



Context and Composition

How Presuppositions Restrict the Interpretation of Free Variables

Vera Hohaus

Dissertation
zur Erlangung des akademischen Grades
Doktor der Philosophie



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Zusammenfassung in deutscher Sprache

Die vorliegende Promotionsschrift ist in der theoretischen Linguistik verortet, konkret in der formalen Semantik. Sie leistet einen Beitrag zur Beantwortung zweier zentraler Forschungsfragen des Faches: Wie lässt sich mit Hilfe mathematischer Modelle beschreiben und vorhersagen, wie Sprachen sich unterscheiden und welche Gemeinsamkeiten sie haben? (Stichwort: Sprachvariation) Wie lässt sich die Kontextabhängigkeit natürlicher Sprache in solchen Grammatikmodellen adäquat erfassen? (Stichwort: Kontextabhängigkeit)

Ein Beispiel für diese Kontextabhängigkeit der Bedeutung sprachlicher Äußerungen ist der Satz *Maria ist größer*, bei welchem der Referenzpunkt des Vergleiches in der Sprechsituation bekannt sein muss –beispielsweise Jonathans Größe– und also aus dem Kontext bezogen wird. In gängigen Modellen von Sprachbedeutung, hier eine Erweiterung von Heim & Kratzer (1998), wird diese Kontextabhängigkeit mit Hilfe freier Variablen modelliert, welche mit Hilfe einer Funktion eine Wertzuweisung aus dem Kontext erhalten. Die vorliegende Arbeit identifiziert und untersucht eine Gruppe von Konstruktionen, sogenannten Rahmensetzungskonstruktionen (Frame Setter), die es dem Englischen und Deutschen erlauben, mit Satzmaterial kompositional Einfluss auf die Interpretation freier Variablen zu nehmen. Diese Rahmensetzungskonstruktionen agieren somit als Mediatoren an der Schnittstelle von Kontext und Komposition. Mit Hilfe von qualitativen Daten (Introspektion, Korpusbeispiele) und quantitativen Daten (Fragebogenstudien mit Erhebung von Akzeptabilitätsurteilen) werden als zentrale Eigenschaften von Rahmensetzungskonstruktionen ihre Flexibilität in Bezug auf den semantischen Typ der freien Variable, ihre Verwendung außerhalb syntaktischer Inseln und ihre kompositionale Integration identifiziert und in der Modellierung erfasst. Grundidee der Analyse ist, dass Rahmensetzungskonstruktionen eine Präsupposition über mögliche minimale Auswertungssituationen einführen, wodurch die Wertzuweisung an die freie Variable zwar indirekt, aber dennoch auf systematische Weise beschränkt wird. Der Mechanismus, der es Rahmensetzern ermöglicht, Einfluss auf die eigentlich kontextabhängige Interpretation freier Variablen zu nehmen, findet in einer Vielzahl von Konstruk-

tionen Anwendung, die für die semantische Theoriebildung von zentraler Bedeutung sind: Die Arbeit ist damit von Relevanz für die Forschung zu Vergleichskonstruktionen, Quantifikation, Modalität, Temporalität sowie Fokusalternativen.

Speziell für Vergleichskonstruktionen verfügen das Deutsche und Englische somit über zwei kompositionale Möglichkeiten, den Vergleichspunkt sprachlich zu bestimmen, nämlich in der Kombination von freier Variable und Rahmensatzkonstruktion (z.B. *Im Vergleich zu Jonathan ist Maria größer*) oder durch eine Argumentphrase (z.B. *Maria ist größer als Jonathan*). Sprachübergreifend ist somit durchaus denkbar, dass eine Sprache nur auf einer dieser beiden Strategien zurückgreift. Die vorliegende Arbeit lotet diese Typologie der kompositionalen Bestimmung von Vergleichsstandards aus mit Daten aus dem Samoanischen, Japanischen, Tadschikistanischen, Wascho und Motu. Ein Schwerpunkt liegt dabei auf der Analyse des Samoanischen, einer polynesischen Sprache aus der austronesischen Sprachfamilie. Als Sprache, die in hohem Maße kontextabhängig ist, nutzt das Samoanische in Vergleichskonstruktionen –so das Ergebnis der Untersuchung– ausschließlich eine Rahmensatzkonstruktion. Die Arbeit leistet damit nicht nur einen Beitrag zur Theoriebildung, sondern auch zur Dokumentation dieser wenig erforschten Sprache. Mit den Worten des Linguisten K. David Harrisons in eigener Übersetzung: „Unterrepräsentierte und unerforschte Sprachen erweitern und vertiefen unser Verständnis dessen, was der menschliche Geist vermag. ... Ihre Erforschung birgt unendlich reiche Entdeckungen.“ (Harrison 2007, S. 236) So auch hier.

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Abbreviations Used in Glosses

Sāmoan

| | |
|--------|---|
| ANAPH. | anaphoric pronoun |
| COMP. | comparison marker |
| DEM. | demonstrative |
| DET. | specific, singular determiner |
| DIR. | directional particle |
| ERG. | ergative preposition |
| FOC. | marker of focus alternatives |
| HUM. | prefix to numerals in reference to humans |
| PREP. | default preposition |
| PRN. | pronoun |
| prog. | progressive |
| sg. | singular |
| TAM | tense-aspect marker |

Tajiki

| | |
|-------|-------------------|
| POSS. | possessor marking |
| ptcp. | participle |
| sg. | singular |

Japanese

| | |
|-------|-------------------------|
| ACC. | accusative case marking |
| CL. | classifier |
| DAT. | dative case marking |
| fem. | feminine |
| gen. | genitive case marking |
| NOM. | nominative case marking |
| PART. | particle |
| PREP. | preposition |
| TOP. | topic marker |

Washo

| | |
|------|------------------|
| AOR | aorist |
| ATTR | attributive |
| COP | copula |
| IPFV | imperfective |
| NEG | negation |
| NMLZ | nominalizer |
| SR | switch reference |

Motu

| | |
|-------|-------------------|
| POSS. | possession marker |
| sg. | singular |
| TOP. | topic marker |

Part I

SETTING THE SCENE

1 Introduction and Background

1.1 General Introduction and Preview of the Proposal

Natural language expressions are dependent on context in their interpretation. In the framework which I will be adopting here, which is essentially the one developed in Heim & Kratzer (1998), the contribution of context to the meaning of a sentence is mediated through free variables, often also referred to as contextual variables, as in *e.g.* Martí Martínez (2003). At Logical Form, free variables are syntactically present and bear a subscript consisting of a numerical index and a semantic type. I assume the basic semantic types for individuals (type $\langle e \rangle$) and truth values (type $\langle t \rangle$), as well as types for degrees (type $\langle d \rangle$), situations (type $\langle s \rangle$), and times (type $\langle i \rangle$).

- (1) a. Semantic types are $\langle e \rangle$, $\langle t \rangle$, $\langle d \rangle$, $\langle s \rangle$, and $\langle i \rangle$.
- b. If σ and τ are types, then $\langle \sigma, \tau \rangle$ is also a type.
 Nothing else is a type.

The interpretation of free variables proceeds via the variable assignment function g , in (2), which assigns a contextually provided value of the matching semantic type, following the Proform and Traces Rule in (3). The interpretation function $\llbracket \cdot \rrbracket$ is relative to this assignment function.

- (2) A variable assignment is a partial function g from the set of indices to the set of all denotations, such that, for every $n, \langle \tau \rangle \in \mathbf{dom}(g)$, $g(n, \langle \tau \rangle) \in D_{\langle \tau \rangle}$.
(Heim & Kratzer 1998, p. 213)
- (3) If α is a proform or a trace, n and $\langle \tau \rangle$ are a number and a type respectively, g is a variable assignment, and $n, \langle \tau \rangle \in \mathbf{dom}(g)$, then $\alpha_{n, \langle \tau \rangle}$ is in the domain of $\llbracket \cdot \rrbracket^g$, and $\llbracket \alpha_{n, \langle \tau \rangle} \rrbracket^g = g(n, \langle \tau \rangle)$.
(Heim & Kratzer 1998, pp. 129, 213)

Contextual variables are fascinating because they often provide the crucial glue to the composition of meaning. I propose here that while their interpretation is dependent on context, the grammar still provides a com-

1 Introduction and Background

positional tool to indirectly manipulate this interpretation: Frame setters, among them the bracketed constituents in (4), systematically restrict the permissible value assignments to free variables without binding them, be they the contextual standard of a comparison, a quantificational domain restriction or the set of focus alternatives.

