UNIVERSITY OF CALIFORNIA

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About Time:

Lexical, Structural, and Discourse Constraints on the Temporal Interpretation of Nominal Predicates

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of Philosophy in Linguistics

by

Maura Christine O'Leary

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ABSTRACT OF THE DISSERTATION

About Time:

Lexical, Structural, and Discourse Constraints

on the Temporal Interpretation of Nominal Predicates

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Doctor of Philosophy in Linguistics

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Professor Jessica L. Rett, Chair

The goal of this dissertation is to clarify and account for the patterns that underlie nominal property times – the intervals over which nominal properties hold of the individuals they describe. Special attention is paid to the relationship between nominal property times and sentential tense operators.

Chapter 1 introduces the problem at hand – namely that nominal property times seem to have an unpredictably large set of possible property times – and introduces key terminology that is used throughout the dissertation.

Chapter 2 focuses primarily on the observable distribution of nominal property times, illustrating that different nominal predicates exhibit different sets of available property times, even when all other aspects of the utterance remain constant. I propose that stage nouns naturally separate into two classes based on their lexical aspect: (i) nouns which have property times which

always overlap one of the time variables in the utterance – the utterance time or the time defined by a tense operator – and (ii) nouns which have property times that overlap *or precede* one of those time variables. I call these "inflexible" and "flexible" nouns, respectively.

In Chapter 3, I show that local binding determines whether nouns are interpreted relative to the utterance time or to a time introduced by a tense operator. This claim is based on data in which the noun's location in the LF is independently known (e.g., existential 'there' constructions, de dicto readings) – in such cases, the noun is reliably interpreted relative to the nearest scoping lambda abstractor over times, whether that is the utterance time, a time introduced by a matrix tense, or a time introduced by an embedded tense. Given that similar claims have been made in the literature for other predicate types (e.g., Percus 2000 for verbs and adverbs, Ogihara 2003 for nominal modifiers), I broaden my proposal in the latter half of the chapter to claim that the time arguments of all predicates are locally bound by the nearest lambda abstractor over times. This dissertation therefore offers strong support that tenses are *sentential* operators, rather than simply operators on verbs, as has been previously claimed (e.g., Enç 1981).

Chapter 4 explores the property times of predicates which refer to familiar referents in an extended discourse. The property times of such predicates are shown to inherit their property times from predicates earlier in the discourse. I extend Tonhauser's (2006) Discourse Representation Theory model of similar data, modifying her account to attribute property time inheritance effects to familiarity at the predicate level, rather than definiteness at the DP level. This modification is based on evidence from definite DPs licensed by uniqueness and definite DPs containing multiple predicates of varying familiarity. As with the claims of Chapter 3, the claims in this chapter hold for all predicate types.

Chapter 5 summarizes the dissertation and offers areas for future research.

The dissertation of Maura Christine O'Leary is approved.

Timothy A. Stowell

Dylan Bumford

Ethan John Poole

Judith Tonhauser

Jessica L. Rett, Committee Chair

University of California, Los Angeles

2022

To my parents, who have provided me with unconditional love and support.

I saw the wonderful lives you've lived and I have tried to follow in your footsteps.

I love you both so very much.

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VITA

Education

2013	B.A. (Linguistics), University of California, Santa Cruz
2017	M.A. (Linguistics), University of California, Los Angeles

Academic Employment

2013-14	TESOL Instructor, Saparachinee School 2, Trang, Thailand
2017	Visiting Scholar, Linguistics Research Center, University of California, Santa Cruz
2016-22	Teaching Assistant, Associate, Fellow, and Instructor, University of California, Los Angeles
2022	Lecturer, San Diego State University

Awards

2017	Distinguished Graduate Student Teaching Award
2021	Linguistic Society of America Student Abstract Award

Publications

O'Leary, M. & Stockwell, R. (2022). Implementing Skills-Based Grading in a Linguistics Course. *American Speech*, 97(2).

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CHAPTER 1

INTRODUCTION

1. The Big Picture

Upon hearing (1), speakers have instant intuitions about the temporal information communicated.

(1) A high school teacher went to the moon.

The time of going to the moon is clearly located in the past of the time at which the sentence is uttered, as communicated by the past tense marked on the verb. But what about the time of being a high school teacher? How does that interval relate to the utterance time? And how does that interval relate to the time of going to the moon?

An obvious interpretation of (1) is one in which the subject went to the moon *while* they had the property of being a high school teacher. However, (1) is equally felicitous in a situation in which the subject went to the moon as part of a college program, well before they became a high school teacher. Likewise, (1) might be used if the subject retired from being a high school teacher before joining a space program.

The utterance in (1) is compatible with many different situations and the interval over which the subject is a high school teacher may vary widely. However, there are limitations – for instance, (1) would not apply in a situation where the subject will not be a high school teacher until sometime after (1) is uttered. With a number of available readings and at least one unavailable reading, (1) points us to an important question: what rules govern the available intervals over which nominal properties may hold?

The goal of this dissertation is to make clear and account for the patterns that underlie nominal temporal interpretation. Primarily, I show that, as is accepted widely for their verbal counterparts, the temporal interpretation of nominal predicates relies heavily on sentential tense operators (Chapter 3). This option has often been dismissed in previous literature on nominal temporal interpretation (e.g., Enç 1981, 1986; Musan 1995, 1999; Tonhauser 2002, 2006, 2020), leading some authors to conclude that tense is a feature of verbal predicates, rather than a feature of sentences. I claim that tense is not only sentential, but that tenses locally bind all time arguments within their scope. In order to account for data that led other authors away from this conclusion, I additionally provide accounts for two confounds that have obscured the relationship between sentential tense and nominal evaluation times: nominal lexical aspect (Chapter 2) and the inheritance of evaluation times by predicates referring to familiar referents from predicates earlier in the discourse (Chapter 4).

I intend for the theories presented in this dissertation to be broadly applicable cross-linguistically by both theoreticians and fieldworkers. I provide tools, tests, and theories useful for diagnosing and describing a wide variety of topics: tense effects, lexical aspect, discourse anaphora, and the location of predicative material within the LF (which can help to elucidate matters such as covert movement, constraints on movement, and reconstruction effects), all based on the temporal interpretation of nouns and other non-verbal predicates.

1.1 Temporal locations

Every predicate is temporally located. The temporal location of verbal predicates is overtly marked by tense in many languages, and is therefore (i) the subject of much study and (ii) fairly easy for speakers to define. When I say “I ran,” it is clear that I participated in a running event sometime

before I uttered that sentence. Alternatively, we might say that, at some point prior to speaking, I was a member of the set of runners, a set that is constantly in flux as people start and stop running. Likewise, if I say "I was a teenager," I am making a claim about my membership in the set of teenagers at a certain time. In a sentence one step more complicated, "A teenager is running" makes a claim that a single entity belongs to both the set of teenagers and the set of runners for intervals overlapping the utterance time.

1.2 Terminology

Alongside the abstract concept of temporal location, it is important to define some of the terminology that will be used throughout this dissertation.

Verbs, nouns, and many other types of predicates may act as the "main" predicate of a proposition (often accompanied by a copula in English in order to fill the V head). I therefore avoid using the term "verb" to describe properties defined by the content of a verb phrase. I instead adopt the term CLAUSAL PREDICATE.

While I discuss the temporal location of many predicates, nouns function as my main case study. In the interest of not repeating the same word in every sentence of this dissertation, I vary between NOUN, NOMINAL, and NOMINAL PREDICATE, using them more or less interchangeably. I mean for all of these terms to refer to the head of the noun phrase, whether that be a single word (e.g., 'teenager') or a collection of words (e.g., 'high school teacher'). If a noun is not specifically designated as a clausal predicate, it should be assumed that it is part of an argument DP, acting as the head of the NP complement to the determiner. Likewise, predicates like adjectives, prepositional phrases, participle phrases, and relative clauses are assumed to be nominal modifiers unless they are specifically designated as clausal predicates.

I likewise use the terms TEMPORAL LOCATION, EVALUATION TIME, and PROPERTY TIME interchangeably to refer to the interval over which a property holds of its referent. These terms may describe the temporal location of any type of predicate, so I often specify that I am talking about, e.g., NOMINAL PROPERTY TIMES. Importantly, I argue in Chapter 2 that a predicate's property time is not equivalent to its TIME ARGUMENT, which I term the INPUT TIME; the distinction between property times and input times will be discussed at length in Chapter 2, where I will also give a more detailed definition of "input time."

Other important times include the UTTERANCE TIME (UT) and the times defined by sentential tenses. The latter are defined based on the clause in which they appear – the tense of a matrix clause is the MATRIX CLAUSE TIME (MCT) and the tense of an embedded clause is the EMBEDDED CLAUSE TIME (ECT). I utilize the somewhat nonstandard phrase "clause time" in order to avoid a discussion of topic/reference times and event times until Chapter 4, which is the only chapter that discusses discourses rather than single sentences. None of the examples in Chapters 2 or 3 involve more than one sentence, nor are they complicated by grammatical aspect, so a lack of distinction between topic/reference time and event time is inconsequential.

2. Outline

The chapters of this dissertation work outwards: Chapter 2 discusses properties of nominal predicates, Chapter 3 the effects of sentential tense, and Chapter 4 cross-sentential anaphora.

2.1 Chapter 2

Chapter 2 focuses primarily on the observable distribution of nominal property times: given a specific noun in a specific sentence, what property times are allowed? I begin the chapter by

illustrating that the same answer will not suffice for all nouns – different nouns exhibit different sets of available property times.

As an example, the sentence in (1) only avoids contradiction if the subject is a member of the set of 'fugitives' *prior to*, rather than during, the utterance time. However, in (2), the only available reading is one in which the subject is a member of the set of 'bachelors' during the utterance time, leading to a contradiction. I address why 'fugitive' is allowed a prior-to-UT reading while 'bachelor' is not.

(1) A fugitive is in jail.

(2) # A bachelor is married.

Towards the beginning of the chapter, I detail previous efforts to model the distribution of nominal evaluation times (Enç 1981, 1986; Musan 1995, 1999; Tonhauser 2002, 2006, 2020), illustrating that no existing theory predicts that nouns like 'fugitive' and 'bachelor' will exhibit systematically different behavior. After a deep dive into specific distributions of the two nominal classes exemplified by 'fugitive' and 'bachelor,' I establish that no previous theory can adequately describe the behavior of either class – likely because the authors were attempting to cover the behavior of both classes with a single description.

I propose that the nominal classes discussed are instances of nominal lexical aspect. I term the difference between the two classes FLEXIBILITY and show that FLEXIBLE NOUNS such as 'fugitive' are compatible with property times which overlap or precede their time arguments ("input times") while INFLEXIBLE NOUNS such as 'bachelor' are only compatible with property times that overlap their input times. I provide evidence from their distributions that, for both nominal classes, the sets

of available property times are influenced by the utterance time and the clausal times of the sentences in which they occur, counter to many previous claims.

Towards the end of the chapter, I discuss whether flexibility ought to be called tense or aspect and whether it is internal or external to the noun's lexical entry.

2.2 Chapter 3

In Chapter 3, I expand on my claims that input times are influenced by the utterance time and the various clausal times introduced by tenses, making the broad claim that the input times to not only nouns, but all predicates, must be locally bound by the nearest lambda abstractor over times.

I begin by providing evidence for this temporal locality constraint in the nominal domain, showing that nouns may only have time arguments ("input times") which are bound by the nearest lambda abstractor over times. Assuming that the DP containing the noun has freedom of movement via quantifier raising, this means that the noun may be interpreted in many places in the LF, and its time argument may therefore be bound by a variety of lambda abstractors, leading to multiple available readings. However, I show that when there is an independent reason (unrelated to times) to think that the noun is interpreted in a specific position in the LF, the noun's time argument must be bound by the nearest lambda abstractor over that position. I appeal to existential 'there' constructions, de dicto readings, and cases of mistaken attitude holders to fix the noun's position within the LF.

In the latter half of the chapter, I broaden my locality constraint to encompass time arguments of all predicate types, citing previous works which claim local binding for the time arguments of verbs and adverbs (Percus 2000), relative clauses (Abusch 1988), and nominal modifiers in general (Ogihara 2003).

I additionally discuss some of the implications of this chapter, including (i) the inefficacy of situation pronouns, (ii) the universal nature of pronominal types that is echoed by times, (iii) the definitively scopal and sentential nature of tense, (iv) support for a locality constraint for world pronouns, and (v) consequences for theories of semantic reconstruction, including comments on Fodor's (1970) "third reading."

2.3 Chapter 4

In Chapter 4, I turn to the cross-sentential behavior of nominal property times. Predicates which refer to familiar referents exhibit different temporal behavior from predicates introducing novel referents (which are the predicates studied in Chapters 2 and 3).[1] Predicates referring to familiar referents inherent their property times from earlier uses of the same predicate within the discourse. Thus, the property time of a predicate referring to a familiar referent is not determined based on the time abstractions of its own sentence, but instead based on the time abstractions of the utterance containing the initial, novel-referent-introducing use of that predicate in the discourse.

Building on Tonhauser's (2006) account based in Discourse Representation Theory, I model how the property time of a predicate introducing a novel referent can be inherited by a predicate referring to a familiar referent later in the discourse: familiar referents are first identified with referents previously established in the discourse, and then the input times and property times of the predicates are shared.

[1] When I say that a predicate "introduces novel referents" or "refers to familiar referents," I mean that it characterizes a set novel to the discourse or characterizes a set familiar to the discourse, respectively. This is discussed further in Chapter 4, in which it will become crucial to be able to discuss the familiarity and novelty of the sets characterized by predicates rather than the familiarity and novelty of the referents of determiner phrases.

I claim that the factors described in Chapters 2 and 3 apply to predicates introducing novel referents, and that the content of Chapter 4 applies to predicates describing familiar referents. This is in contrast with claims from similar theories which instead draw a line between nouns in indefinite DPs and nouns in definite DPs. My delineation attributes the behavior to the predicate, rather than to a property of the determiner under which the predicate occurs, allowing me to account for (i) the fact that nominal predicates in DPs where definiteness is licensed by uniqueness rather than familiarity exhibit the same temporal behavior as nominal predicates which introduce novel referents in indefinite DPs, rather than temporal behavior similar to nouns referring to familiar referents in definite DPs and (ii) the fact that two intersective predicates in the same definite DP can exhibit differences in novelty, and that when they do, any predicate referring to a familiar set will inherit its property time, and any predicate introducing a novel set will have a property time determined via the factors outlined in Chapters 2 and 3. Regardless of the definiteness of the DP, the novelty of the predicate's referent(s) reliably predicts how the predicate arrives at its property time.

2.4 Overview

For those wishing to cut to the chase, this dissertation can be summarized as follows: when a novel set of entities is introduced to a conversation via a nominal predicate, that nominal property must be attributed to a specific temporal interval in order to identify which individuals are being referenced. The intervals over which the nominal property time may hold are constrained by the sentence that the nominal predicate occurs in. I propose that nominal time arguments are locally bound by either the utterance time or the time defined by a sentential tense (Chapter 3). This locally bound time argument is translated into a property time based on the lexical aspect of the noun itself

(Chapter 2); the property time of an inflexible noun must overlap the noun's time argument, and the property time of a flexible noun must hold for an interval that either overlaps or precedes the noun's time argument. Finally, once a property time is established for a nominal predicate, that same property time will be used for that predicate throughout the rest of the discourse, as any later uses of that noun are understood to refer back to the entities picked out initially by the same property over the property time that has already been established.

The properties discussed in Chapters 3 and 4 hold for other linguistic constituents which pick out sets of individuals, e.g., adjectives, prepositional phrases, participle phrases, and relative clauses. Nouns merely offer an exceedingly clear case study. To summarize the points which apply to all predicates: the time arguments of all predicates introducing novel referents are locally bound by the nearest lambda abstractor over times and the property times of all predicates describing familiar referents are inherited from previous, novel-referent-introducing predicates used earlier in the discourse.[2]

[2] Please see my website for updates to the work presented here and for more work on these topics.

CHAPTER 2

NOMINAL LEXICAL ASPECT

1. Introduction and basic data

Previous theories regarding the temporal interpretation of nominal predicates (to be discussed in more detail in §2) claim that a variety of factors affect nominal property times, including the location of the noun in the larger syntactic structure, various features of the determiner under which the noun occurs, information status, and whether the noun is an individual-level or stage-level predicate. However, none of these theories can account for the difference in acceptability between (1) and (2), in which the sentence structure, the determiner, and the information status are held constant for two stage-level nouns:

(1) NOUN TYPE 1: A fugitive is in jail.

(2) NOUN TYPE 2: # A bachelor is married.

In both sentences, an indefinite DP subject contains a noun whose property cannot hold at the same time as the property denoted by the VP predicate without creating a contradiction. Yet the sentence with 'fugitive' is acceptable, while the sentence with 'bachelor' is not.

Assuming a fugitive to be someone who is on the run from the law, it is incongruous for the subject of (1) to be simultaneously a fugitive and in jail. (1) is an acceptable utterance because it allows an interpretation roughly equivalent to (3), in which the subject is a fugitive prior to the utterance time, prior to being in jail.

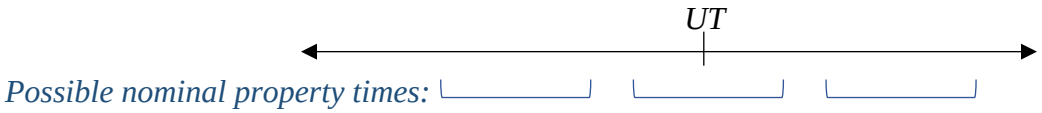
(3) A former fugitive is in jail.

It is similarly incongruent for an individual to simultaneously be a bachelor and married. (2) could be saved from unacceptability if 'bachelor' could be interpreted as 'former bachelor,' given the acceptability of (4); however, no such reading is available. In sum, while 'fugitive' in (1) can be interpreted as 'former fugitive,' 'bachelor' in (2) cannot be interpreted as 'former bachelor.'

(4) A former bachelor is married.

To examine the interpretations that are available to each type of noun, it is important to consider each of the logically possible intervals at which their NOMINAL PROPERTY TIMES might hold *relative to* the utterance time[1] (UT): entirely preceding the UT, overlapping the UT, or entirely following the UT. Thus far, we have established that a nominal property time preceding the UT is available to Noun Type 1 ('fugitive') but not Noun Type 2 ('bachelor').

(5) Possible property times relative to UT:



a. NOUN TYPE 1:

Results for 'fugitive:'

[1] In the sentences introduced thus far, the time introduced by the present tense operator overlaps the utterance time and therefore is not separately considered. Later sections of this chapter will focus on sentences where the tense-introduced time and the utterance time do not overlap.

b. NOUN TYPE 2:

Results for ‘bachelor:’

At this stage, I am forced to abandon (1) and (2) as test sentences, as in those sentences, some of the conceivably possible nominal property times are excluded on definitional grounds: one cannot be a fugitive while in jail (overlapping the UT) and one cannot be a bachelor while married (overlapping the UT) or after being married (following the UT). These logically excluded readings are valuable for highlighting the difference in behavior between ‘fugitive’ and ‘bachelor,’ as ‘fugitive’ is forced into its preceding-the-UT (‘former ___’) reading, and ‘bachelor’ is forced to show its hand that it is not compatible with a preceding-the-UT reading. However, to investigate which options are *linguistically* available, I will use two new sentences that do not share the same definitional constraints; these are given in (6) and (7). (§3 justifies ‘bachelor’ and ‘teenager’ belong to the same class of nouns.)

(6) NOUN TYPE 1: A fugitive is angry.

(7) NOUN TYPE 2: A teenager is angry.

In (8) and (10) I provide potential contexts for these sentences which force the time at which the nominal property holds true into each of the three possible property times shown in (5): intervals preceding, overlapping, or following the UT. The results are given visually in (9) and (11).

(8) NOUN TYPE 1:

Potential contexts for (6):

a. ✓ ‘Fugitive’ holds for an interval *preceding* the UT

Alea, a prisoner, escaped from jail 2 years ago, but was caught last week and is now back in jail. They are understandably angry about this.

b. ✓ ‘Fugitive’ holds for an interval *overlapping* the UT

Bjørn, a prisoner, escaped from jail last week and is still on the run. He just stubbed his toe and is angry about it.

c. # ‘Fugitive’ holds for an interval *following* the UT

Camille, a prisoner, is in jail now and is very angry about it. She will escape next month.

(9) NOUN TYPE 1:

Results for ‘fugitive:’

(10) NOUN TYPE 2:

Potential contexts for (7):[2]

a. # ‘Teenager’ holds for an interval *preceding* the UT

Danai is 25 today. She just stubbed her toe and is upset about it.

b. ✓ ‘Teenager’ holds for an interval *overlapping* the UT

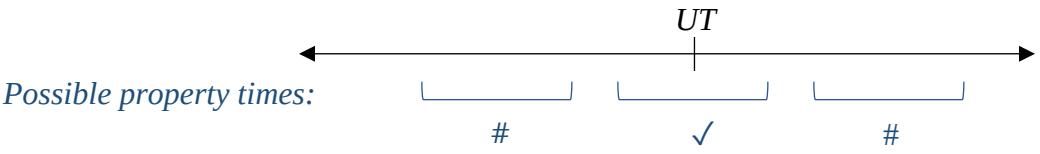
Eryl is 17 today. They just stubbed their toe and are upset about it.

c. # ‘Teenager’ holds for an interval *following* the UT

Faivish is 8 today. He just stubbed his toe and is upset about it.

(11) NOUN TYPE 2:

Results for ‘teenager:’



For both nominal predicates, it is acceptable for the nominal property to hold for an interval which overlaps the UT: (8b) and (10b). (In these present tense sentences, that means that the nominal property also holds at the same time that the VP property holds – this will become relevant when I consider data involving other tenses in §3.) Neither nominal property may hold at a time which exclusively follows the UT, (8c) and (10c). The interesting data point lies in cases where the

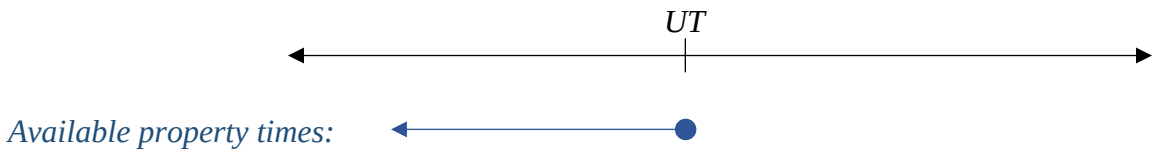
[2] The names in this example, and many others throughout this dissertation, come from the Diverse Names Database, a resource which promotes inclusion in linguistics by offering diverse names for linguists to use in example sentences (Konnelly, Umbal, & Sanders 2021; also discussed in Sanders, Umbal, & Konnelly 2020 and Sanders 2021). More information can be found at https://ledir.ling.utoronto.ca/.

property time properly precedes the UT: as discovered in (1), the nominal property 'fugitive' allows an interpretation where the described entity is a 'fugitive' for an interval entirely preceding the UT, effectively being read as 'former fugitive,' (8a). The analogous reading is not available for 'teenager,' (10a).

The "preceding-UT" interpretations of these nominal predicates do not relegate the property time to a specific interval in the past, but rather any time preceding the UT (be it the day beforehand or 50 years beforehand). Thus, the timelines in (12) and (13) are perhaps more accurate depictions of the property times that are available to these predicates in present tense sentences. The filled circles indicate that that point in time is an acceptable point for the property to hold. An arrow indicates that the property may hold at any time on the timeline in that direction.

(12) NOUN TYPE 1:

Available property times for 'fugitive' in a present tense sentence:



(13) NOUN TYPE 2:

Available property times for 'teenager' in a present tense sentence:

As mentioned at the top of the chapter, all previous theories predict that the property times of 'fugitive' and 'bachelor'/'teenager' should behave identically; §2 lays out these theories and their

predictions for the available property times of ‘fugitive’ and ‘teenager’ as used in the case studies of (6) and (7). In response to the data above, I propose in §3 that (stage) nouns are separated into two natural classes, exemplified by ‘fugitive’ and ‘bachelor’/‘teenager,’ which interact in unique ways with other times present in the LF. The more detailed data provided in §3 shows a previously undiscovered link between nominal property times, the utterance time, and sentential tense. §4 briefly discusses overt temporal operators, such as ‘former’ and ‘future,’ and their interaction with the two nominal classes, as well as whether the relevant temporal features of these two noun types should be classified as tense or aspect. §5 concludes.

2. Background information and previous theories

I am not the first to hunt for a link between nominal property times and the other times in a sentence, such as the utterance time and times supplied by tense operators. Enç (1981, 1986) showed that it is possible for nominal property times to overlap none of the other times in a sentence, from which she concluded that all nominal property times are (exclusively) contextually determined – that they are not influenced in any way by tense or the utterance time. Musan (1995, 1999) updated this theory, noting temporal restraints on nouns introducing novel entities to the discourse, as signaled by certain determiners or syntactic constructions. She concluded that a “hearer-new” information status forced nouns to be “temporally dependent” on the time at which the VP is evaluated. Finally, Tonhauser (2002, 2006, 2020) claims that, regardless of determiner, syntactic structure, or information status, there is an overwhelming tendency for all nominal predicates to overlap the time at which the VP is evaluated, and that this tendency is only overridden with sufficient contextual justification.

After an introduction to the basics of tense, this section gives brief descriptions of each of these theories. I follow each summary with a depiction of how that theory would expect the 'fugitive'/'teenager' minimal pair to behave. The "predictions" I present in §2.2.2, §2.3.1, and §2.4.1 are, for the most part, representative of these papers' *descriptive* generalizations about overall behavior of the data, rather than their theoretical explanations. I leave out some of the theoretical details of these papers, as my main point is that the theories introduced in these works were designed to account for descriptive generalizations that do not include a difference in behavior between two types of stage noun when all else in the sentences is equal. Interestingly, adding a distinction between 'fugitive'-type nouns and 'bachelor'/'teenager'-type nouns to the model justifies a return to a theory that has been discussed and rejected by several of the authors discussed here – to be presented in my Chapter 3.

2.1 Basics of sentential tense

In order to discuss the property times of nominal predicates and their potential interaction with sentential tense, it is important to understand the basics of tense.

When semanticists discuss tense, they are usually discussing the observable effects of tense on the evaluation times of CLAUSAL PREDICATES: the main predicate of a clause, such as the verbal head of the main VP or the adjective, noun, etc. following a copula. Clausal predicates have evaluation times that are non-optionally affected by the tense of their clause (e.g., Percus 2000). In a past tense[3] sentence, a clausal predicate must hold at a time prior to the utterance time, as with

[3] I assume the most simplistic concepts of tense for the sake of clarity, following other authors studying nominal evaluation times (e.g., Musan:1999:23). Unless otherwise stated, I assume single-clause utterances uncomplicated by grammatical aspect.

run, *sad*, and *doctor* in (14).[4] In a present tense sentence like (15), the clausal predicate holds at a time overlapping the utterance time. In a future sentence, the clausal predicate must hold after the utterance time.[5,6]

(14) Gyeong {ran, was sad, was a doctor}.

(15) Gyeong {runs, is sad, is a doctor}.

(16) Gyeong {will run, will be sad, will be a doctor}.

I attribute the evaluation time to the predicates accompanying the copula (e.g., 'sad' and 'doctor'), rather than the tense-marked copula itself, under the assumption that the copula is semantically vacuous and is merely present in English for syntactic and morphological reasons, such as hosting the tense morpheme; it is lexical predicates like 'sad' and 'doctor' that describe properties that hold over specific temporal intervals. This position is supported by the fact that many languages do not use a copula when the clausal predicate is non-verbal, as exemplified below:

[4] Stative predicates may continue to hold throughout the utterance time as well. See Altshuler & Schwarzschild (2013) for discussion of the implicature that past tensed stative predicates do not hold at the utterance time.
[5] There is evidence that the English future "tense" is not a tense at all, but rather a modal (e.g., Klecha 2014, Winans 2016). For the sake of simplicity, I treat the future as a tense, but I do not believe that anything I say in this dissertation is inherently incompatible with a theory in which the future is treated as a modal.
[6] There are many other tenses besides past, present, and future. Some of them are discussed in §4.2.

(17) African-American Vernacular English

You in trouble.

(Bender 2001:77)

(18) Russian:

Moskva gorod

Moscow city

'Moscow is a city.'

(Raptchinsky 1946:11)[7]

(19) Hän (Dene):[8]

yë-jąą nähshi

3SG.POSS-friend silly

'His/her friend is silly.'

I call the time at which the clausal predicate is evaluated the CLAUSE TIME. For the main content of this chapter, I only discuss single clause utterances, which bear MATRIX CLAUSE TIMES ("MCTs"). In the next chapter I also discuss EMBEDDED CLAUSE TIMES ("ECTs"). I adopt a theory of *quantificational* tense: tense operators introduce a time variable (in a matrix clause, the MCT) via an existential quantifier, which bears a specific relationship to the UT (preceding, overlapping, etc.). The time argument of the clausal predicate is locally bound by the MCT (Percus 2000).

To some extent, the MCT is contextually restricted, which is especially important when the scope of the quantificational tense interacts with other scopal elements (e.g., Bäurle 1977, Partee

[7] Example taken from Nordlinger & Sadler (2007:139) who took it from Stassen (1997:62-3). Both of these sources contain a wide cross-linguistic variety of further example sentences which do not contain overt verbal predicates.

[8] This example comes from my personal fieldwork. Thanks go to my speakers Ruth Ridley and Ethel Beck.

1984, Ogihara 1996, Ogihara & Kusumoto 2020). For instance, Partee (1973) points out that "I didn't turn off the stove" means neither 'there exists a single time at which I did not complete a stove-turning-off event' nor 'it is not the case that there exists a time where I turned off the stove.'[9] I assume that quantificational tenses define time variables from a contextually restricted domain, such that "I didn't turn off the stove" might be interpreted as 'during a specific, salient interval, it is not the case that there exists a time where I turned off the stove.'

Finally, it is important for the purposes of Chapter 3 to note the behavior of embedded tenses. There are many interesting effects that arise from embedding various tenses under others. In this dissertation, I only embed past tense under past tense. In English, "past-under-past" sentences exhibit the following ambiguity:

(20) Haris said that Itto was pregnant.

a. *Simultaneous reading*: Haris said, "Itto <u>is</u> pregnant."

b. *Back-shifted reading*: Haris said, "Itto <u>was</u> pregnant."

Past-under-past sentences are ambiguous between a simultaneous reading, in which the property time of the embedded state (being pregnant) overlaps the time of the matrix event (saying), and a back-shifted reading, in which the property time of the embedded state precedes the time of the matrix event. For all multi-clause sentences in this dissertation, I assume a back-shifted reading in order to have an MCT and an ECT that clearly do not overlap, which makes it easier to tell which of them a nominal property time overlaps.

[9] To account for this data, Partee (1973) posits that tenses are more similar to pronouns than they are to existential quantifiers. Sharvit (2013) proposes that the use of quantificational vs. "pronominal" tenses varies language to language.

2.2 Enç 1981, 1986

In the first major look at the evaluation times of nouns, Enç (1981) claims that there is no systematic relationship between tense and nominal property times. Enç begins by reasoning that, under a theory of sentential quantificational tenses,[10] the property defined by a nominal predicate interpreted within the scope of a tense operator should hold at (overlapping) the MCT (to use my own terminology), while a nominal which is interpreted outside the scope of the tense should hold at the UT,[11] and that no other options should be available. She then presents data in which nominal properties do not hold at either the MCT or the UT, which she claims should not be possible under a theory where nominal evaluation times are tied to scopal tense. Two such data points are repeated below:

(21) Every member of our investment club will buy a house.
(Enç 1981:35)

(22) John will meet every hostage at the president's party.
(Enç 1981:38)

In (21), members need not be members at the time when they buy a house; the club may help the financial situation of all of its members, who then might leave the club before purchasing a house. Likewise, they need not be members at the time (21) is uttered – the claim can easily be understood to include those who will become members in the future, and then will later buy a house. In fact, the most likely interpretation of this sentence is one in which 'members' refers to past members, present members, *and* future members.

---

[10] She starts from Montague's (1976) purely scopal analysis of tense as a sentential operator. While Montague's past tense operator P and future tense operator F are not perfectly aligned with modern theories of quantificational tenses, they are similar enough so as to not affect the discussion at hand.
[11] In Chapter 3 of this dissertation, I argue for this same theory, despite Enç and other authors coming to a different conclusion.

For (22), Enç offers the following context: "Suppose that the president is giving a party for people who were held hostage in Iran. John will attend this party…John meets all the ex-hostages" (1981:38). In such a scenario, the property of being a hostage exclusively holds for an interval which precedes both the UT and the MCT (the time of John's meeting them), yet (22) would certainly be true if uttered in this situation.

Having shown that nominal predicates need not be evaluated at the same time as the clausal predicate, nor at the utterance time, Enç rejects the idea that the temporal interpretation of nominal predicates is in any way influenced by tense operators or, more generally, by other times within the utterance, concluding that "only verbs are necessarily interpreted relative to the time provided by the tense" (1986:423) and proposing "an analysis where tense is treated as an operation on verbs, not sentences" (1981:55). When it comes to nouns, she claims that "we seem to be able to talk about ANY set of individuals we please, without being restricted by the moment of evaluation for verbs" (1981:45), so the set denoted by the noun must come purely from contextual information.

She acknowledges that this theory does not perfectly account for the data, in part by contrasting the following two sentences, saying "If I can use *president* to pick out the set of individuals who were president sixty years ago, then I should also be able to use... *acorn* to pick out the set of oak trees that were acorns a hundred years ago" (1981:51), yet such a reading is not available for (24).

(23) Every congressman who remembers a president will be at the party.
(1981:38)

(24) # I chopped down an acorn in my backyard because it was blocking the sun.
(1981:51)[12]

[12] The # is added by me. Enç marks this utterance as unacceptable in prose, calling it "truly deviant" (1981:51).

2.2.1 A note on novel referents

The vast majority of the examples discussed by Enç (1981, 1986) involve DPs which refer to referents familiar to the discourse (e.g. "every hostage," "the president").

In Chapter 4, following Musan (1995, 1999; discussed in §2.3), I show that predicates referring to familiar referents exhibit different temporal behavior than predicates which introduce novel referents[13]. Also in Chapter 4, I offer an account regarding the property times of nominal predicates which refer to familiar referents. In the current chapter and Chapter 3, I intend to theorize only about nominals which introduce novel referents into the discourse. In these two chapters, when I describe certain readings as unavailable, I mean *only* that they are unavailable for predicates introducing novel referents. It is in fact the case that, with adequate context, there are no readings that are unavailable to predicates referring to familiar referents, as will be shown in Chapter 4.

This wide availability of readings is likely what Enç (1981, 1986) is describing, although these works do not explicitly discuss novelty/familiarity. As written, these works predict identical readings for nominals introducing novel referents and nominals referring to familiar referents. Therefore, as I report in §2.2.2 on what Enç (1981, 1986) would predict for sentences containing '*a* fugitive' and '*a* teenager,' I do so faithfully, even though her theories were based, for the most part, on sentences in which no novel referents were introduced.

[13] When I say that a predicate "introduces novel referents" or "refers to familiar referents," I mean that it characterizes a set novel to the discourse or characterizes a set familiar to the discourse, respectively. In Chapter 4, it will become crucial to be able to discuss the familiarity and novelty of the sets characterized by predicates rather than the familiarity and novelty of the referents of determiner phrases.

2.2.2 Predictions

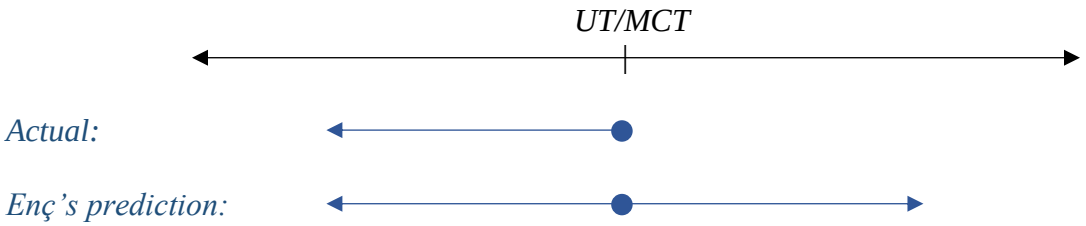
Enç claims that nominal predicates may be interpreted at any time, regardless of the rest of the sentence. For the 'fugitive'/'teenager' sentence pair from §1, Enç predicts that both nouns should be compatible with an interpretation before, during, or after the UT. Below I repeat the sentence pair and offer a visual comparing the actual available property times (from §1) to Enç's predictions, which do not capture the available property times, nor the difference between the two nouns.

(6) NOUN TYPE 1: A fugitive is angry.

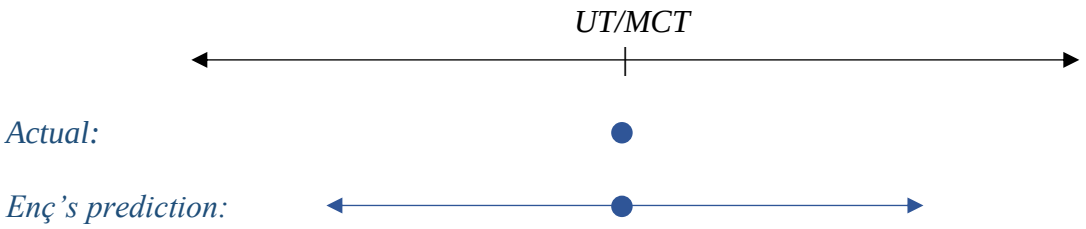
(7) NOUN TYPE 2: A teenager is angry.

(25) Property times in a present tense sentence:

a. NOUN TYPE 1 ('fugitive')



b. NOUN TYPE 2 ('teenager')



2.3 Musan 1995, 1999

Musan (1995, 1999) points out that, counter to Enç's claims, not all nouns are free from the grasp of sentential tense. She claims that either nouns are "temporally dependent" on the clausal predicate and must overlap the MCT, or they are "temporally independent" – free from any (non-pragmatic) temporal constraints, as Enç claimed all nouns were (Musan 1995:75).

In Musan's system, (in)dependence stems from whether the DP[14] containing the noun describe referents that are "hearer-new" or "hearer-established" (1999), as referenced above in §2.2.1. Hearer-new DPs, she claims, are temporally dependent on the MCT. Such DPs are generally signaled by the use of weak-cardinal determiners. The weak-strong distinction follows Milsark (1974). Loosely, weak determiners (such as *some, few, many,* and *two*) are those that can occur in an existential 'there' construction (as in (26)), and strong determiners (such as *all, each, every,* and *most*) are those that cannot. Weak determiner phrases can be further separated into cardinal readings, which "characterize the cardinality of a set of individuals," and partitive readings, which "pick out a proportion of a set of individuals that satisfy the noun" (Musan 1999:628-9). Only cardinal readings are available in existential 'there' constructions. Cardinal readings can also be signaled in any sentence by a rising accent on the noun (Musan 1999:629), while partitive readings can additionally be signaled by the use of "of the" (as in (27a-b)) or by stressing the determiner. Weak determiners with none of these signals are ambiguous between partitive and cardinal readings.

Musan classifies weak-cardinal DPs as hearer-new and weak-partitive DPs as hearer-established. DPs with definite or strong determiners are likewise classified as hearer-established

[14] The line between DP and NP is somewhat blurred, as Musan uses 'NP' to refer to what is now called 'DP.' I use modern terminology. See my Chapter 4 for a discussion of whether novelty is more meaningfully associated with the predicate or with the DP as a whole.

due to their "presuppositional" nature. She claims that hearer-new DPs are temporally dependent on the MCT and that nouns within these DPs are only compatible with property times which overlap the MCT. She claims that hearer-established DPs are temporally independent and that the nouns contained within those DPs can be interpreted at any time. The examples below (based on examples from Musan 1999:634) show that a temporally dependent noun phrase, but not the temporally independent ones, must hold for an interval that overlaps the MCT.

(26) Hearer-new DPs

Temporally dependent: nominal property time must overlap the MCT[15]

Weak-cardinal determiner

a. # There were many college sophomores in high school.

b. # There was a teenager turning two in 1985.

(27) Hearer-established DPs

Temporally **in**dependent: nominal property time need not overlap the MCT

Weak-partitive determiner

a. Some (of the) college sophomores were lazy in high school.

b. Few (of the) teenagers turned two in 1985.

