutually accepted, the target sentence in (A.117a) should lead participants to infer that Samus was talking to Zelda rather than Peach. In contrast, if *even* merely requires a linguistic antecedent independently of its content being mutually accepted, the sentence in (A.117b) should be less unambiguous.

- (A.117) Samus, Princess Peach and Princess Zelda were discussing the current mushroom harvest. Samus said that Fox had picked two mushroom yesterday. While Peach did not believe Samus, Zelda did. Later, Samus was on the phone with one of the Princesses and said:
- a. "Fox picked two mushrooms **again** today."
 - b. "Fox **even** picked five mushrooms today".

However, taken at face-value in the absence of further studies, the present results fail to support the hypothesis that +FOCUS triggers solely require a linguistic antecedent in the context independently of the Common Ground. Rather, the Common Ground seems to play a role for +FOCUS triggers as well as -FOCUS triggers. This concession raises a question about the exact relationship between the linguistic antecedent and the Common Ground for +FOCUS triggers. One possibility that can be discarded right away is that there is a simple ordering relation with respect to what is being accessed first and what second. If, for instance, the Common Ground would be accessed after the linguistic antecedent, it is unclear why we would see the effects observed in the previous chapters, since the presupposition should then already be satisfied, and the reverse would be true if it was the linguistic antecedent that is accessed first insofar as it would leave the results in the present chapter unaccounted for. A more plausible conjecture would be that +FOCUS triggers go through the Common Ground in order to find their antecedent

such that the lack of material inhibits access in a way that results in the degraded acceptability observed in the current experiment. I will leave it to future research to precisify the exact role the Common Ground plays for +FOCUS triggers.

Bibliography

- Abbott, Barbara. 2000. Presuppositions as nonassertions. *Journal of Pragmatics* 32:1419–1437.
- Abbott, Barbara. 2006. Where have some of the presuppositions gone? In *Drawing the boundaries of meaning: Neo-gricean studies in pragmatics and semantics in honor of laurence r. horn*, ed. B. J. Birner & G. Ward, 1–20. Philadelphia: John Benjamins.
- 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.
- Abusch, Dorit. 2002. Lexical alternatives as a source of pragmatic presuppositions. In *Proceedings of SALT XII*, ed. B. Jackson, 1–19. Ithaca, NY: Cornell University.
- Abusch, Dorit. 2010. Presupposition triggering from alternatives. *Journal of Semantics* 27:37–80.
- Albrecht, Jason E., & Edward J. O’Brien. 1993. Updating a mental model: Maintaining both local and global coherence. *Journal of Experimental Psychology: Learning Memory, and Cognition* 19:1061–1070.
- Alxatib, Sam. 2017. The scalar presupposition of ‘only’ and ‘only if’. In *Proceedings of Amsterdam Colloquium 21*, ed. Alexandre Cremers, Thom van Gessel, & Floris Roelofsen, 96–105. Amsterdam: ILLC.

- Amaral, P., & C. Cummins. 2015. A cross-linguistic study on information back-grounding and presupposition projection. In *Experimental perspectives on presuppositions*, ed. Florian Schwarz. Springer.
- Anderson, J. R. 1974. Retrieval of propositional information from long-term memory. *Cognitive Psychology* 6:451–474.
- Aravind, Athulya. 2018. Presuppositions in context. Doctoral dissertation, MIT.
- Aravind, Athulya, & Martin Hackl. 2017. Against a unified treatment of obligatory presupposition trigger effects. In *Proceedings of SALT 27*, ed. Dan Burgdorf, Jacob Collard, Sireemas Maspong, & Brynhildur Stefánsdóttir, 1–12.
- Bade, Nadine. 2016. Obligatory presupposition triggers in discourse - empirical foundations of the theories maximize presupposition and obligatory implicatures. Doctoral dissertation, University of Tübingen.
- Bade, Nadine. 2017. Obligatory additives in the antecedent of conditionals. In *Proceedings of Sinn und Bedeutung 21*, ed. Robert Truswell, Chris Cummins, Caroline Heycock, Brian Rabern, & Hannah Rohde, 73–88.
- Barr, Dale J. Barr, Roger Levy, Christoph Scheepers, & Harry J. Tily. 2013. Random effects structure for confirmatory hypothesis testing: Keep it maximal. *Journal of Memory and Language* 68:255–278.
- Bartsch, R., & T. Vennemann. 1972. The grammar of relative adjectives and comparison. *Linguistische Berichte* 20:19–32.
- Beaver, David. 2001. *Presupposition and assertion in dynamic semantics*. CSLI Publications.
- Beaver, David. 2010. Have you noticed that your belly button lint colour is related

- to the colour of your clothing? In *Presuppositions and discourse: Essays offered to Hans Kamp*, ed. R. Bäuerle, U. Reyle, & T. E. Zimmermann, 65–99. Oxford: Elsevier.
- Beaver, David, & Brady Clark. 2008. *Sense and sensitivity: How focus determines meaning*. Oxford: Blackwell.
- Beaver, David, & Bart Geurts. 2014. Presupposition. In *Stanford encyclopedia of philosophy*, ed. Edward N. Zalta, Uri Nodelman, Colin Allen, & R. Lanier Anderson, 65–99. Stanford, CA: Metaphysics Research Lab. URL <https://plato.stanford.edu/>.
- Beaver, David, & Henk Zeevat. 2007. Accommodation. In *Oxford handbook of linguistic interfaces*, ed. G. Ramchand & C. Reiss, 503–538. Oxford: Oxford University Press.
- Beaver, David I., Craige Roberts, Mandy Simons, & Judith Tonhauser. 2017. Questions under discussion: Where information structure meets projective content. *Annual Review of Linguistics* 3:265–284.
- Beck, Sigrid. 2006a. Focus on ‘again’. *Linguistic and Philosophy* 29:277–314.
- Beck, Sigrid. 2006b. Intervention effects follow from focus interpretation. *Natural Language Semantics* 14:1–56.
- Beck, Sigrid. 2007. Quantifier dependent readings of anaphoric presuppositions. In *Presupposition and implicature in compositional semantics*, ed. U. Sauerland & P. Stateva, 12–33. Palgrave.
- Beck, Sigrid. 2020. Readings of scalar particles: ‘noch’/‘still’. *Linguistics and Philosophy* 43:1–67.
- Beck, Sigrid, & Kyle Johnson. 2004. Double objects again. *Linguistic Inquiry* 35:97–123.