- (4) a. [*Im Vergleich zu Peter*] ist Maria größer_{C_{7,(d)}}.
 in+the comparison with Peter is Mary taller
 ‘Compared to Peter, Mary is taller.’
- b. [*In Bolivia*], Britta was_{C_{7,(i,t)}} blond.
- c. [*Except for Verena*], every musician_{C_{7,(e,t)}} dreads the treble clef.
- d. [*In view of the evidence*], Jockl must_{C_{7,(s,(s,t))}} be the murder.
- e. [*Im Gegensatz zu Sara*] ~_{C_{7,((s,t),t)}} war Nadine_F pünktlich.
 in+the contrast to Sara was Nadine punctual
 ‘Unlike Sara, Nadine was on time.’

The mechanism by which they do relies on the semantics of the frame constituent and the operator FRAME, in (5), which adds the denotation of the frame constituent as a domain restriction regarding the evaluation situations to the core proposition.

$$(5) \quad \llbracket \text{FRAME} \rrbracket = \lambda p_{\langle s,t \rangle} \cdot \lambda q_{\langle s,t \rangle} \cdot \lambda s_{\langle s \rangle} : p(s) \cdot q(s)$$

This presupposition may indirectly restrict the value assignments permissible for a free variable as only certain value assignments will be compatible with the presupposition.

1.2 The Structure of this Dissertation

For most of this dissertation, I will focus on examples of the type of (4-a) and on the free degree variable in Contextual Comparatives (ContComps) in English and German. The value assignment to this variable may be indirectly restricted through comparison frames (CompFs), as which English *compared to*-phrases and German *im Vergleich zu*- and *verglichen mit*-phrases are analyzed. The results of this case study generalize however to other degree constructions and other languages as well as to other frame setters. As a consequence, the structure of this dissertation can be compared to the shape of an upside-down Y. In the first and second part of this dissertation, we will focus on CompFs in ContComps, for which

1.2 The Structure of this Dissertation

the core proposal is developed in chapters 4 and 5. In the third part, we extend this proposal to other comparison constructions, in chapter 6, and to other languages, in chapter 7. In the last part, I extend the analysis to a number of other frame setters and contextual variables. From this structure, we can derive a couple of reading recommendations, too: A reader who is above all interested in comparison should focus on parts 1 to 3, whereas a reader that is curious about frame setters other than CompFs, should work through the important aspects of the core proposal in part 2 but can then skip directly to the last part of the dissertation. Lastly, to the reader who would above all like to learn about the nature of crosslinguistic variation, I also recommend that she familiarize herself with the important aspects of the analysis in chapter 4 but then skip to chapter 8 in part 2.

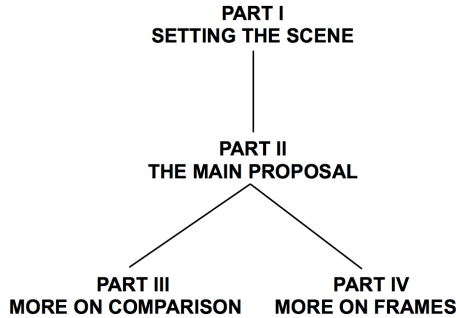


Figure 1.1: The Structure of this Dissertation

In the remainder of this chapter, I will provide some necessary background. I will first introduce the contextual variables in comparison constructions, in section 1.3.1 of this chapter, and briefly show that these free variables can be indirectly manipulated in their value assignment by CompFs. As particular emphasis in this dissertation is on ContComps, which contain a free degree variable, I will discuss their syntax and semantics in some detail, in section 1.3.2. We are then also in a position to formulate a more precise research question, which I do in section 1.4. Chapter 2 provides an overview over the three existing lines of analyses of CompFs, of which the major representatives are Beck, Oda & Sugisaki (2004), Kennedy (2009) and Fults (2006), along with some initial discussion. I reject these analyses in chapter 3, which also specifies the requirements for an empirically adequate analysis. Chapter 4 presents just

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such an analysis. In chapter 5, I further discuss the two core ingredients of this analysis, presuppositions and minimality of situations. In chapter 6, I apply the analysis to more examples. Section 6.2 of that chapter will return to other degree constructions besides the ContComp. Chapter 7 explores the crosslinguistic consequences of the analysis of CompFs. At the core of this chapter is an analysis of degree constructions in Sāmoan, a Polynesian language. Chapter 8 relates the analysis to the literature on frame setters, in particular to the analysis of Maienborn (2001), and applies it to frame setters other than CompFs and other free functional variables: Temporal variables and the domain restriction of quantifiers may be influenced in their interpretation by locative frames (LocFs). The domain variable of a universal quantifier may also be restricted by an exceptive frame (ExcF). Modal frames (ModFs) help determine the accessibility relation of a modal quantifier, whereas Contrastive frames (CFs) manipulate the interpretation of focus alternatives. The last chapter, chapter 9, provides a summary of the dissertation and offers some conclusions.

1.3 Background

Just as I assume that the reader is familiar with the semantic framework of Heim & Kratzer (1998), I assume a basic familiarity with the degree semantics of von Stechow (1984a,b). This section is thus not intended as a general introduction to the topic, for which I refer the reader especially to the overview in Beck (2011). Essential readings include Heim (1985, 2001), Kennedy (1997), and Beck, Hohaus & Tiemann (2012).

1.3.1 Free Functional Variables in Comparison Constructions

We find context dependency in comparison constructions when it comes to what the comparison is in relation to. In English and German, the Positive, the Comparative, the Equative, and the Superlative all do not necessarily require that this standard of the comparison is overtly specified, as illustrated in (6) to (9).

For the Positive in (6-a), the writer assumes that the reader is aware of the standards for who counts as intelligent, wise and competent. The example in (6-b) even indirectly addresses this context-dependency of the Positive: The standards for who counts as old vary across professions.

(6) Context-Dependent Positives:

- a. *Hillary Clinton: She is intelligent_C, wise_C, and competent_C.*¹
- b. *Ein 30-jähriger Fußballer ist alt_C, ein 30-jähriger Unternehmer jung_C, ein 50-jähriger Lehrer alt_C, ein 50-jähriger Ruheständler jung_C.*²
- “A thirty-year old soccer player is old, a thirty-year old manager young, a fifty-year old teacher old, a fifty-year old retiree young.”

The standard for the ContComp in (7-a) provided by the context is the age of the carved cupboard. In (7-b), it is the age of the wife, 35 years. For the Equative in (8-a), I did not provide the necessary context to identify what the comparison is in relation to: It is the age of the fee for forest fire protection, introduced in 1955. In the contextual equative from German in (8-b), the contextually provided standard to which the age of some of the teapots is compared to is sixty years.

(7) Contextual Comparatives:

- a. *There is a carved cupboard here dated 1687, though it is believed that the cottage is older_c.*³
- b. *Als wir 1940 heirateten, war ich schon 35 Jahre alt; mein Mann war fünf Jahre älter_c.*
- “In 1940, when we got married, I was already 35 years old; my husband was five years older.”⁴

(8) Contextual Equatives:

- a. *One fee that's nearly as_C old, dating back to 1963, is the \$25 the state charges to license firearms dealers.*⁵
- b. *Den Kirchentee gibt es schon seit 60 Jahren, manche Teekanne, aus der wir ausschenken, ist auch so_C alt.*⁶

¹ Forum post, *U.S. Catholic* (URL: <http://www.uscatholic.org/>), February 2012. Retrieved from Mark Davies (2010), “The Corpus of Contemporary American English (CoCA)” (URL: <http://corpus.byu.edu/coca/>).

² Sabine Etzold, „Die späte Lust am Lernen,“ *Die Zeit*, November 21, 2002, p. 39.

³ Allen Phoebe (1975), *The Old Galleries of Cumbria and the Early Wool Trade* (Kendal: Abbot Hall Art Gallery). Retrieved from Mark Davies (2004), “The British National Corpus (BYU-BNC)” (URL: <http://corpus.byu.edu/bnc/>).

⁴ „Geboren noch zu Kaisers Zeiten,“ *Braunschweiger Zeitung*, November 24, 2005. Retrieved from Institut für Deutsche Sprache, Mannheim, “The Corpus Search, Management and Analysis System (COSMAS)” (URL: <http://www.ids-mannheim.de/cosmas2/>), item BRZ05/NOV.01626.

⁵ James Salzer, “State Fees Likely to Go Up,“ *Metro News*, March 7, 2010, p. 1B.