[15] Here, I have carefully and intentionally chosen to use a weak-cardinal determiner in an existential 'there' construction, as the data I present in §3 shows that weak-cardinal DPs that are *not* in existential 'there' constructions need not have a property time which overlaps the MCT. My Chapter 3 offers an explanation of why existential 'there' constructions have a special effect.

Definite determiner

c. The college sophomore was brilliant in high school.

d. The teenager turned two in 1985.

Strong determiner

e. Every college sophomore was lazy in high school.

f. Most teenagers turned two in 1985.

2.3.1 Predictions

As mentioned in §2.2.1, "temporally independent" nouns which refer to familiar or "hearer-established" referents are effectively compatible with any property time relative to the MCT and utterance time. In Chapter 4, I show that these property times are determined by the larger discourse, but, for the moment, we will simply put them aside.

Musan claims that nouns in temporally dependent DPs (i.e., weak-cardinal DPs) must have a property time that overlaps the MCT and that there are no limitations on the property times of all other nouns. To visually compare these generalizations to Enç's and to the data introduced at the beginning of the chapter, I return to the 'fugitive'/'teenager' minimal pair, repeated below.

Both 'fugitive' and 'teenager' are complements to the weak determiner 'a,' therefore Musan would expect that each sentence should have a cardinal, temporally dependent reading and a partitive, temporally independent reading, the latter being triggered by heavy stress on 'a' and meaning something like "one of the aforementioned/salient fugitives/teenagers was angry." I put the partitive reading aside, along with all other "presuppositional" DPs, until Chapter 4 and, for now, focus only on readings where we assume no conversational familiarity with the denotation of the noun phrase. In that reading (the weak-cardinal reading of 'a'), Musan expects a temporally

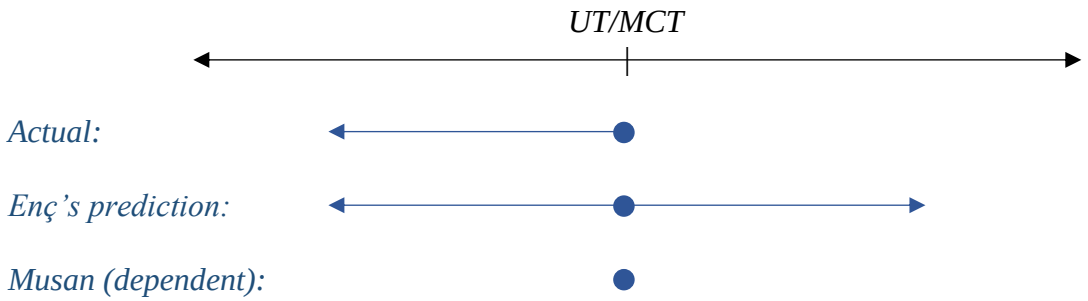
dependent interpretation of the nominal predicate, in which the time of being a 'fugitive'/'teenager' overlaps the MCT, as depicted in (28):

(6) NOUN TYPE 1: A fugitive is angry.

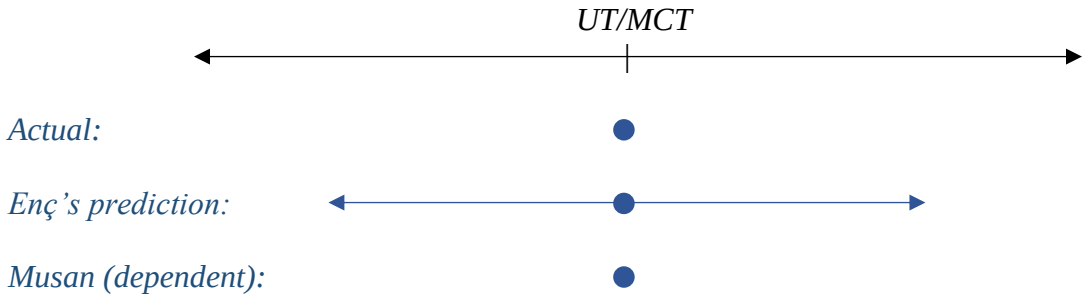
(7) NOUN TYPE 2: A teenager is angry.

(28) Property times in a present tense sentence:

a. NOUN TYPE 1 ('fugitive')



b. NOUN TYPE 2 ('teenager')



At first glance, it seems that we are making progress, as Musan's expectations for dependent readings match the observed data for 'teenager.' Based on this cursory look, it is possible that her theory could account for half of the target data. There are two hitches: first, a single theory should account for both 'fugitive'-type nouns and 'teenager'-type nouns. Second, I show in §3 that 'teenager'-type nouns must overlap *either* the MCT or the UT, while Musan predicts that they

must overlap the MCT. This is not apparent in present tense sentences I have used thus far, where the MCT overlaps the UT, but will quickly become apparent when we transition to past and future tense sentences.

2.4 Tonhauser 2002

Tonhauser (2002)[16] offers exceptions to Musan's observations, showing that nominal predicates which Musan predicts to be temporally dependent can be interpreted at times which do not overlap the MCT, and that nominal predicates which Musan predicts to be temporally independent still exhibit a strong tendency to have property times which overlap the MCT. For instance, the noun phrase 'crew members' in (30) is in the post-copular position of an existential 'there' construction – a position that Musan (1999) claims forces a hearer-new, and therefore temporally dependent, reading – yet the individuals described need not be crew members at the MCT (in this case, the present).[17]

(30) Context: at a reunion of the survivors of the Titanic disaster.

Look, there are even <u>some crew members</u> here.

(Tonhauser 2002:9)

[16] This section focuses only on Tonhauser's theories regarding nominals in indefinite/non-presuppositional DPs. Chapter 4 discusses and applies her (2006) theory of the temporal behavior of nominals in definite/presuppositional DPs.

[17] Several readers of early drafts of this dissertation have reported that they get a partitive reading (≈ "some *of the* crew members") and *only* a partitive reading in this example, despite previous claims that partitive readings are not available in existential 'there' constructions (e.g. Musan 1999:637, who cites Lumsden 1988 and McNally 1992). Tonhauser (p.c.) confirms that a cardinal reading was intended. Nonetheless, whether partitive or cardinal, this example is counter to Musan's (1995, 1999) claims, which state that the nominal predicate in the post-copular DP of an existential 'there' construction should only be compatible with a property time which overlaps the MCT.

The most salient reading is one in which the individuals in question were crew members of the Titanic at some point before the ship sank, for an interval which could not possibly overlap the present tense MCT. Thus, despite what Musan would expect of this data, the post-copular noun phrase is not evaluated at the utterance time, but instead at some contextually salient past time.

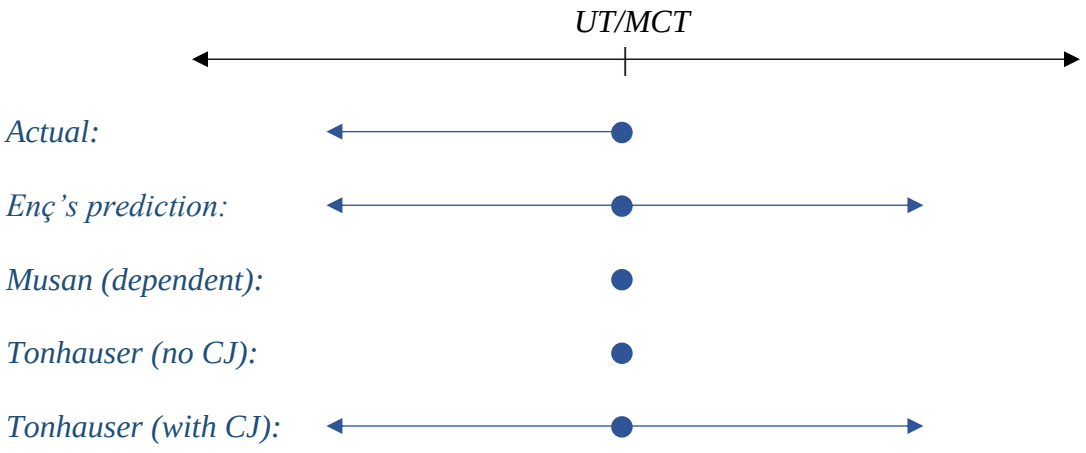
Tonhauser concludes that all nominal predicates, regardless of their information status or the determiner they are paired with, default to a property time that overlaps the MCT – a highly salient time in any sentence – but can be interpreted at any other time given adequate contextual justification. In her words: "These individuals [picked out by the DP] may either be identified by a property that is true of these individuals at the verbal predication time, as the most salient time of the utterance, or the individuals can be identified via a property which is salient for these individuals in the context already – and in this case the property expressed by the nominal predicate does not need to be true of the individuals at the verbal predication time." (2002:2)

2.4.1 Predictions

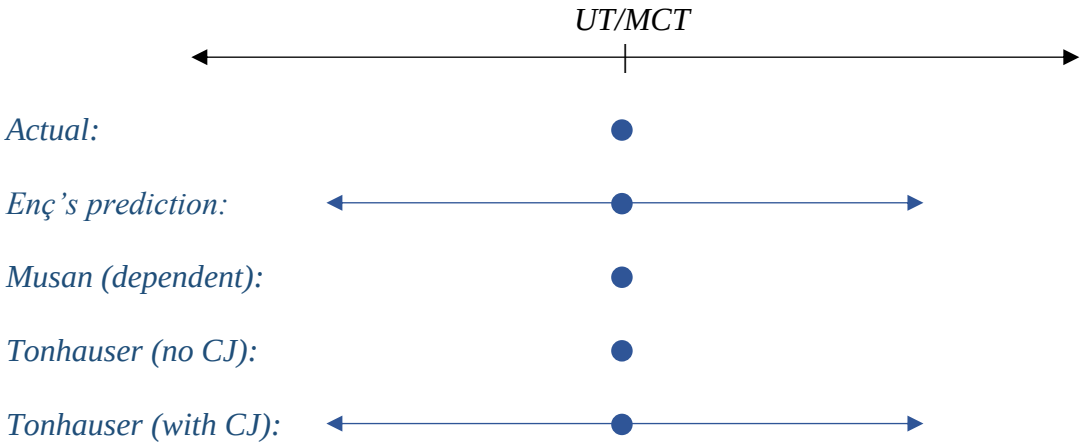
Tonhauser (2002) predicts that, without any contextual justification (abbreviated "CJ" below) for an alternate reading, all nouns are assumed to have a property time that overlaps the MCT. Given a plausible context, however, she claims that any noun can have any property time. The 'fugitive' and 'teenager' example sentences, assumed to be uttered out of the blue, do not have any contextual reasons for a specific property time; thus, Tonhauser (2002) predicts that both of these nominal predicates should have property times which overlap the MCT. As with Enç's (1981, 1986) and Musan's (1995, 1999) predictions, no difference is predicted between the two noun types.

(31) Property times in a present tense sentence:

a. NOUN TYPE 1 (‘fugitive’)



b. NOUN TYPE 2 (‘teenager’)



2.5 Summary

No previous theory predicts a difference between Noun Type 1 (‘fugitive’) and Noun Type 2 (‘bachelor’/‘teenager’). Although Musan and Tonhauser both assert that different readings are predicted for nouns in different sentences, the impetus for varied readings in their models comes from noun-external factors, such as context, information status, or determiner.

In the next section, I show that the two noun types have different, yet predictable, available readings in present, past, and future tense sentences. In the process of describing these nominal classes, I offer the first layer of a theory to explain the systematic behavior of nominal property times, which is then fleshed out throughout the following two chapters. Most importantly, the acknowledgement of two nominal classes with differing temporal behavior in this chapter allows me in Chapter 3 to reveal a link to sentential tense that has previously been rejected.

The proposals presented in this dissertation retain a number of elements from the theories discussed in this section. In Chapter 3, I adopt Enç's (1981) original hypothesis that the temporal interpretation of nominal predicates is affected by the scope of sentential tense (this hypothesis originates with her although she rather quickly discards it). Throughout my dissertation, I embrace Musan's conclusion that nouns referring to familiar entities do not exhibit the same temporal behavior as those introducing novel entities; Chapters 2 and 3 provide a theory for nominals introducing novel entities, and Chapter 4 tackles nominals referring to familiar entities. In Chapter 4, I lean heavily on Tonhauser's (2002) observation that nominals behave differently in context and her (2006) account of cross-sentential anaphora.

3. Flexible and inflexible nouns

The state of the data is as such: it seems that Noun Type 1 ('fugitive') and Noun Type 2 ('bachelor'/'teenager') allow different property times. Namely, we have seen that, in present tense sentences, Noun Type 1 allows a reading where the nominal property time precedes the UT while Noun Type 2 does not. This difference is particularly noticeable in (1) and (2), repeated below, where the preceding-the-UT reading allows (1) to escape contradiction, while the same option is not available in (2).

(1) NOUN TYPE 1: A fugitive is in jail.

(2) NOUN TYPE 2: # A bachelor is married.

The questions to answer are as follows:

(32) a. What behaviors do the two nominal classes exhibit?

b. Is there any systematic relationship between nominal property times and the MCT or the UT?

c. Why are nominal property times sometimes restricted to intervals that overlap the MCT, as noted by Musan (1995)? *(to be covered in Chapter 3)*

d. What role does the context play in determining the nominal property times of nominal predicates referring to familiar entities? *(to be covered in Chapter 4)*

In this section I demonstrate the systematic behavior of each of the two nominal classes (addressing (32a)), as well as their reliance on the MCT and the UT (beginning to address (32b), which I will continue to address in Chapter 3).

It is valuable at this stage to give names to the two nominal classes. Noun Type 1 ('fugitive') allows a larger number of acceptable property times than Noun Type 2 ('bachelor'/'teenager'). For this reason I use the term FLEXIBLE (NOUNS) to refer to Noun Type 1 ('fugitive') and INFLEXIBLE (NOUNS) to refer to Noun Type 2 ('bachelor'/'teenager'). I refer to the trait of being flexible or inflexible as FLEXIBILITY. Some examples of flexible and inflexible nouns are given below:

(33) Examples of FLEXIBLE nominal predicates:

fugitive, student, president, astronaut, secretary, crew member, teacher

(34) Examples of INFLEXIBLE nominal predicates:

bachelor, teenager, sophomore, 27-year-old, first-time chess player

It is also valuable to have a clear mechanism for devising whether a noun is flexible or inflexible. The easiest way to separate the two groups is to look for the differing behavior displayed by 'fugitive' and 'bachelor' at the very start of this chapter.

(1) A fugitive is in jail.

(2) # A bachelor is married.

Only flexible nouns like 'fugitive' are able to be interpreted as 'former __,' and therefore only flexible nouns are able to be paired with a clausal predicate which entails that the nominal property no longer holds. Therefore, in a single clause, present tense utterance, if the subject nominal predicate and the clausal predicate cannot logically hold of the same entity at the same time, sentences with flexible nouns are acceptable, while sentences with inflexible nouns are unacceptable.

(35) To test a noun:

1. Use a single clause, present tense sentence.
2. Use the target noun with the determiner "a" as the subject (ex. *a bachelor*)
3. Use a clausal predicate that cannot be true simultaneously with that noun, *but* where the nominal predicate could reasonably hold *before* the clausal predicate. (ex. bachelor + be married)
4. If the sentence is…
    - acceptable, you have a flexible noun
    - not acceptable, you have an inflexible noun

(36) Examples:

a. # A fifteen-year-old is an octogenarian. # → inflexible

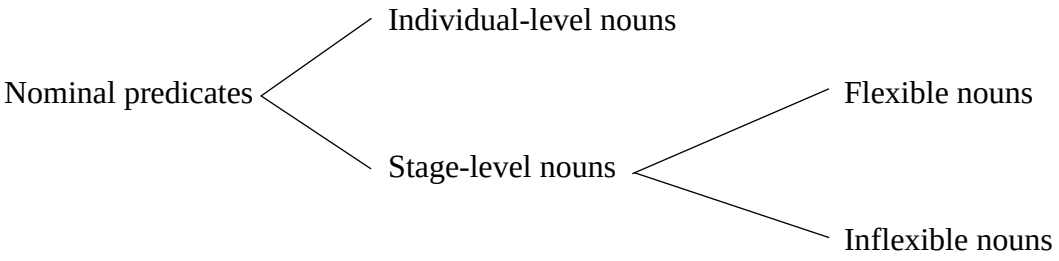
b. A lawyer is retired. ✓ → flexible

3.1 Two types of *stage* noun

Flexible and inflexible nouns are two subtypes of stage nouns. It has long been noted that some predicates describe individuals, while others describe stages – (possibly non-proper) sub-intervals of an individual's existence (e.g., Carlson 1977, Musan 1997). Individual level predicates denote properties that hold for the entirety of the individual's existence (nominal examples include 'human' and 'cat'), while stage nouns describe a temporal chunk (a "stage") of the individual's

existence.[18] Stage-level nouns can be divided into two further categories, flexible and inflexible nouns, based on temporal behavior (O'Leary 2017, O'Leary & Brasoveanu 2018).

(37)



The temporal interpretation of individual-level nouns is not discussed in this dissertation, as they are inextricably tied to the temporal location of the individual itself – the interval over which the individual exists. This interval of existence is governed by its own set of semantic and pragmatic rules (see Musan 1995, Ch.2; 1997); therefore, to use Musan's words, "it is important to look at nouns that denote temporary properties of individuals in order to investigate the temporal location of predication times of nouns" (1995:19).

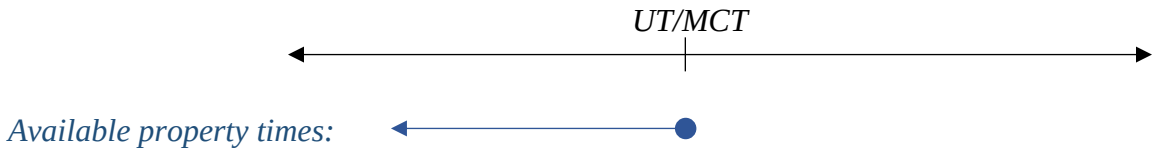
3.2 Flexible nouns

In this section, I describe the behavior of flexible nouns in simple past, present, and future tense sentences. Recall that my previous examination of the flexible noun 'fugitive' in a present tense sentence, (6), yielded the following results:

[18] Musan (1995, 1997, 1999) also discusses "existence-independent" predicates as a third type separate from individual-level and stage-level predicates. These are excluded from my discussion as I am not aware of any existence-independent nominal predicates.

(6) A fugitive is angry.

(38) Available property times for 'fugitive' in a present tense sentence:

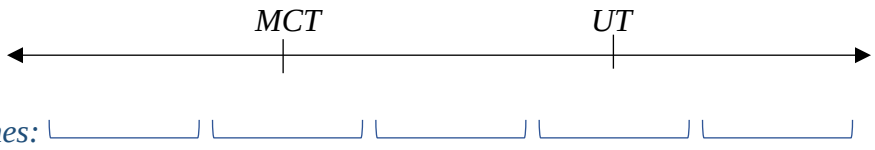


As discussed in previous sections of this chapter, the diagram above represents the possible times at which the property of 'fugitive' may hold in a present tense sentence. The filled circle represents the fact that 'fugitive' may hold for an interval which overlaps the UT/present tense MCT and the arrow represents that 'fugitive' may hold for an interval which occurs at any time preceding the UT/present tense MCT.

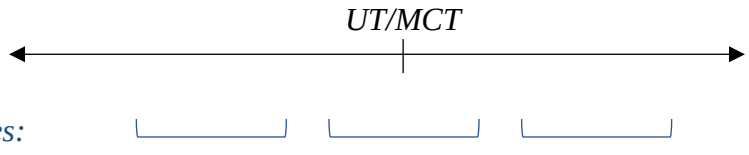
Thus far, I have only discussed present tense sentences, because they inherently involve fewer possible "options" for the relative positions of the nominal property time as compared to the UT and the MCT. In present tense sentences, the MCT overlaps the UT, and thus there are only three possible relations between the nominal property time and the combination UT/MCT – the nominal property can hold before, during, or after the UT/MCT. In past and future tense sentences, where the UT and the MCT do not overlap, there are *five* possible relationships between the nominal property time and the UT and the MCT:[19] overlapping UT, overlapping MCT, between UT and MCT, before both, and after both.

[19] It is possible (in fact, likely) that in a real-world scenario, the nominal property would hold in more than one of the 3-5 slots shown in the diagrams in (39)-(41). For instance, if you say "Yesterday, I met a teenager," it is completely reasonable for the person you met to hold the property of being a teenager yesterday (at the MCT), today (at the UT), as well as between the MCT and the UT and for some time before and after. However, for the purposes of testing which property times are *allowed*, I attempt to isolate each potential reading.

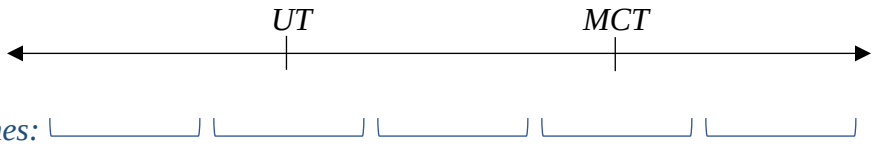
(39) Possible property times relative to the MCT & the UT in **past** tense sentences:



(40) Possible property times relative to the MCT & the UT in **present** tense sentences:



(41) Possible property times relative to the MCT & the UT in **future** tense sentences:



(42)-(50) give past, present (included again for completeness), and future sentences containing flexible nouns, along with scenarios forcing one reading for each of the possible property times marked with a ⌊‾‾‾⌋ in (39)-(41) above and timelines summarizing the acceptability of the sentences in those contexts. For each reading, the relative positions of the utterance time (UT), matrix clause time (MCT), and nominal property time (NPT) are noted using "<" to mean "preceding" and "◯" to mean "overlapping." An overall summary follows in (51).

PAST:

(42) A member of our investment club bought a house.[20]

(43) Potential scenarios for (42):

a. NPT < MCT < UT

Jaci became a member briefly 10 years ago, then bought a house 5 years ago.

b. [NPT ◯ MCT] < UT

Kasih became a member briefly 5 years ago and bought a house during that time.

c. MCT < NPT < UT

Latheef bought a house 5 years ago, then briefly became a member 3 years ago.

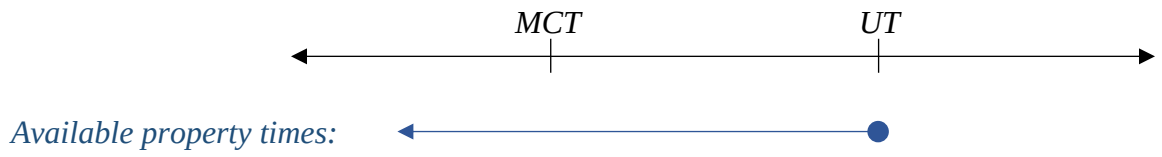
d. MCT < [NPT ◯ UT]

Minenhle bought a house 5 years ago and just now became a member.

e. MCT < UT < NPT

\# Nafiset bought a house 5 years ago and will become a member next year.

(44) Available property times for flexible nouns in a past tense sentence:



[20] Sentence adapted from Enç 1986:407(6).

PRESENT:

(45) A member of our investment club is at an open house.

(46) Potential scenarios for (45):

a. NPT < [MCT ◯ UT]

Ochieng became a member briefly 10 years ago and is at an open house now.

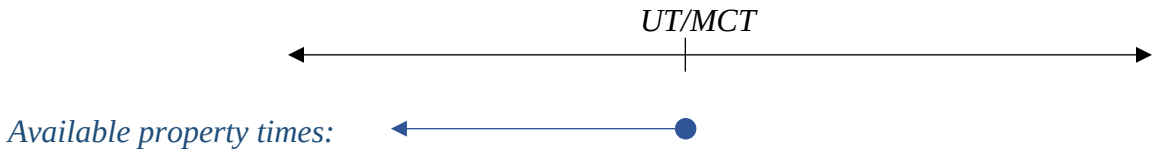
b. *NPT ◯ MCT ◯ UT*

Phuntso is a member now and is at an open house now.

c. [MCT ◯ UT] < NPT

\# Quispe is at an open house now and will become a member next year.

(47) Available property times for flexible nouns in a present tense sentence:



FUTURE:

(48) A member of our investment club will buy a house.

(49) Potential scenarios for (48):

a. NPT < UT < MCT

10 years ago, Räshit was briefly a member. He will buy a house in 5 years.

b. [NPT ◯ UT] < MCT

Samnang is currently a member but is dropping out soon. They will buy a house in 5 years.

c. UT < NPT < MCT

Tagwanibisan will become a member next year but will drop out before she buys a house 5 years from now.

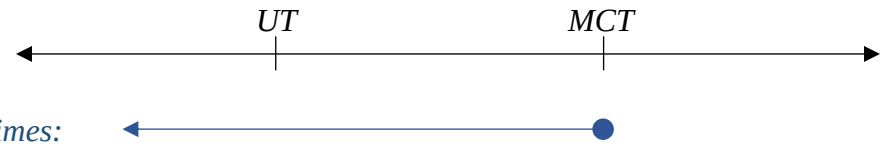
d. UT < [NPT ◯ MCT]

Ujarak will become a member in 5 years and will buy a house while a member.

e. UT < MCT < NPT

\# Vanja will buy a house in 5 years and become a member in 10 years.

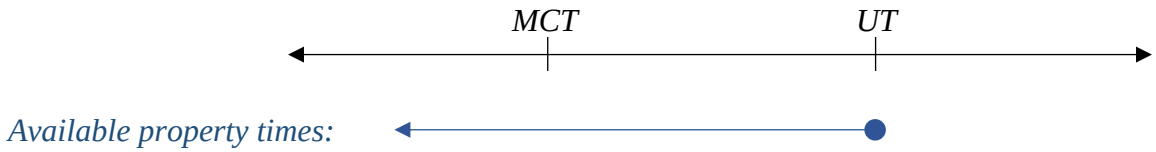
(50) Available property times for flexible nouns in a future tense sentence:



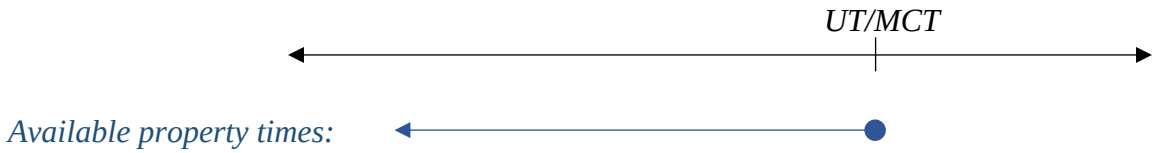
SUMMARY:

(51) Summary of available property times for flexible nouns

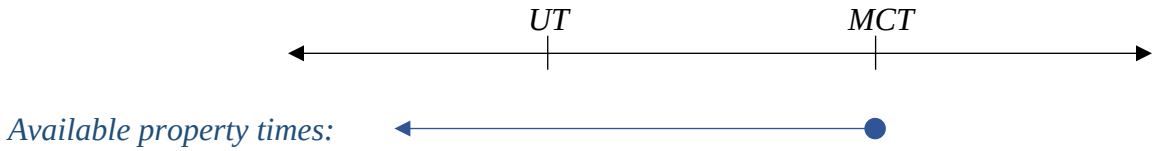
Past:



Present:



Future:



To summarize the data above, flexible nouns are compatible with any property time that does not occur later than *both* the UT and the MCT. Counter to previous claims (which did not have the benefit of assuming two subtypes of stage noun), it is clear that *both* the UT and the MCT play a role in determining acceptable property times for flexible nouns. In the next section, I demonstrate that the UT and the MCT likewise both play a role in determining acceptable property times for inflexible nouns, perhaps even more clearly.

3.3 Inflexible nouns

(52)-(60) repeat the same tests for an inflexible noun. A summary of the data is provided in (61).

PAST:

(52) A 30-year-old bought a house.

(53) Potential scenarios for (52):

a. NPT < MCT < UT

Winona turned thirty 10 years ago and bought a house 5 years ago.

b. [NPT ◯ MCT] < UT

Xuan turned thirty 5 years ago and bought a house during that year.

c. MCT < NPT < UT

Yunuen bought a house 5 years ago, then turned thirty 3 years ago.

d. MCT < [NPT ◯ UT]

Zuriñe bought a house 5 years ago and just turned thirty last week.

e. MCT < UT < NPT

Amal bought a house 5 years ago and will turn thirty next year.

(54) Available property times for inflexible nouns in a past tense sentence:

PRESENT:

(55) A 30-year-old is at an open house.

(56) Potential scenarios for (55):

a. NPT < [MCT ◯ UT]

Boróka turned thirty 10 years ago and is at an open house now.

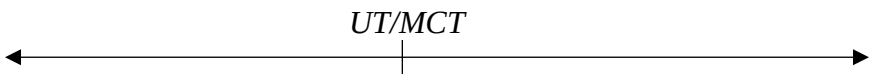
b. NPT ◯ MCT ◯ UT

Carlu turned thirty last month and is at an open house now.

c. [MCT ◯ UT] < NPT

Deniz is at an open house now and will turn thirty next year.

(57) Available property times for inflexible nouns in a present tense sentence:



Available property times:

FUTURE:

(58) A 30-year-old will buy a house.

(59) Potential scenarios for (58):

a. NPT < UT < MCT

10 years ago, Eteri turned thirty. She will buy a house in 5 years.

b. [NPT ◯ UT] < MCT

Fang turned thirty last month. They will buy a house in 5 years.

c. UT < NPT < MCT

Galilahi will turn thirty next year and will buy a house in 5 years.

d. UT < [NPT ◯ MCT]

Hiawatha will turn thirty in 5 years and will buy a house while he is thirty.

e. UT < MCT < NPT

Isi will buy a house in 5 years and will turn thirty in 10 years.

(60) Available property times for inflexible nouns in a future tense sentence:

Available property times: ● ●

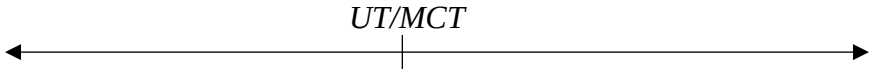
SUMMARY:

(61) Summary of available property times for inflexible nouns

Past:

Available property times: ● ●

Present:



Available property times: ●

Future:

Available property times: ● ●

As their name promises, inflexible nouns are compatible with significantly fewer property times than flexible nouns. In fact, inflexible nouns are only compatible with property times that directly overlap the MCT or the UT; once again, it is clear that the UT and the MCT play a role in the calculation of acceptable nominal property times.

3.4 Input times and property times

The sets of property times available to flexible and inflexible nouns are affected by the UT and the MCT. The relationship between *inflexible* nouns and the UT/MCT is straightforward: the property time of an inflexible noun must overlap one of the two time variables. The relationship between *flexible* nouns and the UT/MCT is slightly more complex: the property time of a flexible noun cannot follow *both* the UT and the MCT, it must overlap or precede at least one of them. In this section, I formalize the interactions of (in)flexible nominal property times with the UT and the MCT.

I propose that each nominal predicate has an internal structure that relates the predicate's time argument, which I will call the INPUT TIME, to the nominal property time. In a simple, single clause sentence, input times must be coindexed with either the UT or the MCT. (In Chapter 3, I will show that the input time must be locally bound by the nearest lambda abstractor, and thus, the input time – either the UT or the MCT – is fully predictable based on the noun's position in the LF.)

Inflexible nouns encode a fairly simple relationship between their input time and property time: the property time must overlap the input time. That is, if the input time is the UT, the inflexible noun's property time is restricted to intervals which overlap the UT. If the input time is the MCT, then the nominal property time must overlap the MCT. These property times are diagramed below (assuming a past tense sentence), following a denotation for inflexible nouns:

(62) $[\![\text{inflexible noun}]\!]^g = [\lambda t_i.\ \lambda x_e.\ \exists t'\ (t' \bigcirc t\ \wedge\ x \text{ is a } \textit{noun} \text{ at } t')]$

(63) Available property times for inflexible nouns in a past tense sentence with given input time:

a. If the input time is the **UT**:

Available property times:

b. If the input time is the **MCT**:

Available property times:

With a flexible noun, on the other hand, the property time is restricted to intervals which overlap *or precede* the input time; the input time acts as an upper limit (à la Abusch 1994) to the set of available property times (O'Leary 2017).[21]

(64) $[\![\text{flexible noun}]\!]^g = [\lambda t_i.\ \lambda x_e.\ \exists t'\ (t' \leq t\ \wedge\ x \text{ is a } \textit{noun} \text{ at } t')]$

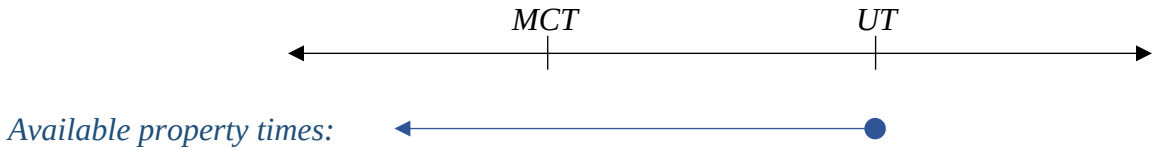
Therefore, if the input time to a flexible noun is the UT, the sentence is acceptable if the nominal property holds for an interval that overlaps the UT or an interval that properly precedes the UT. Likewise, if the input time is the MCT, then the nominal property time must overlap the MCT or

[21] To make the "overlap *or* precede" aspect of flexible nouns more explicit, we might use the following denotation: $[\![\text{flexible noun}]\!]^g = [\lambda t_i.\ \lambda x_e.\ \exists t'((t' \bigcirc t \vee t' < t) \wedge x \text{ is a noun at } t')]$

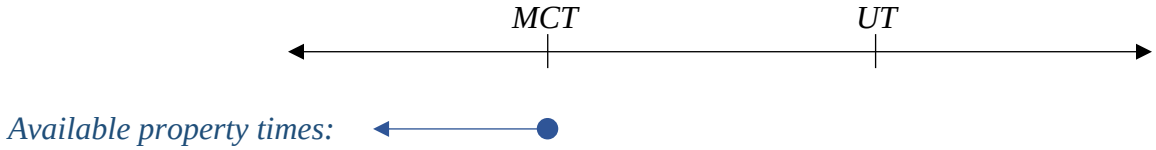
precede it. (65) offers a diagram of what this would mean for available property times in a past tense sentence. (In a future tense sentence, the inherent subset relationship between the available property times with an MCT input time as compared to the available property times with a UT input time would be reversed.)

(65) Available property times for flexible nouns in a past tense sentence with given input time:

a. If the input time is the **UT**:



b. If the input time is the **MCT**:



In sum, the separation of flexible and inflexible nouns allows us to see that there *is* a systematic relationship between nominal property times and the UT/MCT. Previous works (such as those discussed in §2: Enç 1981, 1986; Musan 1995, 1999, Tonhauser 2002) were correct in their observations that nominal property times do not always align with the UT or the MCT. However, treating the UT/MCT as an *input* time that is translated into a property time, rather than directly as

a property time, clarifies the underlying connection: while property times do not always hold at the UT or the MCT, they always bear a predictable relationship to the UT and/or the MCT.[22]

This model explains some of the data points which were previously considered to be counterexamples to any theory of predictable nominal property times. For instance, to return to a piece of data mentioned in §2, Tonhauser (2002) points out that Musan (1995, 1999) would expect 'crew members' in (30) to overlap the MCT (the present). Yet, as Tonhauser points out, 'crew members' is certainly able to hold of the relevant individuals at a time prior to the MCT – most likely a time before the Titanic sank. In a flexible/inflexible model, the property time of 'crew members' can, as Musan expected, be based on the MCT (that is, have the MCT as an input time), but the sentence is also compatible with the reading observed by Tonhauser. As a flexible noun (test shown in (66)), 'crew members' is predicted to be compatible with a property time that either overlaps *or precedes* its input time. (Within the set of property times available to a flexible noun, the exact interval over which the property holds is contextually determined.)

(30) Context: at a reunion of the survivors of the Titanic disaster.
Look, there are even <u>some crew members</u> here.

(Tonhauser 2002:9)

(66) A crew member is retired. ✓ → flexible

[22] Again, note that these claims are meant to hold only for predicates introducing novel referents, as discussed in §2.2.1. Chapter 4 shows that the property times of predicates referring to familiar referents instead inherit their property times from predicates introducing novel referents earlier in the discourse (which derive their property times in the manner described here and in Chapter 3).

3.5 Distribution

It is natural at this point to wonder how nouns are sorted into the flexible and inflexible classes. As with count nouns vs. mass nouns or verbs which bear different lexical aspects, there is likely some element of the words' meanings which contributes to classification, but there is almost certainly no hard and fast rule that will define flexible and inflexible nouns reliably across languages. And, as when sorting nouns into count and mass or verbs into lexical aspectual classes, a cleaner result can be achieved by testing the linguistic behavior of the two classes, rather than relying solely on a metaphysical distinction between the meanings of the two classes. Such a test for flexible and inflexible nouns was given at the start of §3. However, in addition to employing a functional test of linguistic behavior, it is still interesting to speculate on a meaning-based distinction between the two groups.

A notable issue in defining a meaning-based distribution is that the definitions of these words are debatable between speakers. For instance, we all know that 'bachelor' refers to a male that has not yet been married, but can it refer to an unmarried five year old boy? Can it refer to a divorcé? Answers vary and thus drawing a standardized line in the sand based on meaning is unlikely to be successful.

My leading hypothesis about why flexible nouns can be interpreted as 'former ___' but inflexible nouns cannot is that inflexible nouns are more likely to have clear, unique, and temporally related "replacement" terms which describe the state of the entity once the inflexible noun no longer holds. Thus, there is inevitably a more accurate noun that could be used to describe the individual without losing the information that 'former ___' would provide.

For instance, when you stop being a '15-year-old,' you start being a '16-year-old.' That is, if you say that 'a 16-year-old is graduating,' the hearer has the information that the person under

discussion is 16 during a relevant interval *and* that they are a former 15-year-old. On the other hand, describing an individual as a 'prisoner' or a 'retiree' does not communicate to the hearer that they are a 'former fugitive' or a 'former lawyer.' Thus, by being able to use 'fugitive' or 'lawyer' to mean 'former fugitive' or 'former lawyer,' the speaker gains a way to communicate otherwise uncommunicated information.

This distinction might best be phrased in terms of scalar implicature (à la Horn 1972).[23] The term '16-year-old' is more informative than 'former 15-year-old,' since any '16-year-old' is inherently a 'former 15-year-old.' Since every 'former 15-year-old' is also a 'former 14-year-old,' every 'former 14-year-old' is a 'former 13-year-old,' and so on, we can frame these descriptors as a Horn scale: <…, former 13-year-old, former 14-year-old, former 15-year-old, 16-year-old>. 'Bachelor' might likewise appear on the scale <former bachelor, married man> as every 'married man' is a 'former bachelor.' These scales tie in nicely with the fact that inflexible nouns often involve numerals ('15-year-old,' '4th grader,' 'thirty-something') or terms that naturally occur in a sequence ('freshman,' 'sophomore,' 'junior,' 'senior'). Even terms that are not part of a long or numerically-based sequence may still form a reasonable Horn scale in terms of informativity, e.g., <former first-time chess player, chess player>.

Flexible nouns, on the other hand, do not occur naturally on scales like these. There is no widely accepted sequence in which one becomes a secretary then a lawyer then a retiree, and thus we can't reasonably posit a scale such as <former secretary, former lawyer, retiree>, where 'retiree' entails 'former lawyer' and 'former secretary.' Nor does 'prisoner' entail 'former fugitive,' so we cannot assume a scale such as <former fugitive, prisoner>.

[23] Thanks to Laurel Perkins for pointing out the scalar implicature angle.

Thus, a noun is inflexible if 'former [noun]' appears on a Horn scale; there is no need for the language to allow a 'former [noun]' reading when a more informative term can be used to communicate that same information. A noun is flexible if 'former [noun]' does *not* appear on a Horn scale; no replacement term is available to communicate 'former [noun],' so noun itself is allowed to have a reading equivalent to 'former [noun].'

This is not necessarily a perfect hypothesis, but it does explain data that Enç (1981) noted as problematic for her theory. Recall from §2.2 that Enç could not explain why 'president' in (23) can pick out individuals who were formerly president, but 'acorn' in (24) cannot pick out individuals that were formerly acorns and are now large oak trees. 'Acorn' has a relevant replacement term of 'oak tree,' the use of which stills communicate that the individual was at one point an acorn. There is no equivalent term that would communicate 'former president.'