- Beddor, Bob, & Andy Egan. 2018. Might do better: Flexible relativism and the qud. *Semantics and Pragmatics* 11:1–43.
- Benatar, Ashley, & Charles Clifton, Jr. 2014. Newness, givenness and discourse updating: Evidence from eye movements. *Journal of Memory and Language* 71:1–16.
- Benz, Anton, & Katja Jasinskaja. 2017. Questions under discussion: From sentence to discourse. *Discourse Processes* 54:177–186.
- Biezma, María, & Kyle Rawlins. 2017. Rhetorical questions: Severing asking from questioning. In *Proceedings of Semantics and Linguistic Theory*, volume 27, 302–322.
- Bill, Cory, Jacopo Romoli, Florian Schwarz, & Stephen Crain. 2016. Scalar implicatures vs. presuppositions: The view from acquisition. *Topoi* 35:57–71.
- Birch, Stacy, & Keith Rayner. 1997. Linguistic focus affects eye movements during reading. *Memory & Cognition* 25:653–660.
- Birch, Stacy, & Keith Rayner. 2010. Effects of syntactic prominence on eye movements during reading. *Memory & Cognition* 38:740–752.
- Birch, Stacy L., Jason E. Albrecht, & Jerome L. Myers. 2000. Syntactic focusing structures influence discourse processing. *Discourse Processes* 30:285–304.
- Birch, Stacy L., & Susan M. Garnsey. 1995. The effect of focus for words in sentences. *Journal of Memory and Language* 34:232–267.
- Bott, Lewis, & Ira A. Noveck. 2004. Some utterances are underinformative: The onset and time course of scalar inferences. *Journal of Memory and Language* 51:437–457.

- Brasoveanu, Adrian, & Jakub Dotlačil. 2020. *Computational cognitive modeling and linguistic theory*. Springer.
- Braun, Bettina, Yuki Asano, & Nicole Dehé. 2018. When (not) to look for contrastive alternatives: The role of pitch accent type and additive particles. *Language and Speech* 62:751–778.
- Braun, Bettina, & María Biezma. 2019. Prenuclear L*+H activates alternatives for the accented word. *Frontiers in Psychology* 10:1–22.
- Braun, Bettina, & Lara Tagliapietra. 2010. The role of contrastive intonation contours in the retrieval of contextual alternatives. *Language and Cognitive Processes* 25:1024–1043.
- Bredart, S., & K. Modolo. 1988. Moses strikes again: Focalization effects on a semantic illusion. *Acta Psychologica* 67:135–144.
- Brown-Schmidt, Sarah, & Melissa C. Duff. 2016. Memory and common ground processes in language use. *Topics in Cognitive Science* 8:722–736.
- Burkhardt, Petra. 2006. Inferential bridging relations reveal distinct neural mechanisms: Evidence from event-related brain potentials. *Brain and Language* 98:159–168.
- Büring, Daniel. 1997. *The meaning of topic and focus: The 59th Street bridge accent*. London: Routledge.
- Büring, Daniel. 2003. On d-trees, beans, and b-accent. *Linguistics and Philosophy* 26:511–545.
- Büring, Daniel. 2015. A theory of second occurrence focus. *Language, Cognition and Neuroscience* 30:73–87.

- Büring, Daniel. 2016. *Intonation and meaning*. Oxford University Press.
- Büring, Daniel, & Manuel Križ. 2013. It's that, and that's it! exhaustivity and homogeneity presuppositions in clefts (and definites). *Semantics and Pragmatics* 6:1–29.
- Carlson, Katy, Michael W. Dickey, Lyn Frazier, & Charles Clifton, Jr. 2009. Information structure expectations in sentence comprehension. *The Quarterly Journal of Experimental Psychology* 62:114–139.
- Charlow, Nate. 2015. Prospects for an expressivist theory of meaning. *Philosophers' Imprint* 15:1–43.
- Charlow, Simon. 2009. “strong” predicative presuppositional objects. In *Proceedings of ESSLLI 2009*, 1–11.
- Chemla, Emmanuel. 2009. Presuppositions of quantified sentences: Experimental data. *Natural Language Semantics* 17:299–340.
- Chen, Sherry Yong, & E. Matthew Husband. 2018. Comprehending anaphoric presuppositions involves memory retrieval *too*. In *Proceedings of Linguistic Society of America*, volume 44, 1–11.
- Chen, Sherry Yong, Leo Rosenstein, & Martin Hackl. 2019. Facilitation effects of *qud* and event type on negative sentences. Poster presented at the 32nd Annual CUNY Conference on Human Sentence Processing.
- Chierchia, Gennaro, & Sally McConnell-Ginet. 1990. *Meaning and grammar. an introduction to semantics*. Cambridge: MIT Press.
- Clark, Herbert. 1977. ‘bridging’. In *Thinking: Readings in cognitive science*, ed. P. N. Johnson-Laird & P. Wason, 411–420. Cambridge: Cambridge University Press.

- Clark, Herbert. 1996. *Using language*. Cambridge University Press.
- Clifton, Charles, Jr. 2013. Situational context affects definiteness preferences: Accommodation of presuppositions. *Journal of Experimental Psychology: Learning, Memory, and Cognition* 39:487–501.
- Clifton, Charles, Jr., & Lyn Frazier. 2012. Discourse integration guided by the ‘question under discussion’. *Cognitive Psychology* 65:352–379.
- Clifton, Charles, Jr., & Lyn Frazier. 2018. Context effects in discourse: The question under discussion. *Discourse Processes* 55:105–112.
- Constant, Noah. 2014. Contrastive topic: Meanings and realizations. Doctoral dissertation, University of Massachusetts, Amherst.
- Crain, S., & M. Steedman. 1985. On not being led up the garden path: The use of context by the psychological parser. In *Natural language parsing: Psychological, computational, and theoretical perspectives*, ed. L. Karttunen D. Dowty & A. Zwicky, 320–358. Cambridge: Cambridge University Press.
- Creemers, Ava, Jeremy Zehr, & Florian Schwarz. 2018. Interpreting presuppositions in the scope of quantifiers: ‘every’ vs. ‘at least one’. In *Proceedings of Sinn und Bedeutung* 22, 331–348.
- Cummins, C., P. Amaral, & N. Katsos. 2013. Backgrounding and accommodation of presuppositions: An experimental approach. In *Proceedings of Sinn und Bedeutung*, volume 17, 201–218.
- Cutler, Anne, & Janet Fodor. 1979. Semantic focus and sentence comprehension. *Cognition* 7:49–59.