⁶ Susanne Gloger, „Christuskirche,“ *Nordwest Zeitung*, January 8, 2014 (URL: <http://www.nwz.de/>).

1 Introduction and Background

“Our parish’s after-mass tea service has been in existence for sixty years. Some of the teapots which we use to serve tea are as old.”

In the Contextual Superlative in (9-a), it is unlikely that Charles Newcomb is the oldest trainee ever. Looking at the text this sentence is from, all of the other trainees at a certain UPS location are the contextually provided standard for this comparison. In the case of (9-b), the context provides the other pictures in this three-volume atlas on alpine flora as the reference for the superlative.

(9) Contextual Superlatives:

- a. *At 46, Charles Newcomb is the oldest_C trainee.*⁷
 b. *Auf Seite 418 in Band 1 ist die älteste_C Aufnahme abgedruckt, ein Dia von 1965 mit der Purpurroten Krugpflanze. . . .*⁸
 “The oldest picture is on page 418 in volume 1, a slide from 1965 with the purple pitcher plant. . .”

In all of (6) to (9), the respective degree operators combine with a free variable, whose value is contextually provided, as sketched in (10) to (14). I adopt here a lexical entry for the Positive from von Stechow (2009, p. 220, no. (22)). The lexical entries for the equative and the superlative operator are both from Beck (2011, p. 1349-1350, no. (44), (56)). See section 1.3.2 for discussion of the lexical entry in the ContComp.

$$(10) \quad \llbracket [\text{DegP} [\text{Deg POS}] C_{7, \langle d, t \rangle}] \rrbracket^g = \lambda D_{\langle d, t \rangle}. \forall d [(g(7, \langle d, t \rangle))(d) \rightarrow D(d)]$$

with $g(7, \langle d, t \rangle)$ the neutral segment on the respective degree scale

$$(11) \quad \llbracket [\text{DegP} [\text{Deg } \textit{-erdeg}] c_{7, \langle d \rangle}] \rrbracket^g = \lambda D_{\langle d, t \rangle}. \text{MAX}(D) > g(7, \langle d \rangle)$$

$$(12) \quad \llbracket [\text{MAX}] \rrbracket = \lambda D_{\langle d, t \rangle}. \iota d [\forall d' [D(d') \rightarrow d \geq d']]$$

$$(13) \quad \llbracket [\text{DegP} [\text{Deg } \textit{as}] C_{7, \langle d, t \rangle}] \rrbracket^g = \llbracket [\text{DegP} [\text{Deg } \textit{so}] C_{7, \langle d, t \rangle}] \rrbracket^g = \lambda D_{\langle d, t \rangle}. \text{MAX}(D) \geq \text{MAX}(g(7, \langle d, t \rangle))$$

$$(14) \quad \llbracket [\text{DegP} [\text{Deg } \textit{-est}] C_{7, \langle e, t \rangle}] \rrbracket^g = \lambda R_{\langle d, \langle e, t \rangle \rangle}. \lambda x_{\langle e \rangle}. \forall y [(g(7, \langle e, t \rangle))(y) \& y \neq x \rightarrow \text{MAX}(\lambda d. R(d)(x)) > \text{MAX}(\lambda d'. R(d')(y))]$$

Certain prepositional and adverbial phrases feature in ContComps which indirectly determine the value of these free functional variables.

[//tinyurl.com/nwz20140108](http://tinyurl.com/nwz20140108), accessed September 23, 2014).

⁷ Gary Strauss, “UPS’ Pay, Perks Make it a Destination Job,” *USA Today*, October 14, 2003 (URL: <http://tinyurl.com/USAT20031014>, accessed October 10, 2014).

⁸ Urs Willmann, „Der Berg blüht,“ *Die Zeit*, June 17, 2006 (URL: http://www.zeit.de/2004/26/33_alpengem_9fse_text, accessed September 23, 2014.)

Consider the examples from English and German in (15) to (18) below.

(15) Positives:

- a. *Planets are very small_C [compared to stars],...*⁹
- b. *[Compared to many coffee houses], the place is huge_C.*¹⁰
- c. *In Deutschland geht es uns [verglichen mit Menschen in anderen Ländern] doch richtig gut_C.*¹¹
 “Compared to people in other countries,
 we live really well in Germany.”
- d. *Doch [im Vergleich zu ähnlichen Auktionen aus der jüngeren Vergangenheit] fiel das letzte Gebot am Donnerstag günstig_C aus.*¹²
 “Compared to similar auctions from the recent past however,
 the last bid on Thursday was low.”

(16) Comparatives:

- a. *[Compared to cows milk], soymilk has fewer_c calories, no cholesterol, less_c fat and more_c iron.*¹³
- b. *Vollkornbrote haben [im Vergleich zu anderen Broten] einen höheren_c Ballaststoffgehalt und sind reicher_c an Vitaminen... und Mineralstoffen...*¹⁴
 “Compared to other types of bread, whole-grain bread has a higher fiber content and is rich in vitamins and minerals.”
- c. *[Verglichen mit ihrer Kollegin] wählt Pieroth den spröderen_c, der Konzeptkunst verbundeneren_c Weg.*¹⁵
 “Compared to her colleague, Pieroth chooses a more solemn approach, remaining more true to the original ideas behind conceptual art.”

⁹ Michelle Thaller, “Planets in all the Wrong Places,” *Christian Science Monitor*, March 6, 2006 (URL: <http://tinyurl.com/cs20060306>, accessed August 28, 2014).

¹⁰ Syd Kearney, “Wake up, Houston!” *Houston Chronicle*, January 27, 2011, p. 27.

¹¹ Irena Güttel, „Besonders glücklich sind ganz Junge und ganz Alte,“ *Rhein-Zeitung*, January 5, 2013, p. 8.

¹² Deutsche Presseagentur dpa, „Yahoo-Chefin: Ein Essen mit Marissa Mayer für 90.000 Dollar,“ *Frankfurter Allgemeine Zeitung*, June 28, 2013 (URL: <http://www.faz.net/-gq1-7auna>, accessed August 29, 2014).

¹³ Susan Belsinger (2002), “Amazing Aminos”, *Vegetarian Times* 301: p. 39.

¹⁴ „Dunkles Brot ist nicht immer Vollkornbrot,“ *Hannoversche Allgemeine Zeitung*, September 10, 2007, p. 24. COSMAS-item HAZ07/SEP.02591.

¹⁵ Christian Mückl, „Albrecht-Dürer-Gesellschaft Nürnberg: Kunst, die von Hypnose kommt,“ *Nürnberger Zeitung*, March 21, 2013, p. 28.

1 Introduction and Background

(17) Equatives:

- a. [*Compared to my other baked oatmeal recipe*],
*this one is just as_C good!*¹⁶
- b. *Though Nadia's artists are doing well at home and in various parts of the world, [compared to work from other Arab countries] Moroccan art is just not as_C big.*¹⁷
- c. *Die Preise der X-Reisen können [verglichen mit herkömmlichen Reisen] genauso_C teuer, teurer oder billiger sein.*¹⁸
“Dynamic travel packaging can be exactly as expensive, more expensive or less expensive.”
- d. *Die Benutzeroberfläche wirkt [im Vergleich zu anderen... Navis] peppiger, ist aber genauso_C übersichtlich und logisch aufgebaut.*¹⁹
“Compared to other GPS navigation systems, the user interface looks much more upbeat but is exactly as clearly arranged and logically structured.”

(18) Superlatives:

- a. [*... compared to other towns*] *it (i.e. the town of Marfa) was the best-looking and most_C practical.*²⁰
- b. [*Compared to its crosstown rivals*], *Ford is the furthest along in its recovery from the recession...*²¹
- c. *Die Spareinlagen sind bei der Commerzbank, [verglichen mit den anderen beiden Großbanken], am stärksten_C gestiegen.*²²
“Compared to the two other big banks, Commerzbank has had the largest rise in saving deposits.”
- d. *Die Fondsmanager wählen nämlich zumeist aus jeder Branche die Unternehmen aus, die [im Vergleich zu ihren Konkurrenten] die besten_C Umwelt- und Sozialkriterien vorweisen können.*²³

¹⁶ Saucy Spatula food blog, “Baked Oatmeal with Blueberries” (URL: <http://tinyurl.com/SaucySpatula>, accessed August 29, 2014).

¹⁷ Amelia Smith, “Contemporary Moroccan Art,” *Middle East Monitor*, July 24, 2013 (URL: <http://tinyurl.com/MEM20130724>, accessed August 29, 2014).