(23) Every congressman who remembers a president will be at the party.

(1981:38)

(24) # I chopped down an acorn in my backyard because it was blocking the sun.

(1981:51)

In the discussion of (24) and other "deviant" examples, Enç comes to a similar conclusion:

> "In general, NP's are used to pick out objects and VP's are used to predicate something of those objects. The property a speaker chooses to pick out the objects is important in that it must enable the other participants in the discourse to access the objects easily. Therefore, these properties tend to be permanent properties or salient temporary properties… Note that these properties are of a special sort. Given the laws of nature, all other things being equal, little boys grow up to become men,

> acorns grow into oak trees and tadpoles become frogs. Therefore, the property of being a tadpole, for example, is NOT more salient than the property of being a frog in a discourse about frogs. The property of being a frog, however, is more salient than the property of being a tadpole, because it is a more 'immediate' property of the objects under discussion since the objects that croaked were frogs when they croaked. But the immediacy of the property becomes important only when choosing between properties where there is a natural progression from one property to another."
>
> (Enç 1981:51)

For the sake of discussion, the rest of this section lists some of the hypotheses regarding the distribution of flexible and inflexible nouns that I have rejected, along with reasons for rejection.

Hypothesis 1: In O'Leary (2017), I suggested that all flexible nouns were individual-level nouns and that all inflexible nouns were stage-level nouns. However, no flexible or inflexible nouns exhibit lifetime effects (à la Musan 1997), and as such should all be classified as stage-level nouns, as mentioned in §3.1.

Hypothesis 2: In O'Leary & Brasoveanu (2018), we suggest that flexible nouns describe social roles (such as a profession) while inflexible nouns mark merely an individual's existence during a certain time period (such as an age). Therefore flexible, but not inflexible nouns, are more resistant to temporal manipulation and are allowed a semi-permanent status. This observation matches intuitions that are often voiced in colloquialisms like "Once a student of Chomsky, always a student of Chomsky." This hypothesis was rejected because defining "social role" in a way that includes 'student' and 'chess player' (flexible nouns) but excludes 'high school student' and 'first-time chess player' (inflexible nouns) is problematically difficult.

Hypothesis 3: Flexible nouns are linked to past events (e.g., a 'fugitive' has escaped from prison) while inflexible nouns are linked to future events (e.g., a 'bachelor' has not yet married). Unfortunately, while this hypothesis works well for 'fugitive' and 'bachelor,' it fails for most other nouns. For instance, are 'astronaut' and 'plumber' (flexible nouns) linked in a significant way to when someone entered those professions? And why should inflexible nouns like '15-year-old' and 'high-schooler' be primarily associated with the future end dates of those states, rather than the start dates?

Hypothesis 4: Inflexible nouns describe predictable or inevitable stages of life, such as being a bachelor or being 15 years old. However, there are plenty of inflexible nouns that are very much optional stages of life, such as 'graduate student' or 'first-time chess player.'

Hypothesis 5: Inflexible nouns describe stages of life that one cannot repeat/return to. For instance, once you stop being a "teenager," there is no way to return to being one; the same goes for "twenty-something," "48-year-old," "first time chess player," etc. Meanwhile, inflexible nouns, like "fugitive," "astronaut," and "chess player" describe states that can hold of a person over multiple distinct periods in their lifetime. However, while ages certainly cannot be repeated, inflexible nouns like "second grader" and "graduate student" *do* represent states that can be repeated (although perhaps the lexical entries for these nouns are held in a culturally idealized form wherein no schooling is repeated).

4. Additional comments

4.1 Temporal non-intersective adjectives

I have thus far lexicalized flexibility, encoding it into the denotations for flexible and inflexible nouns, repeated below.

(64) $[\![\text{flexible noun}]\!]^g = [\lambda t_i.\ \lambda x_e.\ \exists t'\ (t' \leq t\ \wedge\ x \text{ is a } \textit{noun} \text{ at } t')]$

(62) $[\![\text{inflexible noun}]\!]^g = [\lambda t_i.\ \lambda x_e.\ \exists t'\ (t' \bigcirc t\ \wedge\ x \text{ is a } \textit{noun} \text{ at } t')]$

Given that flexibility seems to be lexically specified, this seems a logical choice; however, in this section, I discuss data that might call that lexicalization into question.

Flexible nouns are allowed an interpretation analogous to saying 'former __.' The same interpretation can be achieved by adding overt words or affixes like 'former,' 'past,' or 'ex-.' These words have counterparts for other temporal relationships: 'current,' 'then,' 'future,' '-to-be,' and so on. The interactions of these temporal non-intersective adjectives with nominal property times have been discussed in previous literature (e.g., Tonhauser 2006, 2007, 2020); I here briefly discuss their interaction with flexibility.

Tonhauser (2006, 2007, 2020) notes that there is a distinction between the property time of the noun *phrase* (i.e. 'former [noun]') and the noun itself: "the noun phrase time and the nominal [property] time are two conceptually distinct times: one is the time at which a noun phrase is temporally interpreted, and the other is the time at which the property denoted by the noun is true of the entities denoted by the noun phrase" (2020:10). In sum, the time at which 'former [noun]' holds is not the same as the nominal property time.

As an example, consider the interpretations available to an inflexible noun modified by a temporal adjective. In (67), the "noun phrase time" of 'former bachelor' overlaps the UT/MCT (the subject is a 'former bachelor' at the time of being married), but the property time of 'bachelor,' which has been affected by 'former,' holds for an interval preceding the UT/MCT. In (68), the noun phrase time of 'future 15-year-old' overlaps the UT/MCT, while the nominal property time of '15-year-old' follows the UT/MCT. In both sentences, the temporal adjective determines the relationship between the UT/MCT and the nominal property time.

(67) A former bachelor is married.

(68) A future 15-year-old is in preschool.

We see the same effects when temporal adjectives are paired with flexible nouns:

(69) A former president is retired.

(70) A future fugitive is angry.

In (69), 'former president' holds at the UT/MCT, and 'president' precedes the UT/MCT. Interestingly, adding 'former' overtly does not add any readings that were not already available to 'president' as a flexible noun. In fact, the possible readings of (69) form a proper subset of the possible readings of the same sentence without 'former' ('A president is retired'), as the reading in which the nominal property time overlaps the UT/MCT is unavailable to (69). In (70), 'future fugitive' holds at the UT/MCT, and the nominal property time of 'fugitive' follows the UT/MCT.

We might then provide the following somewhat primitive denotations for 'former' and 'future':

(71) $[\![\text{former}]\!]^g = [\lambda p_{<i,<e,t>>} . \lambda t_i . \lambda x_e . \exists t' (t' < t \wedge p(t')(x))]$

(72) $[\![\text{future}]\!]^g = [\lambda p_{<i,<e,t>>} . \lambda t_i . \lambda x_e . \exists t' (t' > t \wedge p(t')(x))]$

This denotation of 'future' paired with the flexible noun denotation of (64) predicts the following denotation for 'future fugitive:'

(73) $[\![\text{future fugitive}]\!]^g = [\![\text{future}]\!]^g ([\![\text{fugitive}]\!]^g)$

$= [\lambda p_{<i,<e,t>>} . \lambda t_i . \lambda x_e . \exists t' (t' > t \wedge p(t')(x))] ([\![\text{fugitive}]\!]^g)$

$= [\lambda t_i . \lambda x_e . \exists t' (t' > t \wedge [\![\text{fugitive}]\!]^g(t')(x))]$

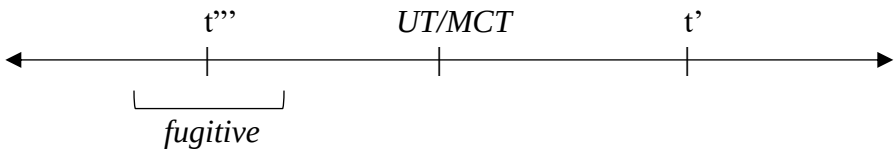
$= [\lambda t_i . \lambda x_e . \exists t' (t' > t \wedge [\lambda t''_i . \lambda y_e . \exists t''' (t''' \leq t'' \wedge$ y is a fugitive at t'''$)](t')(x))]$

$= [\lambda t_i . \lambda x_e . \exists t' (t' > t \wedge [\lambda y_e . \exists t''' (t''' \leq t' \wedge$ y is a fugitive at t'''$)](x))]$

$= [\lambda t_i . \lambda x_e . \exists t' (t' > t \wedge \exists t''' (t''' \leq t' \wedge$ x is a fugitive at t'''$))]$

Unfortunately, the truth conditions here are too weak. In (70), where 'future fugitive' holds at the UT/MCT (as the only available variables to satisfy λt are either the UT or the MCT which overlaps the UT; see Chapter 3 for more on this), the denotation in (73) would result in the interpretation that *x is a fugitive at a time t''' which precedes or overlaps a time t' which follows the UT/MCT*. By this definition, (70) should be compatible with the situation in (74a), diagrammed in (74b). However, (70), repeated as (74c), is not acceptable in this context.

(74) a. Context: Noar was a fugitive in the past, but is not one now and never will be one again.

b. 

c. # A future fugitive is angry.

In (73), 'future' has restricted the *input time* of 'fugitive' to times following the UT/MCT. To achieve the actual reading of (70), 'future' would need to instead restrict the *property time* of 'fugitive' to times following the UT/MCT. It seems that the flexibility of 'fugitive,' which allows an interpretation where the nominal property time precedes the input time, is in some way ignored in the calculation of available readings.

One way we might get a temporal adjective to directly affect the property time would be to develop a much more complex semantics for temporal adjectives, which can first eliminate the flexibility of the nouns in their scope and then manipulate the flexibility-less remainder. Similar approaches may be taken in cases like when 'at most' modifies 'two' if 'two' is assumed to mean 'at least two.' Approaches such as this may involve encoding some of the "to-be-eliminated" meaning (i.e., the 'former' part of a flexible noun or the 'at least' part of 'at least two') as an implicature, rather than an entailment, thus facilitating easy cancellation so that any modifier can operate on a simpler denotation.

A second option would be to separate flexibility from the nominal denotation, and make two silent temporal operators (inflexibility and flexibility) that cannot co-occur with each other or with any temporal adjective. The denotations of nouns would no longer contain the property of

(in)flexibility; instead, nouns would only be able to pair with either the flexibility operator or the inflexibility operator (in addition to being able to pair with overt temporal adjectives).

(75) a. $[\![\textit{flexibility}^*]\!] = [\lambda p_{<i,<e,t>>} . \lambda t_i. \lambda x_e. \exists t' (t' \leq t \wedge p(t')(x))]$

*cannot co-occur with temporal adjectives

b. $[\![\textit{inflexibility}^*]\!] = [\lambda p_{<i,<e,t>>} . \lambda t_i. \lambda x_e. \exists t' (t' \bigcirc t \wedge p(t')(x))]$

*cannot co-occur with temporal adjectives

c. $[\![\text{flexible noun}^*]\!]^g = [\lambda t_i. \lambda x_e.$ *x* is a *noun* at *t*]

*temporal modifier required;

compatible with flexibility; not compatible with inflexibility

d. $[\![\text{inflexible noun}^*]\!]^g = [\lambda t_i. \lambda x_e.$ *x* is a *noun* at *t*]

*temporal modifier required;

compatible with inflexibility; not compatible with flexibility

A third approach would be to separate (in)flexibility from the contentful lexical entry, treating words like 'fugitive' as acategorial roots and flexibility and inflexibility as nominal categorizing heads. Under this approach, overt temporal modifiers like 'future' and 'former' could c-select for the inflexible categorizing n head, thereby avoiding the problematic *preceding t'* reading of (73).

A benefit of such an approach is that copulas could also c-select for the inflexible categorizing head. As it turns out, we do not observe any flexibility when otherwise flexible nouns are acting as the main clausal predicate; like verbs, they are only evaluated *at* the MCT when acting as the main predicate of a clause. For example, 'fugitive' in (76) cannot be interpreted as 'former fugitive.'

(76) Anahera is a fugitive.

Any of these three approaches could explain how (in)flexible nouns are interpreted in combination with temporal modifiers, although the third is likely the most useful once we consider nominal predicates acting as main clausal predicates. Nonetheless, for the sake of simplicity, for the rest of this dissertation, I avoid temporal adjectives and adopt the original denotations for flexible and inflexible nouns (from §3.4) which lexicalize flexibility.

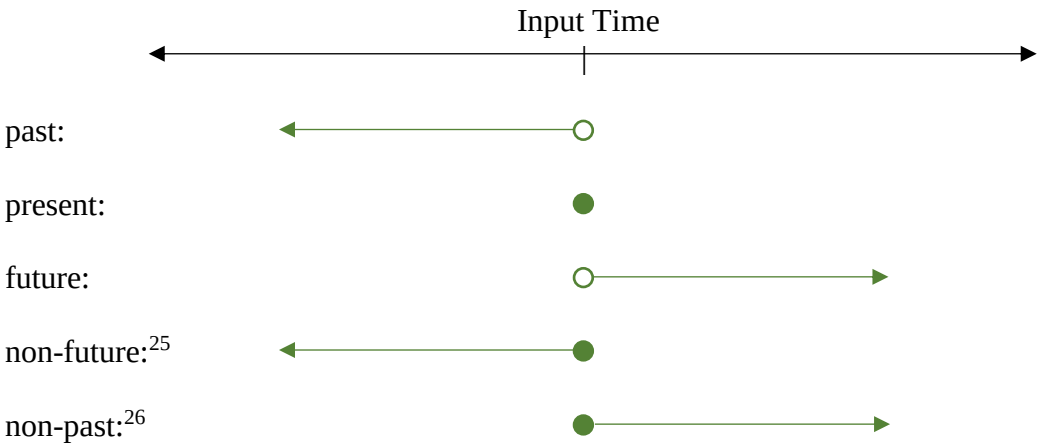
4.2 Nominal aspect vs. nominal tense

Flexibility – the translation of nominal input times to nominal property times via lexically determined relationships – shares some features with what one might consider a tense and some with what some might consider an aspect, both of which are, to some degree, functions from input times to output times (e.g., Reichenbach 1947). In this section, I consider whether flexibility should be described as a nominal tense, nominal aspect, or neither.

Both flexible and inflexible nominal predicates are evaluated relative to an input time (either the UT or the MCT), by which their flexibility defines acceptable property times, following preset constraints. Sentential tenses can likewise be thought of as functions between an input time and an output time. For instance, a matrix clause tense takes the UT as an input time and outputs the MCT as an interval which bears a specific relationship to its UT input time: the present tense outputs an interval that overlaps the input time, the past tense produces an interval precedes the input time, and so on.

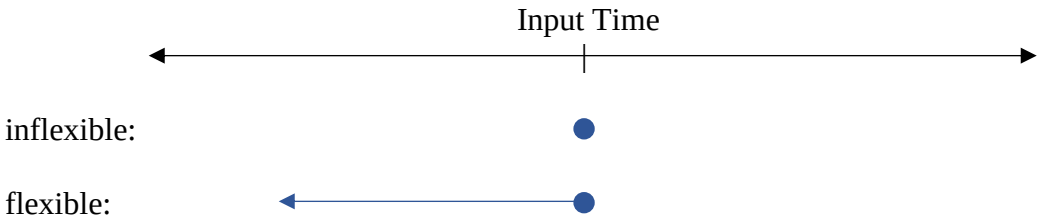
The following graphic shows how some common tenses interact with their input times:[24]

(77) *Relationships between input and output times as defined by sentential tenses*



Compare this to the output intervals of flexible and inflexible nouns with respect to their input time:

(78) *Relationships between input and output times as defined by nominal flexibility*



[24] This graphic is oversimplified and assumes matrix tenses; I do not include information about tense interactions such as sequence of tense, double access, etc. Additionally, there are many recognized tenses that do not appear in this graphic.
[25] Found in languages such as Lardil (Klokeid 1976, Hale 1997), Yuwaalaraay (Williams 1980), and St'a´t'imcets (Matthewson 2006).
[26] Found in languages such as Hixkaryana (Derbyshire 1979, Nordlinger & Sadler 2004), Lak (Helmbrecht 1996), and German (Tonhauser 2015).

An inflexible noun produces a property time that obligatorily overlaps its input time, just like present tense. A flexible noun generates a property time that overlaps or precedes its input time, just like a non-future tense. It is therefore very tempting to say that inflexible nouns have a built-in present tense and that flexible nouns have a built-in non-future tense, especially since such terminology would clearly lay out, in a familiar way, exactly how times are translated within the nominal denotations.

However, these noun-internal features are certainly not "tenses" in the traditional sense. First and foremost, they are internal to the noun itself, rather than being an external marker. Even if we consider flexibility and inflexibility to be phonologically null external markers, such as is briefly posited in the previous section, they have notable differences from what we what we traditionally expect of "tenses:" they are never overt, they are lexically specified, and they are obligatory.

To more formally refute the hypothesis that flexibility is an instance of the traditional concept of tense, I refer to Tonhauser's (2006, 2007, 2008, 2020) requirements for a constituent to qualify as a nominal tense, given in (79) below:

(79) *The category 'nominal tense'*

A nominal marker has (at least) the following properties:

a. The marker occurs on nominal expressions, and its meaning affects the noun phrase it occurs with.

b. The set of nominal tense markers of the language form a grammatical paradigm. This means that the grammar of the language requires that in certain grammatically specified environments the noun be marked by one and only

one member of the nominal tense paradigm, parallel to verbal tense paradigms.

c. In those environments where nominal tense markers are required, the markers are realized with nominal expressions without regard to the semantics of the head noun.

d. The marker encodes a temporal relation between the noun phrase time and the utterance time (deictic tense), or between the noun phrase time and another contextually given perspective time (relative nominal tense).

e. A pure nominal tense does not encode a state change. If the marker under consideration encodes a state change, it may be a tense/aspect combination.

f. The noun phrase time may be anaphorically resolved in discourse (parallel to the reference time of verbal tenses).

(Tonhauser 2008:337-8; 2020:156)

In order to even consider flexibility against these standards, we have to assume a model in which "flexibility" and "inflexibility" are null markers, as briefly posited in §4.1. Under such an assumption, those markers meet the requirements in (a), (b), and (d) are easily met. Requirement (e) is also met: one may be a 'fugitive' currently, even if a 'former __' reading is used. Requirement (f) requires further discussion; as shown in the previous section, the "noun phrase time" – if different from the nominal property time – more or less acts as the input time to the noun itself. Further investigation would be necessary to say whether, e.g., 'future fugitive' holds for an interval that may be determined anaphorically in discourse.

However, regardless of the outcome regarding requirement (f), requirement (c) by itself is enough to rule out flexibility and inflexibility markers as tenses altogether. The semantics of the

noun being modified is clearly a relevant factor when determining which feature is used – the entire premise of inflexible and flexible categories is that nouns are inherently linked to one or the other.

Similar problems arise if we attempt to compare flexibility and inflexibility to grammatical aspect. There are a number of aspects that we might compare flexibility and inflexibility to (although note that the terminology surrounding grammatical aspects is not as consistent cross-linguistically as tense). For instance, we may compare inflexibility to some formulations of the imperfective aspect (e.g., 'I was smiling.'), which references "the ongoing development of situations in which the onset of the event has occurred, but not yet the endpoint" (Becker et al. 2013:213). We might compare flexibility to the perfect aspect, which can be understood to describe an interval which precedes a salient time (e.g., the most salient reading for 'I have lived in Los Angeles.') or an interval which overlaps a salient time (e.g., the most salient reading for 'I have lived in Los Angeles since 2015.').[27]

Again, it would be odd to consider flexibility and inflexibility to be grammatical aspect, given that they are never overt and are associated with specific nouns; Nordlinger & Sadler argue that any case of nominal aspect[28] should be "productive across the whole word class and not simply restricted to a small subset of forms" (2004:778).

It seems that the fact that flexibility and inflexibility are lexicalized is enough to rule them out as being grammatical aspect or tense. However, it may not rule out a classification altogether. A commonly accepted counterpart to grammatical aspect is *lexical* aspect, considered to be a lexicalized feature of verbal predicates: "Grammatical aspect is different from lexical aspect, also

[27] I thank Judith Tonhauser (p.c.) for pointing out the similarity between flexibility and the perfect aspect.
[28] Or nominal tense or nominal mood.

called *Aktionsart, actionality, aspectual class* or *situation aspect*. Lexical aspect bears on inherent features of the verb…" (de Swart 2012:753). Thus, perhaps we should consider a four-way distinction, rather than just a distinction between tense and aspect at large.

(80)

	Tense	**Aspect**
Grammatical	*past, present, …*	*perfect, imperfective, …*
Lexical	*?*	*telic, accomplishment, …*

Given the discussion thus far, flexibility and inflexibility clearly belong in the "lexical" row, rather than the "grammatical" row. I am not aware of any claims for a lexical tense, but lexical aspects share the features of being generally obligatory, covert, and associated intrinsically with specific predicates. Given a dearth of discussion of lexical tenses, it seems difficult to sort (in)flexibility into lexical tense vs. lexical aspect, but it is nonetheless worth discussing if possible.

Tonhauser (2006:23-29) establishes some criteria to distinguish tense from aspect,[29] some of which could theoretically be applied to a lexical tense/aspect distinction. For instance, she notes that "Grammatical aspect markers, but not tenses, may co-occur." Flexibility and inflexibility cannot co-occur; thus this is inconclusive. Her criteria "Grammatical aspect markers, but not tenses, may encode a state change." and "Tenses, but not grammatical aspect markers, are anaphoric." are likewise inconclusive, as neither flexibility nor inflexibility encode a state change (as mentioned above), nor are they anaphoric (if the 'former __' reading of 'fugitive' is used,

[29] As an interesting sidenote, Tonhauser uses these criteria to determine that words like 'former' are an instance of aspect (2006:48). This is notably different than the results for (in)flexibility, which are inconclusive.

'fugitive' may hold at *any* past time). Thus, it seems that flexibility and inflexibility do not clearly exhibit common behaviors of tense or aspect.

I leave the question of "lexical tense vs. lexical aspect" to future research. For now, I adopt the terminology "lexical aspect," since I do not know of any claims of lexical tense and I do not believe that the behavior of flexibility and inflexibility is distinct enough from lexical aspect to warrant the creation of a new category.

5. Conclusion

In this chapter, I bring to light for the first time the fact that not all stage-level nominal predicates exhibit the same temporal behavior. Stage-level nominal predicates can be sorted into two classes, which I term *flexible* and *inflexible*. Each predicate takes an input time from elsewhere in the sentence (I save the details of this for Chapter 3) and is compatible with a specific set of property times relative to that time variable; the parameters of that set are based on whether it is a *flexible* or an *inflexible* predicate. *Flexible* predicates are compatible with any property time that overlaps or precedes their input time. *Inflexible* predicates are compatible only with property times that overlap their input time. Acknowledgement of this lexicalized behavior allows us to observe a clear link between predicative property times and the main clausal time as well as the utterance time, counter to claims in previous literature.

CHAPTER 3

THE TEMPORAL LOCALITY CONSTRAINT

1. Introduction

In Chapter 2, I illustrated that the property times of nominal predicates are, in some way, determined based on other times in the utterance – namely, the utterance time and the time introduced by a sentential tense, which I have called the matrix clause time. The dependence of nominal property times on other times in the utterance was made clearer by sorting stage-level nominal predicates into two classes: flexible nouns and inflexible nouns. Inflexible nouns are compatible with property times which overlap their input time argument, while flexible nouns are compatible with property times which either overlap *or precede* their input time argument. I claimed that the "input times" to these nouns must either be the utterance time or the matrix clause time; however, I did not offer a clear mechanism for determining *which* of these times ought to act as the input time in any given sentence. Instead, in the examples given, the input time was always ambiguous between the utterance time and the matrix clause time (although I alluded to the fact that, in some sentences, input times are restricted to a single option).

In §2 of this chapter, I demonstrate that the input times to nominal predicates which introduce novel referents[1] must be locally bound by the nearest c-commanding lambda abstractor. Thus, a

[1] See Chapter 2, §2.2.1 for information about why I am only discussing nouns referring to novel referents in Chapters 2 and 3. As discussed in Chapter 2, it should be noted that when I say that a predicate "introduces novel referents" or "refers to familiar referents," I mean that it characterizes a set novel to the discourse or characterizes a set familiar to the discourse, respectively. In Chapter 4, it will become crucial to be able to discuss the familiarity and novelty of the sets characterized by predicates rather than the familiarity and novelty of the referents of determiner phrases.

noun scoping below the sentential tense operator will be bound by the lambda abstractor valued by the matrix clause time, and a noun scoping above the matrix tense operator will be bound by the lambda abstractor valued by the utterance time. Evidence comes from various constructions where movement is blocked or where the location of the nominal predicate in the LF is otherwise predictable.

This theory is similar to Enç's (1981) very first hypothesis about nominal evaluation times. As mentioned in my Chapter 2, Enç assumes Montague's (1976) scopal analysis of tense, in which a sentential tense operator acts on an entire clause. Clausal predicates are interpreted at a time defined by the tense operator (i.e., the matrix clause time) by virtue of existing within the scope of the operator.[2] Enç posits that a logical extension to this theory is that a nominal predicate which scopes[3] under the tense operator should likewise be evaluated at the matrix clause time and should therefore have a property time which overlaps the matrix clause time; if the nominal scopes above the tense operator, it should be evaluated at the utterance time (1981:34). Enç claims that, under these assumptions, no nominal predicate should have a property time that does not fall into one of those two camps; that is, all nominal property times should overlap either the matrix clause time or the utterance time. Enç abandons this theory, based on data in which nominal property times do not overlap with either the matrix clause time or the utterance time. (These data points either take the form of flexible nouns whose property times precede the matrix clause time or the utterance time – discussed in my Chapter 2 – or nouns referring to familiar referents whose property times are determined by the larger discourse – discussed in my Chapter 4.) Enç's rejection of this

[2] This explanation is worded informally. For a formal version, see Enç (1981:34).
[3] Enç assumes a model in which DPs can undergo quantifier raising, moving from their overt position in the sentence to a higher position. I make these assumptions also; a more fleshed out description of DP movement is given in §2.

hypothesis lead her to conclude that tense is exclusively a feature of verbs, rather than a feature of sentences – a conclusion that was carried into many of the later works on nominal property times (e.g., Enç 1986; Musan 1995, 1999; Tonhauser 2002, 2006, 2020).

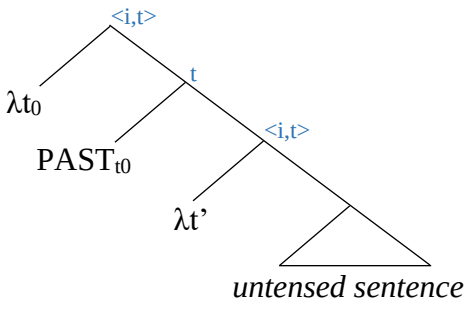
As Enç (1981) notes and as we saw in Chapter 2, nominal property times do not always overlap the matrix clause time or the utterance time. However, in this chapter, I argue that her original hypothesis about the relative positions of predicates and tense operators was not far off: while nominal property times do not always align with the matrix clause time or the utterance time, nominal *input times* always do.

After proposing in §2 that the input times of nominal predicates are locally bound by lambda abstractors valued by either a tense-introduced time or the utterance time, I expand my claim in §3 to propose that the input times to *all* predicates introducing novel referents are locally bound. In §4, I discuss whether a locality constraint should similarly be applied to world arguments.

2. The Nominal Input Time Locality Constraint

Within the LF of any given utterance, the utterance time (UT) and the matrix clause time (MCT) supply values to lambda abstractors over times. The lambda abstractor directly below a tense operator is valued by the time outputted by the tense (the MCT). The lambda abstractor at the very top of an LF is valued by the UT once the sentence is interpreted in context. I will always represent the time variable associated with the UT as t_0. A generalized LF, with node typing, is provided below:

(1)



In Chapter 2, I established that a noun in a single-clause utterance has two possible input times: the UT or the MCT. Here, I argue every nominal input time is *bound* either by the lambda abstractor over times valued by the UT or the lambda abstractor valued by the MCT. Moreover, input times are not randomly bound by one of the two lambda abstractors, but are instead always locally bound by the nearest of them. The apparent optionality of input times stems from the movement of DPs via quantifier raising (QR).

In line with the patterns observed for other inflexible nouns in Chapter 2, the nominal predicate '10-year-old' in (2) may be interpreted with either a UT or an MCT input time.[4,5] (A quick reminder: as in Chapter 2, readers should assume that example sentences are being uttered into a discourse in which the referent of the noun has not been previously established. Chapter 4 discusses the mechanisms by which property times are established for predicates referring to familiar entities.)

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[4] Throughout this chapter and the next, I use mostly inflexible nouns (and, more specifically, inflexible nouns which describe properties with very clear start and end points, such as ages) in my examples, as their lack of flexibility allows the input time to be clearly and definitively established. Every effect discussed applies equally to flexible nouns.

[5] Note that temporal phrases such as "four years ago," "in 2016," "at that time," or "now" have slight effects on the temporal interpretation of other predicates; including these phrases may favor one reading over the other. These effects are not discussed here. I include these temporal phrases to make the MCT and UT markedly distinct (e.g., by forcing a four year gap between them), but place them in parentheses to indicate that the data will most clearly allow *all* readings if such phrases are excluded.

(2) (Four years ago,) Madara met a 10-year-old.

a. Input time = MCT → 10 years old *at the time of meeting*

b. Input time = UT → 10 years old *at the utterance time*

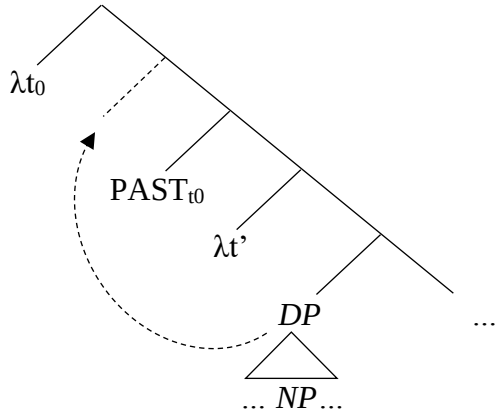
In one interpretation of this sentence, the child was 10 years old at the time when Madara met them. In such a reading, the property time of '10-year-old' overlaps the MCT; therefore, based on the conclusions of Chapter 2, I posit that the MCT is acting as the input time, as marked in (2a). In this reading, given that four years have passed, the person Madara met would be around 14 years old at the time (2) is uttered, so the property time of '10-year-old' does not overlap the UT.

Reading (2b) describes a scenario in which the person Madara met is 10 years old at the time (2) is uttered, and, therefore, would have been around six years old at the meeting time. In this reading, '10-year-old' has a UT input time. As discussed in Chapter 2, only these two readings are available.

I assume that argument DPs, such as 'a 10-year-old,' may undergo QR, covertly raising from their overt position to a higher position in the LF. The DP moves as a whole, and therefore the NP complement to the determiner moves as well.[6] This is crucial, because this movement may change the relative positions of the NP and sentential tenses, such as in (3) below:

[6] In many of my tree diagrams after (3), I leave out the DP level with the intent of making the diagrams easier to read. Nonetheless, whenever I mention or diagram movement, I mean that the DP that includes the target noun is undergoing movement, not just the noun or noun phrase.

(3)



If the input time to '10-year-old' is bound by one of the sentence's lambda abstractors, its position relative to the past tense operator is significant. The reading in (2a) can only be achieved if '10-year-old' sits below the lambda abstractor associated with the past tense so that its input time can be (locally) bound by that lambda abstractor – thereby resulting an MCT input time. For the sake of conciseness, I will refer to this scenario as the input time being "locally bound by the MCT." The LF for this reading is shown in (4a) below.

Reading (2b), in which '10-year-old' has a UT input time, has two possible LFs, in principle: one, (4b.i), in which '10-year-old' remains below the sentential tense and its input time is bound by (the lambda abstractor valued by) the UT from a distance, and another, (4b.ii), in which '10-year-old' raises above the sentential tense and its input time is locally bound by the UT.

Binding is represented by square arrows on the LFs in (4) and (5) below. In (5), as in (3), the dashed line represents the raised position of the DP.

(4) Madara met a 10-year-old.

a. Input time = MCT (*t'*) → 10 years old *at the time of meeting*

Local binding:

$\lambda w_0.\ \lambda t_0.\ [PAST_{t0}\ \lambda t'.\ [\ [\![a\ 10\text{-}year\text{-}old]\!]^g(w_0)(\mathbf{t'})\ [\lambda x.\ [meet\ (x)(m)(w_0)(t')]]]]$

b. Input time = UT (t_0) → 10 years old *at the utterance time*

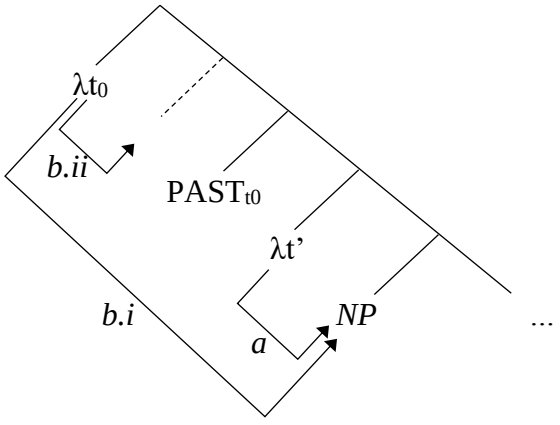
i. *Long-distance binding:*

$\lambda w_0.\ \lambda t_0.\ [PAST_{t0}\ \lambda t'.\ [\ [\![a\ 10\text{-}year\text{-}old]\!]^g(w_0)(\mathbf{t_0})\ [\lambda x.\ [meet\ (x)(m)(w_0)(t')]]]]$

ii. *Movement and local binding:*

$\lambda w_0.\ \lambda t_0.\ [\ [\![a\ 10\text{-}year\text{-}old]\!]^g(w_0)(\mathbf{t_0})\ [\lambda x.\ [PAST_{t0}\ \lambda t'.\ [meet\ (x)(m)(w_0)(t')]]]]$

(5)



I propose that all nominal input times (for nouns introducing novel referents) must be locally bound, thereby ruling out the LF in (4b.i). This proposal is stated explicitly in the rule in (6).[7] In the next section, I present evidence that shows that when movement is restricted, the set of available input times is also restricted to only the lambda abstractors which can locally bind the nominal time argument.

(6) **Nominal Input Time Locality Constraint** (NITLC)

The input times to nominal predicates introducing novel referents must be bound by the nearest lambda abstractor over times.

2.1 Evidence for a locality constraint

If nominal input times must be locally bound, then a noun's input time should be predictable when its location in the LF is independently known. In this section, I present evidence in support of this claim, much of which comes from O'Leary (2021).

2.1.1 Existential 'there' constructions

A locality constraint on nominal input times predicts that, in the absence of movement, only one input time should be available to nominal predicates – namely, the input time will be bound by whichever lambda abstractor most closely scopes over the noun's originating position. Therefore, a good place to investigate the accuracy of the Nominal Input Time Locality Constraint (NITLC) is in a construction known to block movement.

[7] The constraint in (6) will be replaced by a more general constraint in §3.3.

The post-copular DP of an existential 'there' construction cannot undergo movement and must be interpreted in situ (Williams 1984, Heim 1987, Francez 2007).[8] Since the DP cannot move, neither will its nominal complement, forcing the noun to be interpreted below the sentential tense. Thus, the NITLC predicts that the input time of a noun within the post-copular DP of a (matrix) existential 'there' construction must be bound by the MCT, which means that an inflexible noun in this position must have a property time which overlaps the MCT. Unlike in (2), there should be no ambiguity regarding nominal input times; a UT input should be strictly ruled out, as it would require long distance binding into the in situ NP.

(7) and (8)[9] provide a minimal pair. In (7), which contains no existential 'there' construction, 'professor' may have an MCT or a UT input time. In (8), 'professor' is in the post-copular position of an existential 'there' construction and is only compatible with an MCT input time; the reading in which the property of being a professor holds at the UT is unavailable, despite being significantly more plausible.[10]

(7) A professor was in kindergarten in the 80s.

a. Input time = MCT → professor at the time of being in kindergarten (in the 80s)

b. Input time = UT → professor *at the utterance time*

[8] Poole (2017) claims that these post-copular DPs *can* undergo movement, but must undergo syntactic reconstruction. For the purposes of this paper, these two theories achieve the same result, which is that the NP is interpreted in situ.

[9] Based on sentences from Keshet (2008).

[10] This temporal feature of existential 'there' constructions was noted first by Musan (1995, 1999), as discussed in Chapter 2.

(8) There was a professor in kindergarten in the 80s.

a. Input time = MCT → professor at the time of being in kindergarten (in the 80s)

b. # Input time = UT → professor *at the utterance time*

The LFs in (9) mirror those given in (4) and diagrammed in (5). (9a) represents the reading in (8a) in which 'a professor' does not undergo movement and the input time to 'professor' is locally bound by the MCT. (9b) represents attempts at LFs for the unavailable reading of (8b). As in (4b), there are two ways to potentially arrive at a reading in which the nominal input time is bound by the UT. The option which involves raising and local binding by the UT, shown in (9b.ii), is prohibited based on the restriction on movement (Williams 1984, Heim 1987, Francez 2007). The only other option is long-distance binding of the input time by the UT, (9b.i). To rule out the LF of (9b.i), and consequently rule out the unacceptable reading of (8b) as desired, we need the locality constraint.

(9) There was a professor in kindergarten in the 80s.

a. ✓ Input time = MCT (*t'*) → professor *at the time of being in kindergarten*

Local binding:

$\lambda w_0.\ \lambda t_0.\ [PAST_{t0}\ \lambda t'.\ [\ \textit{there be}\ [\![\text{a professor}]\!]^g(w_0)(\mathbf{t'})\ \textit{in kindergarten in the 80s}]]$

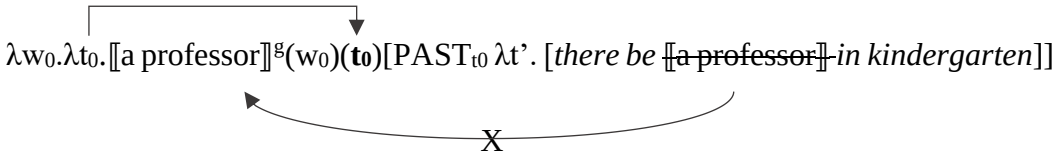
b. # Input time = UT (t_0) → professor *at the utterance time*

i. *Long-distance binding:*

X

$\lambda w_0.\ \lambda t_0.\ [PAST_{t0}\ \lambda t'.\ [\ \textit{there be}\ [\![\text{a professor}]\!]^g(w_0)(\mathbf{t_0})\ \textit{in kindergarten in the 80s}]]$

ii. *Movement and local binding*:



Thus, the proposed NITLC advantageously rules out a possible LF that would result in an unattested reading.

As mentioned in a footnote earlier in the chapter, the NITLC is equally applicable to flexible nouns. For instance, the sentence 'There was a fugitive in Maine in 1982,' allows readings in which the subject was a fugitive at or preceding the MCT (so during or before being in Maine) but not readings in which the subject is a fugitive at the UT or for an interval between the MCT and the UT. That is, this sentence cannot mean that there is someone who just became a fugitive and who was in Maine in 1982, nor can it mean that there is someone who was in Maine in 1982 and was then a fugitive in 1995. Thus, we can conclude that the only allowed LFs are ones in which the input time of 'fugitive' is locally bound by the MCT.

The data points shown for inflexible nouns in the next section are not repeated for flexible nouns, but the NITLC still holds for flexible nouns; a flexible noun must have a property time that overlaps or precedes an input time bound by the nearest c-commanding lambda abstractor.