- Degen, Judith, & Michael K. Tanenhaus. 2019. Constraint-based pragmatic processing. In *Handbook of experimental semantics and pragmatics*, ed. Chris Cummins & Napoleon Katsos, 1–26. Oxford University Press.
- Djäv, Kajsa, & Hezekiah Akiva Bacovcin. 2020. Prosodic effects on factive presupposition projection. *Journal of Pragmatics* 169:61–85.
- Djäv, Kajsa, Jeremy Zehr, & Florian Schwarz. 2017. Cognitive vs. emotive factives: an experimental differentiation. In *Proceedings of Sinn und Bedeutung*, ed. Robert Truswell, Chris Cummins, Caroline Heycock, Brian Rabern, & Hannah Rohde, volume 21, 161–176.
- Domaneschi, Filippo. 2016. *Presuppositions and cognitive processes. understanding the information taken for granted*. Palgrave Macmillan.
- Domaneschi, Filippo, Elena Carrea, Carlo Penco, & Alberto Greco. 2014. The cognitive load of presupposition triggers: mandatory and optional repairs in presupposition failure. *Language, Cognition and Neuroscience* 29:136–146.
- Drenhaus, Heiner, Malte Zimmermann, & Shravan Vasishth. 2011. Exhaustiveness effects in clefts are not truth-functional. *Journal of Neurolinguistics* 24:320–337.
- Dretske, Fred I. 1972. Contrastive statements. *Philosophical Review* 81:411–437.
- Dryer, Matthew S. 1996. Focus, pragmatic presupposition, and activated propositions. *Journal of Pragmatics* 26:475–523.
- Dudley, Rachel. 2017. The role of input in discovering presuppositions triggers: Figuring out what everybody already knew. Doctoral dissertation, University of Maryland.
- Erickson, T. D., & M. E. Mattson. 1981. From words to meaning: A semantic illusion. *Journal of Verbal Learning and Verbal Behavior* 20:540–551.

- Erlewine, Michael Yoshitaka. 2014. Movement out of focus. Doctoral dissertation, Massachusetts Institute of Technology.
- Farkas, Donka F., & Kim B. Bruce. 2010. On reacting to assertions and polar questions. *Journal of Semantics* 27:81–118.
- Filik, Ruth, Kevin B. Paterson, & Simon P. Liversedge. 2009. The influence of *only* and *even* on online semantic interpretation. *Psychonomic Bulletin & Review* 16:678–683.
- Fillmore, Charles J. 1969. Verbs of judging: An exercise in semantic description. *Paper in Linguistics* 1:91–117.
- von Stechow, Kai. 1994. Restrictions on quantifier domains. Doctoral dissertation, University of Massachusetts Amherst.
- von Stechow, Kai. 2000. What is presupposition accommodation? Unpublished Manuscript, MIT.
- von Stechow, Kai. 2004. Would you believe it? the king of france is back! presuppositions and truth-value intuitions. In *Descriptions and beyond*, ed. M. Reimer & A. Bezuidenhout, 315–341. Oxford: Oxford University Press.
- von Stechow, Kai. 2008. What is presupposition accommodation, again? *Philosophical Perspectives* 22:137–170.
- Fodor, J.A., T.G. Bever, & M.F. Garrett. 1974. *The psychology of language: An introduction to psycholinguistics and generative grammar*. New York: McGraw Hill.
- Foraker, S., & B. McElree. 2007. The role of prominence in pronoun resolution: Active versus passive representations. *Journal of Memory and Language* 56:357–383.

- Francis, Naomi. 2018. Presupposition-denying uses of *even*. In *Proceedings of Semantics and Linguistic Theory*, ed. Sireemas Maspong, Brynhildur Stefánsdóttir, Katherine Blake, & Forrest Davis, volume 28, 161–176.
- Francis, Naomi. 2019. Imperatives under *even*. In *Proceedings of the North East Linguistics Society 49*, ed. Maggie Baird & Jonathan Pesetsky, 1–14.
- Fraundorf, Scott H., Aaron S. Benjamin, & Duane G. Watson. 2013. What happened (and what did not): Discourse constraints on encoding of plausible alternatives. *Journal of Memory and Language* 69:196–227.
- Fraundorf, Scott H., Duane G. Watson, & Aaron S. Benjamin. 2010. Recognition memory reveals just how contrastive contrastive accenting really is. *Journal of Memory and Language* 63:367–386.
- Frazier, Lyn. 1978. On comprehending sentences: syntactic parsing strategies. Doctoral dissertation, University of Connecticut.
- Frazier, Lyn, Charles Clifton, Jr., & Katy Carlson. 2007. Focus and vp-ellipsis. *Language and Speech* 50:1–21.
- Frege, Gottlob. 1892. über sinn und bedeutung. *Zeitschrift für Philosophie und philosophische Kritik* 100:25–50.
- Futrell, Richard, Edward Gibson, & Roger Levy. 2020. Lossy-context surprisal: An information-theoretic model of memory effects in sentence processing. *Cognitive Science* 44:1–54.
- Gauker, Christopher. 1998. What is a context of utterance? *Philosophical Studies* 91:149–172.
- Gazdar, Gerald. 1979. *Pragmatics: Implicature, presupposition, and logical form*. Academic Press.