¹⁸ Anieke Walter, „Billigreisen können teuer werden,“ *Der Tagesspiegel*, April 26, 2011 (URL: <http://tinyurl.com/ts20110426>, accessed September 29, 2014).

¹⁹ Review of the Falk Pantera 32+ GPS, *Navigation Professionell*, October 2013 (URL: <http://tinyurl.com/FalkPantera32>, accessed August 29, 2014).

²⁰ Paul Alexander, “Texas Adopts the Arts,” *Travel and Leisure*, February 2000, p. 2 (URL: <http://tinyurl.com/TLFeb2000>, accessed August 29, 2014).

²¹ Nick Bunkley, “Hurt Ford Profit,” *The New York Times*, April 28, 2012, p. 2.

²² „Das bisher beste Jahre für die Commerzbank,“ *Die Welt*, April 16, 1959, p. 8. COSMAS-item BZK/W59.00402.

²³ „Nicht immer ganz grün,“ *Hannoversche Allgemeine Zeitung*, December 24, 2007,

“In fact, portfolio managers usually select those companies from every sector that demonstrate the best environmental and social criteria compared to their competitors.”

In the presence of what I will be analyzing as frame setters and refer to as CompFs, the free degree variable in ContComps exhibits an unfree behavior, determined but not bound: Its value must be in relation to the CompF. This is quite fascinating. Understanding the grammatical mechanism behind this will contribute, more generally, to our understanding of context dependency and compositionality in natural languages, and, more specifically, to understanding the grammar of variables.

However, instead of dragging along all of the above degree constructions throughout, I will focus my investigation on ContComps: We will not return to the other degree constructions until section 6.2, once an analysis of CompFs in ContComps is in place. In preparation for such an analysis, the next section provides a more thorough introduction to the syntax and semantics of ContComps. So far, this introduction has mostly emphasized the relevance of the above data for a more general understanding of free functional variables in the composition of meaning. From a somewhat more narrow point of view, understanding the syntax and semantics of CompFs is relevant to a number of research topics in degree semantics, which I will also point out in the next section.

1.3.2 The Syntax and Semantics of Contextual Comparatives

Contextual Comparatives (ContComps) are the most frequent comparative construction in adult speech²⁴, the first comparative construction to be acquired in first language acquisition in English and German²⁵, and most likely the most widely available type of comparative construction crosslinguistically (Beck, Hohaus & Tiemann 2012).

$$(11) \quad \llbracket [\text{DegP} [\text{Deg} \text{-}er_{\text{deg}}] c_{7, \langle d \rangle}] \rrbracket^g = \lambda D_{\langle d, t \rangle}. \text{MAX}(D) > g(7, \langle d \rangle)$$

p. 13. COSMAS-item HAZ07/DEZ.06223.

²⁴ ContComps were more frequent than phrasal comparatives by a coefficient of 4.13 and by a coefficient of 11.25 for clausal comparatives in a corpus study of adult speech Hohaus, Tiemann & Beck (2014, pp. 238-240) conducted.

²⁵ In a CHILDES corpus study of three English- and three German-learning children, mean age of acquisition for ContComps in English was 3;2 and 3;1 for German, whereas mean age of acquisition for *e.g.* superlatives was 4;4 for English and 4;1 for German (Hohaus, Tiemann & Beck 2014, p. 228). See again below.

1 Introduction and Background

Let us reconsider the analysis already sketched in (11) in the previous section (and repeated above) somewhat more carefully, specifically the following questions:

- (i) Can ContComps be analyzed as an instance of Comparison with a Degree (DegComp)?
- (ii) Is this degree syntactically represented?
- (iii) Is the comparative operator employed in ContComps scopally mobile?
- (iv) Is there variation between German and English when it comes to ContComps?

As implied by (11), I suggest (i) that ContComps can indeed be analyzed as an instance of DegComp, in this case as a comparison with a covert degree, and (ii) that this degree is syntactically represented in the shape of a degree variable, which remains free and receives a value from the context but can also be bound. Evidence from first language acquisition suggests (iii) that ContComps employ a scopally non-mobile operator. There is, however, evidence to suggest that a scopally mobile version is also available. (iv) Lastly, as far as the semantics of ContComps are concerned, there is no variation between German and English. Let us look at the individual questions in somewhat more detail.

(i) We are going to assume that ContComps can be analyzed as instances of DegComp. In (20) to (22), the standard of comparison is represented by a free variable of type $\langle d \rangle$. In the context provided, this variable is assigned 25 years as a value.

- (19) Context:
Peter is twenty-five years old.
- (20) *Mary is older_c.*
 $\text{MAX}(\lambda d. \text{AGE}(\text{Mary}) \geq d) > g(7, \langle d \rangle)$
with $g(7, \langle d \rangle) = 25 \text{ years}$
- (21) *Maria ist älter_c.*
Mary is older
'Mary is older.'
- (22) *Mary is older than that.*
 $\text{MAX}(\lambda d. \text{AGE}(\text{Mary}) \geq d) > g(7, \langle d \rangle)$
with $g(7, \langle d \rangle) = 25 \text{ years}$

The only difference between the English examples in (20) and (22) is that this degree variable is covert in the case of (20). Note that German has no overt counterpart to the ContComp in (21).

(ii) Evidence for an analysis that assumes that this degree variable is syntactically represented (*i.e.* present at Logical Form) even in the case of ContComps, comes from examples such as (23) and (24), where there is no one contextually provided degree.²⁶ Rather, the comparison standard is dependent on the quantifier.

(23) *Whenever John wrote a letter to Mary, she answered two days later_c.*
(Partee 2004, p. 260, ex. (6))

(24) *However fast Mary ran,
her sister managed to be two minutes faster_c.*

The sentence in (24), for instance, is only true of a situation if, informally, for every situation and every degree such that this degree is the speed of Mary's running in the situation, the speed at which her sister runs in this situation exceeds that degree. The analysis of these examples thus requires a semantically bound instance of the degree variable which provides the standard of comparison.

(iii) The time course of first language (L1) acquisition in both German and English suggests that the comparative operator in ContComps is scopally not mobile: Mean age of acquisition for ContComps in a corpus study of three German and three American children was 3;2 for English and 3;1 for German (Tiemann, Hohaus & Beck (2012) and Hohaus, Tiemann & Beck (2014)). Acquisition of ContComps such as (25) was thus significantly earlier than acquisition of other types of comparatives, superlatives, pronominal and overt measure phrase constructions like (26) and (27), and degree questions like (28).

²⁶ Pluractional comparatives are another type of construction that requires binding of a covert variable which provides the standard for the comparison.

- (i) *Nutella got more expensive every year.*
(Beck 2012b, p. 57, ex. (1-b))
- (ii) *Otto ran two seconds faster every time.*
(Beck 2012b, p. 85, ex. (116-a))

Interestingly, under both analyses considered in Beck (2012b), this variable is not of type $\langle d \rangle$ but rather of the type of an eventuality, which under one account is then mapped onto the relevant degree, which serves as an argument for the comparative operator.

1 Introduction and Background

- (25) *CHI: *you put it in the wash okay* .
 *FAT: *put it in the wash* .
 *CHI: *yeah* .
 *FAT: *why* ?
 *CHI: *it will be cleaner* .
 (Ross, age: 2;6.17, file: 20a1.cha)
- (26) *CHI: *he almost this big # right* ?
 *MOT: *no # he's about this big* .
 (Sarah, age: 4;0.05, file: sarah087.cha)
- (27) *GAI: *how big is she* ?
 *CHI: *she's ten feet tall* .
 (Sarah, age: 4;5.04, file: sarah107.cha)
- (28) *CHI: *und wie lange laeuft die Uhr noch* ?
 and how long runs the clock still
 ‘How long does the clock still run?’
 (Pauline, age: 6;10.21, file: pa061021.cha)