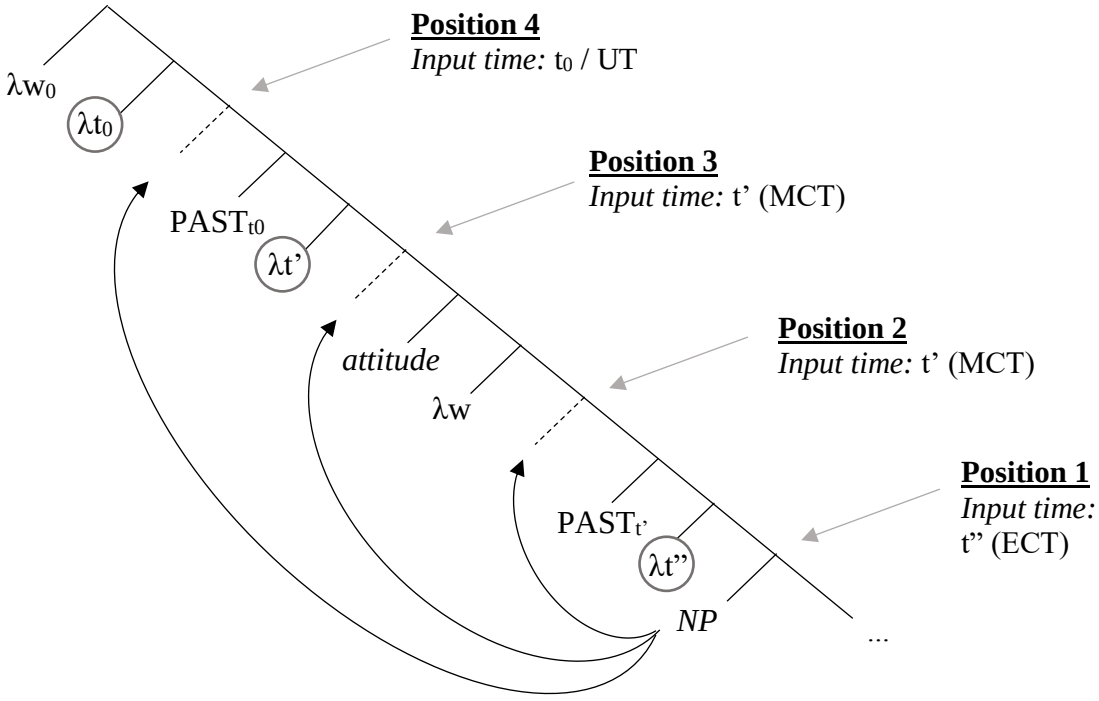
2.1.2 Embedded clauses

Sentences with embedded clauses, and therefore multiple sentential tenses, have mostly gone undiscussed in the nominal evaluation time literature. Such sentences offer an additional time

variable, supplied by the embedded tense: the EMBEDDED CLAUSE TIME (ECT).[11] By adding more structure to the LF and another potential antecedent for nominal input times, sentences with embedded clauses offer several new ways to test the accuracy of the NITLC.

If the NITLC is accurate, the input time of a nominal predicate should be predictable based on the location of the nominal within the LF. The following graphic shows the various positions in which a nominal may be interpreted in a sentence with a clause embedded under an attitude verb relative to tenses, lambda abstractor over times and worlds, and the attitude verb itself:

(10)



[11] And even a fourth time variable: the time that the matrix subject believes it to be at the time of their saying, believing, etc. (equivalent to MCT if they are not mistaken). This lambda abstractor would be introduced just below the attitude verb. For the moment, I here make the assumption that matrix subjects are not mistaken about the time at which they are speaking, believing, etc. This topic is revisited in §2.1.2.3.

Given freedom of movement, a nominal which originates in an embedded clause is able to occupy any of these positions and is therefore compatible with interpretations in which its input time is coindexed with any of the three lambda abstractors over times, as shown in (11).[12] A timeline is provided in (11e).

(11) a. (In 2016,) Jaagup told me that (in 2006) he taught a 21-year-old to ride a bike.

b. ✓ *Reading 1*: **UT** input time (21 at time (8a) is uttered):

In 2006, Jaagup taught someone who was 6 years old at the time how to ride a bike. In 2016, he told me about it. By now, the person he taught is 21 years old.

c. ✓ *Reading 2*: **MCT** input time (21 at time of the telling event):

In 2006, Jaagup taught someone who was 11 years old at the time how to ride a bike. In 2016, when the person he taught was 21 years old, he told me about it. By now, the person he taught is 26 years old.

d. ✓ *Reading 3*: **ECT** input time (21 at time of teaching):

In 2006, Jaagup taught someone who was 21 years old at the time how to ride a bike. In 2016, he told me about it. By now, the person he taught is 36 years old.

[12] For all examples in this dissertation, I assume that the UT is in the year 2021.

e. Timelines from the various contexts

Input time:	UT ✓	MCT ✓	ECT ✓
Age during teaching (2006)	6	11	**21**
Age during J's telling (2016)	16	**21**	31
Age at utterance time (2021)	**21**	26	36

Assuming only upward movement, the same freedom of input time is not available to all nouns in a two-clause utterance. A nominal predicate originating in the matrix clause cannot lower down to a position below the embedded tense, which is necessary to be bound by the ECT. Thus, a noun originating in the matrix clause is only compatible with a UT input time, (12b), or an MCT input time, (12c) – the two lambda abstractors that scope over its originating position. An ECT input time, (12d), is not acceptable.

(12) a. (In 2016,) a 21-year-old told me that (in 2006) she taught Serik how to ride his bike.

b. ✓ *Reading 1*: **UT** input time (21 at time (9a) is uttered):

In 2006, a girl who was 6 years old at the time taught Serik how to ride his bike. In 2016, she told me about teaching him. She is now 21 years old.

c. ✓ *Reading 2*: **MCT** input time (21 at time of the telling event):

In 2006, a girl who was 11 years old at the time taught Serik how to ride his bike. In 2016, when she was 21 years old, she told me about teaching him. She is now 26 years old.

d. # *Reading 3*: **ECT** input time (21 at time of teaching):

In 2006, a woman who was 21 years old at the time taught Serik how to ride his bike. In 2016, she told me about teaching him. She is now 36 years old.

e. Timelines from the various contexts

Input time:	UT ✓	MCT ✓	ECT #
Age during teaching (2006)	6	11	**21**
Age during telling (2016)	16	**21**	31
Age at utterance time (2021)	**21**	26	36

2.1.2.1 Embedded existential 'there' constructions

Just as a matrix existential 'there' construction can force an MCT input time, an embedded existential 'there' construction can force an ECT input time. Like its matrix counterpart, a noun in the post-copular DP of an embedded existential 'there' construction cannot undergo movement. Therefore, if the NITLC is correct and nominal input times must be locally bound, a noun in this position will only be compatible an input time that is bound by the ECT – the nearest c-commanding lambda abstractor over times. (13) confirms that a noun in an embedded existential 'there' construction is compatible with an ECT input time, but not a UT or MCT input time.

(13) a. (In 2016,) Rathna told me that (in 2006) there was a 71-year-old in her syntax class.

b. # *Reading 1*: **UT** input time (71 at time (10a) is uttered):

In 2006, Rathna taught a syntax class and someone who was 56 at the time enrolled. In 2016, she told me about it. By now, the person she taught is 71 years old.

c. # *Reading 2*: **MCT** input time (71 at time of the telling event):

In 2006, Rathna taught a syntax class and someone who was 61 at the time enrolled. In 2016, when the person she taught was 71 years old, she told me about it. By now, the person she taught is 76 years old.

d. ✓ *Reading 3*: **ECT** input time (71 at time of teaching):

In 2006, Rathna taught a syntax class and someone who was 71 at the time enrolled. In 2016, she told me about it. By now, the person she taught is 86 years old.

e. Timelines from the various contexts

Input time:	UT #	MCT #	ECT ✓
Age during class (2006)	56	61	**71**
Age during telling (2016)	66	**71**	81
Age at utterance time (2021)	**71**	76	86

2.1.2.2 De dicto readings

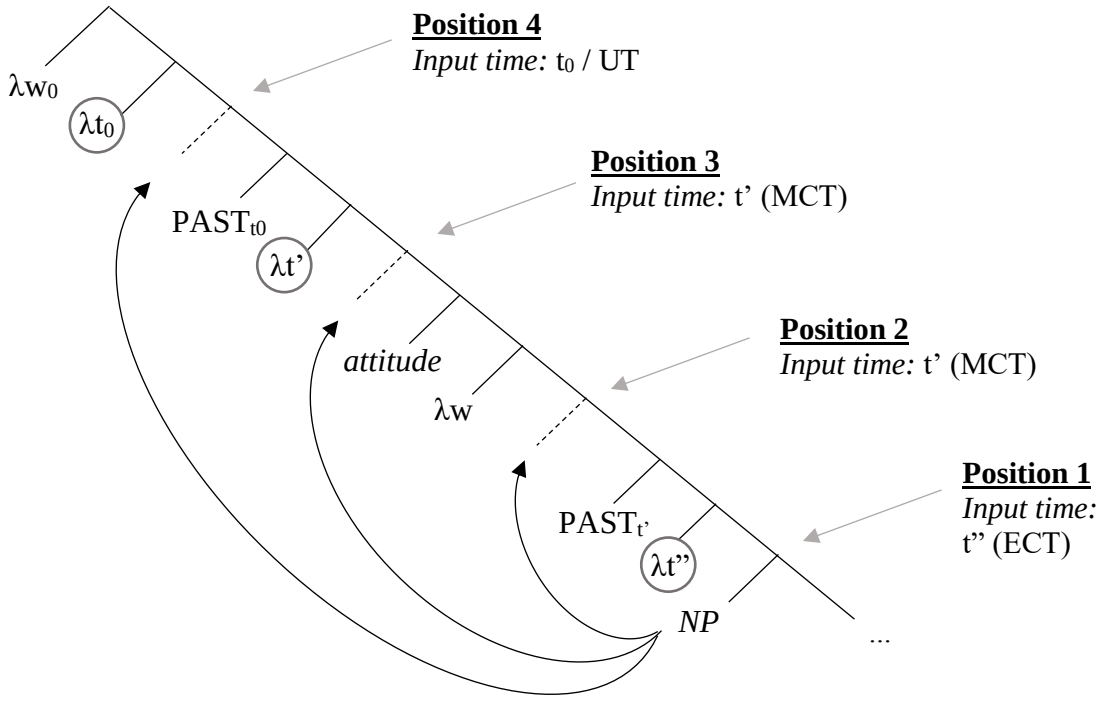
The location of a nominal predicate is also predictable if it must be interpreted below an attitude verb, such as in a de dicto reading. A DP receives a *de dicto* reading if it is interpreted within the

scope of an intensional operator, such as an attitude verb. De dicto readings are contrasted with *de re* readings, in which the DP is interpreted as if it is outside of the scope of the intensional operator. De re readings are often achieved theoretically by covertly raising a DP outside of the scope of the intensional operator within the LF via QR. De dicto readings (relative to attitude verbs) report the attitude holder's beliefs, while de re readings report the state of things in the actual world. Thus, in the sentence "Alejandra said that she met a king," a de dicto reading of 'a king' would be felicitous if Alejandra thought that the person she met was a king (whether or not he actually was), while a de re reading of 'a king' would be felicitous if she said that she met Pallab, and Pallab is actually a king (whether or not Alejandra knows it). The terms de dicto and de re here are used in a broad sense to refer to both the source of the information about an embedded subject's age and where the quantificational force of the DP scopes in the LF.[13]

Importantly, to get a de dicto reading, a DP must remain below the attitude verb, and therefore its nominal complement will be interpreted in one of the two lowest positions (position 1 or position 2) shown in (10), repeated below, which differ only in their relation to the embedded tense.

[13] *De dicto*, as used here, may also be called "non-specific, opaque," and *de re* may be called "specific, transparent" (Fodor 1970).

(10)



Under the NITLC, the input times of these two positions should be predictable based on their relationship to the lambda abstractors in the LF. Position 1 occurs below the embedded tense; thus, locally bound input times of nouns in this position are bound by the ECT. Position 2 occurs above the embedded tense but below the attitude verb; locally bound input times of nouns in this position are bound by the MCT, as the matrix tense provides the nearest c-commanding lambda abstractor over times. Importantly, there is no position below the attitude verb for which the UT is the nearest lambda abstractor, so, assuming the ban on long-distance binding set forth by the NITLC, a UT input time should not be available to a nominal that is interpreted below the attitude verb, as in a de dicto reading. Put another way, if long-distancing binding of input times *were* possible, a UT input time paired with a de dicto reading would be available. A lack of such a reading (de dicto with a UT input time) supports the need for an input time locality constraint.

(14) provides a context and two sentences. In both sentences, the nominal predicate in the embedded subject DP has a UT input time – that is, it is an inflexible noun which has a property time that overlaps the UT, but not the MCT or the ECT. In (14b), the UT input time is paired with a de dicto reading, reflecting the attitude holder's beliefs (predicted to be unacceptable under the NITLC, as it requires long-distance binding of the input time). In (14c), the UT input time is paired with a de re reading, reflecting the actual state of things (predicted to be acceptable, as the UT input time can be locally bound after the DP undergoes covert movement). As these are difficult judgments, the table in (14d) provides a summary of the temporal information from the context; note that information is organized in a different manner from the tables in (11)-(13).

(14) a. ***Context:***

In 2001, Josiah was scared by someone creeping up on him in a parking lot. Although he never saw their face, he saw that the person was very short, so Josiah assumed it was a young child, perhaps 5 or 6 years old. Josiah told me about this event in 2011, ten years after it happened. By now, 20 years after the event, Josiah thinks that the person who scared him is in their 20s. However, the person who scared him was actually Thomas, a very short old man who is now 85 years old; Josiah does not know this information.

b. **UT + de dicto**: someone who Josiah *thinks* is in their 20s *now* scared Josiah

\# (In 2011,) Josiah told me that a 20-something scared him (in 2001).

c. **UT + de re**: someone who is *actually* 85 *now* scared Josiah

✓ (In 2011,) Josiah told me that an 85-year-old scared him (in 2001).

d. Timeline

Year	2001	2011	2021
Event	*scaring*	*telling*	*now*
Actual age	*65*	*75*	***85*** ✓
Josiah's belief about their age	*child*	*teen*	***20s*** #

In (14b), the UT + de dicto reading, the person's reported age is based on Josiah's beliefs about what their age is at the time of the utterance. In (14c), the UT + de re reading, the reported age is based on the person's actual age at the time of the utterance. The unacceptability of the UT + de dicto reading in (14b) provides further evidence that long distance binding of input times is not possible and supports the need for a locality constraint like the NITLC; there is no possible position for the noun that would result in *local* binding by the UT while remaining under the attitude verb. (15) provides the two logically possible LFs for (14b), with the nominals occurring in position 1 (below the embedded tense) and position 2 (above the embedded tense, but below the attitude verb) from the tree diagram in (10). Both would require long distance binding to get a UT input time to the embedded nominal predicate, which is correctly ruled out by the NITLC.

(15) a. *Below the embedded tense:*

X

λw_0. λt_0. [$PAST_{t0}$ λt. [*j* $say_{w0,t}$ λw. $\lambda t'$. [$PAST_{t'}$ $\lambda t''$. [[[a 20-something]]^g (w) (**t_0**) λx. [scare (*j*)(x)(w)(t'')]]]]]

b. *Above the embedded tense:*

X

λw_0. λt_0. [$PAST_{t0}$ λt. [*j* $say_{w0,t}$ λw. $\lambda t'$. [[[a 20-something]]^g (w) (**t_0**) λx. [$PAST_{t'}$ $\lambda t''$. [scare (*j*)(x)(w)(t'')]]]]]

Unlike a UT input time, MCT and ECT input times *are* compatible with de dicto readings, as predicted: position 1 of (10) results in an ECT input time, position 2 results in an MCT input time, and both are below the attitude verb. Assuming the same context, both of the following sentences are acceptable:

(16) a. **MCT + de dicto**: someone who Josiah *thinks* was a teen *when he told me about* the event scared Josiah

✓ (In 2011,) Josiah told me that a teen scared him (in 2001).

b. **ECT + de dicto**: someone who Josiah *thinks* was a child *when they scared him* scared Josiah

✓ (In 2011,) Josiah told me that a child scared him (in 2001).

Likewise, all three input times are compatible with de re readings. UT + de re, predicted for position 4 of (10), is given above in (14c). MCT + de re, given below in (17a), is predicted for position 3 of (10). ECT + de re, given below in (17b), requires either long-distance binding of the noun's world argument or semantic reconstruction; see §4 for a discussion of these options.

(17) a. **MCT + de re**: someone who was *actually* 75 *when Josiah told me about the event* scared Josiah

✓ (In 2011,) Josiah told me that a 75-year-old scared him (in 2001).

b. **ECT + de dicto**: someone who was *actually* 65 *when they scared Josiah* scared Josiah

✓ (In 2011,) Josiah told me that a 65-year-old scared him (in 2001).

2.1.2.3 Mistaken attitude holders

In the LFs given thus far for sentences with clauses embedded under attitude verbs, one lambda abstractor was left out, for the sake of simplicity. Instead of three lambda abstractors over times, there are technically four. Under the attitude verb, in addition to a lambda abstractor over worlds, which is valued by the world(s) which the attitude holder believes to be possible, there is also a lambda abstractor over times, valued by the time which the attitude holder believes it to be at the time of their speech/belief/etc. – that is, what the attitude holder *thinks* the MCT is (regardless of whether or not they are correct). I will call this time the ATTITUDE VERB TIME (AVT).

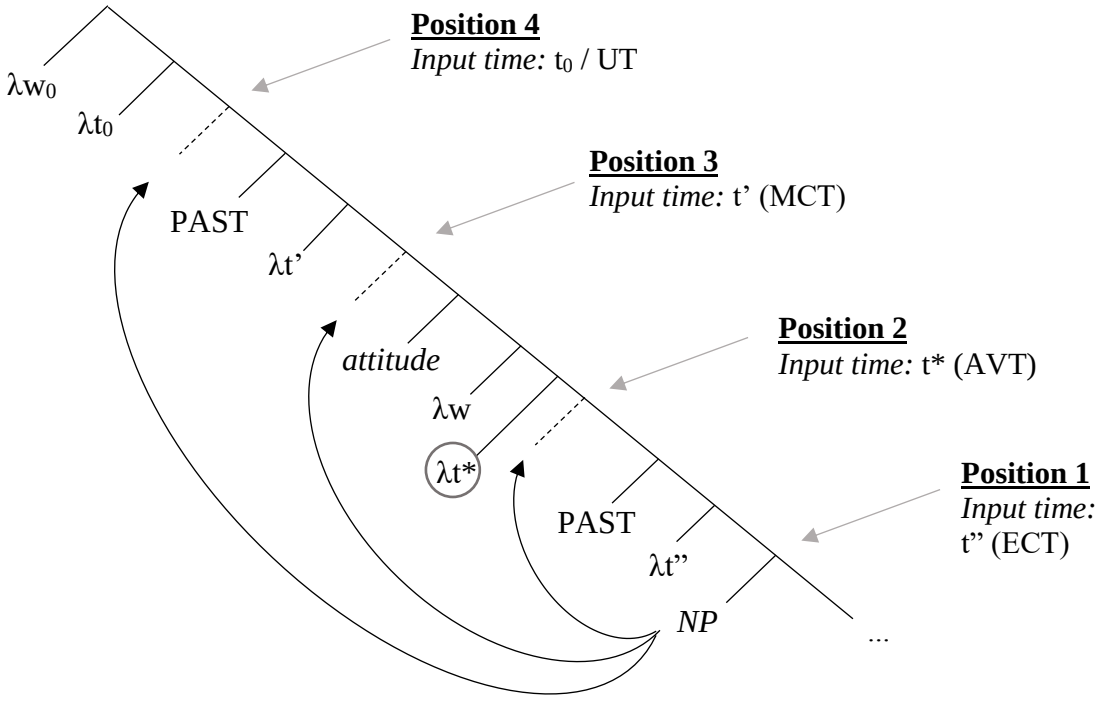
In most scenarios, attitude holders are correct or close to correct about the time; they likely know what year and day it is and can approximate the time of day fairly well. In such cases, the extensions of the MCT and the AVT are equivalent or near-equivalent. Because this is generally the case, the lambda abstractor which is valued by the AVT can often be left out of LF (as I have done thus far) without causing too many problems – those constituents that would have been directly under the scope of the AVT's lambda abstractor will instead be under the scope of the MCT's lambda abstractor, which results in an inconsequential difference in truth conditions if the extensions of the AVT and the MCT are equivalent or near-equivalent.

There are, however, some cases where the attitude holder may be wildly mistaken about the time they are situated in: waking up from a coma, extreme inebriation, imprecise time travel, etc. In such a case, the extension of the AVT would be significantly different from the MCT and should not be left out of the LF.

Notably, the inclusion of the AVT's lambda abstractor changes the input time for what I have called "position 2," where the DP/NP scopes below the attitude verb but above the embedded tense. In (10), I claimed that the input time of a noun in position 2 would be locally bound by the

MCT. This was incorrect; position 2 is locally bound by the AVT, as depicted in (18). It is just that the extension of the AVT, in most scenarios, is indistinguishable from the extension of the MCT.

(18)



As discussed in §2.1.2.2, a de dicto reading is only compatible with position 1 or position 2. Following the LF in (18), position 1 should result in an ECT input time, and position 2 should result in an AVT input time. According to the NITLC, a property time which overlaps *only* the extension of the UT or *only* the extension of the MCT should not be acceptable.

The example below provides a scenario in which the extensions of the MCT and the AVT are notably distinct points in time. According to the NITLC, an MCT input time is not compatible with a de dicto reading; thus, a noun inside a de dicto DP should not be compatible with a property

time that overlaps the extension of the MCT and *not* the extension of the AVT. This data exhibits a stark contrast to the example in (16), where the MCT and AVT were effectively equivalent (due to the attitude holder not being mistaken about the time at which they were speaking), and therefore an MCT + de dicto reading *appeared* to be acceptable.

(19) a. ***Context:***

In 1991, Josiah was scared by someone creeping up on him in a parking lot. Although he never saw their face, he saw that the person was very short, so Josiah assumed it was a young child, perhaps 5 or 6 years old. Ten years later, in 2001, Josiah fell into a coma. In 2011, Josiah woke up from the coma and then, thinking it to be 2001, told me that someone scared him in a parking lot "ten years ago." However, the person who scared him was actually Thomas, a very short old man who was 55 at the time of the scaring event.

In 2011, the time when Josiah actually told me about the event, Thomas was actually 75. Had Josiah known that it was 2011, he would have thought him to be in his 20s.

b. **MCT + de dicto**: someone who Josiah *thinks* was in their 20s *when he told me* about the event scared Josiah

\# Josiah told me that a 20-something scared him.

c. **MCT + de re**: someone who was *actually* 75 *when Josiah told me about the event* scared Josiah

✓ Josiah told me that a 75-year-old scared him.

d. **Timeline**

Year	*1991*	*2001*	*2011*	*2021*
Associated variable	*ECT*	*AVT*	*MCT*	*UT*
Actual age	*55*	*65*	*75* ✓	*85*
Josiah's belief about their age	*child*	*teen*	*20s #*	*30s*

The unacceptability of an MCT + de dicto reading in a context where the MCT and AVT are sufficiently distinct from one another shows that a noun under the scope of an attitude verb cannot be bound by the lambda abstractor valued by the MCT, providing further evidence in favor of a local binding constraint.

2.2 Generalization Z and the implications for situation pronouns

Keshet (2008, 2010) proposes a constraint very similar to the NITLC:

(20) **Generalization Z**

The situation pronoun selected for by a noun in a weak NP must be coindexed with the nearest λ above it.

(Keshet 2008:126)

In the big picture, Generalization Z and the NITLC offer similar solutions to the problem of adequately constraining nominal time arguments: local binding. However, there are several small

differences between Generalization Z and the NITLC (even after setting aside terminology differences such as 'input times' vs. times/situations 'selected for' and 'coindexed' vs. 'bound') which highlight particularly interesting data. I discuss these here.

First, Generalization Z applies only to the nominal complements of weak determiners. As mentioned in Chapter 2, "weak" determiners are those that can occur in the post-copular position of an existential 'there' construction, such as 'a,' 'some,' 'many,' and 'two,' and strong determiners are those that cannot, such as 'the,' 'that,' and 'every' (Milsark 1977). Keshet additionally clarifies that he only classifies determiners as "weak" if they bear a cardinal reading (defining the cardinality of a novel group) rather than a partitive one (picking a subgroup out of a known set), as cardinal readings are the only readings available in existential 'there' constructions. By contrast, the NITLC applies to all nominal predicates which introduce novel referents, including novel groups introduced by nouns under both weak and strong determiners. Thus, the NITLC applies to all of the predicates covered by Generalization Z (nouns under weak determiners, which all introduce novel referents) plus nouns under strong determiners that introduce novel referents. This is a small difference, but highlights interesting data that will be covered in more detail in Chapter 4.

As a brief illustration of the distinction (which also acts as a preview of Chapter 4 material), the NITLC, but not Generalization Z, applies to the nominal predicate 'bachelors' in the last sentence of (21), which introduces novel referents, but occurs under the strong determiner 'the.' The strong determiner is licensed by the familiarity of the group of people who were happy in the 70's; this group intersects with the group of current bachelors to create the group of 'happy bachelors' – those who were happy in the 70's and are bachelors now. The NITLC correctly identifies that the input time to 'bachelors' in (21) must be locally bound (by the UT/present tense

MCT), thereby forcing a simultaneous (and contradictory) interpretation with ‘married.’ Despite occurring under a strong determiner, ‘bachelor’ patterns with the other novel-referent-introducing predicates which occur under weak determiners. Generalization Z does not make any predictions about this data.

(21) I knew a lot of happy people when I was in college in the 70’s. I just saw them all at my college reunion. # The happy bachelors are married.

The difference between nouns under weak or indefinite determiners and nouns introducing novel referents is discussed in depth in Chapter 4, as are discourse snippets like (21).

The second noteworthy difference between Generalization Z and the NITLC is Generalization Z’s reference to situation pronouns, while the NITLC references only times (although the potential for a locality constraint for world pronouns is discussed in §4). Some semanticists use the term “situations” to describe a subpart of a world, committed to the truth values of some propositions, but not every proposition (e.g., Elbourne 2011). Others, including Keshet (2008:19), use the term “situation” to mean a world variable and a time variable inseparably paired together; in such a system, predicates which would have otherwise taken world and/or time arguments instead take situation arguments.

Unfortunately, (this type of) situation pronoun does not hold up as a viable tool when considering a wide variety of nominal evaluation times. Situation pronouns encode worlds and times as inseparable pairs – any predicate that takes a situation pronoun as an argument must take *both* the world information and the time information that come inside it. Therefore, situation pronouns cannot model any data in which a single predicate takes world and time arguments from different parts of the LF.

For instance, a model in which worlds and times are encoded in a single situation pronoun predicts that a single predicate should not simultaneously be able to be interpreted de re (and therefore at a world that definitively originates above the attitude verb) and to have an ECT input time (which decidedly originates below the attitude verb).

The following situation puts forth exactly this scenario for the nominal predicate '6-year-old.' The context in (22a) forces a de re reading of '6-year-old' in (22b), as Xulia does not know that Tamatoa was 6 years old at the time of the stealing. It also forces an ECT input time for '6-year-old,' since Tamatoa is 6 years old at the time of the stealing but not at the time of Xulia's speech act nor at the time at which (22) was uttered.

(22) a. **Context:**

20 years ago, in 2001, Tamatoa was 6 years old. He was very tall for his age though, so many people mistook him for an adult at first glance. While he was 6 years old, he stole Xulia's wallet. She knew who did it, but thought him to be an adult due to his size. Xulia described this event a few years ago and told me that Tamatoa had stolen her wallet. I know Tamatoa and know that he must have been 6 years old at the time, because he is 26 now.

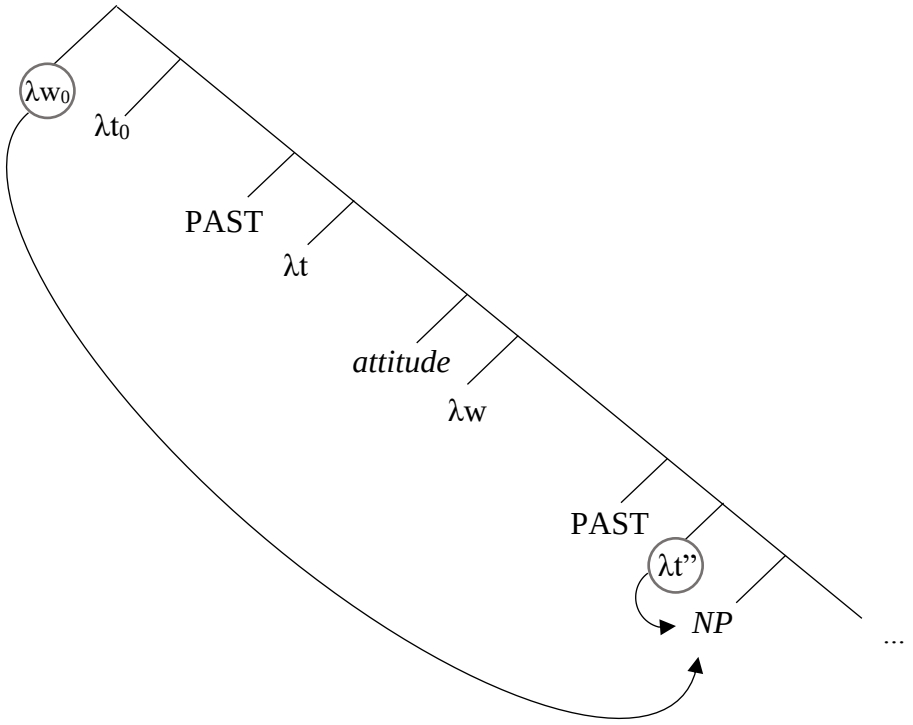
b. ✓ **ECT + de re**:

Xulia said that a 6-year-old stole her wallet (twenty years ago).

c. **Timeline**

Year	*2001*	*2011*	*2021*
Event	*stealing*	*telling*	*now*
Actual age	*6*	*16*	*26*
Xulia's belief about thief's age	*adult*	*adult*	*adult*

d.



Despite the fact that a model using only situation pronouns would predict this reading impossible, the sentence in (22b) is felicitous in the given context. The sentence remains felicitous even if the de re and ECT features are made explicit:

(23) Xulia said that a six-year-old stole her wallet twenty years ago, but she didn't know (and still doesn't know) that he was six at the time.

The acceptability of (22b) and (23) show that separated world and time variables are necessary to account for the behavior of nominal predicates.

3. Non-nominal time arguments are also locally bound

In this section, I propose that the time arguments of *all* predicates which introduce novel referents are locally bound, rather than just the time arguments of nominal predicates. Other works have asserted portions of this claim, some establishing locality constraints for the time arguments of specific sets of predicates and some discussing the relative temporal interpretations between nouns and their modifiers. I briefly discuss these previous works in §3.1 and §3.2 before proposing a generalized Temporal Locality Constraint in §3.3.

3.1 Clausal predicates and their modifiers (Percus 2000)

Non-nominal predicates can be used as nominal modifiers (e.g., adjectives, prepositional phrases, participle phrases), clausal predicates (all of the above plus verbs), or clausal predicate modifiers (e.g., adverbs). In this section, I discuss clausal predicates and their modifiers; nominal modifiers are discussed in §3.2.

Percus (2000) claims that verb and adverbial situation pronouns are locally bound by the nearest lambda abstractor, given in his Generalizations X and Y below. Like Keshet (2008), Percus uses "situations" to mean temporally located parts of worlds (2000:185), and "situation pronouns" to refer to world/time pairs.

(24) **Generalization X**

The situation pronoun that a verb selects for must be coindexed with the nearest λ above it.

(Percus 2000:201)

(25) **Generalization Y**

The situation pronoun that an adverbial quantifier selects for must be coindexed with the nearest λ above it.

(Percus 2000:204)

In (26) and (27), I rephrase Generalizations X and Y to be compatible with the terminology used in this dissertation. First, given the discussion in §2.2, I separate situation pronouns into independent world and time pronouns.[14] Second, I change "verb" to "clausal predicate" to account for the fact that Percus uses Generalization X to explain the behavior of *all* clausal predicates; his examples include, e.g., 'be a semanticist' and 'be Canadian', not just lexical verbs. Third, I use the term "inputs" to be compatible with the nominal lexical aspect of Chapter 2. This change is effectively meaningless for clausal predicates and adverbs, which always have property times that overlap their input time, but allows for a maximal similarity between the various locality constraints. Finally, I use "bound" in place of "coindexed" as Percus clarifies that "nearest" means "the lowest λ that c-commands the pronoun" (2000:201) and describes the two generalizations as "binding principles" (2000:205).

[14] Keshet (2008) demonstrates that Percus' Generalizations X and Y, as well as his own Generalization Z, hold independently for worlds and times.

(26) **Generalization X'**

The times and worlds that are inputs to clausal predicates must be bound by the nearest lambda abstractors.

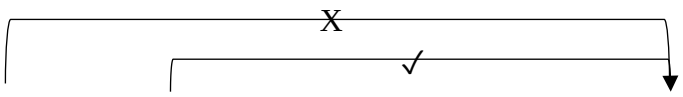
(27) **Generalization Y'**

The times and worlds that are inputs to adverbs must be bound by the nearest lambda abstractors.

(28) and (29) below illustrate the claims that Generalizations X' and Y', respectively, make about times.[15] In both examples, there exist two lambda abstractors over times: the UT (t_0) and the MCT (t'). In line with Generalizations X' and Y', the time at which the underlined content holds must overlap the nearer of the two lambda abstractors – the MCT (t').

In (28), the property 'be in kindergarten' must hold for an interval which overlaps the MCT (t'); there is no reading of (28) in which the professors are in kindergarten now (t_0) and not in 1980 (t') – a reading that should be acceptable if the input time of 'be in kindergarten' could be bound by the UT (t_0). Likewise, in (29), the input time of the adverb 'obligatorily' must be bound by the MCT ($t' \approx$ the 70's); (29) has no reading in which the obligation holds exclusively at the UT (t_0) and not in the 70's (t').

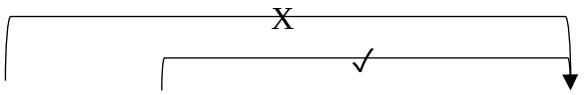
(28) a. In 1980, my syntax professor was in kindergarten.



b. λt_0. [$PAST_{t0}$ [$\lambda t'$. In 1980, my syntax professor <u>be in kindergarten</u>.]]

[15] (28) and (29) are based on examples from Keshet (2008:119,124).

(29) a. In the 70's, my professors obligatorily wore ties.



b. λt_0. [$PAST_{t0}$ [$\lambda t'$. In the 70's, my professors <u>obligatorily</u> wear ties.]]

In sum, the input times for both clausal predicates and adverbs must be bound by the nearest lambda abstractor over times; all other readings are ruled out.

3.2 Nominal modifiers

The time arguments of nominal modifiers are likewise claimed to be subject to a locality constraint; I attribute the claim about nominal modifiers as a general class to Ogihara (2003), but recommend Abusch (1988) for a detailed account of the local binding of relative clauses. Like nominal predicates, the position of nominal modifiers in the LF is affected by DP movement, and so their input times are subject to change based on their location in the LF.

As an example, I below repeat the existential 'there' construction tests from §2.1.1, focusing on a nominal modifier rather than a noun. In (30), 'a closed shop' sits in the post-copular position of an existential 'there' construction and therefore cannot undergo movement, forcing 'closed' to be interpreted below the sentential past tense. The input time of 'closed' is bound by the MCT, creating a contradiction wherein the shop is asserted to be simultaneously both open and closed at the MCT (≈ last year). In (31), 'a closed shop' has freedom of movement and may be interpreted above the sentential tense. Both an MCT input time and a UT input time are possible for 'closed,' the latter of which provides a non-contradictory reading where the shop is closed now, but was open last year.

(30) #There was a closed shop open last year.

(31) A closed shop was open last year.

Since DPs move as a whole, any predicate within the DP will have the same "nearest" lambda abstractor as the noun it modifies and therefore the same input time. Along these lines, Keshet (2008) posits the following generalization:

(32) **Intersective Predicate Generalization**

Two predicates combined via Predicate Modification may not be evaluated at different times or worlds from one another.

(Keshet 2008:44)

Keshet assumes the following definition of Predicate Modification, citing variations of the rule from (in chronological order) Gazdar (1980), Keenan & Faltz (1985), Partee (1987), Winter (1996), and Heim & Kratzer (1998). This definition is compatible with the theories of input times and nominal lexical aspect from Chapter 2.

(33) Predicate Modification (PM)

If α is a branching note, {β,γ} is the set of α's daughters, and ⟦β⟧ and ⟦γ⟧ are both functions of conjoinable type τ, then ⟦α⟧ = ⟦β⟧ ⊓ ⟦γ⟧

(34) ⊓ Operator

For any functions *f* and *g* of conjoinable type τ, *f* ⊓ *g* =

a. $f \wedge g$, if $\tau = t$

b. $\lambda a \in D_{\alpha} . f(a) \sqcap g(a)$, if $\tau = \langle \alpha, \beta \rangle$

(35) Conjoinable type:

a. *t* is a conjoinable type.

b. if τ_1 is a conjoinable type, then for any type τ_2, $<\tau_2,\tau_1>$ is a conjoinable type.

(Keshet 2008:43-4)

(36) rephrases Keshet's Intersective Predicate Generalization to match the terminology used in this dissertation. I first specify that the predicates must introduce novel referents. (Predicates which do not introduce novel referents are discussed in Chapter 4, including cases where one intersective predicate refers to familiar referents and the other to novel referents, a case which turns out to result in different input times.) Second, I clarify that the two predicates must having matching *input* times; more on this below.

(36) **Input-Based Intersective Predicate Generalization**

Two predicates which introduce novel referents and are combined via Predicate Modification may not have different input times or worlds from one another.

The change from "may not be evaluated at different times" to "may not have different input times" spells out that it is *input times* and not *property times* that must be shared between intersective predicates. This difference is effectively unobservable for inflexible nouns, which have property times that overlap their input times, making the two intervals difficult to distinguish. When it comes to flexible nouns, however, it is very important that any generalization is clearly referencing one or the other, as the two intervals need not overlap. This means that even if two intersective predicates share an input time, they may not have overlapping property times if one of them is a flexible noun.

Consider the following examples. In (37)-(40), the inflexible noun ‘bachelor’ is paired with a modifier that either asserts or presupposes the property of being married. As these properties cannot logically hold at the same time as ‘bachelor,’ the resulting sentences are contradictory.

(37) *Inflexible noun + intersective adjective:* # A married bachelor called me.

(38) *Inflexible noun + prepositional phrase*: # A bachelor with his wife called me.

(39) *Inflexible noun + participle:* # A bachelor kissing his wife called me.

(40) *Inflexible noun + relative clause:* # A bachelor who is married called me.

(41)-(44) show sentences analogous to (37)-(40), but containing the flexible noun ‘fugitive’ and modifiers which entail or presuppose imprisonment. If the *property times* of the nouns and their modifiers were shared, (41)-(44) would all be contradictory. However, if the *input times* of the nouns and their modifiers are shared, the ‘former _ _ _’ interpretation of ‘fugitive’ allows (41)-(44) to have non-contradictory readings. (41)-(44) do, in fact, have non-contradictory readings.[16]

(41) *Flexible noun + intersective adjective:* An imprisoned fugitive called me.

(42) *Flexible noun + prepositional phrase:* A fugitive in jail called me.

(43) *Flexible noun + participle:* A fugitive serving his sentence called me.

(44) *Flexible noun + relative clause:* A fugitive who is in jail called me.

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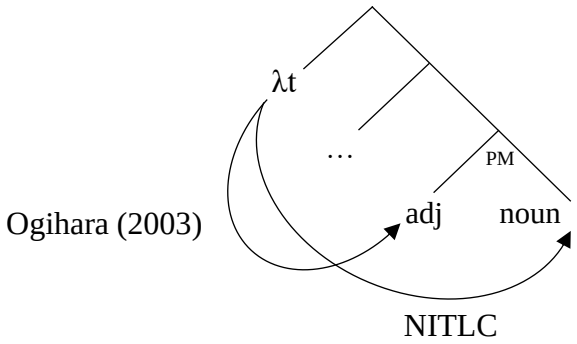
[16] (43) is very similar to data discussed in Kusumoto (1999). Kusumoto notes that in the most salient reading of (i) the participle phrase ‘doing time in the Concord jail’ has a property time that overlaps the UT while the property time of ‘fugitive’ is in the past of the UT. (Kusumoto took a different approach in accounting for this mismatch of property times, positing that a silent variable *t** representing the UT may be inserted directly above the participle phrase.)