- Gernsbacher, Morton Ann. 1985. Surface information loss in comprehension. *Cognitive Psychology* 17:324–363.
- Geurts, Bart. 1996. Local satisfaction guaranteed: A presupposition theory and its problems. *Linguistics and Philosophy* 19:259–294.
- Geurts, Bart, David Beaver, & Emar Maier. 2020. Discourse representation theory. In *Stanford encyclopedia of philosophy*, ed. Edward N. Zalta. Stanford, CA: Metaphysics Research Lab. URL <https://plato.stanford.edu/>.
- Glanzberg, Michael. 2005. Presuppositions, truth values, and expressing propositions. In *Contextualism in philosophy: Knowledge, meaning, and truth*, ed. G. Preyer & G. Peter, 349–396. Oxford University Press.
- Gotzner, Nicole. 2015a. Establishing alternative sets. Doctoral dissertation, Humboldt-University Berlin.
- Gotzner, Nicole. 2015b. What’s included in the set of alternatives? psycholinguistic evidence for a permissive view. In *Proceedings of Sinn und Bedeutung 19*, 232–247.
- Gotzner, Nicole. 2019. The role of focus intonation in implicature computation: A comparison with ‘only’ and ‘also’. *Natural Language Semantics* 27:189–226.
- Gotzner, Nicole, & Katharina Spalek. 2017. Role of contrastive and noncontrastive associates in the interpretation of focus particles. *Discourse Processes* 54:638–654.
- Gotzner, Nicole, Isabell Wartenburger, & Katharina Spalek. 2016. The impact of focus particles on the recognition and rejection of contrastive alternatives. *Language and Cognition* 8:59–95.
- Grant, Margaret, Charles Clifton, Jr., & Lyn Frazier. 2012. The role of non-actuality implicatures in processing elided constituents. *Journal of Memory and Language* 66:326–343.

- Greenberg, Yael. 2016. A novel problem for the likelihood-based semantics of *even*. *Semantics and Pragmatics* 9:1–28.
- Grice, Paul. 1989. *Studies in the way of words*. Cambridge, MA: Harvard University.
- Grubic, Mira, & Marta Wierzba. 2019. Presupposition accommodation of the german additive particle ‘auch’ (= “too”). *Frontiers in Communication* 4:1–18.
- Gundel, Jeanette K., & T. Fretheim. 2008. Topic and focus. In *The handbook of pragmatics*, ed. Laurence Horn & Gregory Ward, 175–196. Wiley-Blackwell.
- Gurevich, Olga, Matthew A. Johnson, & Adele E. Goldberg. 2010. Incidental verbatim memory for language. *Language and Cognition* 2:45–78.
- Göbel, Alexander. 2017. On the processing of presuppositions as anaphors. Unpublished Manuscript, UMass, Amherst.
- Göbel, Alexander. 2019a. Additives pitching in: L*+h signals ordered focus alternatives. In *Proceedings of SALT 29*, 279–299.
- Göbel, Alexander. 2019b. Final appositives at the right frontier: An experimental investigation of anaphoric potential. In *Proceedings of Sinn und Bedeutung 23, vol. 1*, ed. M.Teresa Espinal et al., 451–467.
- Göbel, Alexander, Brian Dillon, & Lyn Frazier. 2018. Investigating the parallelism requirement of ‘too’. Poster presented at the 92nd Annual Meeting of the Linguistic Society of America.
- Halliday, M. A. K. 1967. Notes on transitivity and theme in english: Part 2. *Journal of Linguistics* 3:177–274.
- Hamblin, Charles. 1973. Questions in montague grammar. *Foundations of Language* 10:41–53.

- Hankamer, Jorge, & Ivan A. Sag. 1976. Deep and surface anaphor. *Linguistic Inquiry* 7:391–428.
- Harris, Jesse A., & Katy Carlson. 2018. Information structure preferences in focus-sensitive ellipsis: How defaults persist. *Language and Speech* 61:480–512.
- Harris, Jesse A., & Christopher Potts. 2009. Perspective-shifting with appositives and expressives. *Linguistics and Philosophy* 32:523–552.
- Harris, Jesse Aron. 2012. Processing perspectives. Doctoral dissertation, UMass, Amherst.
- Hartmann, K., & M. Zimmermann. 2009. Morphological focus marking in gùrùntùm (west chadic). *Lingua* 119:1340–1365.
- Haviland, Susan E., & Herbert H. Clark. 1974. What's new? acquiring new information as a process in comprehension. *Journal of Verbal Learning and Verbal Behavior* 13:512–521.
- Heim, Irene. 1982. On the semantics of definite and indefinite noun phrases. Doctoral dissertation, UMass, Amherst.
- Heim, Irene. 1983. On the projection problem for presuppositions. In *Proceedings of WCCFL 2*.
- Heim, Irene. 1990. Presupposition projection. In *Presupposition, lexical meaning and discourse processes: Workshop reader*, ed. R. van der Sandt, 1–33. University of Nijmegen.
- Heim, Irene. 1991. Artikel und definitheit. In *Handbuch der semantik*, ed. A. v. Stechow & D. Wunderlich, 487–535. Berlin: de Gruyter.
- Heim, Irene. 1992. Presupposition projection and the semantics of attitude verbs. *Journal of Semantics* 9:183–221.

- Heim, Irene, & Angelika Kratzer. 1998. *Semantics in generative grammar*. Oxford: Blackwell.
- Hirsch, Aron. 2017. An inflexible semantics for cross-categorial operators. Doctoral dissertation, MIT.
- Hirsch, Aron, Jeremy Zehr, & Florian Schwarz. 2017. Presupposition projection from disjunction in online processing. In *Proceedings of SuB 21*.
- Husband, E. Matthew, & Fernanda Ferreira. 2016. The role of selection in the comprehension of focus alternatives. *Language, Cognition and Neuroscience* 31:217–235.
- Irmer, Matthias. 2009. Bridging inferences in discourse interpretation. Doctoral dissertation, Leipzig University.
- Jackendoff, Ray. 1972. *Semantic interpretation in generative grammar*. Cambridge, MA: MIT Press.
- Jayez, J., V. Mongelli, A. Reboul, & J.-B. van der Henst. 2015. Weak and strong triggers. In *Experimental perspectives on presuppositions*, ed. Florian Schwarz. Springer.
- Jayez, Jacques, & Valeria Mongelli. 2013. How hard are hard triggers? In *Proceedings of Sinn und Bedeutung*, volume 17.
- Jeong, Sunwoo. 2018. Qud effects on epistemic containment principle: An experimental study. In *Proceedings of Sinn und Bedeutung*, ed. Uli Sauerland & Stephanie Solt, volume 22, 487–504.
- Johnson-Laird, P. N., & Bruno G. Bara. 1984. Syllogistic inference. *Cognition* 16:1–61.