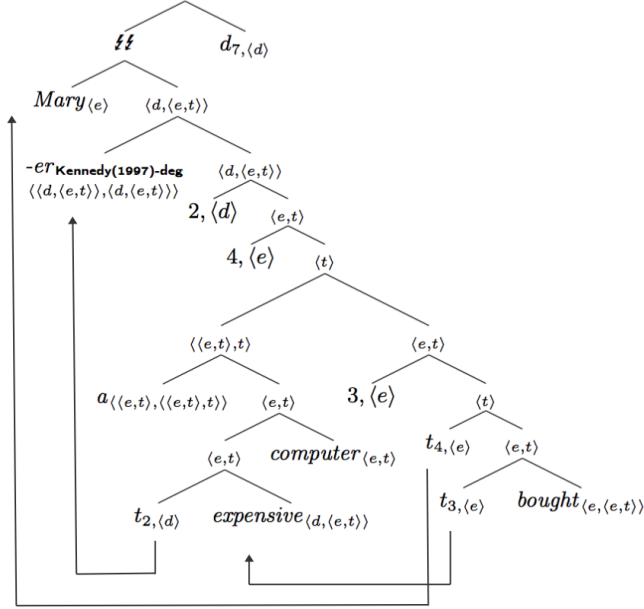
Hohaus, Tiemann & Beck (2014) provide the following explanation for the early acquisition of ContComps: At a first stage, children might not decompose a comparative adjective such as *cleaner* in (25) into a comparative operator and a relational adjective meaning. Moreover, ContComps employ the version of Kennedy (1997, p. 183, no. (123-c))’s operator in (30), which is of type $\langle\langle d, \langle e, t \rangle \rangle, \langle d, \langle e, t \rangle \rangle\rangle$ and scopally not very mobile, just like its sibling in (29). (See also Berezovskaya & Hohaus (2015).)

$$(29) \quad \llbracket -er_{\text{Kennedy(1997)}} \rrbracket = \lambda R_{\langle d, \langle e, t \rangle \rangle} . \lambda y_{\langle e \rangle} . \lambda x_{\langle e \rangle} . \\ \text{MAX}(\lambda d . R(d)(x)) > \text{MAX}(\lambda d' . R(d')(y))$$

$$(30) \quad \llbracket -er_{\text{Kennedy(1997)-deg}} \rrbracket = \lambda R_{\langle d, \langle e, t \rangle \rangle} . \lambda d_{\langle d \rangle} . \lambda x_{\langle e \rangle} . \\ \text{MAX}(\lambda d' . R(d')(x)) > d$$

Movement of the operator results in a type mismatch, as is illustrated in (31). Although parasitic movement (Beck & Sauerland 2000) allows us to syntactically derive a degree relation of type $\langle d, \langle e, t \rangle \rangle$, the two other arguments of the comparative operator cannot be compositionally integrated. (See Beck, Hohaus & Tiemann (2012, pp. 152-153) and Berezovskaya & Hohaus (2015) for in-depth discussion.) Under an analysis which employs an operator which must be interpreted *in situ*, ContComps thus do not require degree abstraction, which is the reason why they are acquired before all degree constructions that do so.

- (31) a. *Mary bought a more expensive computer.*
 b.



While the evidence from first language acquisition is compelling, it is unclear how such an analysis accounts for the scope ambiguities observed in ContComps and DegComp between certain modal quantifiers (ModQ) and the Degree phrase, as in the key example in (32) from Heim (2001, p. 224, ex. (28)).

- (32) *Right now, my draft is twelve pages long.*
The final paper is required to be exactly two pages longer (than that).

[ModQ > DegP]: “In every acceptable world, the paper is exactly 14 pages long. (It is thus not allowed to be longer than 14 pages.)”

[DegP > ModQ]: “The paper is exactly 14 pages long in all acceptable worlds in which it is shortest. (Other lengths might also be allowed.)”

Breakstone et al. (2011) provide evidence from processing that this ambiguity cannot be explained in terms of movement of the *exactly*-phrase alone, an approach pursued in Oda (2008) and Beck (2012a).

If it turns out that the derivation of these readings really requires movement of the Degree phrase, we will have to assume that ContComps

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and DegComp optionally are derived with the scopally mobile operator in (33), of type $\langle d, \langle \langle d, t \rangle, t \rangle \rangle$, which we already saw in the previous section and which is a sibling of the clausal comparative operator in (34).

$$(33) \quad \llbracket -er_{\text{deg}} \rrbracket = \lambda d_{\langle d \rangle}. \lambda D_{\langle d, t \rangle}. \text{MAX}(D) > d$$

(Heim 2001, p. 216, no. (5-a))

$$(34) \quad \llbracket -er_{\text{clausal}} \rrbracket = \lambda D'_{\langle d, t \rangle}. \lambda D_{\langle d, t \rangle}. \text{MAX}(D) > \text{MAX}(D')$$

(Beck 2011, p. 1346, no. (29))

For my plot, nothing hinges on the choice between (30) and (33), and I will continue to use (33) in the analysis of ContComps and DegComp.

(iv) I have no reason to believe that ContComps in German and English differ in their compositional analysis.²⁷ Given all of the preceding discussion, the ContComps in (20) and (21), repeated from above, both are assigned the analysis in (35) and (36).

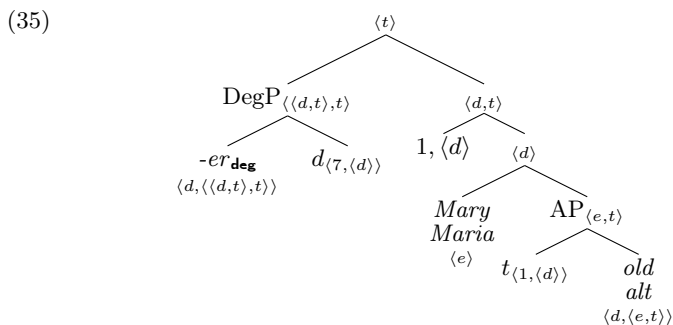
$$(19) \quad \text{Context:}$$

Peter is twenty-five years old.

$$(20) \quad \textit{Mary is older}_c.$$

$$(21) \quad \textit{Maria ist älter}_c.$$

Mary is older
'Mary is older.'



$$(36) \quad \text{a.} \quad \llbracket old \rrbracket = \llbracket alt \rrbracket = \lambda d_{\langle d \rangle}. \lambda x_{\langle e \rangle}. \text{AGE}(x) \geq d$$

$$\text{b.} \quad \llbracket [1 [Mary [t_{\langle 1, \langle d \rangle} old]]] \rrbracket^g = \lambda d. \text{AGE}(\text{Mary}) \geq d$$

²⁷ I will abstract away from any individual syntactic difference between the two languages for most of this dissertation. I refer the reader to *e.g.* Beck & Gergel (2014) for a contrastive discussion.

- c. $\llbracket \llbracket [-er_{deg} d_{\langle 7, \langle d \rangle}] \llbracket 1 [Mary [t_{\langle 1, \langle d \rangle}] old] \rrbracket] \rrbracket^g = 1$
 iff $\text{MAX}(\lambda d. \text{AGE}(\text{Mary}) \geq d) > g(7, \langle d \rangle)$
 with $g(7, \langle d \rangle) = 25 \text{ years}$
- d. ‘Mary’s age exceeds a contextually provided degree, 25 years.’

The free degree variable in (35) is assigned a value from the context by the variable assignment function. For the examples in (20) and (21), $g(7, \langle d \rangle) = 25 \text{ years}$ in the provided context.

1.4 Research Questions

With this analysis of ContComps in place, let me state more precisely the question that we will first set out to investigate. I will do so with the help of an example. In the context of (37), the ContComps in (38) and (39) are ambiguous in that the comparison could be either with Peer Steinbrück or Sigmar Gabriel (or both of them, in fact).²⁸

(37) Context:



Peer Steinbrück, Sigmar Gabriel, Frank Walter Steinmeier²⁹

- (38) *Steinmeier is older.*
- (39) *Steinmeier ist älter.*
 Steinmeier is older
 ‘Steinmeier is older.’

In (40) and (41), however, the free degree variable must receive Sigmar Gabriel’s age as its value, as in (42). Despite the contextual prominence of Peer Steinbrück in (37), his age does not constitute a possible value

²⁸ The picture depicts three leading politicians of the Social Democratic Party of Germany (SPD), who have featured prominently in the news in the last couple of years and who are commonly referred to as a *troika*. Of the three, Peer Steinbrück is in fact the oldest.

²⁹ Thorsten Denkler, „Backen aufblasen im Steinbruch,“ *Süddeutsche Zeitung*, May 15, 2012 (URL: <http://sz.de/1.1357898>, accessed March 25, 2014).

1 Introduction and Background

assignment (nor does any other age degree). As Beck (2009, p. 4) puts it: “Thus the *compared to*-phrase serves to indirectly (contextually) fix the intended value for the comparison standard.”