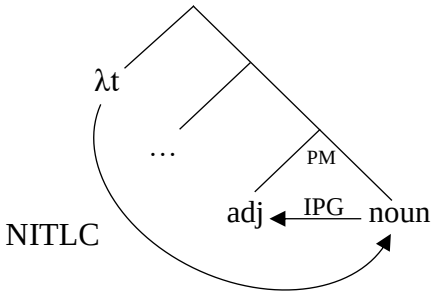
(i) Most of the fugitives doing time in the Concord jail were caught by Officer Jones.
(Kusumoto 1999:173)

The Input-Based Intersective Predicate Generalization provides an accurate description of the behavior of nominal predicates and their modifiers. However, it does not add anything new to a theory which already contains (a) the NITLC, (b) Ogihara's claim that all nominal modifiers have locally bound time arguments, and (c) a standard theory of DP movement in which a noun and its modifiers will always scope together. Effectively, when deployed in addition to the NITLC, both Ogihara's (2003) claim about nominal modifiers and the Input-Based Intersective Predicate Generalization achieve the same goal. Using the NITLC and Ogihara's (2003) theory, the input times to both nominal predicates and their modifiers are locally bound, and, given that nouns and their modifiers always scope together, they will always have the same input times (schematized in (45)). Using the NITLC plus the Input-Based Intersective Predicate Generalization, the input times to nominal predicates are locally bound, and any nominal modifiers are restricted to having an input time identical to the noun they modify (schematized in (46)). Both options result in nouns and their modifiers sharing the same input times.

(45)



(46)



The next section makes a debate between (45) and (46) moot, as I propose a single generalization which subsumes all those mentioned thus far.

3.3 Generalized Temporal Locality Constraint

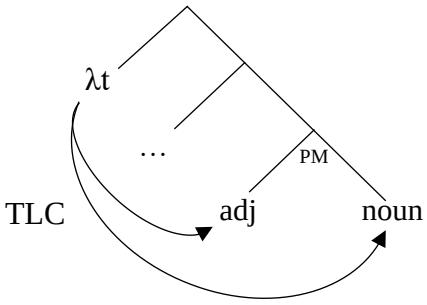
The input times for nouns, verbs, adverbs, adjectives, prepositional phrases, participle phrases, and relative clauses are all locally bound by the nearest c-commanding lambda abstractor over times, as currently described in a piecemeal fashion by the Nominal Input Time Locality Constraint, Percus' (2000) Generalization X for clausal predicates and Generalization Y for adverbs, Ogihara's (2003) description of nominal modifiers, and, indirectly, Keshet's (2008) Intersective Predicate Generalization. I propose the following generalized locality constraint, which subsumes the other five claims (O'Leary 2021):

(47) **Temporal Locality Constraint** (TLC)

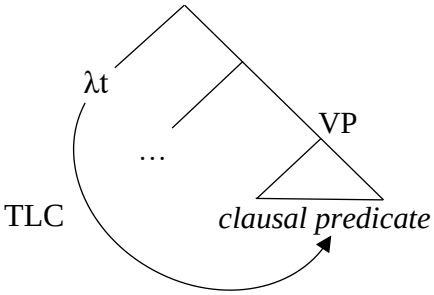
The input times to any predicates introducing novel referents must be bound by the nearest lambda abstractor over times.

The generalized Temporal Locality Constraint accounts for every predicate, whether it is within an argument DP, as depicted in (48), acting as the clausal predicate, as in (49), or modifying the clausal predicate, as in (50).

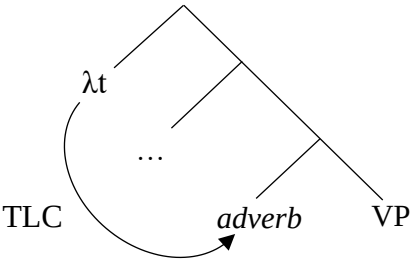
(48)



(49)



(50)



This single generalization not only encompasses all of the temporal information from the five generalizations that predate it, but also highlights a bigger pattern: it is not just happenstance that each type of predicate has a locally bound time argument. *All* time arguments are locally bound.

Non-quantificational DPs classically form a tripartite paradigm: directly referring expressions or "R-expressions" (e.g., 'the president'), pronominals (e.g., 'she'), and anaphors (e.g., 'herself'). Partee (1973) points out similarities between personal pronominals and the times defined by sentential tenses. Recognizing the anaphoric (locally bound) nature of time arguments in predicates which introduce novel referents highlights the existence of an equivalent tripartite paradigm in the temporal domain (e.g., R-expressions like 'May 2nd, 1983,' pronominal times introduced by tenses, and anaphoric time arguments to predicates introducing novel referents).

As a point of interest, nominal time arguments alone may exhibit the entirety of the three-way paradigm. Overtly referring temporal expressions appear in phrases like 'the president in/of 1985.' As established here, the temporal arguments of predicates which introduce *novel* referents exhibit strong anaphoric tendencies. In Chapter 4, building on Tonhauser's (2006) analysis, I demonstrate that the temporal arguments of predicates which refer to *familiar* referents exhibit behavior closer to classical pronouns, as they are coreferent with times established elsewhere in the discourse, but are not subject to any sentence-internal binding rules. In fact, Tonhauser (2020) shows that these argument times can receive deictic, discourse anaphoric, bound, and even donkey anaphoric interpretations.

Even though the TLC lends itself to the universal nature of anaphoric constituents (especially as counterparts to referring expressions and pronominals), a locality constraint is still, at its core, a stipulation. I here discuss two theories that avoid necessitating a stipulative rule. First, we might adopt a purely scopal theory of tense, in which there are no time pronouns whatsoever. In a purely

scopal system, everything in the scope of a given operator – such as a tense – is evaluated with respect to that operator. Therefore, the time argument of any given predicate would be determined by where the predicate is located in the LF. Ironically, a purely scopal model was the theory that Enç (1981) first considered in her foundational work on nominal evaluation times, although she rejected it because, in some of her data, the reliance of nominal time arguments on tense was obscured by flexibility (accounted for in my Chapter 2), the pronominal nature of predicates referring to familiar referents (Chapter 4), and universal temporal operators/generic readings (not covered in this work). The TLC certainly points back in the direction of a purely scopal model, but in §4 I discuss whether there might be cases where the location of the predicate in the LF (based on its quantificational force) does not align with the position from which its time argument is locally bound – data which would not be compatible with a scopal theory.

A second system would involve having a single time-variable be particularly privileged at any given point in the derivation. For instance, in Bittner's (2014) dynamic system of "centering," one argument of each atomic semantic type is "top-ranked" and stored in the "center of attention." A system such as this would store just one time variable in the center of attention and it would not be a far reach to assume that only the top-ranked time variable was available to predicates in need of a time argument. As new time variables are introduced into the derivation, such as by tenses, the "top-ranked" time variable may be replaced, allowing the UT to be privileged at one point, then the MCT, and so on.

There is no strict need to adopt either a pure scopal theory or a centering theory, as the TLC is perfectly sufficient on its own. I mean only to highlight that the universal pattern that the TLC accounts for should be addressed in any work on the basic nature of temporal pronouns, and that there are two models which may already be adequate or nearly adequate to encapsulate this pattern.

4. Semantic reconstruction and a locality constraint for worlds

Before positing the generalized Temporal Locality Constraint (TLC), I mentioned a number of generalizations formalized in previous works, which are repeated below using the terminology of this dissertation.

(51) **Generalization X'**

The times and worlds that are inputs to clausal predicates must be bound by the nearest lambda abstractors.

(based on Percus 2000:201)

(52) **Generalization Y'**

The times and worlds that are inputs to adverbs must be bound by the nearest lambda abstractors.

(based on Percus 2000:204)

(53) **Generalization Z'**

The times and worlds that are inputs to nouns under a weak-cardinal determiner must be bound by the nearest lambda abstractors.

(based on Keshet 2008:126)

(54) **Input-Based Intersective Predicate Generalization**

Two predicates combined via Predicate Modification may not have different input times or worlds from one another.

(based on Keshet 2008:44)

Added to these are Ogihara's (2003) claim that the temporal arguments of nominal modifiers are locally bound and the NITLC, introduced in §2 of this chapter.

(55) **Nominal Input Time Locality Constraint**

The input times to nominal predicates introducing novel referents
must be bound by the nearest lambda abstractor over times.

In §3.3, I proposed the Temporal Locality Constraint (repeated below), claiming that it could, in one fell swoop, cover all of the observations contained in the six generalizations that preceded it.

(56) **Temporal Locality Constraint** (TLC)

The input times to any predicates introducing novel referents
must be bound by the nearest lambda abstractor over times.

However, as astute readers may have noticed, the TLC does not actually encompass all of the information provided in the other generalizations, despite the assurances I made in §3. Specifically, it does not account for any of the claims made about the behavior of world pronouns, namely that:

(57) a. the world arguments of clausal predicates are locally bound (Generalization X)

b. the world arguments of adverbs are locally bound (Generalization Y)

c. the world arguments of nouns under weak-cardinal determiners are locally bound (Generalization Z)

d. two predicates combined via PM must have the same world argument (IPG)

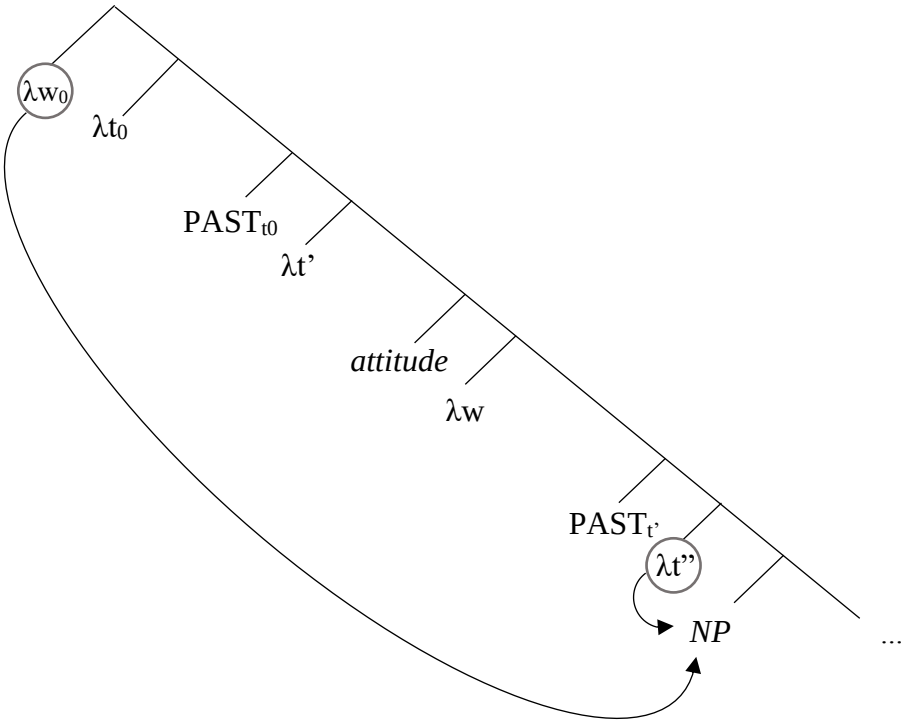
This collection of information about world pronouns defines a parallel pattern to the one described for times which led to the proposal of the TLC and thus begs the question – is there an equivalent locality constraint on world arguments?

(58) **<u>World Argument Locality Constraint</u>** (<u>WALC</u>) – *hypothetical*

The worlds that are inputs to any predicates introducing novel referents must be bound by the nearest lambda abstractor over worlds.

We might brush off the proposal of such a constraint quickly based on data presented in §2.2 of this chapter, in which a single nominal predicate was interpreted de re and with an ECT input time. (This example was used to show the inefficacy of world-time pair "situation" pronouns.) As was stressed in that section, the ECT input time is only possible if the nominal predicate is interpreted below the embedded tense, which points to the predicate's world argument being non-locally bound.

(59)



One might wonder whether we could claim that the world argument in this example *is* locally bound if we make use of Keshet's (2008) concept of "split intensionality," where a DP can scope between the attitude verb and its time and world abstractors. Split intensionality does allow additional de re readings to be compatible with local world binding;[17] for instance, split intensionality could explain a de re reading paired with an AVT evaluation time, as the DP could scope below the attitude's lambda abstractor over times (resulting in local binding of the input time by the AVT) but above the attitude's lambda abstractor over worlds (resulting in local binding of the world argument by the lambda abstractor valued by the actual world). However, split intensionality cannot help us to represent a de re reading paired with an ECT input time, as discussed here, as an ECT input time is only available if the DP scopes below the embedded tense. As the embedded tense scopes below the attitude verb and all of its lambda abstractors, there is no way for the DP to scope below the embedded tense (necessary for an ECT input time) and simultaneously above the attitude's lambda abstractor over worlds (necessary for a de re reading to be the result of local binding).

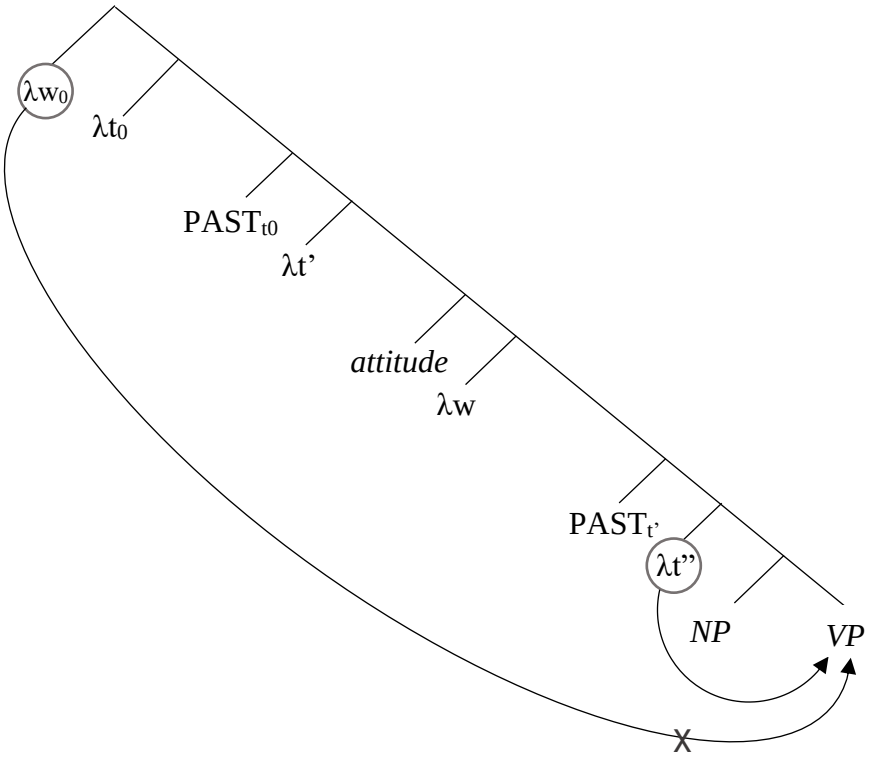
In a de re + ECT reading, as diagrammed in (59), it seems that a DP/NP is interpreted in situ, with its time argument locally bound and its world argument bound from a distance. If this is indeed the only way to arrive at a de re + ECT reading, it is a strong argument against the constraint proposed in (58).

However, it is worth noting that this option (a locally bound time argument and a long-distance bound world argument) is not available to all predicates. Following the Percus' (2000) generalizations in (51)-(52) – summarized in (57a-b) – a long-distance bound world argument is

[17] Thanks to Ethan Poole for pointing out that split intensionality allows us to make additional readings compatible with both local time binding and local world binding.

not available to clausal predicates or adverbs, schematized in (60) below. There is a clear divide in the data: long-distance binding of world arguments *appears* to be available to NPs and their modifiers[18] which occur in *movable* DPs, but it is not available to clausal predicates and adverbs, which must be interpreted in situ.[19]

(60)



It is conceivable that there might be two different sets of rules about world binding options: one for moveable predicates which allows long-distance binding and one for non-moveable predicates

[18] Via the Intersective Predicate Generalization, (54)/(57d).
[19] Likewise, Keshet's (2008) Generalization Z, rephrased in (53)/(57c), was motivated by data in which nominal predicates originated in the post-copular position of existential 'there' constructions – a position which block DP movement, as discussed in §2.1.1. He concludes that nouns in the post-copular position of existential 'there' constructions cannot have world arguments that are bound from a distance. This further supports the descriptive generalization that long-distance world binding can only affect *movable* constituents, even though the more generalized way that Generalization Z is phrased does not.

which requires local binding. However, I propose that the difference between (59) and (60) is better explained by a generalized locality constraint on the binding of world pronouns (i.e., the WALC, introduced in (58)), quantifier raising, and, most importantly, *semantic reconstruction*.

Theories of reconstruction, i.e., interpreting a DP in a low/pre-movement position, are often separated into syntactic and semantic reconstruction. There is evidence that both syntactic and semantic reconstruction are necessary to explain reconstruction effects, even within the same language (Keine & Poole 2018). In a case of syntactic reconstruction, a DP is interpreted exclusively at a low position rather than a high one.[20] A DP that has undergone syntactic reconstruction is interpreted low in every way, almost as if no movement had happened at all, so cases of syntactic reconstruction have no significant interaction with the generalizations of this dissertation. Semantic reconstruction, on the other hand, uses a higher-type trace to *effectively* interpret a moved DP in its previous location, while still keeping the actual copy higher in the LF.[21] While syntactic reconstruction involves interpreting the DP low in *every* way, semantic reconstruction does not. In fact, based on data from Hindi-Urdu, Keine & Poole (2018) claim that world pronouns must be bound based on the higher position of the DP, rather than the (comparatively low) position of the higher-type trace, even though the position of the trace determines other factors, such as the scope of the DP's quantificational force.

[20] There are many ways to say this: a higher copy is neglected, the DP moves upwards and then lowers back to a previous position, etc. Regardless of terminology and theoretical details, the DP is not semantically interpreted in any way in its higher position, making syntactic reconstruction irrelevant to point being made here.

[21] This is useful when the actual location of the DP in the LF is important for, e.g., Condition C connectivity (e.g., Sharvit 1998; Lechner 2013, 2019).

(61) *Higher-type traces cannot produce reconstruction for binding of world pronouns.*[22]

(Keine & Poole 2018:31)

This generalization highlights a derivation in which the de-re + ECT reading schematized in (59) *does* adhere to the WALC – namely a derivation in which the DP housing the target NP is moved above the attitude verb/intensional operator, leaving behind a complex trace of type <i,<<e,t>,t>>. Assuming only local binding, using the type <i,<<e,t>,t>> forces the final interpretation of the DP to involve a world argument bound by the lambda abstractor over worlds which most closely scopes over the raised DP and a time argument bound by the lambda abstractor over times which most closely scopes over the *trace* – i.e., the desired de-re + ECT reading.

(62) λw_0 [λt_0 [$PAST_{t0}$ $\lambda t'$ […DP(w_0) [$\lambda \mathcal{Q}_{<i,<<e,t>,t>>}$ […Op [λw [$PAST_{t'}$ $\lambda t''$ […$\mathcal{Q}$(t")…]]]]]]]]

This derivation uses a higher-type trace which produces reconstruction for the binding of the time pronoun. Thus, I could add on to Keine & Poole's generalization in one of two ways:

(63) *Higher-type traces cannot reconstruct for the binding of world pronouns, but they **can (optionally)** reconstruct for the binding of time pronouns.*

(64) *Higher-type traces cannot reconstruct for the binding of world pronouns, but they **must** reconstruct for the binding of time pronouns.*

---

[22] Their generalization actually reads: "*Higher-type traces cannot produce reconstruction for binding of **situation** pronouns"* (emphasis mine). They use "situation pronouns" to mean sub-parts of worlds, rather than world-time pairs (as we have seen that term used in other generalizations throughout the chapter). I use "world pronouns" here, with permission of the authors, to avoid confusion with the alternate type of "situation" pronoun discussed in §2.2.

The third logically available option, in which *higher-type traces cannot produce reconstruction for binding of world **or time** pronouns,* is ruled out in any theory which accepts the LF in (62).

If the stronger claim in (64) is correct, and higher-type traces *must* reconstruct for the binding of time pronouns, then the input time to any noun should always be coindexed with the lambda abstractor over times which most closely c-commands the noun's (DP's) *scopal* position. In loose terms, (64) predicts that the input time will always be bound by the nearest lambda abstractor over the noun's low position/trace, while (63) predicts that the input time could be bound by either the nearest lambda abstractor over the noun's low position/trace or the nearest lambda abstractor over the noun's high position. Both (63) and (64) predict that (62) is a possible LF, as (62) involves local binding of the input time based on the noun's *low* position.

To test which of (63) and (64) is more accurate, (65) provides a test sentence with a context which forces a non-specific, transparent reading (Fodor 1970; often called the "third reading") and a UT input time for 'a 100-year-old.' "Non-specific" means that the quantificational force of 'a 100-year-old' must scope below the intensional operator. "Transparent" means that the intensional status of 'a 100-year-old' scopes above the intensional operator; guaranteeing that syntactic reconstruction is not a viable strategy. Finally, a UT input time to '100-year-old' means that the higher-type trace must *not* reconstruct for the binding of the time pronoun (else the input time would be *t'*, as *λt'* is the lambda abstractor over times that most closely scopes over the trace).

A UT input time can only be based on the noun's higher position, therefore the stronger claim in (64), in which input times must be determined based on the position of the trace, predicts that

(65c) is *not* a possible LF. The weaker claim in (63) predicts that (65c) *is* a possible LF.[23] Either outcome contributes a valuable piece of information about semantic reconstruction.

(65) a. ***Context:***

In 1960, Laarni wanted to meet a member of her favorite band, although she didn't care which member. All of those members are 100 years old now, although Laarni may or may not know this.

b. Third reading (non-specific, transparent) + UT:

(In 1960,) Laarni wanted to meet a 100-year-old.

c. Hypothetical LF:

λw_0 [λt_0 [DP(w_0)(t) [$\lambda \mathcal{Q}_{<<e,t>,t>}$ [$PAST_{t0}$ $\lambda t'$ [… Op [λw […$\mathcal{Q}$…]]]]]]]

Unfortunately, I do not supply a judgment or a final answer here, as the judgments for examples of this type seem to be complicated enough to consistently elicit a variety of answers. I invite other linguists to explore this data and come to one of the conclusions mentioned above.

In the end, the question of whether or not higher-type traces must reconstruct for the binding of times is interesting but separate from the original question of this section: are world arguments, like time arguments, subject to a locality constraint? This dissertation is not the place for the lengthy discussion this question deserves, but the brief examination provided here shows that such a hypothesis is possible, and perhaps even likely. Most importantly, I have demonstrated that a

[23] Note that (63) predicts that there are two possible types for higher-type traces: <i,<<e,t>,t>>, which reconstructs for times as in (62), and <<e,t>, t>, which does not reconstruct for times, as in (65c).

world locality constraint is compatible with a temporal locality constraint, which may not be immediately obvious.

5. Conclusion

Much of the classical work on the temporal interpretation of nominal predicates (Enç 1981, 1986; Musan 1995, 1999; Tonhauser 2002, 2006, 2020) is unified by the claim that the position of nominals relative to the scope of sentential tense operators has little or nothing to do with the property times of those nominals. Contrary to this foundational assumption, I argue here that a scope-based analysis of tense is, in fact, an ideal way to account for the temporal interpretation of nominal predicates.

Previous works have established that the input times of many predicates are bound by the nearest lambda abstractor over times (e.g., Percus 2000, Ogihara 2003, Keshet 2008). In this chapter, I demonstrated that nominal input times are also locally bound, and that any temporal ambiguity is easily accounted for by an appeal to quantifier raising. Support for the claim that nominal input times are locally bound comes from existential 'there' constructions and de dicto readings; when the noun's location in the LF is predictable, the noun's input time is also predictable. A locality constraint accounts for many of the data points from previous literature in the field of nominal property times, especially Musan's (1995, 1999) discussions of syntactic environments (notably, existential 'there' constructions) which force temporal dependence on the time defined by the tense.

Given the evidence for local binding constraints on the input times of nouns, verbs, adverbs, adjectives, prepositional phrases, participle phrases, and relative clauses, I propose that the input

times of *all* predicates are bound by the nearest lambda abstractor, summarized here in a generalized locality constraint:

(66) **Temporal Locality Constraint** (TLC)

The input times to any predicates introducing novel referents must be bound by the nearest lambda abstractor over times.

It is conceivable that this constraint could be generalized to all input times – including the input times to tenses. Similar accounts of tenses have been proposed for the tenses of relative clauses (e.g., Abusch 1988 for English; Ogihara 1989, 1996 for Japanese) and the tenses of embedded clauses (e.g. Absuch 1994, Heim 1994). I leave the potential expansion of the TLC to all input times to future work.

Also discussed were the implications of this locality constraint for the universal nature of pronouns, the binding of world pronouns, and semantic reconstruction. No doubt there are many other areas of semantic theory upon which the Temporal Locality Constraint can shed further light.

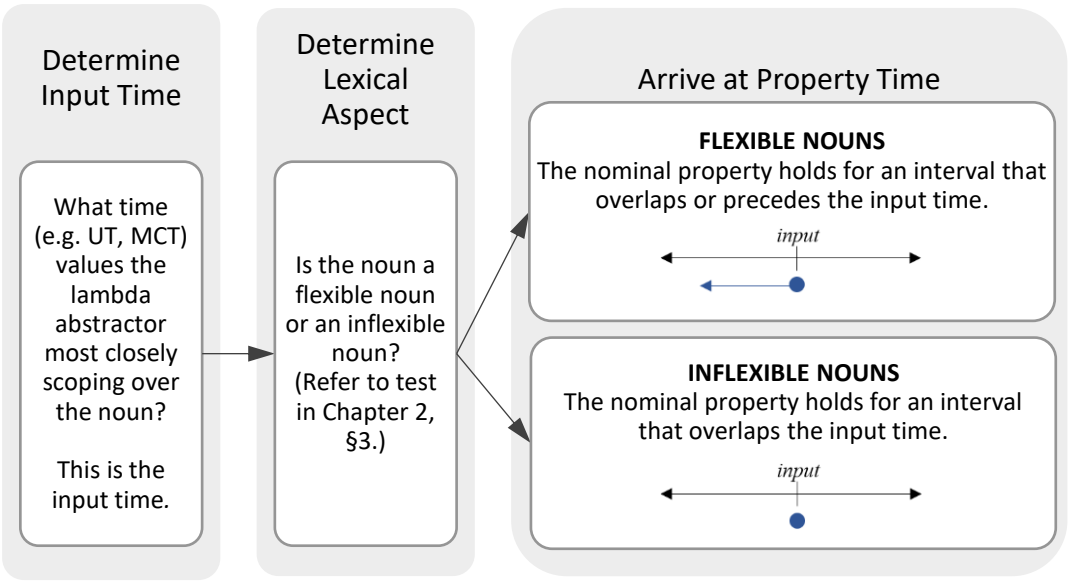
CHAPTER 4

THE EFFECTS OF NOVELTY AND FAMILIARITY ON PROPERTY TIMES

1. Introduction

Let me begin this chapter by summarizing what has been said in this dissertation thus far. In Chapter 2, I claim that nouns have an inherent lexical aspect – their property times are determined as a *function* of their input times, rather than as a direct reflection of their input times. In Chapter 3, I propose that the input times to all predicates which introduce novel referents, including nouns, are locally bound by the nearest lambda abstractor over times based on the predicate's position in the LF. A summary of the way in which Chapters 2 and 3 propose that nominals arrive at their property times is illustrated in the flow chart in (1):

(1) Determining the property time of a nominal predicate introducing novel referents:



Chapters 2 and 3 examine the property times of predicates which introduce *novel* referents. In this chapter, I discuss how property times are determined for predicates which refer to *familiar* referents. I propose that the property times for such predicates are, for the most part, inherited from the first use of the same predicate earlier in the discourse, when it was first used to introduce the then-novel referent.

§1.1 lays out the basic data, showing that predicates which introduce novel referents and predicates which refer to familiar referents must arrive at their property times via different mechanisms. §2 describes an account from Tonhauser (2006) based in Discourse Representation Theory, layering her theory about the property times of predicates which refer to familiar referents on top of my theory about the property times of predicates which introduce novel referents (as introduced in my Chapters 2 and 3). In §3, I present more complex data which force a modification to that system. I end by emphasizing the theoretical desiderata for any future accounts of this data (§4).

1.1 Core data

Thus far in this dissertation, we have only discussed sentences such as (2), in which a predicate occurs under an indefinite determiner. We have yet to discuss sentences such as (3), in which a predicate occurs under a definite determiner.

(2) A bachelor is happy.

(3) The bachelor is happy.

The referent of 'bachelor' in (2) is novel to the discourse, signaled by the indefinite determiner 'a' (Heim 1982). (3) presents (2)'s definite counterpart, in which 'bachelor' refers to a referent familiar to the discourse,[1] licensing the definite determiner 'the.'[2]

The temporal interpretation of 'a bachelor,' a DP which can be used out of the blue to introduce a novel referent, is governed by nominal lexical aspect (Ch. 2) and the Temporal Locality Constraint (TLC; Ch. 3). When 'a bachelor' is paired with the verbal predicate '[be] married' (a property which cannot simultaneously hold of the same entity as 'bachelor') in a present tense sentence, 'bachelor' and 'married' obligatorily hold for overlapping intervals, resulting in a contradiction.

(4) # A bachelor is married.

[1] When I say that a predicate "introduces novel referents" or "refers to familiar referents," I mean that it characterizes a set novel to the discourse or characterizes a set familiar to the discourse, respectively. I am not alone in treating predicates as referring; Heim (1982, 1983), for instance, places indices on predicates rather than on determiners. As we will see in this chapter, it will become crucial to be able to discuss the familiarity and novelty of the sets characterized by predicates rather than the familiarity and novelty of the referents of determiner phrases.

[2] Definiteness can be licensed by either familiarity or by uniqueness (e.g., Schwarz 2013). Definites licensed by uniqueness are discussed in §3.3.

This contradiction is predicted from the status of ‘bachelor’ as an inflexible noun, meaning that its property time must overlap its input time, and from the TLC, which says that the noun’s input time will be the nearest time abstraction. In a present tense sentence, where the interval defined by the sentential tense overlaps the utterance time, this means that an inflexible noun’s property time will always overlap the utterance time.

Meanwhile, the same sentence with ‘the bachelor’ (which is only licensed as part of a larger context and must refer to a familiar referent) does not exhibit the same contradiction:

(5) My best friend while I was in college was a bachelor. I saw him again recently. The bachelor is married.

If the temporal interpretation of the familiar instance of ‘bachelor’[3] were affected by nominal lexical aspect and the TLC, then the last sentence of (5) ought to be just as contradictory as (4). Instead, the familiar instance of ‘bachelor’ is interpreted at the same time as (5)’s novel instance of ‘bachelor’ – the time at which the speaker was in college. It would seem that the property time of the novel use of ‘bachelor’ (which is affected by nominal lexical aspect and subject to the TLC) establishes the property time for the familiar instance of ‘bachelor’ as well.

This effect, in which a nominal referring to a familiar referent ‘inherits’ the property time of a nominal which refers to a novel referent earlier in the discourse, can also be seen in cases where there is no potential for a contradiction:

[3] For the sake of brevity, I will sometimes use “the familiar instance of ___” to mean “the instance of ___ which refers to a familiar referent” and “the novel instance of ___” to mean “the instance of ___ which introduces a novel referent.”

(6) When I studied abroad in the 90's, I only made two friends – a 20-year-old and a 32-year-old. Last year, the 20-year-old came to visit me in California!

As with the two instances of 'bachelor' in (5), the familiar instance of '20-year-old' in (6) inherits its property time from the novel instance of the same predicate. 'The 20-year-old' is therefore interpreted as 20 years old at the time of the speaker studying abroad, rather than at the time of visiting California or at the utterance time.

It is clear that the property times of nominal predicates referring to familiar referents are not derived from lexical aspect and the TLC in the way that the property times of novel-referent-introducing predicates are. Instead, *nominal predicates referring to referents familiar to the discourse inherit a property time established by a prior use of the same predicate within the discourse.*[4]

In §2, I describe and adopt Tonhauser's (2006) account of this phenomenon, layering her account of how the familiar instance of a nominal predicate can inherit the property time of a

[4] Importantly, the initial, novel-referent-introducing use of the predicate may have any of a variety of property times, as long as those property times are compliant with the parameters laid out in Chapters 2 and 3. Whatever property time is established for the initial use will be inherited by any later uses of the predicate. The nominals discussed in (5) and (6) both have property times that overlap the MCT of the sentence in which they were initially introduced, but it is equally acceptable for a noun to have a property time which overlaps UT of sentence in which it is initially introduced, and for that UT-overlapping property time to be inherited by later uses of the predicate. For instance, in (i), the nominal predicate '15-year-old' establishes a property time which overlaps the UT in the first sentence, and the same property time is used for '15-year-old' in the second sentence.

(i) A 15-year-old received a bike around 10 years ago. The 15-year-old turned five years old that day.

For the most part, I do not bother including data in which a property time is defined by overlapping the UT, as it is very difficult to show definitively that the second use has inherited its property time. Since the UT is (effectively) the same for the first and second sentences of (i), the UT-overlapping property time would be available to the second instance of '15-year-old' no matter whether it inherited its property time or had its own locally bound UT input time.

previous instance of the predicate over my theory of how the novel instance of the predicate originally arrives at a property time.

1.2 The relevance of nominal lexical aspect

As with local binding effects in Chapter 3, inflexible nouns will once again be the clearest way to observe the effect described in this chapter. In (5) and (6), repeated below, the familiar instances (underlined) of two inflexible nouns, 'bachelor' and '20-year-old,' are interpreted at the same time as their novel counterparts – a time that precedes both the main clausal time (MCT) and the utterance time (UT) of the sentences in which they occur. Thus, they are effectively read as 'the former bachelor' and 'the former 20-year-old' – a reading that is not usually available to inflexible nouns (see Ch. 2).

(5) My best friend while I was in college was a bachelor. I saw him again recently. The bachelor is married.

(6) When I studied abroad in the 90's, I only made two friends – a 20-year-old and a 32-year-old. Last year, the 20-year-old came to visit me in California!

Flexible nouns, on the other hand, always have an available reading in which the noun is interpreted as 'former ___' (see Ch. 2). If 'bachelor' and '20-year-old' in (5) and (6) were replaced with flexible nouns, it would be unclear whether a 'former ___' reading ought to be attributed to familiarity (as in (5) and (6)) or flexibility (as in Ch. 2). For instance, in (7), 'a doctor' (a flexible noun introducing a novel referent) is interpreted as 'a former doctor,' holding over an interval prior to both the visiting time and the utterance time. 'Doctor' can likewise be interpreted as 'former doctor' when referring to a familiar referent in (8), again holding prior to both the visiting and

utterance times. However, given that ‘former doctor’ was already an available interpretation of ‘doctor’ based on lexical aspect alone, it is difficult to definitively conclude that the definiteness in (8) is changing the temporal interpretation in any way, unlike in (5) and (6), where the effects are clear.

(7) A doctor came to visit me after she retired.

(8) When I studied abroad in the 90’s, I only made two friends – a doctor and a lawyer. Last year, the doctor came to visit me in California after she retired.

However, it *is* possible to show definitively that flexible nouns referring to familiar referents likewise inherit their property time from a previous, novel usage. If the sentence involves a future tense, the property time established by a novel instance of the nominal predicate can be one that is in the future of the utterance time (see Ch. 2 for discussion of all of the property times available in sentences with various tenses). Using a context in which the inherited property time leads to a ‘future ___’ reading removes any confounds from the effects of flexibility as neither flexible nor inflexible nouns are expected to have ‘future ___’ readings relative to both MCT and UT.

To demonstrate this point, in (9), the novel instance of ‘fugitive’ establishes a property time that overlaps a reference point ‘in ten years.’ The familiar instance of ‘fugitive’ in the second sentence of (9) inherits this property time and is therefore effectively interpreted as ‘the future fugitive’ (relative to both the UT and the MCT of the sentence it occurs in) – an interpretation that would not otherwise be available to the predicate ‘fugitive.’

(9) In ten years, Nguyen will meet a fugitive who will be on the run *at that time*. The fugitive is a lawyer right now and has not yet committed any crimes or been arrested.

(10) #A fugitive is a lawyer right now and has not yet committed any crimes or been arrested.

If the familiar instance of 'fugitive' in (9) were to have a property time derived from lexical aspect and the TLC, the property time would have to overlap or precede the UT. Such an interpretation leads to a contradiction, as we see in (10), where the property time of a novel instance of 'fugitive' *is* calculated based on nominal lexical aspect and the TLC. Instead, the familiar instance of 'fugitive' in (9) describes a property that holds ten years in the future of the UT and the MCT of the sentence it occurs in because its property time is inherited from the novel instance of 'fugitive' within the same discourse. The effects seen here are the same as those demonstrated for inflexible nouns in (5) and (6); the examples above show that both flexible and inflexible nouns, when referring to a referent familiar to the discourse, inherit their property times from an earlier instance of the same predicate which first introduced the referent into the discourse. However, as with the data in Chapter 3, it is significantly easier to observe these effects with inflexible nouns, as in (5) and (6), than with flexible nouns, as in (9). Wherever new data is introduced in this chapter, I will use inflexible nouns.

2. Tonhauser 2006

In §1, I showed that when two copies of the same nominal predicate occur in the same discourse, referring to the same referent, the two copies of the predicate will share the same property time. This property time is established based on the local binding of the input time of the initial, *novel* instance of the predicate and is then inherited by the familiar instance of the predicate. Tonhauser (2006) provides a Discourse Representation Theory (DRT) account for this property time

inheritance phenomenon. In this section, I present her theory and implement it in conjunction with the theories from Chapters 2 and 3 of this dissertation.

2.1 Differing assumptions regarding nominals introducing novel referents

Before giving the details of Tonhauser's account of property time inheritance, I will first give a brief description of the differences in our theories regarding the temporal interpretation of nominals which introduce novel referents.

To recap my account, in Chapters 2 and 3, I argue (a) that these nouns have an inherent lexical aspect which relates an *input* time argument to the noun's *property* time (Ch. 2) and (b) that those input times must be locally bound by the nearest time abstraction (TLC, Ch. 3).

Tonhauser claims that for *every* nominal predicate (both novel and familiar uses) an anaphoric time t_n is introduced, which must be resolved (2006:85). Assuming that the predicate denotes a state rather than an event, t_n represents a subset of the interval over which the state is true, written $t_n \subseteq \tau(s)$). τ is "a 1-place functor…from eventualities or individual discourse referents to times…adapted from Krifka's (1989) temporal trace function which maps eventuality discourse referents to the time at which the eventuality is true" (Tonhauser 2006:58). Effectively, $\tau(s)$ defines the interval over which some state *s* holds, equivalent to what I have been calling the 'property time' of stative predicates. (11) specifies the resolution of the anaphoric t_n:

(11) **Constraint on the Resolution of t_n**

The nominal time t_n is the topic time t_{top}, unless the discourse context supports an alternative resolution of t_n.

(Tonhauser 2006:89)

In some ways, the "anaphoric time t_n" is very similar conceptually to my "input time," in that both are time arguments coindexed with other times in the sentence or discourse, and both provide an anchor point by which the property time of a stative predicate is determined. That is, in both systems nominal property times are defined as intervals which bear a certain relationship to either t_n or an input time. In Tonhauser's model, the nominal property time is always assumed to overlap the time that anchors it (t_n), while in my model nominal property times overlap the anchoring time (the input time) if inflexible, or overlap or precede if flexible.

The most important difference between t_n and input times is that t_n is a discourse anaphor, while the input times I have discussed thus far are locally bound. Thus, (all) nominal predicates in Tonhauser's model have property times anchored to a time from the larger discourse, while nominal predicates in my model (at least the ones which introduce novel referents) have property times anchored to some other time in their utterance (e.g., the UT or the MCT). While these two models clearly have significant differences, they will sometimes produce the same result: the MCT is often equivalent to the topic time, which means that a topic time t_n and an MCT input time would produce the same anchor by which the nominal property time would be determined.