- Kadmon, Nirit. 2001. *Formal pragmatics: semantics, pragmatics, presupposition, and focus*. Blackwell.
- Kamp, Hans. 1981. A theory of truth and semantic representation. In *Formal methods in the study of language*, ed. J. Groenendijk, T. Janssen, & M. Stokhof, 277–322. Amsterdam: Mathematisch Centrum.
- Kamp, Hans. 1988. Comments. In *Contents of thought*, ed. R. Grim & D. Merrill, 156–181. Tucson, AZ: University of Arizona Press.
- Kamp, Hans, & Uwe Reyle. 1993. *From discourse to logic: Introduction to modeltheoretic semantics of natural language, formal logic and discourse representation theory*. Dordrecht: Kluwer Academic Publishers.
- Karttunen, Lauri. 1973. Presuppositions of compound sentences. *Linguistic Inquiry* 4:168–193.
- Karttunen, Lauri. 1974. Presupposition and linguistic context. *Theoretical Linguistics* 1:181–194.
- Karttunen, Lauri. 2016. Presupposition: What went wrong? In *Proceedings of Sinn und Bedeutung*, volume 26.
- Karttunen, Lauri, & Stanley Peters. 1979. Conventional implicature. In *Syntax and semantics, vol. 11*, ed. C.-K. Oh & D.A. Dineen, 1–56. New York: Academic Press.
- Kay, Paul. 1990. Even. *Linguistics and Philosophy* 13:59–111.
- Kay, Paul. 1992. At least. In *Frames, fields, and contrasts: new essays in semantic and lexical organization*, ed. A. Lehrer & E. F. Kittay, 309–332. Hillsdale, NJ: L. Erlbaum Associates.
- Kehler, Andrew, & Hannah Rohde. 2017. Evaluating an expectation-driven qud model of discourse interpretation. *Discourse Processes* 54:219–238.

- Kennedy, Lynda, Cory Bill, Florian Schwarz, Stephen Crain, Raffaella Folli, & Jacopo Romoli. 2015. Scalar implicatures vs presuppositions: the view from broca's aphasia. In *Proceedings of NELS 45*, 1–15. Amherst, MA: GLSA.
- Kim, Christina S. 2007. Processing presupposition: verifying sentences with 'only'. In *Penn Working Papers in Linguistics 14.1*, ed. Joshua Tauberer, Aviad Eliam, & Laurel MacKenzie, 213–226.
- Kim, Christina S. 2012. Generating alternatives: Interpreting focus in discourse. Doctoral dissertation, University of Rochester.
- Kim, Christina S. 2015. Presupposition satisfaction, locality and discourse constituency. In *Experimental perspectives on presuppositions*, ed. Florian Schwarz, 109–134. Springer.
- Kim, Christina S., Christine Gunlogson, Michael K. Tanenhaus, & Jeffrey T. Runner. 2015. Context-driven expectations about focus alternatives. *Cognition* 139:28–49.
- Kim, Nayoun, Laurel Brehm, Patrick Sturt, & Masaya Yoshida. 2020. How long can you hold the filler: Maintenance and retrieval. *Language, Cognition and Neuroscience* 35:17–42.
- Kiss, Katalin É. 1998. Identificational focus versus information focus. *Language* 74:245–273.
- Klinedinst, Nathan. 2016. Two types of semantic presuppositions. In *Pragmemes and theories of language use, perspectives in pragmatics, philosophy & psychology 9*, ed. Keith Allan, Alessandro Capone, & Istvan Kecskes, 601–624. Springer.
- Kotek, Hadas. 2017. Dissociating intervention effects from superiority in english *wh*-questions. *The Linguistic Review* 43:397–417.

- Kratzer, Angelika. 1977. What 'must' and 'can' must and can mean. *Linguistics and Philosophy* 1:337–355.
- Krifka, Manfred. 1993. Focus and presupposition in dynamic interpretation. *Journal of Semantics* 10:269–300.
- Krifka, Manfred. 2008. Basic notions of information structure. *Acta Linguistica Hungarica* 55:243–276.
- Krifka, Manfred. 2013. Response particles as propositional anaphors. In *Semantics and Linguistic Theory*, volume 23, 1–18.
- Kripke, Saul A. 2009. Presupposition and anaphora: Remarks on the formulation of the projection problem. *Linguistic Inquiry* 40:367–386.
- Langendoen, D. T., & H. Savin. 1971. The projection problem for presuppositions. In *Studies in linguistic semantics*, ed. C. J. Fillmore & D. Terence Langendoen, 54–60. Irvington.
- Levinson, S.C. 1983. *Pragmatics*. Cambridge: Cambridge University Press.
- Levy, Roger. 2008. Expectation-based syntactic comprehension. *Cognition* 106:1126–1177.
- Lewis, David. 1979. Scorekeeping in a language game. In *Semantics from a different point of view*, ed. R. Bäuerle, U. Egli, & A. von Stechow. Berlin: Springer.
- Lewis, Richard L., & Shravan Vasishth. 2005. An activation-based model of sentence processing as skilled memory retrieval. *Cognitive Science* 29:375–419.
- Leys, Christophe, Christophe Ley, Olivier Klein, Philippe Bernard, & Laurent Licata. 2013. Detecting outliers: Do not use standard deviation around the mean, use absolute deviation around the median. *Journal of Experimental Social Psychology* 49:764–766.

- Malt, Barbara C. 1985. The role of discourse structure in understanding anaphora. *Journal of Memory and Language* 24:271–289.
- Mandelkern, Matthew. 2016. A note on the architecture of presupposition. *Semantics and Pragmatics* 9:1–24.
- Mandelkern, Matthew, Jeremy Zehr, Jacopo Romoli, & Florian Schwarz. 2019. We've discovered that projection across conjunction is asymmetric (and it is!). *Linguistics and Philosophy* online:1–42. URL <https://doi-org.silk.library.umass.edu/10.1007/s10988-019-09276-5>.
- Martin, Andrea E. 2018. Cue integration during sentence comprehension: Electrophysiological evidence from ellipsis. *PLoS ONE* 13:1–21.
- Matthewson, Lisa. 2006. Presuppositions and cross-linguistic variation. In *Proceedings of NELS* 36, 1–14.
- Matthewson, Lisa. 2008. Pronouns, presuppositions, and semantic variation. In *Proceedings of SALT* 18, 527–550.
- Meyer, Marie-Christine. 2015. Redundancy and embedded exhaustification. In *Proceedings of Semantics and Linguistic Theory* 25, 491–511.
- Miller, Philip, & Barbara Hemforth. 2014. Vp ellipsis beyond syntactic identity: the case of nominal antecedents. In *Proceedings of Linguistic Evidence*.
- Miller, Philip, & Barbara Hemforth. 2020. Acceptability of vp ellipsis: discourse conditions vs. syntactic identity. Poster presented at the 33rd Annual CUNY Conference on Human Sentence Processing.
- Morgan, J. L. 1969. On the treatment of presupposition in transformational grammar. In *Proceedings of CLS* 5.