- (40) *Compared to Gabriel, Steinmeier is older.*
- (41) *Verglichen mit Gabriel ist Steinmeier älter.*
compared with Gabriel is Steinmeier older
'Compared to Gabriel, Steinmeier is older.'
- (42) $\text{MAX}(\lambda d. \text{AGE}(\text{F.W.S.}) \geq d) > g(7, \langle d \rangle)$
with $g(7, \langle d \rangle) = \text{AGE}(\text{S.G.})$

What is the underlying composition process? In particular, what is the syntax and semantics of CompFs? I am going to suggest that CompFs, just like other frame setters, add a presupposition regarding the type of evaluation situations which make a proposition true. In this case, these situations are restricted to minimal situations in which there is a comparison with Sigmar Gabriel, that is in which he is being compared with someone along some dimension. Only certain value assignments to the free degree variable may prevent the assertion from contradicting this presupposition, in this case Sigmar Gabriel's age degree.

Under this view, there are three strategies for determining the standard of a comparison, the contextual strategy of ContComps, and two compositional strategies, as Beck, Hohaus & Tiemann (2012) point out. The indirect compositional strategy is represented by CompFs, while the direct compositional strategy is exemplified by English *than*- and German *als*-phrases like in (43) and (44), which are arguments of the comparative operator. For this reason, I will also refer to these phrases as direct standard phrases.

- (43) *Mary is older [than Peter].*
- (44) *Maria ist älter [als Peter].*
Mary is older than Peter
'Mary is older than Peter.'

The availability of these three strategies is obviously of relevance for two of the major research topics in degree semantics in the past decade, the inventory of degree operators (Hankamer (1973), Heim (1985), Kennedy (1997), Bhatt & Takahashi (2007, 2011), Hofstetter (2009), Merchant (2009, 2011, 2012), Beck, Hohaus & Tiemann (2012), and Berezovskaya & Hohaus (2015)) and crosslinguistic variation in the expression of com-

1.4 Research Questions

parison construction (Beck, Oda & Sugisaki (2004), Krasikova (2008), Beck et al. (2009), Kennedy (2009), Shimoyama (2012), Bogal-Allbritten (2013), and Bochnak (2013a)). We will return to both topics in due course. Up next is an exploration of the landscape of the existing analyses of CompFs.

2 Landscape

Comparison frames (CompFs) have occasionally featured in the literature on degree constructions, although I agree with Fulst (2006, p. 39), who points out a “lack of interest in these constructions”. I can identify three major groups of approaches, which differ with respect to (i) the compositional status of CompFs, (ii) the relationship between the CompF and the degree operator, and (iii) the denotation of the CompF. More specifically, these approaches differ in how they answer the following three questions:

- (i) Are CompFs compositionally integrated? (Yes./ No.)
- (ii) Is the frame setter an argument of the degree operator? (Yes./ No, more indirect relationship.)
- (iii) What is the denotation of the CompF and its semantic type? What is the semantic contribution of the material other than the contained DP? (Semantically vacuous./ Not semantically vacuous.)

Let us look at the answers in some more detail.

2.1 Orphan Constituent and Degree Inference

Beck, Oda & Sugisaki (2004), which Beck, Hohaus & Tiemann (2012) take to extend to German, propose an analysis of CompFs as parentheticals and thus “orphan constituents” (Haegeman 1991/2009), which are “. . . not integrated into the compositional semantics of the main clause at all.” (Beck, Oda & Sugisaki 2004, p. 296) Their function is “. . . to set the context for the following sentence.” (Beck, Oda & Sugisaki 2004, p. 295) They do so by contributing an individual of type $\langle e \rangle$. From this individual an appropriate degree is inferred outside of the semantic composition. This degree then serves as a value for the free degree variable introduced by the comparative operator. Crucially, the frame setter is neither an argument of the comparative operator nor does it bind the relevant degree argument of the comparative by quantifying over it. Under this approach, *compared to* and *im Vergleich zu* are treated as semantically

2 Landscape

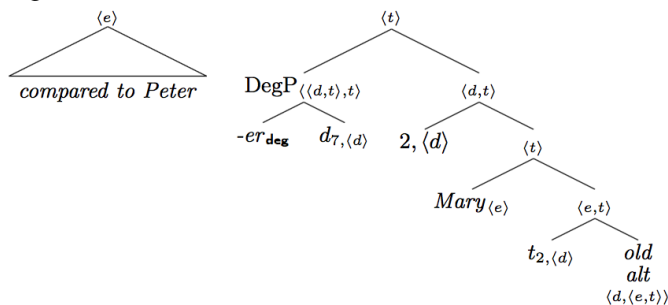
vacuous. I sketch the interpretation of the simple examples in (45) and (46) under this account below.

(45) *Compared to Peter, Mary is older.*

(46) *Im Vergleich zu Peter ist Maria älter.*
 in+the comparison to Peter is Mary older
 ‘Compared to Peter, Mary is older.’

(47) a. $\llbracket \llbracket [\text{DegP} -er_{\text{deg}} d_{7,\langle d \rangle}] [2, \langle d \rangle] [Mary [t_{2,\langle d \rangle} old]] \rrbracket \rrbracket^g =$
 $\text{MAX}(\lambda d. \text{AGE}(\text{Mary}) \geq d) > g(7, \langle d \rangle)$
 b. $\llbracket \text{compared to Peter} \rrbracket = \text{Peter}$
 c. pragmatic inference: $\text{Peter} \rightarrow g(7, \langle d \rangle) = \text{AGE}(\text{Peter})$

(48) Logical Forms:



As far as I can see, the two constituents will have to be interpreted by separate interpretation functions, with the host clause receiving the interpretation in (47-a): The maximal degree to which Mary is old exceeds a contextually provided degree. The CompF contributes Peter to the interpretation, in (47-b). A more general discourse coherence mechanism might then force us to relate the two interpretations (cf. *e.g.* Asher 2000), resulting in not only mapping Peter onto his age degree, as in (47-b), but also assigning $g(7, \langle d \rangle)$ this degree. (Both, Beck, Oda & Sugisaki (2004) and Beck, Hohaus & Tiemann (2012) remain silent about this specific step of the interpretation.)

The challenge for such an analysis is a challenge faced by any analysis of parentheticals in that it needs “...to explain first, why expressions which lack integration in the overall sentence in so many respects appear within that utterance. . . and second, how the relation between parenthetical and host clause can best be explained.” (Dehé & Kavalova 2007, p. 1) From the perspective of compositional semantics, I find it very hard to understand how the interpretation of a syntactically not integrated con-

stituent proceeds.

Support for an analysis that relies on pragmatic processes, according to Beck, Oda & Sugisaki (2004), comes from the differential interpretation of *compared to-* and *than-*phrases, and from variation in acceptability regarding ContComps with CompFs³⁰: They observe that in what I am going to refer to as Father-Son Examples, CompFs may give rise to an ambiguity. This observation extends to German. Consider (49) and (50). Only in the case of the CompF may the past height of the speaker serve as the standard for the comparison.

- (49) a. *Compared to me, my son is taller.*
 = ‘My son’s height exceeds my height.’
 = ‘My son is taller than I was at his age.’
 b. *My son is taller than I am.*
 = ‘My son’s height exceeds my height.’
 ≠ ‘My son is taller than I was at his age.’

(Beck, Oda & Sugisaki 2004, p. 340, fn. 6)

- (50) *Im Vergleich zu mir ist mein Sohn größer.*
 in+the comparison to me is my son taller
 ‘Compared to me, my son is taller.’
 = ‘My son’s height exceeds my height.’
 = ‘My son is taller than I was at his age.’

Under the pragmatic account, a speaker might just as well make the inference from Peter to a relevant past height of his as a value for the free degree variable in the ContComp, and thereby generate the reading which is otherwise unavailable. The ambiguity of Father-Son Examples is thus indicative of compositional differences between comparatives with a CompF and our run-of-the-mill comparatives with a direct standard phrase.

What is more, Beck, Oda & Sugisaki (2004) and Beck, Hohaus & Tiemann (2012) claim that speakers are successful to varying degrees when it comes to inferring less plausible degrees on the basis of the individual provided by the frame setter. Consider the examples from English and German in (51) and (52) below. Apparently, English (51-d) as well as German (52-d) receive varying but uniformly degraded acceptability judgments.

³⁰ This variation is observed in German and English as well as in Japanese. See subsection 7.3.2 for further discussion.

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- (51) a. *Mary bought a more expensive umbrella [than John did].*
 b. *Mary bought a longer umbrella [than John did].*
 c. [*Compared to what John bought*],
Mary bought a more expensive umbrella.
 d. ?/??/*[*Compared to what John bought*],
Mary bought a longer umbrella.