In Tonhauser (2006), all nouns arrive at their property times in the same way – a discourse anaphoric t_n subject to (11). In this chapter, I adopt this approach exclusively for nominal predicates referring to familiar referents, as we will see that her model makes it simple for the t_n of a familiar instance of a noun to be anaphoric to the t_n of a novel instance of the same predicate earlier in the discourse – our main goal for this chapter. However, I maintain that novel instances of nominal predicates arrive at their property times via a locally bound input time which then interacts with nominal lexical aspect (as in Chapters 2 and 3). In order to model the TLC in DRT,

I adopt the use of t_n as an input time for all nominal predicates. For novel instances of nominal predicates, I assume t_n to be locally bound by the UT or the MCT, per the TLC of Chapter 3.

2.2 Discourse Representation Theory

Tonhauser's account is built using the dynamic semantic system Discourse Representation Theory (DRT; e.g., Kamp 1981, Kamp & Reyle 1993, Kamp et al. 2011). In this chapter, I assume some familiarity with DRT, but will nevertheless give a brief overview of the format that I will be using. (Readers wishing to learn more about DRT should consult Kamp & Reyle (1993) and Kamp et al. (2011).)

In DRT (as in many dynamic semantic systems), discourse participants have *information states* which encode what they take to be true, possible, desirable, etc. in the world. Each utterance updates the discourse participants' information states, and therefore the meaning of an utterance comprises its *update potential*.

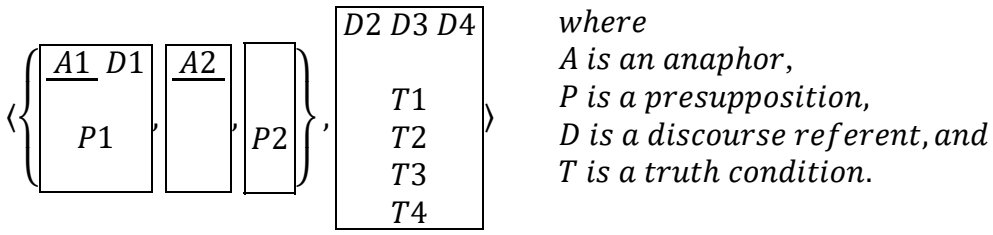
DRT uses Discourse Representation Structures (DRSs) to represent the information present in either an utterance (its update potential) or a discourse context (i.e., information state). Generally, a DRS is constructed for a single utterance before being added to the larger discourse context. In the process of embedding the meaning of an utterance within the discourse context, the presuppositions and anaphoric elements of the utterance are resolved.

Each DRS (in the manner in which they will be composed in this chapter) is comprised of an ordered pair (e.g., van der Sandt 1992, Kamp 2001), wherein the first element is a (possibly empty) set of presuppositions,[5] which may contain (possibly anaphoric) discourse referents and

[5] For some authors, each presupposition may consist of a full DRS, composed of an ordered pair where the left-most element is a further embedded presupposition (see Kamp 2001, Kamp et al. 2011). Following

presupposed content, and the second element contains a (possibly empty) set of discourse referents and a set of truth conditions. In this chapter, I use the term "conditions" as a catch-all term for presuppositions and truth conditions. Note that anaphoric discourse referents, for which "the context must provide a suitable value" (Kamp et al. 2011:264), are underlined, while non-anaphoric discourse referents are not.

(12) General structure of a DRS



In the process of embedding the DRS of a given utterance into the discourse context, the presuppositions and anaphora are first resolved, and then the discourse referents and truth conditions are added to the discourse context DRS to make a single, new discourse context. Intuitively, "a DRS is true provided we can find individuals for each of the discourse referents in its universe in such a way that the conditions which the DRS contains for particular discourse referents are satisfied by the corresponding individuals" (Kamp & Reyle 1993:73).

I will only be using the aspects of this system that are directly relevant to the theoretic questions at hand, namely those pertaining to tense, temporal interpretation, and definiteness. To show some of these, a sample derivation:

Tonhauser (2006), I adopt a simplified list-based representation of presuppositions here based on the needs of this chapter.

(13) a. Galilea was hungry.

b. Utterance DRS $K_{1.1}$:

$$K_{1.1}: \langle \left\{ \boxed{\begin{array}{c} t \\ \hline t < UT \end{array}} \right\}, \boxed{\begin{array}{c} g\ t_{top}\ s\ UT \\ \\ Galilea(g) \\ hungry(s,g) \\ t \subseteq \tau(s) \end{array}} \rangle$$

c. Presupposition and anaphor are resolved in DRS $K_{1.2}$:

$$K_{1.2}: \langle \{\}, \boxed{\begin{array}{rc} 1 & g\ t_{top}\ s\ UT\ t \\ \\ 2 & Galilea(g) \\ 3 & hungry(s,g) \\ 4 & t \subseteq \tau(s) \\ 5 & t = t_{top} \\ 6 & t < UT \end{array}} \rangle$$

d. Fully resolved discourse context DRS $K_{1.3}$:

$$K_{1.3}: \langle \{\}, \boxed{\begin{array}{c} g\ t_{top}\ s\ UT \\ \\ Galilea(g) \\ hungry(s,g) \\ t_{top} \subseteq \tau(s) \\ t_{top} < UT \end{array}} \rangle$$

(13b) provides a representation of the anaphors, presuppositions, discourse referents, and truth conditions of the sentence in (13a); (13c-d) show incremental steps in the resolution of its meaning into a null context. In (13c), I have included line numbers so that I can more easily refer to specific content in prose. Although they are not traditionally a part of DRT, line numbers will be used periodically throughout this chapter.

In the DRS $K_{1.1}$ in (13b), the sentence of (13a) introduces a number of discourse referents: the entity by the name of Galilea (*g*), the topic time (t_{top}), a state (*s*), and the utterance time (*UT*).[6] The past tense introduces an anaphoric time *t*, which is presupposed to precede the utterance time. The utterance asserts that the predicate 'hungry' holds of *g* over state *s* and that the anaphoric time *t* is a subinterval of the interval over which the state *s* holds ($\tau(s)$).

In (13c)'s DRS $K_{1.2}$, the anaphoric time *t* has been resolved to the topic time in line 5 (Tonhauser 2006:61). After *t* is resolved, the presupposition that *t* precedes the utterance time ($t < UT$) merges with the truth conditions in line 6.

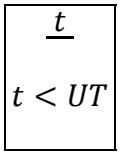
In the fully resolved (discourse context) DRS $K_{1.3}$, the equivalence between *t* and t_{top} means that any reference to *t* can be replaced with the more informative t_{top}. *t* is removed from the DRS altogether.

2.2.1 The treatment of tense

The past tense in (13) is presented in a very different manner than tenses were treated in Chapters 2 and 3. In Chapters 2 and 3, the past tense was presented as an existential quantifier (i.e., 'there exists a time *t* such that *t* precedes the UT…"). In DRT, however, tenses are treated as pronouns (e.g., the past tense introduces a variable *t* which is presupposed to precede the UT). Note that the contribution of tense to the DRS in (13b) was the anaphoric discourse referent *t* and a presupposition that *t* preceded the UT.

[6] The utterance time (as a discourse referent) is represented as "now" in Tonhauser (2006) and as "n" in Kamp & Reyle (1993), Kamp (2001), and Kamp et al. (2011). I use "UT" in order to maintain maximum consistency with the preceding chapters.

(14) The past tense contributes the following to the presuppositional structure:



I adopt the pronominal approach in this chapter, as that is what is standard within DRT (see Kamp et al. 2011:§3.5). I adopt DRT because Tonhauser's (2006) DRT account is the only theory I know of which accounts for the phenomenon of property time inheritance.

A benefit of adopting such a different theory of tense is that the analyses of nominal property times which I propose in Chapters 2 and 3 are shown to be compatible with systems other than those they were built for. That being said, there are a handful of issues involved in modeling the locality constraint of Chapter 3 in DRT which need to be discussed at this juncture.

The locality constraint presented in Chapter 3 relies heavily on the scopal nature of quantificational tenses – nominal input times are locally bound based on the nearest lambda abstractor over times which scopes over them. Transitioning from that model to a pronominal tense model may seem daunting; however, many authors have claimed that quantificational tenses and pronominal tenses are not all that different and that, with small adaptations, they can model the same data (e.g., Bäurle 1977, Partee 1984, Ogihara 1996, Ogihara & Kusumoto 2020). At a base level, both quantificational and pronominal tenses in some way prescribe a relationship between two time, including presupposing that relationship, as in (14); see Sharvit (2013:12) for denotations and further discussion of similarities between quantificational and pronominal tenses. The main differences in use between quantificational and pronominal tenses tend to be matters of convenience; for instance, quantificational tenses lend themselves more easily to issues of scope

(as in my Chapter 3), while pronominal tenses can be more easily used to model the anaphoric behaviors of tenses (e.g., Partee 1973).

For our purposes, the main problem with pronominal tenses is that they lack the clear notion of scope granted to us by quantificational tenses, which was harnessed in Chapter 3 to guarantee that nominal input times were bound by the *nearest* time (in some dynamic systems, this might correspond to the *most recently introduced* time). At the core, the main desideratum was to privilege that specific time variable such that it could be picked out as the proper antecedent for a nominal input time – any system which can specify the proper antecedent to the nominal input time would work equally well for our purposes.

A dynamic theory that privileges temporal pronouns in such a way was mentioned briefly in §3.3 of Chapter 3: Bittner's (2014) "centering" system. In this system, one argument of each atomic semantic type is "top-ranked" and stored in the "center of attention." A system such as this would store just the most recently introduced time variable in the center of attention and it would not be a far reach to assume that only the top-ranked time variable was available to predicates in need of an input time argument. As new time variables are introduced into the derivation, such as by tenses, the "top-ranked" time variable would be replaced, allowing the UT to be privileged at one point, then the MCT, and so on, such that, when the nominal predicate entered the derivation, the correct antecedent to its input time would have been the time variable most recently assigned to the "top-ranked" position. This would produce the same input times that a scopal theory afforded us without a need for quantificational tenses.

DRT, to my knowledge, does not have a way of ordering variables or privileging the most recently introduced variable, but it certainly *could*. Some of the works in which DRT is used show that DRSs have the potential to be composed compositionally from an LF/syntactic tree, with each

node making a contribution to the DRS in turn (Kamp & Reyle 1993, Tonhauser 2006:Appendix A). None of the works that have proposed that DRSs are built in such a way have had any reason to attempt to model a locality constraint, so, to my knowledge, no compositional version of DRT yet exists which is adequate to account for the TLC. Nonetheless, in a system where DRSs are built in a fully compositional manner, a centering-like privileging of certain variables seems possible to implement and would, as described above, result in effectively the same benefits as a scopal system.

I do not design nor implement such a system here, as this chapter is meant to account for property time inheritance by predicates referring to familiar referents, and not the locally bound input times of predicates introducing novel referents. However, I do assume that locally bound input times would be reconcilable with a pronominal system such as DRT, for the reasons described here.

2.3 Singular DPs

Tonhauser (2006) defines a system for a nominal referring to a familiar referent to inherit a property time from a nominal which introduced a novel referent earlier in the discourse. In this section, I walk through her model by deriving the DRS for the following discourse:

(15) A teenager was here. The teenager was happy.

To arrive at the final (discourse context) DRS, the (update potential) DRS of each individual sentence must first be computed. The first sentence is not drastically different from the sample that was given in (13). The predicate ‘hungry’ is replaced with the predicate ‘be here’ (the indexical nature of ‘here’ will be ignored), but the tense and the simplicity of the syntax remain the same.

The most significant difference between (13a) and (15) is that the subject in (15) is comprised of the indefinite determiner 'a' and a nominal predicate, rather than a proper name.

In Tonhauser's system, a nominal predicate adds four items to the DRS: a state, (16a); the nominal property, (16b), which holds over the newly introduced state;[7] an anaphoric time t_n, (16d); and a truth condition, (16c), that the anaphoric time t_n is within the interval over which the state holds. As an anaphor, t_n must be resolved to some time in the context. These additions are represented in the following definition, which will be continuously updated throughout this chapter:

(16) Nominal predicate additions to the DRS (*version 1 of 5*):

a. a new discourse referent *s* (a state)

b. the truth condition $\boxed{p(s,u)}$ where *p* is the property denoted by the noun

c. the truth condition $\boxed{t_n \subseteq \tau(s)}$

d. the anaphoric discourse referent $\boxed{\underline{t_n}}$ to the presuppositional structure

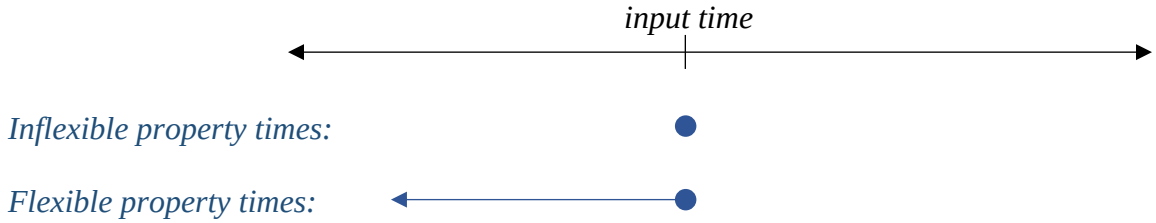
(adapted from Tonhauser 2006:385)

As mentioned in §2.1, I take t_n to be effectively equivalent to what I have been calling the "input time" throughout this dissertation. According to the truth condition added to the DRS by (16c), the interval over which the nominal property holds must contain this time. This correctly describes the

[7] This property holds of a discourse referent *u*. In the system used by Tonhauser (2006), this discourse referent is introduced by the DP which the predicate occurs in, to be discussed shortly.

relationship between the input time and property time of an inflexible noun, but does not accurately describe the relationship between the input time and the property time of a flexible noun. Recall that an inflexible noun must hold for an interval containing its input time, while a flexible noun may hold either for an interval containing its input time or for an interval entirely preceding its input time:

(17)



To reflect this variation in nominal lexical aspect, I modify line (c) of (16), provided in (18) below. The new entry offers a truth condition specifically for flexible nouns, in which interval over which the state holds may overlap the input time t_n or precede it (denoted by the operator '$\leq$').[8] When not dealing with a flexible noun, Tonhauser's original truth condition is used.[9]

[8] To use only the operators defined in Tonhauser (2006), the addition to line (c) would have to be stated disjunctively: "the truth condition $\boxed{\left[t_n \subseteq \tau(s)\right] \vee \left[\tau(s) < t_n\right]}$ if the predicate is flexible, else $\boxed{t_n \subseteq \tau(s)}$"

[9] In Chapter 2, I discussed the fact that we could model flexibility and inflexibility either as part of the denotation of the noun or as independent operators. I opt for the former here, assuming (18) to be a condensed version of two different DRT "denotations" – one for flexible nouns and one for inflexible nouns. If flexibility and inflexibility were treated as independent operators, the only real difference is that the truth conditions in (18c) and the anaphoric discourse referent of (18d) would not be part of the "Nominal predicate additions to the DRS." Instead, (18c) and (18d) would be housed in two new definitions, "Additions of flexibility to the DRS" and "Additions of inflexibility to the DRS."

(18) Nominal predicate additions to the DRS (*version 2 of 5*):

a. a new discourse referent *s* (a state)

b. the truth condition $\boxed{p(s,u)}$ where *p* is the property denoted by the noun

c. the truth condition $\boxed{\left[\tau(s) \leq t_n\right]}$ if the predicate is flexible, else $\boxed{t_n \subseteq \tau(s)}$

d. the anaphoric discourse referent $\boxed{\underline{t_n}}$ to the presuppositional structure

This definition is used in the process of creating a DRS for the first sentence of (15), in conjunction with the contribution of the indefinite determiner phrase, given in (19).

(19) Indefinite DP additions to the DRS (*version 1 of 2*):

a. a new discourse referent *u* (an individual)

(adapted from Tonhauser 2006:384)[10]

DRSs showing incremental stages of resolution of the first sentence of (15) are given in (20) below. (20b) provides the unresolved DRS for the utterance, in which both anaphoric times – the nominal input time t_n and the time *t* defined by the past tense – are unresolved. (Note that the nominal predicate 'teenager' is inflexible, and therefore the DRS includes the truth condition $\boxed{t_n \subseteq \tau(s)}$, as specified in (18c).) In (20c), both t_n and *t* are resolved to the topic time in lines 4 and 7,

[10] Indefinite DPs in Tonhauser's model additionally add the presupposition $\boxed{novel(u)}$, to ensure that the discourse referent *u* introduced by the indefinite DP is not co-referent with any previously mentioned discourse referents. This presupposition is generally resolved in the first step of any DRS resolution without leaving any trace, so I have excluded it altogether for the sake of simplicity, despite its importance.

respectively (Tonhauser 2006:61,89), although only *t requires* a t_{top} resolution (discussed below). (20d) provides the fully resolved discourse context into which the next sentence of the discourse will be uttered; superfluous variables have been removed.

(20) a. A teenager was here.

b. Utterance DRS $K_{1.1}$:

$$K_{1.1}\colon \left\langle \left\{ \begin{array}{|c|}\hline t \\ \hline t < UT \\ \hline \end{array}, \begin{array}{|c|}\hline t_n \\ \hline \\ \hline \end{array} \right\}, \begin{array}{|c|}\hline y\ t_{top}\ s\ s_1\ UT \\ \hline teenager(s,y) \\ t_n \subseteq \tau(s) \\ be\text{-}here(s_1,y) \\ t \subseteq \tau(s_1) \\ \hline \end{array} \right\rangle$$

c. Presupposition and anaphora are resolved in DRS $K_{1.2}$:

$$K_{1.2}\colon \langle \{\}, \begin{array}{rc} 1 & \begin{array}{|c|}\hline y\ t_{top}\ s\ s_1\ UT\ t_n\ t \\ \hline \end{array} \\ 2 & teenager(s,y) \\ 3 & t_n \subseteq \tau(s) \\ 4 & t_n = t_{top} \\ 5 & be\text{-}here(s_1,y) \\ 6 & t \subseteq \tau(s_1) \\ 7 & t = t_{top} \\ 8 & t < UT \end{array} \rangle$$

d. Fully resolved discourse context $K_{1.3}$:

$$K_{1.3}\colon \langle \{\}, \begin{array}{|c|}\hline y\ t_{top}\ s\ s_1\ UT \\ \hline teenager(s,y) \\ t_{top} \subseteq \tau(s) \\ be\text{-}here(s_1,y) \\ t_{top} \subseteq \tau(s_1) \\ t_{top} < UT \\ \hline \end{array} \rangle$$

As shown in the previous chapter, assuming freedom of movement within the LF, 'teenager' can have either an MCT (t_{top}) input time or a UT input time. In (20c), I chose to resolve the nominal input time t_n to the topic time (line 4) in order to more closely mirror the examples used in Tonhauser (2006). However, in line with the previous chapter, t_n could have just as easily have been resolved to the utterance time – both t_{top} and *UT* are listed among the discourse referents in the DRSs above and are therefore available as potential antecedents. It is important that both t_{top} and *UT* be available as antecedents in order to match the empirical data discussed in the previous chapters.

The other anaphoric time, *t*, could only be resolved to t_{top}; *t* is presupposed to properly precede *UT*, thereby leaving t_{top} as the only viable antecedent.

The second sentence of the discourse (repeated below) holds new challenge: a nominal within a definite DP referring to a familiar referent.

(15) A teenager was here. The teenager was happy.

While an indefinite DP added a non-anaphoric discourse referent, a definite DP adds an anaphoric discourse referent; this definition is given in (21) below. It is worth noting at this point that the familiar, anaphoric nature of 'the teenager' is attributed to the definiteness of the DP in this model; the referent of 'the teenager' will be identified with some previously established referent *because* it appears in a definite DP. Earlier in this chapter, I took a different approach, attributing familiarity to the predicate, rather than to the DP. Since familiarity is one of the features that licenses definiteness, we will always see definiteness when familiarity is present. However, definites can be licensed by things other than familiarity (such as uniqueness; e.g., Schwarz 2013), so we cannot assume that all definite DPs are referring to familiar referents. For the moment, we will continue

to adopt Tonhauser's (2006) model as written, which will produce the same results as long as we continue to only look at definites licensed by familiarity, as in (15). In §3, I will discuss whether we might want to modify this model so that familiarity (and therefore anaphoricity to a previously mentioned referent) is attributed to the predicate, rather than to the definiteness of the DP.

(21) Definite DP additions to the DRS (*version 1 of 2*):

a. a new anaphoric discourse referent *u* (an individual) to the presuppositional structure

(adapted from Tonhauser 2006:384)[11]

I follow Kamp et al. (2011) in assuming that the nominal content embedded under a definite determiner is presupposed rather than asserted;[12] since the predicative material under a definite determiner is used to identify the antecedent of the anaphoric discourse referent, that information is included as a presuppositional constraint on *u* (in much the same way that the presupposition provided by the past tense was a constraint on *t* in the examples above).

Thus, the predicative content supplied by the nominal appears in the presuppositional structure when occurring under a definite DP, but remains on the non-presuppositional side of the DRS when embedded under an indefinite DP. The contributions of a nominal predicate are updated in (22) to reflect this, clarifying that the first three elements contributed by the nominal predicate fall into place wherever the discourse referent defined by the DP is located.

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[11] Definite DPs in Tonhauser's model add both an anaphoric discourse referent *u* and the presupposition *disc-old(u)* ('*u* is discourse old'). Both the anaphoricity of the discourse referent and the presupposition require that *u* have an antecedent within the discourse, so I follow Kamp et al. (2011) in using only the anaphoric discourse referent.

[12] This matches common assumptions within other semantic models, such as lambda calculus, in which a definite determiner presupposes the existence of an entity for which the predicative content holds (e.g., Heim & Kratzer 1998). See also Heim (1982), which claims "In definites, the descriptive content of the NP is presupposed, whereas in indefinites it is (merely) asserted" (1982:233).

Thus far, we have the following definitions of the contributions from definite DPs, indefinite DPs, and the nominal predicates within them:

(21) Definite DP additions to the DRS (*version 1 of 2, repeated*):

a. a new anaphoric discourse referent *u* (an individual) to the presuppositional structure

(19) Indefinite DP additions to the DRS (*version 1 of 2, repeated*):

a. a new discourse referent *u* (an individual)

(22) Nominal predicate additions to the DRS (*version 3 of 5*):

a. in the box in which the discourse referent *u* is introduced by the DP that the predicate occurs in:

i. a new discourse referent *s* (a state)

ii. the condition $\boxed{p(s,u)}$, where *p* is the property denoted by the noun

iii. the condition $\boxed{\left[\tau(s) \leq t_n\right]}$ if the predicate is flexible, else $\boxed{t_n \subseteq \tau(s)}$[13]

b. the anaphoric discourse referent $\boxed{\underline{t_n}}$ to the presuppositional structure

[13] As we will see shortly, this step will become inconsequential when working under a definite determiner, as t_n will be defined based on its compatibility with *s* rather than the other way around. This is ideal given the data in §2.3 showing that there is no difference in behavior between flexible and inflexible nominals in definite DPs.

These definitions allow the creation of a preliminary DRS for the second sentence of (15), shown in (23) below.

(23) a. The teenager was happy.

b. DRS $K_{2.1}$:

$$K_{2.1}: \langle \left\{ \begin{array}{|c|}\hline \underline{t_1} \\ t_1 < UT \\ \hline \end{array}, \begin{array}{|c|}\hline \underline{t_{n1}} \\ \\ \hline \end{array}, \begin{array}{|c|}\hline \underline{u}\ s_2 \\ teenager(s_2, u) \\ t_{n1} \subseteq \tau(s_2) \\ \hline \end{array} \right\}, \begin{array}{|c|}\hline s_3 \\ happy(s_3, u) \\ t_1 \subseteq \tau(s_3) \\ \hline \end{array} \rangle$$

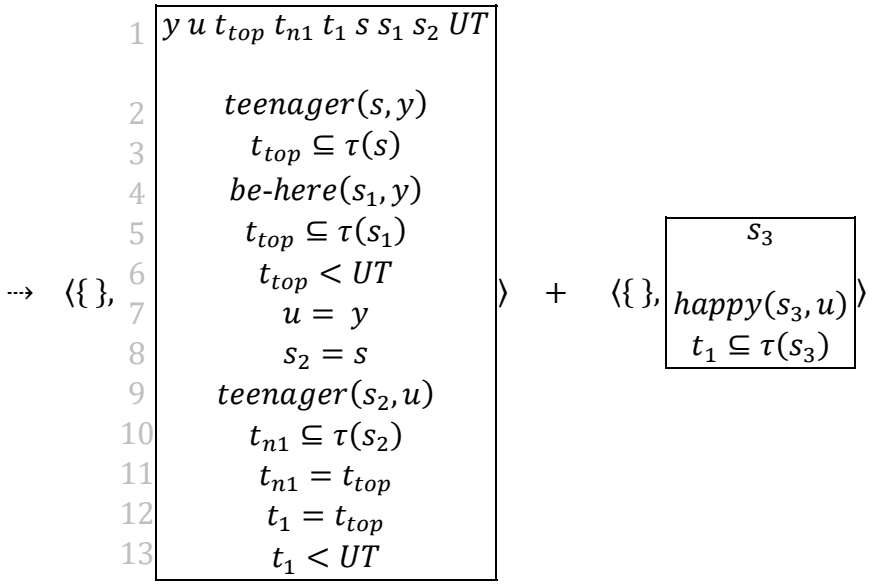
In (24b), the anaphors and presuppositions of (23b) are resolved into the discourse context from (20d).[14] This includes the crucial step of identifying *u* with *y* in line 7 (discussed below).

(24) a. A teenager was here. The teenager was happy.

b. $K_{1.4}$: the anaphors and presuppositions of $K_{2.1}$ are resolved into context $K_{1.3}$

$$\langle \{\ \}, \begin{array}{|c|}\hline y\ t_{top}\ s\ s_1\ UT \\ teenager(s, y) \\ t_{top} \subseteq \tau(s) \\ be\text{-}here(s_1, y) \\ t_{top} \subseteq \tau(s_1) \\ t_{top} < UT \\ \hline \end{array} \rangle \quad + \quad \langle \left\{ \begin{array}{|c|}\hline \underline{t_1} \\ t_1 < UT \\ \hline \end{array}, \begin{array}{|c|}\hline \underline{t_{n1}} \\ \\ \hline \end{array}, \begin{array}{|c|}\hline \underline{u}\ s_2 \\ teenager(s_2, u) \\ t_{n1} \subseteq \tau(s_2) \\ \hline \end{array} \right\}, \begin{array}{|c|}\hline s_3 \\ happy(s_3, u) \\ t_1 \subseteq \tau(s_3) \\ \hline \end{array} \rangle$$

[14] Resolution is marked by the symbol ⇢.



The presupposition associated with *u* – *teenager(s₂,u)* – places a constraint on the discourse referents with which *u* may be identified; therefore, even if the context were full of other referents of the appropriate type, *u* would be identified with *y*, as *y* fits the requirements of having the property 'teenager' hold of it at some time in the discourse. (According to the current model, if there are no previous discourse referents which 'teenager' had held of, the derivation results in a presupposition failure. §3 discusses cases where the nominal property has not been mentioned in the discourse, and yet there is no presupposition failure.)

With *u* identified with *y* (line 7), there are two propositions regarding the teenager-hood of the same individual: one in which the teenager-hood holds for state *s* (line 2) and the other for state s_2 (line 9). Following Tonhauser (2006:83), I assume states to be maximal; s_2 can therefore be identified with *s* (line 8), as they both represent the entire state of teenager-hood for the individual *u/y*.

(25) Maximality of States

∀P ∀s ∀x [s is maximal in P(s,x) if ¬∃s' such that s⊂s' and P(s',x)]

(Tonhauser 2006:83)

This identification likewise means that $\tau(s) = \tau(s_2)$, thereby rendering $t_{n1} \subseteq \tau(s_2)$ unnecessary information – we no longer need the input time t_{n1} to locate the runtime of s_2. In order to maintain consistency, t_{n1} must be resolved to some time within $\tau(s)$, which, in this context, can only be t_{top} (line 11).

The final discourse context $K_{2.2}$ represents the fully resolved discourse context (into which further sentences may be uttered), the final result of merging $K_{2.1}$ with $K_{1.4}$ and removing superfluous information. (26c) provides an informal paraphrase of the final DRS.

(26) a. A teenager was here. The teenager was happy.

b. Discourse context $K_{2.2}$: the (simplified) result of merging $K_{2.1}$ with $K_{1.4}$

$$\langle \{\}, \boxed{\begin{array}{c} y\ u\ t_{top}\ t_{n1}\ t_1\ s\ s_1\ s_2\ UT \\ \\ teenager(s,y) \\ t_{top} \subseteq \tau(s) \\ be\text{-}here(s_1,y) \\ t_{top} \subseteq \tau(s_1) \\ t_{top} < UT \\ u = y \\ s_2 = s \\ teenager(s_2,u) \\ t_{n1} \subseteq \tau(s_2) \\ t_{n1} = t_{top} \\ t_1 = t_{top} \\ t_1 < UT \end{array}} \rangle \quad + \quad \langle \{\}, \boxed{\begin{array}{c} s_3 \\ \\ happy(s_3,u) \\ t_1 \subseteq \tau(s_3) \end{array}} \rangle$$

⇢ ⟨{ }, $\boxed{\begin{array}{c} y\ t_{top}\ s\ s_1\ s_3 UT \\ \\ teenager(s,y) \\ t_{top} \subseteq \tau(s) \\ be\text{-}here(s_1,y) \\ t_{top} \subseteq \tau(s_1) \\ happy(s_3,y) \\ t_{top} \subseteq \tau(s_3) \\ t_{top} < UT \end{array}}$ ⟩

c. Paraphrase of final DRS:

There exists an entity which is (a) a teenager for an interval overlapping a past topic time, (b) 'here' for an interval which also overlaps that past topic time, and (c) happy for an interval which also overlaps that past topic time.

2.4 Plural DPs

Tonhauser applies the same model to plural DPs. In this section, I will briefly present representations for (27),[15] as the ability to model plurals will be important when working with more complex data in §3.

(27) Some teenagers were here. The teenagers were happy.

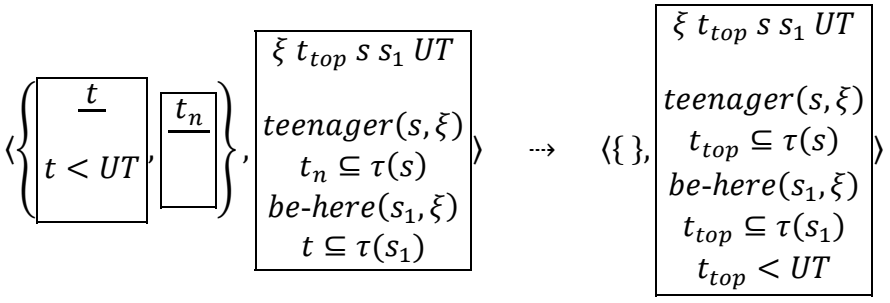
As in the previous section, I will first walk through the representations sentence by sentence. (28) presents the initial representation of the first sentence, as well as its resolution (following the ⇢);

[15] I analyze 'some' as an indefinite marker.

(29) shows the initial representation of the second sentence. Following Tonhauser (2006), lowercase Greek letters are used for plural referents.[16]

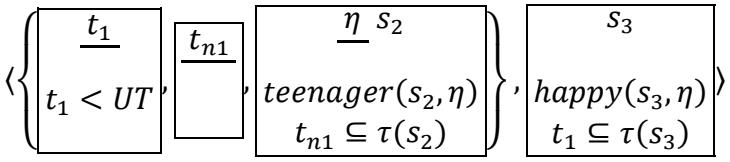
(28) a. Some teenagers were here.

b.



(29) a. The teenagers were happy.

b.

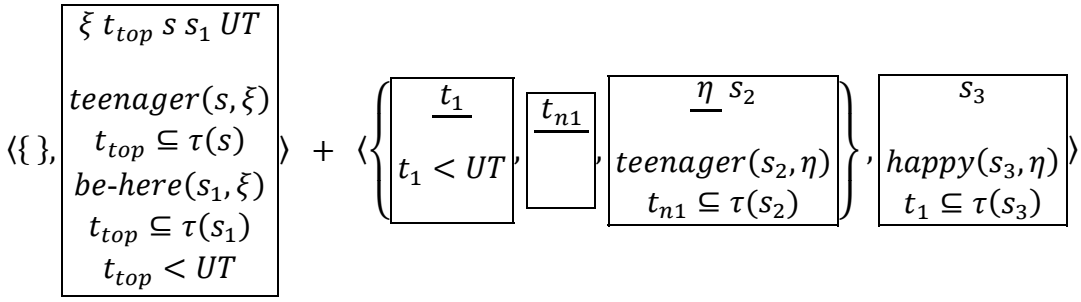


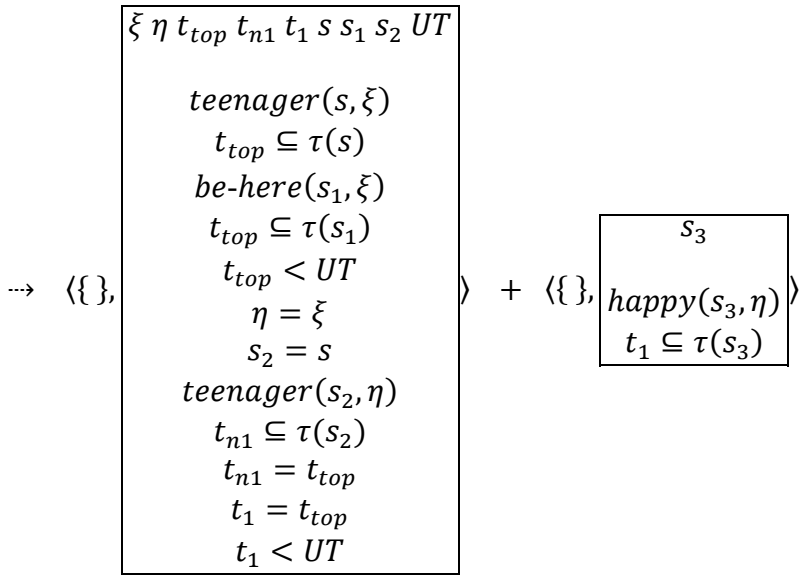
The step-by-step resolution of the second sentence (‘The teenagers were happy.’) into the discourse context created by the first sentence (‘Some teenagers were here.’) is shown in (30):

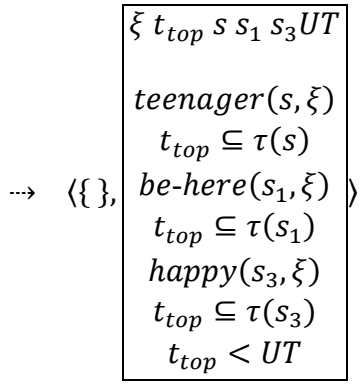
[16] By contrast, Kamp & Reyle (1993) and Kamp et al. (2011) use lowercase Roman letters for singular discourse referents, uppercase Roman letters for plural discourse referents, and lowercase Greek letters for discourse referents that are agnostic between singular and plural.

(30) a. Some teenagers were here. The teenagers were happy.

b.







c. Paraphrase of final DRS:[17]

There exists a plurality which are (a) teenagers for an interval overlapping a past topic time, (b) 'here' for an interval which also overlaps that past topic time, and (c) happy for an interval which also overlaps that past topic time.

2.5 A crucial case

This section applies the model presented above to a discourse in which attributing the correct temporal evaluation to a familiar instance of a nominal predicate is necessary to prevent contradiction. Returning, for the moment, to singular DPs, we will finally examine one of the crucial cases presented at the beginning of the chapter. Recall (5):

(5) My best friend while I was in college was a bachelor. I saw him again recently. The bachelor is married.

In (5), a locally bound reading of the last instance of 'bachelor' would result in a contradiction, requiring 'bachelor' and 'married' to hold of a single entity simultaneously. In this section, I walk through a derivation of a similar, but slightly simpler discourse which shares that property; in (31), like (5), the second instance of 'bachelor' must have the same property time as the first in order to avoid contradiction.

[17] This model is only compatible with a scenario in which the states (teenager, happy, etc.) hold of the individuals in the group over the same interval. That is, all of the teenagers have to be teenagers at the same time. (Kamp et al. 2011 define a distributivity operator for other purposes, but it is unclear to me that it could be applied here without harming the work done by the Maximality of States rule.)

(31) There was a bachelor in college in 1970. I saw him yesterday. The bachelor is married.

Again, I present the derivation sentence by sentence.[18] Much like the previous indefinite-DP sentences, the first sentence of this discourse is fairly simple to represent. The only novel addition is the constraint that *t ⊆ 1970*, contributed by the phrase 'in 1970.'

(32) a. There was a bachelor in college in 1970.

b.

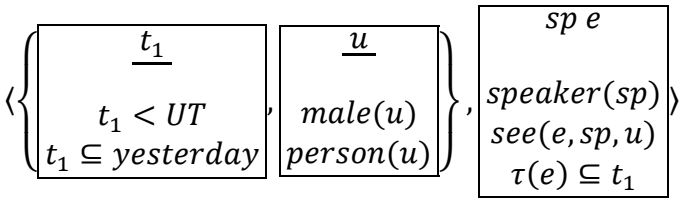
$$\langle \left\{ \begin{array}{|c|}\hline \underline{t} \\ t < UT \\ t \subseteq 1970 \\ \hline \end{array}, \begin{array}{|c|}\hline \underline{t_n} \\ \\ \hline \end{array} \right\}, \begin{array}{|c|}\hline y\ t_{top}\ s\ s_1\ UT \\ bachelor(s,y) \\ t_n \subseteq \tau(s) \\ in\text{-}college(s_1,y) \\ t \subseteq \tau(s_1) \\ \hline \end{array} \rangle \quad \dashrightarrow \quad \langle \{\}, \begin{array}{|c|}\hline y\ t_{top}\ s\ s_1\ UT \\ bachelor(s,y) \\ t_{top} \subseteq \tau(s) \\ in\text{-}college(s_1,y) \\ t_{top} \subseteq \tau(s_1) \\ t_{top} \subseteq 1970 \\ t_{top} < UT \\ \hline \end{array} \rangle$$

The next sentence, 'I saw him yesterday,' involves some new traits, including both a first person pronoun (represented as a property of speaker-hood; Tonhauser 2006, Kamp et al. 2011) and the third person pronoun 'him' (represented as an anaphor bearing the properties of 'male' and 'person'; Kamp et al 2011:267).

[18] The DRSs for this three-sentence discourse end up being much longer and more complex than those in the previous sections. For ease of reading, a simplified version of this derivation displaying only the most important elements is given at the end of the section in (37).

(33) a. I saw him yesterday.

b.



Merging 'I saw him yesterday' into the discourse context created by 'There was a bachelor in college in 1970' presents a minor problem: there is no available time variable in the existing discourse context which can serve as the antecedent to the anaphoric t_1 that also satisfies that presuppositional constraints placed on t_1 ($t_1 < UT$, $t_1 \subseteq yesterday$). *UT* does not satisfy the presupposition of preceding itself and neither *UT* nor t_{top} satisfy the presupposition of being a subset of the interval of 'yesterday'; the use of either of those times as an antecedent for t_1 would result in a presupposition failure. I make the assumption that in cases such as these, a new topic time (here t_{top1}) is introduced in the process of presupposition resolution to act as an antecedent to t_1.[19,20]

[19] Tonhauser uses a similar method in a case where there are no suitable antecedents for the anaphoric time variable associated with a nominal predicate (2006:94-95).

[20] The question of how topic times are updated is not a new field of study, but neither is it critical to the points being made in this chapter, which is why I adopt this quick-fix approach. For more discussion of narrative progression and operators derived from tense and aspect which may help to represent it in DRT, see Tonhauser (2006:66) and Kamp et al. (2011:§3.5).