- Myers, Jerome L., & Edward J. O'Brien. 1998. Accessing the discourse representation during reading. *Discourse Processes* 26:131–157.
- Ni, W., S. Crain, & D. Shankweiler. 1996. Sidestepping garden paths: Assessing the contributions of syntax, semantics and plausibility in resolving ambiguities. *Language and Cognitive Processes* 11:283–334.
- O'Brien, Edward J., & Jason E. Albrecht. 1992. Comprehension strategies in the development of a mental model. *Journal of Experimental Psychology: Learning Memory, and Cognition* 18:777–784.
- O'Brien, Edward J., Anne E. Cook, & Sabine Guéraud. 2010. Accessibility of outdated information. *Journal of Experimental Psychology: Learning Memory, and Cognition* 36:979–991.
- O'Brien, Edward J., Michelle L. Rizella, Jason E. Albrecht, & Jennifer G. Halleran. 1998. Updating a situation model: A memory-based text processing view. *Journal of Experimental Psychology: Learning Memory, and Cognition* 24:1200–1210.
- Özyıldız, Deniz. 2017. Attitude reports with and without true belief. In *Proceedings of SALT 27*, 397–417.
- Özyıldız, Deniz. 2018. A prosodic factivity alternation explained by clause movement. Poster presented at SALT 28.
- Parker, Dan, & Colin Phillips. 2016. Negative polarity illusions and the encoding of hierarchical representations in memory. *Cognition* 157:321–339.
- Paterson, K. B., S. P. Liversedge, & G. Underwood. 1999. The influence of focus operators on syntactic processing of “short” reduced relative clause sentences. *Quarterly Journal of Experimental Psychology* 52A:717–737.

- Pearson, Hazel. 2010. A modification of the “hey, wait a minute” test. *Snippets* 22:7–8.
- Pesetsky, David. 2000. *Phrasal movement and its kin*. Cambridge, MA: MIT Press.
- Pierrehumbert, Janet B., & Julia Hirschberg. 1990. The meaning of intonational contours in the interpretation of discourse. In *Intensions in communication*, ed. P. R. Cohen, J. Morgan, & M. E. Pollack, 271–311. Cambridge, MA: MIT Press.
- Poppels, Till, & Andrew Kehler. 2019. Ellipsis and the qud: Evidence from sluicing with nominal antecedents. Poster presented at the 32nd Annual CUNY Conference on Human Sentence Processing.
- Potts, Christopher. 2005. *The logic of conventional implicatures*. Oxford: Oxford University Press.
- Potts, Christopher. 2007a. Conventional implicatures, a distinguished class of meanings. In *The oxford handbook of linguistic interfaces*, ed. Gillian Ramchand & Charles Reiss, 475–501. Oxford University Press.
- Potts, Christopher. 2007b. The expressive dimension. *Theoretical Linguistics* 33:165–197.
- Roberts, Craige. 2006. *Only*, presupposition and implicature. Unpublished Manuscript, OSU.
- Roberts, Craige. 2011. ‘only’: A case study in projective meaning. In *Formal semantics and pragmatics: Discourse, context and models. special issue of the baltic international yearbook of cognition, logic and communication*, ed. Barbara H. Partee, Michael Glanzberg, & Jurgis Skilters, 1–59. Riga, Latvia.
- Roberts, Craige. 2012. Information structure in discourse: Towards an integrated

- formal theory of pragmatics. *Semantics and Pragmatics* 5:1–69. Earlier version appeared in OSU Working Papers in Linguistics 49 in 1996.
- Roberts, Craige. 2015. Accommodation in a language game. In *A companion to david lewis*, ed. B. Loewer & J. Schaffer, 345–366. Malden, MA: Wiley-Blackwell.
- Romoli, Jacopo. 2012. Soft but strong. neg-raising, soft triggers, and exhaustification. Doctoral dissertation, Harvard University.
- Romoli, Jacopo. 2015. The presuppositions of soft triggers are obligatory scalar implicatures. *Journal of Semantics* 32:173–219.
- Romoli, Jacopo, Manizeh Khan, Yasutada Sudo, & Jesse Snedeker. 2015. Solving temporary referential ambiguity using presupposed content. In *Experimental work on presuppositions*, ed. Florian Schwarz, 67–87. Springer.
- Romoli, Jacopo, & Uli Sauerland. 2017. Presuppositions and accommodation. In *The routledge handbook of pragmatics*, ed. A. Barron, G. Steen, & G. Yueguo, 1–29. Routledge.
- Romoli, Jacopo, & Florian Schwarz. 2015. An experimental comparison between presuppositions and indirect scalar implicatures. In *Experimental work on presuppositions*, ed. Florian Schwarz, 215–240. Springer.
- Ronai, Eszter, & Ming Xiang. 2019. Calculating scalar inference under quds. In *NELS 49: Proceedings of the 49th Annual Meeting of the North East Linguistic Society: Volume Three*, ed. Maggie Baird & Jonathan Pesetsky, 73–86. Amherst, MA: GLSA.
- Rooth, Mats. 1985. Association with focus. Doctoral dissertation, University of Massachusetts Amherst.

- Rooth, Mats. 1992. A theory of focus interpretation. *Natural Language Semantics* 1:75–116.
- Rooth, Mats. 1999. Association with focus or association with presupposition? In *Focus: Linguistic, cognitive and computational perspectives*, ed. Peter Bosch & Rob van der Sandt, 232–244. Cambridge: Cambridge University Press.
- Russell, Bertrand. 1905. On denoting. *Mind* 14:479–493.
- Sachs, Jacqueline Strunk. 1967. Recognition memory for syntactic and semantic aspects of connected discourse. *Perception and Psychophysics* 2:437–443.
- Sachs, Jacqueline Strunk. 1974. Memory in reading and listening to discourse. *Memory & Cognition* 2:95–100.
- Sag, Ivan A., & Jorge Hankamer. 1984. Toward a theory of anaphoric processing. *Linguistics and Philosophy* 7:325–345.
- van der Sandt, Rob. 1992. Presupposition projection as anaphora resolution. *Journal of Semantics* 9:333–377.
- van der Sandt, Rob, & Bart Geurts. 2001. Too. In *Proceedings of the 13th Amsterdam Colloquium*. University of Amsterdam.
- Schafer, A., J. Carter, Charles Clifton, Jr., & L. Frazier. 1996. Focus in relative clause construal. *Language and Cognitive Processes* 11:135–163.
- Schlenker, Philippe. 2008. *Be Articulate: A pragmatic theory of presupposition projection*. *Theoretical Linguistics* 34:157–212.
- Schlenker, Philippe. 2010. Local contexts and local meanings. *Philosophical Studies* 151:115–142.