(Beck, Hohaus & Tiemann 2012, p. 151, ex. (23))

- (52) a. *Mae hat einen teureren Regenschirm gekauft [als Jo].*
 Mae has a more.costly umbrella bought than Jo
 ‘Mae bought a more expensive umbrella than Jo.’
 b. *Mae hat einen längeren Regenschirm gekauft [als Jo].*
 Mae has a longer umbrella bought than Jo
 ‘Mae bought a longer umbrella than Jo.’
 c. [*Im Vergleich dazu, was Jo gekauft hat*],
 in+the comparison there+to what Jo bought has
hat Mae einen teureren Regenschirm gekauft.
 has Mae a more.costly umbrella bought
 ‘Compared to what Jo bought,
 Mae bought a more expensive umbrella.’
 d. ?/??/*[*Im Vergleich dazu, was Jo gekauft hat*],
 in+the comparison there+to what Jo bought has
hat Mae einen längeren Regenschirm gekauft.
 has Mae a longer umbrella bought
 ‘Compared to what Jo bought,
 Mae bought a longer umbrella.’

(Beck, Hohaus & Tiemann 2012, Appendix, p. 4, ex. (14)-(15))

The explanation for this variation is as follows: The inference from the item Jo bought to its length as a value for the free degree variable is considerably less straightforward than the inference of its price, which is reflected in the degraded acceptability judgments as well as in the variation between speakers as to the exact judgment.

We will see in the next chapter that we do neither have strong empirical evidence in favor of this variation in acceptability nor in favor of assigning CompFs the status of parentheticals.

2.2 Compositional Integration and Manipulation of Utterance Contexts

A second line of approaches to CompFs differs from the account developed in Beck, Oda & Sugisaki (2004) in that the CompF is compositionally fully integrated, while yet maintaining that the relationship between the degree operator and the CompF is an indirect one.³¹

Under **Kennedy (2007a, 2009)’s analysis**, *compared to*-phrases and the likes thereof “...modify the contextual parameters w.r.t. which the standard of comparison... is computed. ... In other words, the semantic function of *compared to* is to manipulate the context...” (Kennedy 2009, p. 157) CompFs are compositionally integrated but the relationship with respect to the free variable introduced by the degree operator remains an indirect one. *Compared to* is semantically not vacuous, but the internal composition of the CompF is not transparent:

$$(53) \quad \begin{aligned} & \llbracket [\textit{compared to}](y)(R)(x) \rrbracket^c = 1 \\ & \text{iff } \llbracket R(x) \rrbracket^{c'} = 1 \text{ for any } C' \text{ just like } C \text{ except that } C' = \{x, y\} \\ & \text{(cf. also Kennedy 2009, p. 157, no. (49))} \end{aligned}$$

I present an implementation of this analysis in (54) to (55) below. (However, I do not understand very well the idea of lexical material like (53) directly manipulating the evaluation parameter of a sentence.) The sentence in (45) is thus true in the context of utterance if in any other utterance context c' that includes only Mary and Peter in the domain of individuals, it is true that Mary’s age exceeds a contextually provided degree. I provide a visualization in Figure 2.1.

$$(45) \quad \textit{Compared to Peter, Mary is older.}$$

$$(54) \quad \begin{aligned} & \llbracket [\textit{Mary} \llbracket \textit{compared to Peter} \rrbracket \llbracket \textit{old-er}_{\text{Kennedy(1997)-deg}} \rrbracket d_{7, \langle d \rangle}] \rrbracket^{g, c} = 1 \\ & \text{iff } \llbracket \llbracket \textit{old-er}_{\text{Kennedy(1997)-deg}} \rrbracket d_{7, \langle d \rangle} \rrbracket^{g, c'} (\llbracket \textit{Mary} \rrbracket^{g, c'}) = 1 \\ & \text{iff } \text{MAX}(\lambda d. \text{AGE}(\textit{Mary}) \geq d) > g(7, \langle d \rangle) \\ & \text{for any } C' \text{ just like } C \text{ except that } C' = \{\textit{Peter, Mary}\} \end{aligned}$$

³¹ The recent analysis of standard phrases in comparatives in Washo in Bochnak (2013a) seems to fall into this category, too. It is too language-specific to be discussed here, in addition to the fact that several technical details of the analysis remain unclear. See section 7.3.2 for data from the language. Also, Roger Schwarzschild’s analysis of “incomplete comparatives” comes from this line of approaches. Unfortunately, I do not think there is more than a handout available (Schwarzschild 2010) and I will not be able to discuss his analysis here.

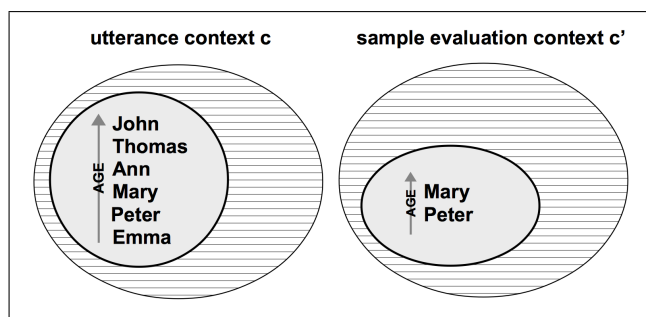
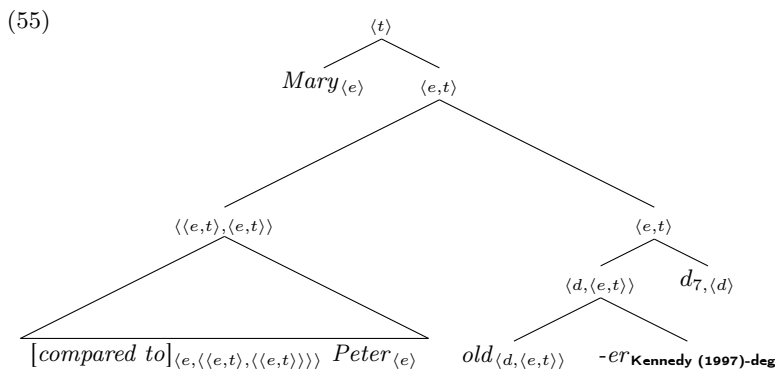


Figure 2.1: Manipulating Utterance Contexts and Domains

Before discussing this account any further, let me also present a very similar but much more explicitly spelled out analysis for CompFs in degree constructions, designed to account for data from Fijian and presented by **Pearson (2010)**. A lexical entry for *compared to* under her account is in (56) and only minimally different from (53). Frame setters add the presupposition that the domain of individuals consists only of those individuals that are arguments of the frame setter.

$$(56) \quad \llbracket compared\ to \rrbracket^{g,c} = \lambda x_{\langle e \rangle} \cdot \lambda P_{\langle e, t \rangle} \cdot \lambda y_{\langle e \rangle} \cdot P(y)$$

presupposition (simplified): $C = \{x, y\}$
 (cf. Pearson 2010, p. 363, no. (27))

The example sentence from (45) will only be defined in a context in which Mary and Peter are the only individuals, and will then be true if and only if Mary's age exceeds a contextually provided degree:

$$(57) \quad \text{MAX}(\lambda d. \text{AGE}(\text{Mary}) \geq d) > g(7, \langle d \rangle)$$

presupposition: $C = \{\text{Mary}, \text{Peter}\}$

Both accounts nicely capture the intuitive contribution of CompFs, but face certain empirical challenges. First, how can they explain the observation that $g(7, \langle d \rangle)$ is obligatory assigned $\text{AGE}(\text{Peter})$? Because of the focus on implicit comparison³², neither Kennedy (2007a, 2009) nor Pearson (2010) discuss how the value assignment to the free degree variable introduced by the comparative comes about. As far as the context set of degrees is concerned, from which values for the free variable introduced by the comparative are going to come, no restriction is introduced, *i.e.* the relevant utterance contexts could still include **12 years** as a salient degree, even if this is not Peter’s age.