(34) a. There was a bachelor in college in 1970. I saw him yesterday.

b.

$$\langle \{\}, \boxed{\begin{array}{c} y\ t_{top}\ s\ s_1\ UT \\ \\ bachelor(s,y) \\ t_{top} \subseteq \tau(s) \\ in\text{-}college(s_1,y) \\ t_{top} \subseteq \tau(s_1) \\ t_{top} \subseteq 1970 \\ t_{top} < UT \end{array}} \rangle \ + \ \langle \left\{ \boxed{\begin{array}{c} \underline{t_1} \\ \\ t_1 < UT \\ t_1 \subseteq yesterday \end{array}}, \boxed{\begin{array}{c} \underline{u} \\ \\ male(u) \\ person(u) \end{array}} \right\}, \boxed{\begin{array}{c} sp\ e \\ \\ speaker(sp) \\ see(e,sp,u) \\ \tau(e) \subseteq t_1 \end{array}} \rangle$$

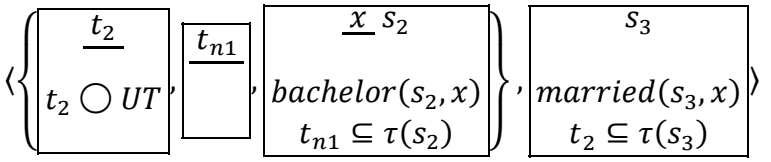
$$\dashrightarrow \ \langle \{\}, \boxed{\begin{array}{c} y\ u\ t_{top}\ t_{top1}\ t_1\ s\ s_1\ UT \\ \\ bachelor(s,y) \\ t_{top} \subseteq \tau(s) \\ in\text{-}college(s_1,y) \\ t_{top} \subseteq \tau(s_1) \\ t_{top} \subseteq 1970 \\ t_{top} < UT \\ t_1 = t_{top1} \\ t_1 < UT \\ t_1 \subseteq yesterday \\ u = y \\ male(u) \\ person(u) \end{array}} \rangle \ + \ \langle \{\}, \boxed{\begin{array}{c} sp\ e \\ \\ speaker(sp) \\ see(e,sp,u) \\ \tau(e) \subseteq t_1 \end{array}} \rangle$$

$$\dashrightarrow \ \langle \{\}, \boxed{\begin{array}{c} y\ sp\ t_{top}\ t_{top1}\ s\ s_1\ e\ UT \\ \\ bachelor(s,y) \\ t_{top} \subseteq \tau(s) \\ in\text{-}college(s_1,y) \\ t_{top} \subseteq \tau(s_1) \\ t_{top} \subseteq 1970 \\ t_{top} < UT \\ t_{top1} < UT \\ t_{top1} \subseteq yesterday \\ speaker(sp) \\ see(e,sp,y) \\ \tau(e) \subseteq t_{top1} \end{array}} \rangle$$

The final DRS from the series of resolutions above provides the discourse context into which the final sentence, containing 'the bachelor,' is uttered. A preliminary DRS for this final sentence is given below.[21]

(35) a. The bachelor is married.

b.

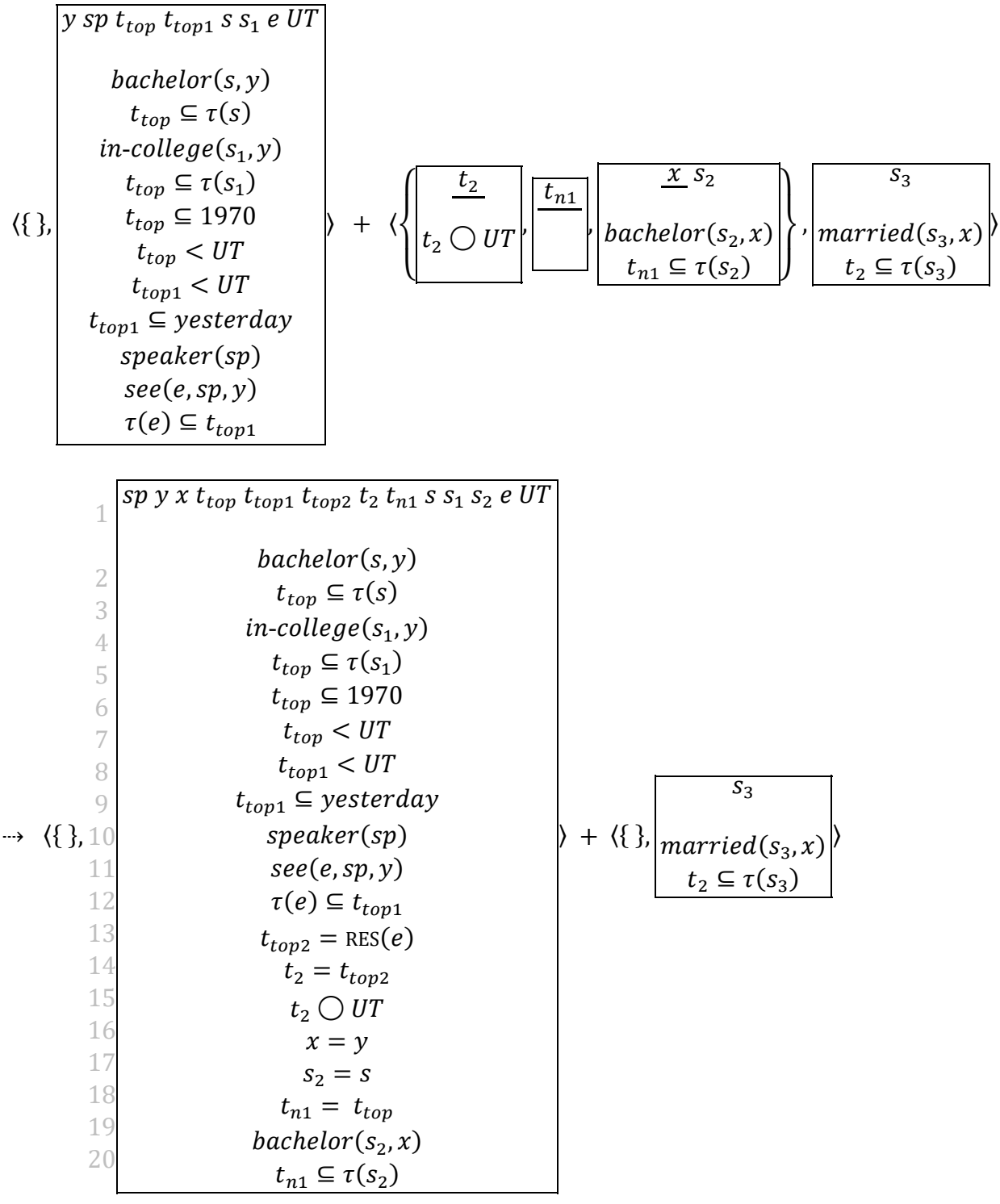


Finally, (36) merges the definite-DP sentence into the discourse context from (34). (Discussion follows.)

[21] Following Tonhauser's definition of present tense (2006:69), I use the ◯ operator (2006:58) to express an overlap between t_2 and the utterance time.

(36) a. There was a bachelor in college in 1970. I saw him yesterday. The bachelor is married.

b.



$\dashrightarrow$ $\langle \{\}, \boxed{\begin{array}{c} sp\ y\ t_{top}\ t_{top1}\ t_{top2}\ s\ s_1\ s_3\ e\ UT \\ \\ bachelor(s,y) \\ t_{top} \subseteq \tau(s) \\ in\text{-}college(s_1,y) \\ t_{top} \subseteq \tau(s_1) \\ t_{top} \subseteq 1970 \\ t_{top} < UT \\ t_{top1} < UT \\ t_{top1} \subseteq yesterday \\ speaker(sp) \\ see(e,sp,y) \\ \tau(e) \subseteq t_{top1} \\ t_{top2} = \text{RES}(e) \\ t_{top2} \bigcirc UT \\ married(s_3,y) \\ t_{top2} \subseteq \tau(s_3) \end{array}} \rangle$

c. Paraphrase of final DRS:

There exists an individual$_y$ who is a bachelor for an interval overlapping a past topic time in 1970 and in college for an interval which also overlaps that past topic time in 1970. There exists a second individual$_{sp}$ who is the speaker and who saw the individual$_y$ within a second topic time which takes place within the bounds of yesterday. The individual$_y$ is married for an interval which contains (a third topic time which contains) both the endpoint of the seeing event and the utterance time.

In the process of presupposition resolution, we once again must introduce a new topic time. This time around, I make use of Tonhauser's RES operator (used in line 13), which she uses as a way to explicitly introduce a new topic time after an eventive sentence. RES is a 'function which maps an eventuality [abbreviated *ev*] to a time whose left boundary is the right boundary of the eventuality, i.e. RES(ev) is a time that starts when ev terminates" (2006:58). A new topic time may be introduced

as "the result time of ev (RES(ev)), if ev is an event" (2006:66). In this discourse, this new topic time (t_{top2}) acts as the antecedent to t_2.

We now return to the main goal in representing this discourse. To avoid any contradiction from the incompatible predicates 'bachelor' and 'married' in the final sentence, the two states must not hold simultaneously. It is therefore imperative that t_{n1} and t_2, the times which anchor those states, are not resolved to the same antecedent. Satisfying the presupposition $t_2 \bigcirc UT$, t_2 is identified with the new t_{top2} in line 14, which transitively means that the property 'married' holds for a period overlapping the utterance time.

Were t_{n1} associated with a nominal in an indefinite DP, it would have to be identified with either t_{top2} or *UT* according to the TLC, both of which would result in contradiction. However, because t_{n1} is associated with a nominal in a definite DP, t_{n1} is identified with t_{top} (line 18) via the identification of *x* and s_2 with *y* and *s*, just as in the examples in §2.3 and 2.4. This process, shown in the derivation above, involves identifying antecedents for all three anaphoric variables of (35b) (recall that anaphoricity is marked by underlining). The anaphoric individual *x* must be identified with *y* (line 16), as *y* is the only potential antecedent for which the property 'bachelor' holds true at some time. The anaphoric state s_2 is identified with *s* (line 17), as, under the Maximality of States, they are both states which hold for the maximal interval that 'bachelor' is true of *x* and therefore inherently define the same interval. Finally, the anaphoric time t_{n1} must be identified with some time within the runtime of s_2 (= *s*), given the presupposition $t_{n1} \subseteq \tau(s_2)$. Of all of the available time variables, only t_{top} fulfills this presuppositional requirement, thus t_{n1} is identified with t_{top} (line 18).

By this series of identifications, the second instance of 'bachelor' inherits both the input time (t_{top}) and the property time ($\tau(s)$) of the first instance of 'bachelor' in the discourse. Importantly,

this inheritance allows us to avoid any contradiction caused by an overlap of the 'bachelor' state and the 'married' state.

(37) provides a simplified version of this discourse, bearing only the elements most important to the model: the two instances of 'bachelor,' the tenses of their respective sentences, and the potentially contradictory predicate 'married.' Most importantly, the indefinite DP is used in a past tense sentence (and an MCT/topic time input time is assumed) to guarantee that a definite DP within a present tense sentence may only be interpreted at the same t_n via anaphora resolution.

(37) a. There was a bachelor… The bachelor is married.

b.

$$\langle \{\}, \boxed{\begin{array}{c} y\ t_{top}\ s\ UT \\ bachelor(s,y) \\ t_{top} \subseteq \tau(s) \\ t_{top} < UT \end{array}} \rangle + \langle \left\{ \boxed{\begin{array}{c} t_2 \\ t_2 \bigcirc UT \end{array}}, \boxed{\begin{array}{c} t_{n1} \\ \end{array}}, \boxed{\begin{array}{c} x\ s_2 \\ bachelor(s_2,x) \\ t_{n1} \subseteq \tau(s_2) \end{array}} \right\}, \boxed{\begin{array}{c} s_3 \\ married(s_3,x) \\ t_2 \subseteq \tau(s_3) \end{array}} \rangle$$

$$\dashrightarrow \langle \{\}, \boxed{\begin{array}{c} y\ x\ t_{top}\ t_{n1}\ t_2\ s\ s_2\ UT \\ bachelor(s,y) \\ t_{top} \subseteq \tau(s) \\ t_{top} < UT \\ x = y \\ s_2 = s \\ t_{n1} = t_{top} \\ bachelor(s_2,x) \\ t_{n1} \subseteq \tau(s_2) \\ t_2 \bigcirc UT \end{array}} \rangle + \langle \{\}, \boxed{\begin{array}{c} s_3 \\ married(s_3,x) \\ t_2 \subseteq \tau(s_3) \end{array}} \rangle$$

$\dashrightarrow \langle \{\}, \boxed{\begin{array}{c} y\ t_{top}\ t_2\ s\ s_3\ UT \\ \\ bachelor(s,y) \\ t_{top} \subseteq \tau(s) \\ t_{top} < UT \\ t_2 \bigcirc UT \\ married(s_3,y) \\ t_2 \subseteq \tau(s_3) \end{array}} \rangle$

c. Paraphrase of final DRS:

There exists an individual who is a bachelor for an interval overlapping a past topic time and who is married for an interval which contains the utterance time.

3. Further data

At the beginning of this chapter, I attributed property time inheritance to familiarity, which I took to be a feature of predicates. Yet the DRT model given in §2.3-§2.5 refers only to definiteness, a feature of the DP. Familiarity is one of the features that licenses definiteness, so definiteness will always be present when referring to familiar referents. However, there are other ways to license definiteness (such as uniqueness; e.g., Schwarz 2013), meaning that not every definite DP involves a familiar referent.

In this section, I aim to show that familiarity always licenses property time inheritance, but that definiteness does *not* always license property time inheritance. In §3.1 and §3.2, I show that even in the case of "weak familiarity" (Roberts 2003), we still see property time inheritance. In §3.3, I show that predicates in definite DPs do not exhibit property time inheritance effects if definiteness was licensed by uniqueness rather than familiarity. In §3.4, I offer cases where multiple intersective predicates occur in a definite DP, where one predicate refers to a novel set of referents and the other refers to a familiar set of referents. I show that, despite both predicates

occurring in the same definite DP, the predicate referring to a novel set of referents patterns with what we have seen for other novel-referent-introducing predicates (subject to the TLC; no property time inheritance effects), and the predicate referring to a familiar set of referents patterns with what we have seen for other predicates referring to familiar referents (i.e., property time inheritance effects). These data support my original claim that property time inheritance is based on familiarity, rather than definiteness, and, separately, that familiarity is a feature of predicates, rather than DPs. Continuing §3.4, I re-work the DRT-based system of §2 so that it more closely models this hypothesis.

3.1 Logical entailment

The model presented in §2 is most clearly built to accommodate instances of direct repetition of a nominal predicate (e.g., 'a bachelor' – 'the bachelor,' 'a teenager' – 'the teenager'). These cases are excellent examples of what Roberts (2003) calls "strong familiars" – cases where familiarity involves "explicit previous mention of the entity in question" (2003:288). However, familiarity can take other forms. In this section and the next, I offer several subtypes of what Roberts terms "weak familiars" – "wherein the existence of the entity in question need only be entailed" (2003:288). My intent in these two sections is merely to show that property time inheritance is licensed by weak familiarity just as much as by strong familiarity.

The first example of weak familiarity comes in the form of a speaker using equivalent, but not identical, terms to refer to the same referent. For instance, use of the nominal predicate 'bachelor' may refer back to an established entity who has been identified as both male and unmarried, even if the word 'bachelor' was never used. It does not matter whether the properties of male and unmarried are introduced together as in (38) or separately as in (39).

(38) I used to work with an unmarried man. I saw him again recently. The bachelor is married.

(39) I used to work with a man named Hasim. He was unmarried. I saw him again recently. The bachelor is married.

'The bachelor is married' does not result in a contradiction in either (38) or (39), suggesting that 'bachelor' and 'married' do not hold simultaneously. We can therefore infer that (38) and (39)'s familiar instances of 'bachelor,' like their counterparts in §2, inherit their property times from elsewhere in the discourse.

Given the native speaker intuitions that the familiar uses of 'bachelor' in (38) and (39) inherit property times from elsewhere in the discourse, we would ideally want our DRT model to allow looser "matching" of presupposed content during the anaphor identification process – that is, someone who hears (38) or (39) easily deduces that an unmarried man is a bachelor (presumably holding the state of bachelor-hood over the same interval that he is unmarried); speaker intuitions such as this ought to be allowed in our model.

(40) below exemplifies what adding these speaker inferences to the model from §2 might look like. The anaphoric individual *x* must find an antecedent which meets the requirement of being a bachelor. In a small change from §2, (40) allows the predicate 'unmarried' (which applies to the discourse referent *y*) to suffice as adequate justification of identifying *x* with *y* (line 6), following speaker intuitions, rather than requiring the presupposed state of bachelor-hood to only "match" with an identical predicate within the discourse.

In order to arrive at a non-contradiction-inducing property time for 'bachelor,' (40) takes the link between 'bachelor' and 'unmarried' one step further: if the state of being a bachelor and the state of being unmarried are sufficiently equivalent to justify the identification of *x* with *y*, then

they ought to hold over the same interval; that is, s_2 (the state of bachelor-hood) should be identified with *s* (the state of being unmarried) and, following the same logic from §2, t_{n1} (the input time of 'bachelor') should be identified with t_{top} (the input time of 'unmarried'). Via these identifications (which occur in lines 7 and 8, respectively), (40) arrives at what seems to be the correct temporal interpretation for 'bachelor.'

(40) a. There was an unmarried man… The bachelor is married.

b.

$$\langle\{\,\},\ \boxed{\begin{array}{c} y\ t_{top}\ s\ UT \\ \hline unmarried(s,y) \\ t_{top} \subseteq \tau(s) \\ man(y)^{22} \\ t_{top} < UT \end{array}}\rangle + \langle\left\{\boxed{\begin{array}{c} t_2 \\ \hline t_2 \bigcirc UT \end{array}}, \boxed{\begin{array}{c} t_{n1} \\ \hline \end{array}}, \boxed{\begin{array}{c} x\ s_2 \\ \hline bachelor(s_2,x) \\ t_{n1} \subseteq \tau(s_2) \end{array}}\right\}, \boxed{\begin{array}{c} s_3 \\ \hline married(s_3,x) \\ t_2 \subseteq \tau(s_3) \end{array}}\rangle$$

$$\dashrightarrow\ \langle\{\,\},\ \boxed{\begin{array}{rc} 1 & y\ x\ t_{top}\ t_{n1}\ t_2\ s\ s_2\ UT \\ \hline 2 & unmarried(s,y) \\ 3 & t_{top} \subseteq \tau(s) \\ 4 & man(y) \\ 5 & t_{top} < UT \\ 6 & x = y \\ 7 & s_2 = s \\ 8 & t_{n1} = t_{top} \\ 9 & bachelor(s_2,x) \\ 10 & t_{n1} \subseteq \tau(s_2) \\ 11 & t_2 \bigcirc UT \end{array}}\rangle + \langle\{\,\},\ \boxed{\begin{array}{c} s_3 \\ \hline married(s_3,x) \\ t_2 \subseteq \tau(s_3) \end{array}}\rangle$$

[22] I make an assumption here, following Musan's (1995) discussion of individual-level predicates (such as 'man'), that 'man' should be attributed to the entire existence of *y*, rather than to a state – I therefore do not include a state as an argument of 'man.' This is not a complete theory of how individual-level predicates should be treated in DRT; I merely intend to show that 'bachelor' should be able to inherit a property time from the interval over which *y* is unmarried, but not from the interval over which *y* is a man.

$\dashrightarrow$ $\langle \{\}, \boxed{\begin{array}{c} y\ t_{top}\ t_2\ s\ s_3\ UT \\ \\ unmarried(s,y) \\ t_{top} \subseteq \tau(s) \\ man(y) \\ t_{top} < UT \\ bachelor(s,y) \\ t_2 \bigcirc UT \\ married(s_3,y) \\ t_2 \subseteq \tau(s_3) \end{array}} \rangle$

c. Paraphrase of final DRS:

There exists an individual who (a) is a man, (b) is unmarried and a bachelor for an interval overlapping a past topic time, and (c) is married for an interval which contains the utterance time.

The exact boundaries of such a modification to the system of §2 are not clear. I suspect that it would be difficult to adequately define across the board which predicates should be "matched" in the way that 'bachelor' and 'unmarried' were above, despite the clarity of speaker intuitions. Although entailment clearly must be involved, I suspect that it would not be hard to find cases where one predicate entails another, but the two should not necessarily be assumed to hold over the exact same interval.

3.2 Bridging and marble sentences

Another case of weak familiarity comes in the form of "bridging" definites (Clark 1975). In cases of bridging, "the definite relates back to the context in an interesting, somewhat indirect way…the antecedent is not the referent of the definite itself, but stands in some salient relationship to it'

(Schwarz 2013:2). An example is given in (41), where the definite DP ‘the employees’ relates to the indefinite DP ‘a company (in France in the 1800’s).’

(41) I was reading recently about a company in France in the 1800’s. The business shut down in 1850. In 1860, the employees all met up for a reunion.

Importantly, the predicate ‘employees’ does not hold for an interval overlapping either the UT or the MCT of the sentence it occurs in (≈ the time of the reunion) and must therefore be inheriting its property time from elsewhere. Presumably, the predicate ‘employees’ holds of its referents for an interval contained within the interval which ‘company’ holds of its referent.

Tonhauser (2006:94-97) accounts for similar data by assuming that a predicate such as ‘employees’ (‘crew members’ in her example) has an anaphoric internal argument representing the entity which the ‘employees’ are employees *of*. Here, such an internal argument would be identified with the ‘company in France.’ The state over which the property ‘employee’ holds must, logically, be a subinterval of the state over which the ‘company’ exists; thus, the temporal interpretation of ‘employees’ is interpreted relative to the temporal interpretation of ‘company.’

Cases of bridging will not always be such that they involve an anaphoric internal argument. For instance, in (42), ‘12-year-olds’ is temporally interpreted relative to the ‘orphanage.’ The only reading of this discourse is one in which the club-starters in question are 12 years old in 2010 and are at the orphanage in 2010, even if the club-starting does not occur until 2015. Importantly, the property of being 12 years old does not hold at the UT or the MCT of its own sentence, therefore its property time must be inherited from elsewhere.

(42) I lived next to an orphanage in 2010. The 12-year-olds started a club in 2015, years after they left the orphanage.

It seems unlikely that the predicate ‘12-year-olds’ has an internal argument with which the ‘orphanage’ could be identified. Contextual restriction instead limits the ‘12-year-olds’ to ones who were at the orphanage, and that connection is apparently enough to cause a temporal link as well, despite the fact that one can easily be 12 without being in an orphanage (in contrast to employees, who can only have that property if there exists an employing entity).

A similar situation arises from so-called “marble sentences” (Heim 1982:21, attributed to Barbara Partee).[23]

(43) All ten of my closest friends in college were unmarried. I saw them all again recently at my college reunion. The nine women are still single. The bachelor is married.

In this case, there is no explicitly mentioned discourse referent with which ‘(the) bachelor’ can be identified, nor is the property of being male ever explicitly mentioned. ‘Bachelor’ is instead identified with the remaining, non-woman member of a group of unmarried individuals. There is something to be said, again, for logical entailment, as in §3.1; ‘bachelor,’ being composed of ‘unmarried’ and ‘male,’ must apply to one of the ten friends and cannot apply to the nine who are women. From a lack of alternative options, the identity of the bachelor can be deduced, despite having no prior discourse referent. In the words of Kamp et al.: “definite descriptions are happy to pick up entities whose existence is implied by the context, even if no explicit introduction has previously taken place” (2011:271).

[23] See Kamp et al. 2011:184-6 for a non-temporal discussion of similar data within the DRT framework.

Again, this raises the question of where ‘bachelor’ inherits its temporal interpretation from. Similar to (38) and (39) of §3.1, it seems likely that the state over which ‘bachelor’ holds would be identified with the state over which ‘unmarried’ holds of that same individual (requiring the assumption that ‘unmarried’ holds over different states for each of the ten friends). On the other hand, the predicate ‘unmarried’ need not be mentioned so long as it can be inferred:

(44) I only had a few male friends when I lived in Chicago. Almost all of them were married. The bachelor is married now too.

(44) leaves very little room for the inheritance of states. Should ‘bachelor’s state be identified with that of ‘friends?’ ‘Married?’ Surely not. It is possible that the topic time of the first sentence, defined by the interval ‘when I lived in Chicago,’ is a useful input time for ‘bachelor’ – such a choice, while outside the rules of the current model, would define the correct truth conditions.

I do not here suggest a solution which would modify the theory of §2 adequately to account for the data presented in this section. I merely intend to show that many types of weak familiarity license property time inheritance.

3.3 Definites licensed by uniqueness

§3.1 and §3.2 show that many types of familiarity license property time inheritance. In this section, I show that it is *not* the case that all types of definites license property time inheritance.

Some definites are licensed by virtue of “referring to an individual or entity that uniquely meets the descriptive content of the definite description” (Schwarz 2013:2), such as “immediate situation” definites or “larger situation” definites (Hawkins 1978). Immediate situation definites involve a unique entity that fits the definite description within a local context, such as within a

single room/conversation, while larger situation definites involves a unique, and likely well-known, entity within a larger context.

(45) *Immediate situation:*

The teenager is unhappy. (uttered in a situation with only one non-adult)

(46) *Larger situation:*

The president is on TV. (uttered in the US)

Unlike all other examples thus far of sentences containing definite DPs, both (45) and (46) can be uttered out of the blue. Neither a teenager nor a president needs to have been previously mentioned (as the definites in §2 and §3.1 were) or implied (as the definites in §3.2 were) at any point earlier in the discourse in order to license the definite DPs 'the teenager' or 'the president,' and thus no previous discourse is necessary. Even though 'the teenager' and 'the president' are definite DPs, both 'teenager' and 'president' are introducing novel referents to the conversation. Definiteness in this case is licensed by the uniqueness of the individual which fits the predicative description, rather than by familiarity of the discourse referents or anaphoricity with a previously mentioned entity.

In Chapter 3, I claimed that all predicates which introduce novel discourse referents are subject to the Temporal Locality Constraint, repeated in (47):

(47) **Temporal Locality Constraint** (TLC)

The input times to any predicates introducing novel referents

must be bound by the nearest lambda abstractor over times.

If the TLC holds true of (45) and (46) – as is predicted, given that 'teenager' and 'president' introduce novel referents – then the property times available to them should be the same as those available to those nouns within indefinite DPs (i.e., 'a teenager' and 'a president') – cases which we know to be subject to the TLC.

And, indeed, 'teenager,' an inflexible noun,[24] must hold of the subject of (45) at the UT/MCT of its present tense sentence, as would 'teenager' in 'A teenager is unhappy.'

'President,' a flexible noun,[25] is predicted under the TLC to hold of the subject of (46) at or before the UT/MCT of its present tense sentence, as would 'president' in 'A president is on TV.' Because of the uniqueness presupposed of 'the president' in (46), the most salient reading by far is the reading in which 'president' holds at the UT/MCT, describing the current president, who is most likely to be picked out as the unique referent of 'president.' However, in a context where there was no current president, or where a past president was more salient, the subject of (46) could easily refer to a past president, as predicted by the TLC.

This data suggests that it is novelty and familiarity within the discourse, rather than indefiniteness and definiteness, which determine whether a property time is subject to the TLC

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[24] Recall that in order to know what readings are predicted by the TLC, we first need to know whether a nominal predicate is flexible or inflexible (so that we know how their input times and property times interact). The following test was given in §3 of Chapter 2:

(ii) To test a noun:
1. Use a single clause, present tense sentence.
2. Use the target noun with the determiner "a" as the subject (ex. *a bachelor*)
3. Use a clausal predicate that cannot be true simultaneously with that noun, *but* where the nominal predicate could reasonably hold *before* the clausal predicate. (ex. *bachelor + be married*)
4. If the sentence is…
- acceptable, you have a <u>flexible</u> noun
- not acceptable, you have an <u>inflexible</u> noun

(iii) # A teenager is 40-years-old. # → inflexible

[25] Following the same test as in the previous footnote:

(iv) A president is unemployed. ✓ → flexible

(predicates introducing novel referents) or inherited from elsewhere in the discourse (predicates referring to familiar referents). I call this hypothesis the Novelty-Familiarity Generalization (NFG) for ease of reference.

(48) **Novelty-Familiarity Generalization** (NFG)

Predicates introducing novel referents to a discourse are subject to the TLC, while predicates referring to referents familiar to a discourse inherit property times from elsewhere in the discourse.

Note that the NFG is effectively just a summary of what I have been saying thus far. The TLC already stipulates that it only applies to "predicates introducing novel referents," so the first clause of the NFG contributes nothing new. It is only included in the interest of clarity, so that the rules for predicates introducing novel referents and the rules for predicates referring to familiar referents are presented side by side.

The Novelty-Familiarity Generalization is not dissimilar from proposals made by Musan (1995, 1999) about "temporally dependent" and "temporally independent" DPs.[26] Musan claims that "temporally dependent" DPs are those which are "not treated as established in the discourse model of the hearer" (1999:622) and that predicates within temporally dependent DPs must have property times which overlap the MCT (to use my terminology). "Temporally independent" DPs are those which are "established in the discourse model of the hearer" (1999:644); predicates within temporally independent DPs may have any property time.

[26] The line between DP and NP is somewhat blurred, as Musan uses 'NP' to refer to what is now called 'DP.' I use modern terminology.

Both Musan and I claim that there is a notable difference in temporal behavior between predicates referring to novel referents and those referring to familiar referents. However, our two theories predict significantly different property times for each of those two groups of predicates. Novel-referent-introducing/temporally dependent predicates are forced to have property times which overlap the MCT in Musan's model. However, in my Chapters 2 and 3, I show that a much wider variety of property times is available to predicates introducing novel referents: for inflexible nouns, any time that overlaps *either* the MCT or the UT and for inflexible nouns, any time which overlaps or precedes either the MCT or the UT. In Musan's model, temporally independent predicates which refer to familiar referents may have *any* property time. As I have shown in this chapter, predicates which refer to familiar referents inherit their property times from predicates used earlier in the discourse; those predicates, in turn, have property times that are calculated based on nominal lexical aspect and TLC. Thus, it is not the case that predicates referring to familiar referents can have *any* property time, even though it may look that way if you only compare their property times against the UT and the MCT of the sentence they occur in. From the point of view of the data I have introduced in this dissertation, Musan predicts too few possible property times for nouns which introduce novel referents and too many possible property times for nouns which refer to familiar referents.

A final difference between Musan's proposal and mine is that I attribute familiarity to predicates, rather than DPs. More on this in the next section.

3.4 Familiar nominal modifiers

In addition to attributing property time inheritance to familiarity rather than definiteness, I here also show that familiarity should be attributed to predicates rather than DPs, under the assumption

that predicates refer to (sets of) referents (à la Heim 1982, 1983). In this section, I present data in which two intersective predicates within the same DP vary in familiarity. Following the NFG, any predicate referring to a novel set of referents is subject to the TLC, and any predicate referring to a familiar set of referents inherits its property time from elsewhere in the discourse.

Following a basic concept of intersective predicates (e.g., Partee 1995), when a noun is modified, both the noun and its modifier characterize sets, the intersection of which acts as an argument to the determiner. Both sets – the one characterized by the noun and the one characterized by the modifier – may be either novel or familiar to the discourse. I propose that both the noun and its modifier are *independently* subject to the NFG, and that the novelty or familiarity of one predicate has no bearing on the other. Thus, a noun or nominal modifier which characterizes sets novel to the discourse will be subject to the TLC and a noun or nominal modifier which characterizes sets familiar to the discourse will inherit a property time from elsewhere in the discourse.

(49)-(52) exemplify the four possible combinations of familiarity and novelty within a noun and its modifier.

In (49), a novel nominal pairs with a novel modifier, meaning that both will have input times bound by the nearest lambda abstractor over times. As discussed in Chapter 3, the noun and modifier necessarily have the same "nearest" lambda abstractor and therefore necessarily the same input time. In (49), both 'happy' and '10-year-old' must hold for intervals overlapping either the UT or the MCT (the time of going to the movies).

(49) ***Novel nominal, novel modifier:***

A <u>happy</u> <u>10-year-old</u> went to the movies.

In (50), the underlined instances of both the nominal predicate ‘bachelors’ and the modifier ‘drunk’ characterize sets familiar to the discourse; thus, they both inherit their property times from elsewhere in the discourse, as per the Novelty-Familiarity Generalization. In this case, both predicates were used explicitly at earlier points in the discourse, so they both inherit property times from the previous instances of the predicates ‘bachelors’ and ‘drunk,’ which, in turn, were subject to the TLC, drawing input times from the sentences they occurred in. Thus, both instances of ‘bachelors’ hold for an interval overlapping the time of being in college and both instances of ‘drunk’ hold for an interval overlapping the event of getting up to trouble while traveling. The underlined phrase ‘drunk bachelors’ therefore characterizes the intersection of the set of those who were bachelors in college and the set of those who were drunk during the trip.

(50) ***Familiar nominal, familiar modifier:***

There were four bachelors who were friends in college. After they all got married, three of them went on a trip and, as drunk tourists, got up to a lot of trouble. The drunk bachelors stayed friends for many years, but lost touch with the fourth bachelor.

In (51), the underlined instance of the nominal predicate ‘bachelors’ characterizes a set of entities familiar to the discourse, having been introduced in the first sentence. Thus, both instances of ‘bachelors’ hold for an interval overlapping the time of the speaker being in college; this property time prevents a contradiction with ‘married’ in the final sentence. The familiar instance of ‘bachelors’ is paired with the novel modifier ‘50-year-old’ in the final sentence of the discourse. As a predicate which introduces a novel referent, ‘50-year-old’ is subject to the TLC and therefore holds for an interval which overlaps the UT/MCT of the present tense sentence it occurs in. Thus,

the underlined phrase ‘50-year-old bachelors’ characterizes the intersection of the set of those who were bachelors at the time the speaker was in college and the set of those who are 50 years old at the utterance time.

(51) ***Familiar nominal, novel modifier:***

I knew many bachelors in college. I saw them all again recently at my college reunion. All of the 50-year-old bachelors are married.

In (52), the underlined instance of the adjectival modifier ‘happy’ characterizes a set familiar to the discourse, having been introduced in the first sentence. Thus, both instances of ‘happy’ hold for an interval overlapping the time of the speaker being in college. The nominal predicate ‘bachelors,’ on the other hand is subject to the TLC, as it characterizes a novel set, namely the set of contextually relevant individuals for whom the predicate ‘bachelors’ holds at the UT. Thus, the underlined phrase ‘happy bachelors’ characterizes the intersection of the set of those who were happy at the time the speaker was in college and the set of those who are bachelors at the utterance time.

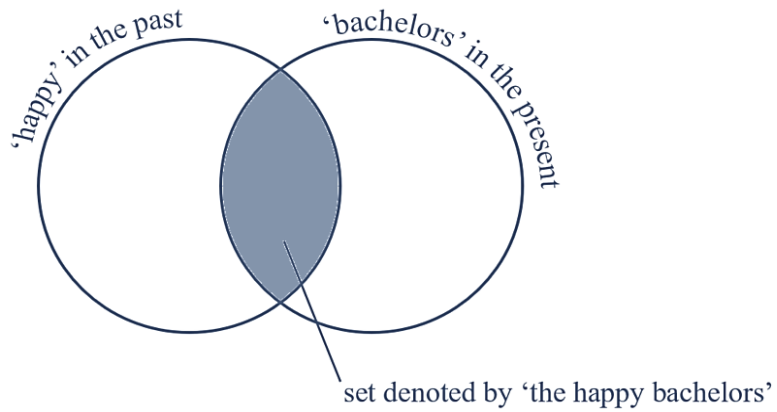
(52) ***Novel nominal, familiar modifier:***

I knew a lot of happy people when I was in college. I just saw them all at my college reunion. The happy bachelors are living in San Francisco.

I will focus on the reading described above for (52) for the rest of this section, so I provide a visual aid in (53), followed by two variants of (52), with the aim of making the interpretations of ‘happy’ and ‘bachelors’ particularly clear. (54) includes a clause that explicitly states that the interval over which ‘happy’ holds does not include the utterance time. (55) provides a particularly striking

contrast with (52), in that the clausal predicate of the final sentence has been changed to '(be) married,' resulting in a contradiction. This contradiction reinforces the fact that 'bachelor' holds for an interval which overlaps the utterance time.

(53)



(54) I knew a lot of happy people when I was in college. I just saw them all at my college reunion. The happy bachelors are living in San Francisco, although they aren't happy anymore.

(55) I knew a lot of happy people when I was in college. I just saw them all at my college reunion. # The happy bachelors are married.

The rest of this section is devoted to an attempt to model the interpretations of 'happy' and 'bachelor' of (52), and by extension the Novelty-Familiarity Generalization, in DRT. This attempt results in several proposed changes to the model that was presented in §2.

As in the final example of §2, I will model a simplified version of the relevant discourse in order to create shorter and more readable DRSs. I merge the final sentence of the discourse ('The happy bachelors live in San Francisco.') into a simplified discourse context ('There were some

happy people…'), which contains only the crucial elements: the DP in which 'happy' is first used and the tense which supplies 'happy' with an MCT/topic time input time.

(56) There were some happy people… The happy bachelors live in San Francisco.

(57) represents a first attempt at modeling the discourse in (56), using essentially the theory presented in §2. The only change from §2 is the addition of the adjective, which adds the same content to the DRS as a nominal predicate. Importantly, just as any nominal introduces an anaphoric input time t_n, the adjective 'happy' here introduces an analogous anaphoric input time t_a. (If you are viewing this dissertation in color, I have highlighted t_a in yellow so that it is easier to find.) In order to model the readings discussed above, it is imperative that t_n and t_a are independent from each other and are able to be identified with different antecedents.

(57) a. There were some happy people… The happy bachelors live in San Francisco.

b. Non-final derivation:

$$\langle \{\}, \boxed{\begin{array}{c}\xi\ t_{top}\ s\ s_1\ UT \\ happy(s,\xi) \\ t_{top} \subseteq \tau(s) \\ people(s_1,\xi) \\ t_{top} \subseteq \tau(s_1) \\ t_{top} < UT\end{array}} \rangle + \langle \left\{ \boxed{\begin{array}{c}t \\ t \bigcirc UT\end{array}}, \boxed{\begin{array}{c}t_a \\ \ \end{array}}, \boxed{\begin{array}{c}t_n \\ \ \end{array}}, \boxed{\begin{array}{c}\eta\ s_2\ s_3 \\ happy(s_2,\eta) \\ t_a \subseteq \tau(s_2) \\ bachelor(s_3,\eta) \\ t_n \subseteq \tau(s_3)\end{array}} \right\}, \boxed{\begin{array}{c}s_4 \\ live\text{-}in\text{-}SF(s_4,\eta) \\ t \subseteq \tau(s_4)\end{array}} \rangle$$

$\dashrightarrow$ $\langle \{\}, \boxed{\begin{array}{ll} 1 & \xi\ \eta\ t_{top}\ t\ t_a\ t_n\ s\ s_1\ s_2\ s_3\ UT \\ & \\ 2 & happy(s,\xi) \\ 3 & t_{top} \subseteq \tau(s) \\ 4 & people(s_1,\xi) \\ 5 & t_{top} \subseteq \tau(s_1) \\ 6 & t_{top} < UT \\ 7 & \eta = \xi \\ 8 & s_2 = s \\ 9 & t_a = t_{top} \\ 10 & happy(s_2,\eta) \\ 11 & t_a \subseteq \tau(s_2) \\ 12 & t_n = t \\ 13 & bachelor(s_3,\eta) \\ 14 & t_n \subseteq \tau(s_3) \\ 15 & t \bigcirc UT \end{array}} \rangle + \langle \{\}, \boxed{\begin{array}{c} s_4 \\ \\ live\text{-}in\text{-}SF(s_4,\eta) \\ t \subseteq \tau(s_4) \end{array}} \rangle$

$\dashrightarrow$ $\langle \{\}, \boxed{\begin{array}{c} \xi\ t_{top}\ t\ s\ s_1\ s_3\ s_4\ UT \\ \\ happy(s,\xi) \\ t_{top} \subseteq \tau(s) \\ people(s_1,\xi) \\ t_{top} \subseteq \tau(s_1) \\ t_{top} < UT \\ bachelor(s_3,\xi) \\ t \subseteq \tau(s_3) \\ t \bigcirc UT \\ live\text{-}in\text{-}SF(s_4,\xi) \\ t \subseteq \tau(s_4) \end{array}} \rangle$

In line 7, the plural discourse referent associated with the definite DP 'the happy bachelors' (η) is identified with the discourse referent introduced by the indefinite DP 'some happy people' (ξ). In §2, where nominal properties provided the only information that linked one discourse referent with another, a novel discourse referent had to be identified with a discourse referent which had been described by the same nominal predicate. In (57), there is no prior use of the nominal property

'bachelors.' This property is *presupposed*[27] to hold of η (based on the definition in (22) of what a nominal predicate adds to the DRS), which leaves us with a problem: if the property 'bachelor' is presupposed to hold of η, as is assumed by the current model, is it reasonable to identify η with ξ, which does not bear that property? A second problem lurks in this derivation as well: 'the happy bachelors' (η) is identified with 'some happy people' (ξ) while in the actual reading 'the happy bachelors' picks out a subset of 'some happy people.' I will tackle these issues one by one.