- Schlenker, Philippe. 2011. The proviso problem: a note. *Natural Language Semantics* 19:395–422.
- Schlenker, Philippe. 2019. Triggering presuppositions. Unpublished Manuscript, CNRS/NYU.
- Schwarz, Florian. 2007. Processing presupposed content. *Journal of Semantics* 24:373–416.
- Schwarz, Florian. 2009. Two types of definites in natural language. Doctoral dissertation, University of Massachusetts, Amherst.
- Schwarz, Florian. 2014. Presuppositions are fast, whether hard or soft – evidence from the visual world. In *Proceedings of SALT*, volume 24, 1–22.
- Schwarz, Florian. 2015a. *Experimental perspectives on presuppositions*. Springer.
- Schwarz, Florian. 2015b. Introduction: Presuppositions in context—theoretical issues and experimental perspectives. In *Experimental perspectives on presuppositions*, ed. Florian Schwarz, 1–38. Springer.
- Schwarz, Florian. 2015c. Presuppositions vs. asserted content in online processing. In *Experimental perspectives on presuppositions*, ed. Florian Schwarz, 89–108. Springer.
- Schwarz, Florian. 2019. Presuppositions, projection, and accommodation - theoretical issues and experimental approaches. In *Handbook of experimental semantics and pragmatics*, ed. Chris Cummins & Napoleon Katsos, 1–49. Oxford University Press.
- Schwarz, Florian, & Sonja Tiemann. 2017. Presupposition projection in online processing. *Journal of Semantics* 34:61–106.

- Schwarzschild, Roger. 1999. Givenness, avoidf and other constraints on the placement of accent. *Natural Language Semantics* 7:141–177.
- Selkirk, Lisa. 1995. Sentence prosody: Intonation, stress, and phrasing. In *The handbook of phonological theory*, ed. John A. Goldsmith, 550–569. London: Blackwell.
- Shetreet, Einat, Edward J. Alexander, Jacopo Romoli, Gennaro Chierchia, & Gina Kuperberg. 2019. What we know about knowing: Presuppositions generated by factive verbs influence downstream neural processing. *Cognition* 184:96–106.
- Simons, Mandy. 2001. On the conversational basis of some presuppositions. In *Proceedings of Semantics and Linguistic Theory XI*, ed. B. Jackson R. Hastings & Z. Zvolenszky, 1–448. Ithaca, NY: Cornell University.
- Simons, Mandy. 2003. Presupposition and accommodation: Understanding the stalnakerian picture. *Philosophical Studies* 112:251–278.
- Simons, Mandy. 2006a. Foundational issues in presupposition. *Philosophy Compass* 1:357–372.
- Simons, Mandy. 2006b. Presupposition without common ground. Unpublished Manuscript, Carnegie Mellon University.
- 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 *Semantics and Linguistic Theory*, volume 20, 309–327.

- Singh, Raj, Evelina Fedorenko, Kyle Mahowald, & Edward Gibson. 2016. Accommodating presuppositions in inappropriate in implausible contexts. *Cognitive Science* 40:607–634.
- Sloggett, Shayne. 2017. When errors aren't: How comprehenders selectively violate binding theory. Doctoral dissertation, University of Massachusetts, Amherst.
- Snider, Todd. 2017. Anaphoric reference to propositions. Doctoral dissertation, Cornell University, Podunk IN.
- Spalek, Katharina, Nicole Gotzner, & Isabell Wartenburger. 2014. Not only the apples: Focus sensitive particles improve memory for information-structural alternatives. *Journal of Memory and Language* 70:68–84.
- Spenader, Jennifer. 2002. Presuppositions in spoken discourse. Doctoral dissertation, Stockholm University.
- Stalnaker, Robert. 1970. Pragmatics. *Synthese* 22:272–289.
- Stalnaker, Robert. 1973. Presuppositions. *Journal of Philosophical Logic* 2:447–457.
- Stalnaker, Robert. 1974. Pragmatic presuppositions. In *Semantics and philosophy*, ed. M. Munitz & P. Unger, 471–482. New York: New York University Press.
- Stalnaker, Robert. 1978. Assertion. *Syntax and Semantics* 9:315–332.
- Stalnaker, Robert. 1998. On the representation of context. *Journal of Logic, Language, and Information* 7:3–19.
- Stalnaker, Robert. 2002. Common ground. *Linguistics and Philosophy* 25:701–721.
- Stalnaker, Robert. 2014. *Context*. Oxford, UK: Oxford University Press.

- von Stechow, Arnim. 1990. Focusing and backgrounding operators. In *Discourse particles*, ed. Werner Abraham, 37–84. Amsterdam & Philadelphia: John Benjamins.
- Strawson, Peter F. 1950. On referring. *Mind* 59:320–344.
- Sturt, Patrick, Anthony J. Sanford, Andrew Stewart, & Eugene Dawydiak. 2004. Linguistic focus and good-enough representations: An application of the change-detection paradigm. *Psychonomic Bulletin & Review* 11:882–888.
- Sudo, Yasutada. 2012. On the semantics of phi features on pronouns. Doctoral dissertation, MIT.
- Szabolcsi, A. 1981. Compositionality in focus. *Folia Linguistica Societatis Linguisticae Europaeae* 15:141–162.
- Tanenhaus, Michael K., & Greg Carlson. 1990. Comprehension of deep and surface verbphrase anaphors. *Language and Cognitive Processes* 5:257–280.
- Theiler, Nadine. 2019. When additive particles can associate with wh-phrases. In *Proceedings of Sinn und Bedeutung 23, vol. 2*, ed. M.Teresa Espinal et al., 347–364.
- Tian, Ye, & Richard Breheny. 2016. Dynamic pragmatic view of negation processing. In *Negation and polarity: Experimental perspectives*, ed. P. Larrivé & C. Lee, 21–43. Springer.
- Tiemann, Sonja. 2014. The processing of *wieder* ('again') and other presupposition triggers. Doctoral dissertation, University of Tübingen.
- Tiemann, Sonja, Mareike Kirsten, Sigrid Beck, Ingo Hertrich, & Bettina Rolke. 2015. Presupposition processing and accommodation: An experiment on *wieder* ('again') and consequences for other triggers. In *Experimental perspectives on presuppositions*, ed. Florian Schwarz, 39–65. Springer.