First, the issue related to the property 'bachelors' being presupposed. I have assumed that all presupposed information acts as a constraint on identification. η should not be able to be identified with ξ if η is presupposed to hold a property ('bachelor') that ξ does not. The simplest fix would involve moving 'bachelor' out of the presuppositional structure, aiming for the following DRS, in which the property of bachelor-hood appears in the non-presuppositional structure:

(58) a. The happy bachelors live in San Francisco.

b.

$$\langle \left\{ \boxed{\underline{t} \;\; t \bigcirc UT}, \boxed{\underline{t_a}}, \boxed{\underline{t_n}}, \boxed{\underline{\eta \;\; s_2} \;\; happy(s_2,\eta) \;\; t_a \subseteq \tau(s_2)} \right\}, \boxed{\underline{s_3 \;\; s_4} \;\; bachelor(s_3,\eta) \;\; t_n \subseteq \tau(s_3) \;\; live\text{-}in\text{-}SF(s_4,\eta) \;\; t \subseteq \tau(s_4)} \rangle$$

Such a change to the model requires a change to the definition of what a predicate adds to the DRS and, more importantly, where in the DRS that content is added. Some predicates embedded within definite DPs (namely, the familiar ones, like 'happy' above) should still follow the rule defined in

[27] Since this property is presupposed and that presupposition is not satisfied in the context, the whole DRS should really just result in a presupposition failure, rather than being carried through to a final resolution as I did.

(22) that predicative content should be introduced in the same box of the DRS in which their DP introduces a discourse referent. However, other predicates in definite DPs (namely, the novel ones, like 'bachelor' above) will not. Those predicates that introduce novel content, as 'bachelor' does, must introduce their content into the non-presuppositional side of the DRS:[28,29]

(59) Predicate additions to the DRS (*version 4 of 5*):

a. if the predicate characterizes a set novel to the discourse, add the following to the non-presuppositional structure; otherwise add the following to the box which introduces the discourse referent *u* introduced by the DP that the predicate occurs in:

i. a new discourse referent *s* (a state)

ii. the condition $\boxed{p(s,u)}$, where *p* is the property denoted by the predicate

[28] This definition uses '$t_{n/a}$' to mean 'the anaphoric input time of a noun/adjective.' However, these effects are not limited to nouns and adjectives, therefore $t_{n/a}$ could be replaced with anaphoric input times for any other intersective predicate (e.g., t_p for a prepositional phrase).

[29] This modification requires that the semantics somehow "knows" which predicates characterize sets novel to the discourse and which characterize sets familiar to the discourse. In an abstract sense, I assume that familiarity is a feature marked on predicates; such a feature is already necessary in order to license definiteness. In a more concrete sense, the best option is likely to appeal to prosody. Those predicates that introduce novel content as 'bachelor' does (and that therefore must introduce their content into the non-presuppositional side of the DRS) are often marked as such in natural language: these predicates bear an L+H* pitch accent (e.g., Büring 2003). In cases where no predicate is novel, this pitch accent is infelicitous:

(v) a. Some happy people… The happy BACHELORS$_{L+H*}$…
b. # Some happy bachelors… The happy BACHELORS$_{L+H*}$…

We might therefore begin the definition in (59) with "if the predicate is marked with a L+H* pitch accent, add the following to the non-presuppositional structure…"

(This notation is written using ToBI ("tones and break indices"). L+H* describes an intonational contour in which the stressed syllable (denoted by *) is given a high pitch and the preceding syllable is given a low pitch. Thus, 'the happy BACHELORS$_{L+H*}$' would have a low tone on the last syllable of 'happy' and a high tone on the first syllable of 'bachelors.')

iii. the condition $\boxed{\left[\tau(s) \leq t_{n/a}\right]}$ if the predicate is flexible, else

$\boxed{t_{n/a} \subseteq \tau(s)}$

b. the anaphoric discourse referent $\boxed{\underline{t_{n/a}}}$ to the presuppositional structure

To return to the second problem noted above: if η is identified with ξ, then 'the happy bachelors' is identified with 'some happy people' when, in fact, 'the happy bachelors' picks out a subset of 'some happy people.' In line with the discussion of data at the beginning of this section, we want instead to identify the set characterized by the second instance of 'happy' (within the definite DP) with the set characterized by the initial instance of 'happy' (within the indefinite DP). In the current model, there is no discourse referent for the group of entities which 'happy' describes, so, again, a modification is needed. (61) shows a simple sentence with an indefinite subject, in which a new mechanism is implemented: each predicate defines a discourse referent, and the group defined by the intersection of the predicate extensions is defined via an explicit intersection operator.[30] (If you are viewing this dissertation in color, the new additions are highlighted in yellow.) (60) provides the same sentence using the pre-intersection model for direct comparison.

The addition of intersection, used in many other semantic frameworks (e.g., Partee 1995), allows us to explicitly model the set characterized by each predicate. Following Kamp & Reyle's (1993:511) method for defining eventualities, I use 'α: $happy(s, \alpha)$' to define a discourse referent

[30] It is common in DRT (e.g., Kamp et al 2011) to assume mereological sums (Link 1983), making "product" a more accurate term than "intersection" from a mathematical perspective. I have chosen to use intersection to make a clear link with the fact that nouns and adjectives like 'happy' are often termed "intersective predicates" (e.g., Partee 1995).

α such that $happy(s, \alpha)$ is true. 'Some happy bachelors' is then defined as the intersection of the set defined by 'happy' and the set defined by 'bachelors.'[31]

(60) **Without** intersection:

a. Some happy bachelors were here.

b.

$$\langle \left\{ \boxed{\begin{array}{c}\underline{t} \\ t < UT\end{array}}, \boxed{\underline{t_a}}, \boxed{\underline{t_n}} \right\}, \boxed{\begin{array}{c}\xi\ t_{top}\ s\ s_1\ s_2\ UT \\ \\ happy(s,\xi) \\ t_a \subseteq \tau(s) \\ bachelor(s_1,\xi) \\ t_n \subseteq \tau(s_1) \\ be\text{-}here(s_2,\xi) \\ t \subseteq \tau(s_2)\end{array}} \rangle \quad \dashrightarrow \quad \langle \{\}, \boxed{\begin{array}{c}\xi\ t_{top}\ s\ s_1\ s_2\ UT \\ \\ happy(s,\xi) \\ t_{top} \subseteq \tau(s) \\ bachelor(s_1,\xi) \\ t_{top} \subseteq \tau(s_1) \\ be\text{-}here(s_2,\xi) \\ t_{top} \subseteq \tau(s_2) \\ t_{top} < UT\end{array}} \rangle$$

(61) **With** intersection:

a. Some happy bachelors were here.

b.

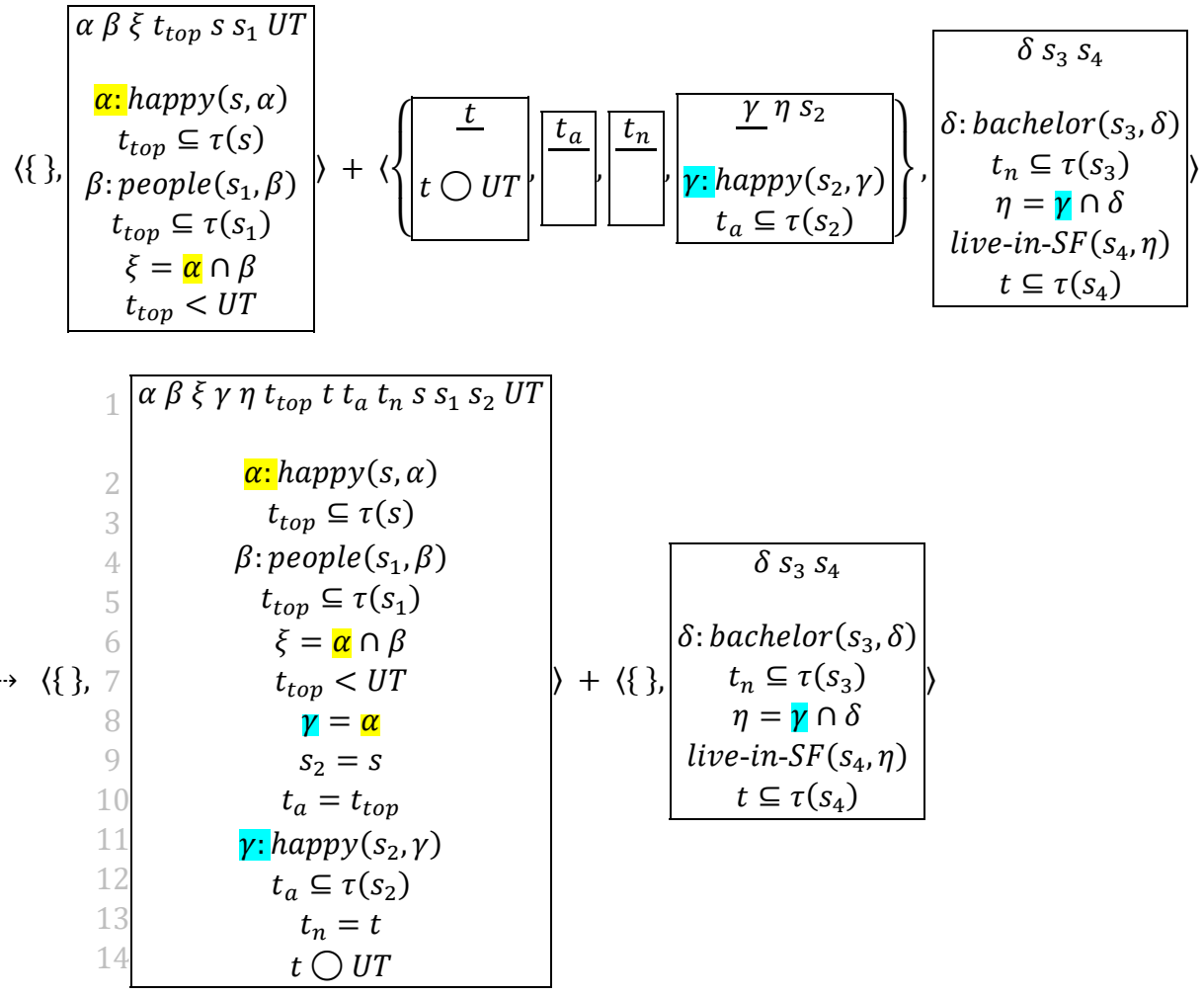
$$\langle \left\{ \boxed{\begin{array}{c}\underline{t} \\ t < UT\end{array}}, \boxed{\underline{t_a}}, \boxed{\underline{t_n}} \right\}, \boxed{\begin{array}{c}\alpha\ \beta\ \xi\ t_{top}\ s\ s_1\ s_2\ UT \\ \\ \alpha\text{:}\ happy(s,\alpha) \\ t_a \subseteq \tau(s) \\ \beta\text{:}\ bachelor(s_1,\beta) \\ t_n \subseteq \tau(s_1) \\ \xi = \alpha \cap \beta \\ be\text{-}here(s_2,\xi) \\ t \subseteq \tau(s_2)\end{array}} \rangle \quad \dashrightarrow \quad \langle \{\}, \boxed{\begin{array}{c}\alpha\ \beta\ \xi\ t_{top}\ s\ s_1\ s_2\ UT \\ \\ \alpha\text{:}\ happy(s,\alpha) \\ t_{top} \subseteq \tau(s) \\ \beta\text{:}\ bachelor(s_1,\beta) \\ t_{top} \subseteq \tau(s_1) \\ \xi = \alpha \cap \beta \\ be\text{-}here(s_2,\xi) \\ t_{top} \subseteq \tau(s_2) \\ t_{top} < UT\end{array}} \rangle$$

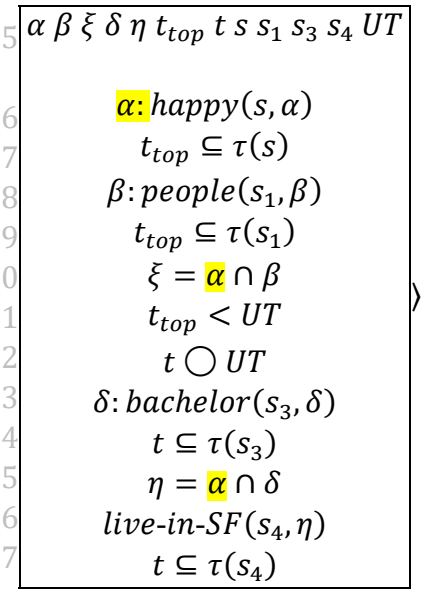
[31] See Kamp et al. (2011:183) for a similar method of creating a new discourse referent using a summation operator.

Having discourse referents associated with the sets characterized by predicates allows us to achieve the desired identification; namely, the extension of the second instance of 'happy' (γ below, highlighted in blue if viewing in color) can be identified with the extension of the first instance of 'happy' (α below, highlighted in yellow if viewing in color). This identification occurs in line 8.

(62) a. Some happy people were… The happy bachelors live in San Francisco.

b.



⇢ ⟨{ }, 

⟩

c. Paraphrase of final DRS:

There exist a number of pluralities: one group is 'happy' for a state overlapping a past topic time, another group are 'people' for a state overlapping that past topic time, and a final group are 'bachelors' for a state overlapping the utterance time. The entities that are in both the 'happy-in-the-past' group and the 'bachelors-now' group have the property of 'living in San Francisco' for a state that overlaps the utterance time.

The most important line of the above derivation is line 25, in which η (≈'the happy bachelors') is defined as the intersection of α (the initial, indefinite-DP instance of 'happy') and δ (the definite-DP/only instance of 'bachelors'). This gets us the desired reading where 'happy bachelors' denotes the intersection of those who were happy at a past time and those who are bachelors at UT.

For completeness, the modifications presented above, which allowed for discourse referents representing predicate extensions, are added to the definitions of what definite DPs, indefinite DPs, and predicates add to the DRS:[32]

(63) Definite DP additions to the DRS (*version 2 of 2*):

a. a new non-anaphoric discourse referent *u* (an individual) to the presuppositional structure

b. a condition that *u* is equal to the intersection of all sets defined by the predicates within the DP

(64) Indefinite DP additions to the DRS (*version 2 of 2*):

a. a new discourse referent *u* (an individual) to the non-presuppositional structure

b. a condition that *u* is equal to the intersection of all sets defined by the predicates within the DP

[32] As shown in the derivations in (61) and (62), it is imperative that intersection is introduced at some point into the DRS. In (63) and (64), I include intersection as a part of what definite and indefinite DPs add to the DRS. This is slightly problematic: at the stage when the DP "adds" to the DRS, how does the semantics know what all the predicates inside the DP are? I have not seen any renditions of DRT (including my own) which provide a good solution to this problem. My hopes are that future uses of DRT become more and more compositional and eventually include some sort of rule of combination akin to Predicate Modification (e.g., Heim & Kratzer 1998), which would introduce a set equivalent to the intersection of two intersective predicates. For the moment, though, I house intersection in the list of what DPs add to the DRS as a sort of quick-fix solution.

(65) Predicate additions to the DRS (*version 5 of 5*):

a. if the predicate characterizes a set novel to the discourse, add the following to the non-presuppositional structure; otherwise add the following to the box which introduces the discourse referent *u* introduced by the DP that the predicate occurs in:

i. a new discourse referent α (an individual), where α is anaphoric if the predicate characterizes a set familiar to the discourse, and non-anaphoric if the predicate characterizes a set novel to the discourse

ii. a new discourse referent *s* (a state)

iii. the condition $\boxed{\alpha: p(s, \alpha)}$, where *p* is the property denoted by the predicate

iv. the condition $\boxed{\left[\tau(s) \leq t_{n/a}\right]}$ if the predicate is flexible, else $\boxed{t_{n/a} \subseteq \tau(s)}$

b. the anaphoric discourse referent $\boxed{\underline{t_{n/a}}}$ to the presuppositional structure

These modifications, which allow the Novelty-Familiarity Generalization to be modeled in DRT, mark a fairly significant change from the theory presented in §2. Instead of property time

inheritance (and the necessary series of identifications that model it) being attributed at the DP level based on definiteness, it is attributed at the predicate level based on familiarity.

4. Desiderata from other dynamic systems

As discussed in §2.2.1, the formalisms presented in this chapter may not be perfectly compatible with those used in the other chapters of this dissertation, especially in regard to the locality constraints discussed in Chapter 3. Thus, readers wishing to adopt the theories of this dissertation might want to model the discourse effects discussed in this chapter in other dynamic systems which rely more heavily on compositionality, scope, and logical form, or in dynamic systems which assume quantificational tenses. In this section, I will briefly outline the key elements that any account ought to include, and then discuss some potential approaches.

First, there must be different treatments of those predicates which introduce novel referents and those which refer to familiar referents. There should be some method for distinguishing between the two types of predicates within definite DPs.

Second, all predicates which introduce novel referents must have locally bound input times and should also show the effects of nominal lexical aspect (flexibility).

Third, predicates referring to familiar referents should not have locally bound input times and should not show the effects of nominal lexical aspect. Instead, they should inherit their property times from elsewhere in the discourse. If an identical or semantically equivalent predicate introduced novel referents earlier in the discourse, that should be the predicate from which a property time is inherited.

Working within the above guidelines, there are a number of options for how to represent the temporal interpretation of predicates which refer to familiar referents. The approach taken in

this chapter, in which predicates introduce discourse referents and the extensions of familiar-referring predicates are identified with the extensions of earlier predicates, might be applied to other systems. Some variation of maximal state-hood is likely a necessity for any system of this type, so that the states for which the two predicates hold (and therefore also their runtimes/property times) may also be identified with one another.

One option which avoids the introduction of discourse referents by predicates would be to store (e.g., in a stack) predicates saturated with time arguments, either (a) in a single complex entry with the discourse referent that they describe or (b) in a separate stack that stores predicates only. In either case, when a predicate referring to a familiar referent is used, the system should find the stored version of the predicate and re-use the times associated with it. In the interest of most closely mapping how speakers store information, I personally would advocate for a system more like (a), in which information predicated of a variable's referent is stored alongside the variable itself. After all, when a conversational participant hears 'Kaspar is a bachelor,' they do not hold on only to 'Kaspar' – they link 'Kaspar' with 'bachelor' and can refer to him unambiguously by either his name or a definite 'the bachelor' from that point forward. A model that likewise stores discourse referents and properties together would be an excellent representation of the conversational memory of a human interlocuter.

A variant on this option would be to assume that predicates referring to familiar referents have no time argument or property time whatsoever. Instead, the predicate just communicates "this property holds of this entity at *some* time – check the rest of the discourse for that information." In such a model, all predicates that have input times would have locally bound input times, as predicates referring to familiar referents would not *have* input times (or property times) – there is some allure to the simplicity of such a system.

This highlights another important point, which I have admittedly been slightly inconsistent about between chapters: should times be arguments of the DP or of the predicate? Given what I have said throughout this dissertation, especially in this chapter, it would seem that I fully support the latter option. As seen in §3.4 of this chapter, two predicates in the same DP can even have different input times; such data seems like it would only be compatible with a times being arguments of the predicates directly. Nonetheless, in Chapter 3, I use LFs like (66b), in which *t'* is an argument of the DP 'a 10-year-old.'

(66) a. Madara met a 10-year-old.

b. $\lambda w_0.\ \lambda t_0.\ [PAST_{t0}\ \lambda t'.\ [\ [\![\text{a 10-year-old}]\!]^g(w_0)(\mathbf{t'})\ [\lambda x.\ [\text{meet}\ (x)(m)(w_0)(t')]]]]$

In DPs like 'a 10-year-old' which contain only one predicate, it is inconsequential whether times are arguments of DPs or predicates, as the DP would simply pass the time argument through to its predicate. However, when more than one intersective predicate is present within the same DP (as in Chapter 3, §3.2, or Chapter 4, §3.4), it seems like it should matter which one of these approaches is taken. However, if predicates referring to familiar referents do not have property times, as discussed above, then a DP's time argument would only be passed through to predicates which introduce novel referents, as desired. (As discussed in Chapter 3, §3.2, two intersective predicates in the same DP which both introduce novel referents should have the same input time.) Even if predicates referring to familiar referents *do* have property times, having times be arguments to entire DPs merely requires some mechanism (such as the NFG) for blocking those predicates from using that time argument as an input time. Thus, surprisingly, I believe that a system which treats times as arguments to the DP is fully compatible with the empirical observations made in this dissertation.

5. Conclusion

In this chapter, I presented two major groups of data. The first (in §1.1) showed that predicates referring to referents familiar to the discourse inherit their property times from a previous instance of the same predicate (which, in turn, has established its property time via the methods laid out in the previous chapters). The second (in §3) showed that not all predicates within definite DPs are familiar and only those that *are* familiar are property time inheriting, resulting in a model which tied property time inheritance exclusively to the familiarity of the predicate extension, rather than to the definiteness of the DP.

Tonhauser (2006) provided a foundational theory which accounted for the first group of data. Using Discourse Representation Theory (DRT), familiar referents (marked as such by their position in definite DPs) were identified with referents previously established in the discourse which had been described by the same predicate. In this process of identification, the property times and input times of those predicates were also identified with each other in order to prevent inconsistency, given an assumption that the interval over which a state holds is the maximal period for which the predicate associated with that state holds of the specific discourse referent ("Maximality of States").

In §3.4, I modified that theory in order to account for the second group of data, which showed that predicates which introduce novel referents, whether they occur in indefinite or definite DPs, always have locally bound input times, while predicates which refer to familiar referents always inherit their property times from elsewhere in the discourse. To account for this, I modified the theory so that it was not DPs which were identified with other DPs, but rather predicate extensions that were identified with other predicate extensions. To facilitate this, I added discourse referents introduced by each predicate, the intersection of which defined the DP as a whole. Tonhauser's

(2006) discourse referent identification, as well as the subsequent property and input time identification, remained. Thus, in the updated model, some predicates within definite DPs can inherit property times while other predicates within the same DP have locally bound input times.

There is much more work available to be done on this topic, especially with regards to the weak familiarity data presented in §3.2, for which no account was given. Additionally, in order to integrate smoothly with the binding requirements of Chapter 3, significant changes will need to be made to DRT (§2.2.1), or the concepts of this chapter will need to be implemented in a different dynamic system (§4). This chapter represents an advancement, not a culmination, in the study of the temporal interpretation of predicates at the discourse level; there are many more advancements waiting to be made.

CHAPTER 5

CONCLUSION

1. Summary

The goal of this work has been to offer a comprehensive and compositional account of the times at which nominal predicates may be interpreted, with specific attention paid to the relationship between sentential tense and nominal property times.

By NOMINAL PROPERTY TIMES, I mean the intervals over which a nominal property may hold of the individual it describes. Counter to previous claims, I argue that the intervals compatible with a given noun in a given utterance in a given discourse may be determined compositionally, based on the lexical aspect of the nominal predicate itself (Ch. 2), its location in the LF relative to sentential tenses (Ch.3), and whether it describes a referent novel to the discourse[1] (Ch. 4).

All prior models (e.g., Enç 1981, 1986; Musan 1995, 1999; Tonhauser 2002, 2006, 2020) lacked compositionality to some extent, based on a core belief that a scopal theory of tense was not a viable option. This belief stemmed from the first major work on nominal evaluation times (Enç 1981), which investigated a simple extension of a scopal theory of tense: if tense is scopal, then nouns scoping below the tense should be evaluated at the time defined by the tense, and at the utterance time if above the tense's scope. Enç quickly provides counterexamples to this claim and rejects scopal tense altogether, concluding that tense is more likely a feature of verbal

[1] Recall that "a predicate which describes a referent novel to the discourse" here means a predicate which characterizes a set novel to the discourse. Likewise, a predicate which "refers to familiar referents" is meant to be understood as a predicate which characterizes a set familiar to the discourse.

predicates than a feature of sentences. (This is, of course, incompatible with later theories that other non-verbal elements are scopally affected by tense, such as adverbs (Percus 2000) and nominal modifiers (Ogihara 2003).)

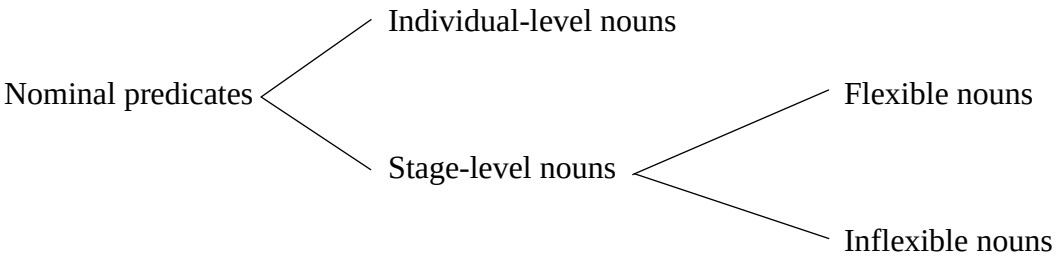
In this dissertation, I claim that there is truth behind Enç's original hypothesis: nominal predicates – like verbs, adverbs, and nominal modifiers – are temporally located based on their scopal relationships with sentential tenses. I argue that the data which has appeared to refute this theory are reflections of (a) a distinction between the lexical properties of two nominal classes and (b) a distinction between the behavior of predicates introducing to novel referents and predicates referring to familiar referents. By explaining the systematicity hiding behind these seemingly problematic data points, a theory based on the scopal relationships between nominal predicates and sentential tenses falls easily into place.

This dissertation therefore offers strong support that tenses are indeed *sentential* features, rather than features of verbs or other isolated groups of predicates. I take this to partially explain why "no nominal expression has, to date, been shown to be a nominal tense" (Tonhauser 2020:16) – there are no nominal tenses and there are no verbal tenses. Tenses scope over the entirety of sentence, equally affecting all predicates scoping under them.

1.1 Chapter 2

Chapter 2 accounts for one of the confounds that has confused previous attempts at accounting for nominal property times. In this chapter, I demonstrate that not all nominal predicates have the same set of acceptable property times, even if all else in the utterance stays the same. I argue that nominal predicates naturally separate into three classes: individual-level nouns (à la Musan 1997), FLEXIBLE NOUNS, and INFLEXIBLE NOUNS.

(1)



The difference between the two novel classes, flexible nouns and inflexible nouns, is how the noun's time argument, or "INPUT TIME," is related to the acceptable intervals over which the nominal property may hold. (Regardless of type, the time argument of a nominal predicate is locally bound by the nearest time abstraction, i.e., tense or utterance time; see Ch. 3.) Flexible nouns, exemplified by 'fugitive' in (2), are allowed any property time which either precedes or overlaps their input time. Thus, the subject of (2a) may hold the property of 'fugitive' prior to being 'in jail' at the utterance time, avoiding contradiction. Inflexible nouns, on the other hand, must hold for an interval which overlaps their input time; thus, the subject of (3a) must hold the property of being a 'bachelor' at the utterance time, while they also hold the property of being 'married,' creating a contradiction.

(2) <u>Flexible</u>

a. A fugitive is in jail.

b. $[\![\text{fugitive}]\!]^g = [\lambda t_i.\ \lambda x_e.\ \exists t'\ (t' \leq t\ \wedge\ x \text{ is a } \textit{fugitive} \text{ at } t')]$

(3) <u>Inflexible</u>

a. # A bachelor is married.

b. $[\![\text{bachelor}]\!]^g = [\lambda t_i.\ \lambda x_e.\ \exists t'\ (t' \bigcirc t\ \wedge\ x \text{ is a } \textit{bachelor} \text{ at } t')]$

Flexibility has been at the heart of many counterexamples in previous literature; a minimal pair like (2a) and (3a) provided enough evidence for many works to conclude that the available property times of nominal predicates are not consistent. Add in an example where the most natural reading involves the property time of ‘fugitive’ overlapping the utterance time (unlike the most natural reading of (2)), and nominal property times as a class seem to lose all predictability:

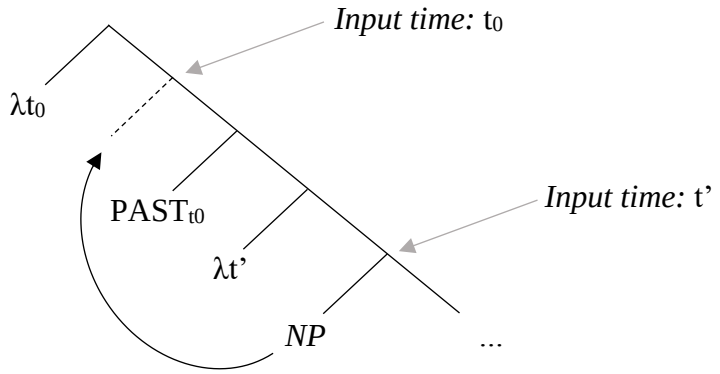
(4) A fugitive that everyone is looking for is supposedly hiding somewhere nearby.

However, acknowledgement of difference in flexibility allows us to search for systematicity in *input times*, rather than *property times*, re-opening previously discarded theories for reexamination under a new light. Under this approach, I show in Chapter 3 that, while property times are not always coindexed with the nearest scoping time abstraction (the hypothesis that Enç 1981 tested), input times always are.

1.2 Chapter 3

Chapter 3 looks at how the values of input times are determined based on the other time variables in the utterance. I conclude that the input times to nominal predicates introducing novel referents are locally bound by the nearest lambda abstractor over times. That is, if a noun scopes below a tense, its input time will be coindexed with the time defined by that tense. If a noun scopes above all tenses, its input time will be coindexed with the utterance time.

(5)



This conclusion is supported by data in which the input times to nominal predicates are restricted when the nominal's position in the LF is otherwise predictable. For instance, in existential 'there' constructions, where the post-copular argument must be interpreted in situ (Williams 1984, Heim 1987, Francez 2007, Poole 2017), input times are limited to the times defined by the nearest scoping tense. In clauses embedded under attitude verbs, de dicto readings – in which the argument must be interpreted in a position below the attitude verb – are only compatible with input times which can be locally bound from such positions.

This puts nouns in line with many other predicates: Percus (2000) claims that the time arguments of verbs and adverbs are locally bound by the nearest time abstraction, Abusch (1988) makes the same claim for relative clauses, and Ogihara (2003) more generally for all nominal modifiers. Given all of these claims, I propose the overarching Temporal Locality Constraint:

(6) **Temporal Locality Constraint** (TLC)

The input times to any predicates introducing novel referents must be bound by the nearest lambda abstractor over times.

I additionally discussed (i) whether the data from this chapter will force us to abandon situation pronouns (in the sense of world-time pairs), (ii) whether nominal times exhibit a universal tendency of variables to separate into a tripartite paradigm of directly referring expressions, pronominals, and anaphors, (iii) whether a purely scopal theory of tense is compatible with the data presented, (iv) whether we might also posit a locality constraint for world arguments, and (v) how the Temporal Locality Constraint ties in with theories of semantic reconstruction.

1.3 Chapter 4

Chapters 2 and 3 explained how input times and property times are arrived at for nominal predicates which introduce novel referents into the discourse. In Chapter 4, I address the property times of nominal predicates that refer to familiar, rather than novel, referents.

The motivating data for this chapter are exemplified by (7) and (8). In (7), 'bachelor' introduces a novel referent and must have a property time that overlaps the utterance time, as predicted by the theories of Chapters 2 and 3, resulting in a contradiction based on an overlap with the property time of 'married.' The final sentence of (8) is nearly identical, yet contains no contradiction. I attribute this difference to the fact that the underlined 'bachelor' in (7) refers to a novel discourse referent while the underlined 'bachelor' in (8) refers to a familiar discourse referent.

(7) # A <u>bachelor</u> is married.

(8) My best friend while I was in college was a bachelor. I saw him again recently. The <u>bachelor</u> is married.

In this chapter, I show that nominal predicates which refer to familiar referents "inherit" their property times from earlier uses of the same predicates which introduced novel referents into the

discourse. (For instance, the second instance of ‘bachelor’ in (8) is interpreted as having the same property time as the first instance of ‘bachelor’ in the discourse – in the most natural reading, this is a property time which overlaps the time at which the speaker was in college.) The initial use of the predicate is subject to the TLC, while later uses, which refer back to referents introduced by the initial use, are not. In cases where a predicate refers to familiar discourse referents, but the exact predicate has not been used previously in the discourse, allowances are made to allow the predicate to inherit a property time from elsewhere in the discourse. This account is summarized in the Novelty-Familiarity Generalization:

(9) **Novelty-Familiarity Generalization** (NFG)

Predicates introducing novel referents to a discourse are subject to the TLC, while predicates referring to referents familiar to a discourse inherit property times from elsewhere in the discourse.

A crucial contribution of this chapter is that property time inheritance is tied to the familiarity of a predicate, rather than to the definiteness of the DP in which it occurs. This is supported by evidence from definites licensed by uniqueness and definite DPs containing multiple predicates of varying familiarity. For instance, in (10), the underlined instance of ‘bachelor’ characterizes a familiar set of discourse referents and inherits its property time from the initial use of the predicate ‘bachelors,’ while the predicate ‘50-year-old’ characterizes a novel set (which is intersected with the set of bachelors) and derives its property time from sentence internal time variables, following the TLC. Despite occurring in the same definite DP, the two predicates vary in familiarity and in the method by which they arrive at their property times.

(10) I knew many bachelors in college. I saw them all again recently at my college reunion. All of the 50-year-old bachelors are married.

The Novelty-Familiarity Generalization is implemented as a modification to a system originated in Tonhauser (2006), couched in the dynamic semantic Discourse Representation Theory (e.g., Kamp 1981, Kamp & Reyle 1993, Kamp et al. 2011). In my update to the system, discourse referents are introduced by predicates rather than DPs, and thus property times are inherited from predicates introducing novel referents by predicates referring to familiar referents. Anaphoric discourse referents are "identified with" previously introduced discourse referents based on their shared properties (e.g., an anaphoric plural discourse referent introduced by the underlined instance of 'bachelors' in (10) would be identified with the established discourse referent previously introduced by the initial instance of 'bachelors'; other potential antecedents are ruled out by virtue of not sharing the presupposed property of being a bachelor). Following Tonhauser, I assume that states are maximal; the state over which the initial instance of 'bachelors' holds of its referents represents the entire state of bachelor-hood for those referents. The same goes for the familiar instance of 'bachelors,' and thus the two states are equivalent and can be identified with one another. The runtimes of two equivalent states – i.e., the property times of the predicates associated with the states – define the same interval, therefore both instances of 'bachelors' share the same property time. Thus, by identifying the extension of the familiar 'bachelors' with the extension of the novel 'bachelors,' the property time of the familiar 'bachelors' is forced into equivalence with the property time of the novel 'bachelors.'

1.4 Overview

In sum, a predicate introducing novel referents into a discourse must hold over some property time. If the predicate is a flexible noun, then its property time either overlaps or precedes the time that values the nearest scoping lambda abstractor over times. For all other predicates introducing novel referents, the property time must overlap the time that values the nearest scoping lambda abstractor. Predicates which refer back to previously introduced referents, instead of introducing novel ones, inherit the property time of the initial use of that predicate (which introduced the relevant referents).

2. Applications & future work

The tools provided in this dissertation are useful in many ways. The most obvious extension of the work done here is the direct application of the same tests to languages other than English; such applications can produce results valuable to theoreticians studying cross-linguistic semantic and syntactic effects as well as fieldworkers mapping out the complexities of lesser-studied languages.

For instance, the work done in Chapter 2 may be repeated in order to determine the available property times of non-verbal predicates and the flexibility (whatever form that may take) of non-verbal predicates, shedding light on the internal temporal features of predicates cross-linguistically. It is possible that, with more cross-linguistic data, we may be able to come back to the question left open at the end of Chapter 2 – should flexibility continue to be classified as lexical aspect, or does it substantiate a new class which may be better described as lexical tense?

The tests done in Chapter 3 to show that input times are locally bound can be easily replicated to see whether the TLC holds cross-linguistically. Importantly, if the TLC holds for a language, then property times can be used to determine additional information about the tense system of that

language. Investigating tense systems via non-verbal predicates is useful for both fieldworkers and theoreticians, as the relationship between tense and verbal evaluation times is often obscured by interactions with grammatical aspect, mood, or evidentiality. Utilizing additional information from non-verbal predicates will likely allow us to more clearly observe universal behaviors of tense.

In languages where the TLC holds and much is already known about the tense system, property times become a tool to diagnose the location of predicative material within the LF. As was seen in Chapter 3, such diagnostics can contribute to current theoretical research, on topics including covert quantifier raising, constraints on movement, intensionality and the binding of world pronouns, and semantic reconstruction effects.

Finally, the work done in Chapter 4 can be repeated in other languages in order to study not only property time inheritance, but also discourse anaphora and novelty more broadly, as well as the methods by which definiteness is licensed. In particular, studying property time inheritance provides a method for diagnosing novelty without a reliance on definiteness, which can be particularly useful in languages without overt definiteness markers.

Importantly, all of these many subjects can be investigated near-simultaneously with a comparatively small amount of data, given that data points will be reused between topics, which is incredibly beneficial to field linguists working with endangered languages where documentation needs to be completed quickly.

In addition to cross-linguistic work, there are a number of theoretical questions left open for future work. For instance, how do property times behave under universal quantification? Consider the following example: ‘Every senior will have met a president’ (Enç 1981:36). In one reading of this sentence, it seems as if ‘every’ quantifies over both individuals and times, meaning something like ‘any individual x at any time t for which senior(x,t) = 1 …’ In this reading, the subjects may

be ‘seniors’ at any property time. A compositional theory has yet to be provided for readings such as this.

Another open question: how do input and property times interact with grammatical aspect and what does that tell us about the structure of the LF? If results show that grammatical aspect only affects VPs, and we already know that tense affects the entire sentence, then nominal and adjectival property times could be used as a tool by which we determine whether a particular operator is an instance of tense or grammatical aspect – another valuable fieldwork tool.

On the subject of tense, we might also ask whether all input times are locally bound or whether that property is specific to the input times of referent-introducing predicates? That is, could we think of *tenses* as having input times that are locally bound? Certainly, one might think of a matrix tense as defining a new time variable based on a locally bound UT *input time* – could this analogy function at the embedded level as well? Such a discussion could have an interesting impact on the modeling of sequence-of-tense effects, as well as the modeling of tenses in relative clauses (e.g., Abusch 1988).

Additionally, there are further questions relevant to investigating the full extent of the local binding of input times. For instance, we have described input times as having anaphoric properties, so we might wonder whether languages with long distance anaphors in the individual domain also allow long distance binding of input times.

Another important question that was not fully resolved in this dissertation is whether world arguments are locally bound in the same way that time arguments are. As laid out in Chapter 3, this question is intrinsically tied to questions about the nature of semantic reconstruction: must higher-type traces reconstruct for the binding of input times, or is such reconstruction optional?

Given the complicated nature of the judgments involved, this question was left open to future work.

Questions left open in Chapter 4 should also be considered further. For instance, how can property time inheritance be modeled in cases of weak familiarity? Some cases of logical equivalence are accounted for in Tonhauser's (2006) model, but, as discussed in §3.2 of Chapter 4, property time inheritance in cases of bridging and "marble sentences" are yet to be explained. Also from Chapter 4: should predicates referring to familiar referents have time arguments at all?

Finally, how do input and property times interact with temporal adverbial and prepositional phrases, such as 'tomorrow' or 'in 2010?' As mentioned briefly in Chapter 2, initial judgments suggest that these phrases may force specific temporal interpretations. Do they introduce time variables of their own which locally bind predicate input times? Or do they merely influence which of the available readings is most salient?

There are, of course, even more areas which I have not mentioned which will fuel future research: flexibility in non-nominal predicates, nominal property times in languages which lack overt tenses, the effects of prosody, and so on.

With all of these questions and more ready to be answered, this dissertation marks the beginning, rather than the end, of a long line of research into compositionally determined property times.

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