- Tiemann, Sonja, M. Schmid, N. Bade, B. Rolke, I. Hertrich, H. Ackermann, J. Knapp, & S. Beck. 2011. Psycholinguistic evidence for presuppositions: On-line and off-line data. In *Proceedings of Sinn und Bedeutung*, volume 15, 581–595.
- Tieu, Lyn, Philippe Schlenker, & Emmanuel Chemla. 2019. Inferences without words. In *Proceedings of the National Academy of Sciences*, volume 116, 9796–9801.
- Tomioka, Satoshi. 2010. A scope theory of contrastive topics. *Iberia* 2:113–130.
- Tonhauser, Judith. 2012. Diagnosing (not-)at-issue content. In *Semantics of Underrepresented Languages of the Americas*, volume 6, 239–254.
- Tonhauser, Judith. 2015. Are 'informative presuppositions' presuppositions? *Language and Linguistics Compass* 9:77–101.
- Tonhauser, Judith, David Beaver, Craige Roberts, & Mandy Simons. 2013. Toward a taxonomy of projective content. *Language* 89:66–109.
- Tonhauser, Judith, Marie-Catherine de Marneffe, Shari R. Speer, & Jon Stevens. 2019. On the information structure sensitivity of projective content. In *Proceedings of Sinn und Bedeutung* 23, 923–949.
- Vaikšnoraitė, Elena, Marie-Catherine de Marneffe, & Judith Tonhauser. 2019. The prosody of presupposition projection: A production experiment. In *Proceedings of NELS 29*, ed. Maggie Baird & Jonathan Pesetsky, 241–254. Amherst, MA: GLSA.
- Van Dyke, J. A., & R. L. Lewis. 2003. Distinguishing effects of structure and decay on attachment and repair: a retrieval interference theory of recovery from misanalyzed ambiguities. *Journal of Memory and Language* 4:285–316.
- Wagers, Matthew W., Ellen F. Lau, & Colin Phillips. 2009. Agreement attraction in

- comprehension: Representations and processes. *Journal of Memory and Language* 61:206–237.
- Wagner, Michael. 2012a. Contrastive topics decomposed. *Semantics and Pragmatics* 5:1–54.
- Wagner, Michael. 2012b. Focus and givenness: A unified approach. In *Contrasts and positions in information structure*, ed. Ivona Kučerová & Ad Neeleman, 102–148. Cambridge University Press.
- Wagner, Michael. 2020. Prosodic focus. In *Blackwell companion to semantics*, ed. Lisa Matthewson, Cécile Meier, Hotze Rullman, & Thomas Ede Zimmermann. Wiley-Blackwell.
- Walker, Andreas. 2012. Focus, uniqueness and soft presupposition triggers. In *Language, Logic and Meaning. Proceedings of the 18th Amsterdam Colloquium*, ed. Maria Aloni, Vadim Kimmelman, Floris Roelofsen, Katrin Schulz, Galit Weidman Sassoon, & Matthijs Westera, 460–469. Springer.
- Wason, P. C. 1966. Reasoning. In *New horizons in psychology*, ed. B. M. Foss. Harmondsworth: Penguin.
- Wold, Dag E. 1996. Long distance selective binding: The case of focus. In *Proceedings of Semantics and Linguistic Theory 6*, ed. Teresa Galloway & Justin Spence, 311–328. Ithaca, NY: Cornell University.
- Zeevat, Henk. 1992. Presupposition and accommodation in update semantics. *Journal of Semantics* 9:379–412.
- Zeevat, Henk. 1994. A speculation about certain triggers. In *The proceedings of the ibm/journal of semantics conference on focus*, ed. R. van der Sandt & P. Bosch, 669–676. IBM Heidelberg.

- Zeevat, Henk. 2002. Explaining presupposition triggers. In *Information sharing*, ed. K. van Deemter & R. Kibble, 61–87. Stanford: CSLI Publications.
- Zeevat, Henk. 2004. Particles: Presupposition triggers, context markers or speech act markers. In *Optimality theory and pragmatics*, ed. R. Blutner & H. Zeevat, 91–111. New York: Palgrave MacMillan.
- Zehr, Jeremy, Cory Bill, Lyn Tieu, Jacopo Romoli, & Florian Schwarz. 2016. Presupposition projection from the scope of none: Universal, existential, or both? In *Proceedings of SALT 26*, 448–457.
- Zehr, Jeremy, & Florian Schwarz. 2016. Entailed vs. non-entailed presuppositions - an experimental assessment. In *Proceedings of NELS 46*, 319–328.
- Zehr, Jeremy, & Florian Schwarz. 2018a. Penncontroller for internet based experiments (ibex). URL <https://doi.org/10.17605/OSF.IO/MD832>.
- Zehr, Jeremy, & Florian Schwarz. 2018b. Returning to non-entailed presuppositions again. In *Proceedings of Sinn und Bedeutung 22*.
- Zimmermann, Malte, & Edgar Onea. 2011. Focus marking and focus interpretation. *Lingua* 121:1651–1670.
- Zondervan, Albert Jan. 2010. Scalar implicatures *or* focus: An experimental approach. Doctoral dissertation, University of Amsterdam.
- Zondervan, Arjen. 2009. Experiments on *qud* and focus as a contextual constraint on scalar implicature calculation. In *Semantics and pragmatics: From experiment to theory*, ed. U. Sauerland & K. Yatsushiro, 94–112. Palgrave Macmillan.
- Zondervan, Arjen, Luisa Meroni, & Andrea Gualmini. 2008. Experiments on the role of the question under discussion for ambiguity resolution and implicature

computation in adults. In *Proceedings of SALT 28*, ed. T. Friedman & S. Ito, 765–777. Ithaca, NY: Cornell University.