This problem arises because of a specific assumption of mine, introduced above, that the comparative operator combines with a free degree variable, rather than with a variable of type $\langle e \rangle$. An easy fix would thus be to assume that contextual comparatives employ *-er*^{Kennedy (1997)}, repeated in (29), or *-er*^{Heim (1985)} in (58), instead of the operator of type $\langle \langle d, \langle e, t \rangle \rangle, \langle d, \langle e, t \rangle \rangle \rangle$, which we use in (54). A prediction of this line of analyses would then be that CompFs can only be used to manipulate value assignments to free variables that are either of type $\langle e \rangle$ or $\langle e, t \rangle$, a prediction which I find undesirable.

$$(29) \quad \llbracket -er^{\text{Kennedy (1997)}} \rrbracket = \lambda R_{\langle d, \langle e, t \rangle \rangle} \cdot \lambda y_{\langle e \rangle} \cdot \lambda x_{\langle e \rangle} \cdot \text{MAX}(\lambda d'. R(d')(x)) > \text{MAX}(\lambda d'. R(d')(y))$$

$$(58) \quad \llbracket -er^{\text{Heim (1985)}} \rrbracket = \lambda y_{\langle e \rangle} \cdot \lambda R_{\langle d, \langle e, t \rangle \rangle} \cdot \lambda x_{\langle e \rangle} \cdot \text{MAX}(\lambda d. R(d)(x)) > \text{MAX}(\lambda d'. R(d')(y))$$

(Heim (1985, pp. 5-7), Bhatt & Takahashi (2011, p. 585, no. (7)))

³² Note that the distinction between explicit and implicit comparison in (i) and (ii), which is at the core of both, Kennedy (2007a) and Kennedy (2009), is completely irrelevant for the line of analysis pursued here. CompFs are not indicative of either implicit or explicit comparison, as they can occur with both types of comparison constructions. (Cf. also Kennedy (2009, p. 157, fn. (5)) for discussion.)

- (i) Explicit Comparison:
 “Establish an ordering between objects x and y with respect to gradable property R using a morphosyntactic for whose conventional meaning has the consequence that the degree to which x is R exceeds the degree to which y is R .”
 (Kennedy 2009, p. 156, no. (46))
- (ii) Implicit Comparison:
 “Establish an ordering between objects x and y with respect to gradable property R using the positive form by manipulating the context in such a way that the positive form is true of x and false of y .” (Kennedy 2009, p. 156, no. (45))

2 Landscape

Globally restricting the domain of individuals for the sentence to just, *e.g.* Mary and Peter, is additionally problematic when it comes to other free variables of type $\langle e \rangle$ or $\langle e, t \rangle$ the sentence might contain. These variables will also be restricted in their value assignment by the CompF. Take the sentence in (59), for example.

- (59) *Compared to Sue,*
Ann was more delighted with every_{C⟨e,t⟩} student's progress.

Under any analysis under which CompFs globally manipulate the context, the domain of the universal quantifier *every* will be the set containing only Ann and Sue (or subsets thereof), which is an undesirable prediction. This kind of problem is of course well-known from the literature on quantifier domain restriction. Consider (60), for instance.

- (60) *Sweden is a funny place. Every tennis player looks like Björn Borg, and more men than women watch tennis on TV. But most people really dislike foreign tennis players.*
(von Fintel 1994, p. 29, no. (20))

If we were to globally restrict utterance context to just Swedish individuals, we would get the domain restriction for *most people* right, but would be unable to evaluate the Noun phrase *foreign tennis players* anymore. (See Westerstahl (1985), Soames (1986) and von Fintel (1994) for further discussion.)

2.3 Argument of Degree Operator

What unifies both accounts presented so far is an attempt to capture the intuition that CompFs like *compared to* in English as well as *ver-glichen mit* and *im Vergleich zu* in German only indirectly contribute to the value assignment to the free variable introduced by the degree operator. They are thus fundamentally different than English *than*-phrases and their equivalents across languages. **Fults (2005, 2006)** rejects such a view and proposes that CompFs are really not any different from *than*-constituents in that they are an argument of a degree operator.³³ Fults (2005) proposes that what he calls comparison phrases contribute a set of degrees, which then serves as an argument of a comparative operator

³³ This is also a line of reasoning adopted by Hayashishita (2009) and Shimoyama (2012) for Japanese. See section 7.3.2 for detailed discussion.

of type $\langle\langle d, t \rangle, \langle\langle d, t \rangle, t \rangle\rangle$, repeated from (34) above. Applied to the example in (45), the comparison phrase receives the interpretation in (61). The truth conditions for the sentence are in (62). Under this analysis, the example in (45) almost shares the truth conditions of the clausal comparative, in (63).

$$(34) \quad \llbracket -er_{\text{clausal}} \rrbracket = \lambda D'_{\langle d, t \rangle} . \lambda D_{\langle d, t \rangle} . \text{MAX}(D) > \text{MAX}(D')$$

$$(61) \quad \llbracket \textit{compared to Peter} \rrbracket = \lambda d_{\langle d \rangle} . \exists R [R(d)(\text{Peter})]$$

(cf. Fults 2005, pp. 150-152)

(45) *Compared to Peter, Mary is older.*

$$(62) \quad \text{MAX}(\lambda d . \text{AGE}(\text{Mary}) \geq d) > \text{MAX}(\lambda d' . \exists R [R(d')(\text{Peter})])$$

‘Mary’s age exceeds the maximal degree in the set of degrees such that there is some degree relation which maps Peter onto these degrees.’

- (63) a. *Mary is older than Peter is.*
 b. $\text{MAX}(\lambda d . \text{AGE}(\text{Mary}) \geq d) > \text{MAX}(\lambda d' . \text{AGE}(\text{Peter}) \geq d')$
 ‘Mary’s age exceeds Peter’s age.’

Note that the semantics in (61) does not require that the degree relation in the comparison phrase be identical to the gradable predicate in the sentence. In the case of commensurable degrees, this account therefore predicts the availability of subcomparative readings with CompFs. This prediction is not borne out, as is illustrated in (64) and (65) below.³⁴ (See also Fults (2005, p. 152).)

- (64) *Compared to the moat, the drawbridge is longer.*
 \neq ‘The length of the drawbridge exceeds the width of the moat.’
 $=$ ‘The length of the drawbridge exceeds the length of the moat.’

- (65) *Im Vergleich zum Burggraben ist die Zugbrücke länger.*
 in+the comparison to+the moat is the drawbridge longer
 ‘Compared to the moat, the drawbridge is longer.’

Fults (2006) therefore presents a revised analysis, which does not encounter this problem: CompFs are selected for only by a special POS-operator, which shares the semantics of the comparative. More specifically, this operator has the lexical entry of $-er_{\text{Heim (1985)}}$, repeated below.

$$(58) \quad \llbracket -er_{\text{Heim (1985)}} \rrbracket = \lambda y_{\langle e \rangle} . \lambda R_{\langle d, \langle e, t \rangle \rangle} . \lambda x_{\langle e \rangle} .$$

³⁴ As a German speaker put it upon being presented with (65): „Das wäre ja dumm.“

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$$\text{MAX}(\lambda d. R(d)(x)) > \text{MAX}(\lambda d'. R(d')(y))$$

Compared to is semantically vacuous and the entire phrase merely contributes an argument of type $\langle e \rangle$ for the comparative operator. “Thus, *compared to*-phrases can be given an identical analysis to the one given to the phrasal comparative.” (Fulst 2006, p. 137) I find this analysis unattractive as it does neither explain the distribution of *compared to*- and *im Vergleich zu*-phrases nor does it capture the substantial differences between frame setters and direct standard phrases, which we will observe in the next chapter.

2.4 Chapter Summary

The table below provides a summary of the answers which the three lines of approaches provide to the key questions outlined at the beginning of this chapter.

| | compositional status | relationship to degree operator | semantic type |
|--|---------------------------------|---------------------------------|---|
| Beck, Oda & Sugisaki (2004) Beck, Hohaus & Tiemann (2012) | Not compositionally integrated. | Indirect. | Semantically vacuous. |
| Kennedy (2007, 2009) Pearson (2010) | Compositionally integrated. | Indirect. | $\langle e, \langle \langle e, t \rangle, \langle e, t \rangle \rangle \rangle$ |
| Fulst (2005) | Compositionally integrated. | Direct. | $\langle e, \langle d, t \rangle \rangle$ |
| Fulst (2006) | | | Semantically vacuous. |

Figure 2.2: The Landscape of Analyses of CompFs

Apart from Fulst (2006), all of the analyses have the disadvantage of assigning frame setters in degree constructions a somewhat isolated status in the grammar of natural language. They appear very different from other mechanisms which the grammar provides to assign values to variables, regardless of their semantic type and of whether they are free or bound. I thus cannot help but to perceive them as *Insellösungen*, point solutions with an *ad hoc* feel to them.

3 Data

The previous chapter identified as two of the key questions in the analysis of CompFs (i) their compositional status and (ii) the nature of their relationship with the degree operator. In this chapter, I provide evidence in favor of a compositional analysis of CompFs, in section 3.1, and against the status of CompFs as arguments of the degree operator, in section 3.2.

3.1 Evidence in Favor of Compositional Integration

CompFs are compositionally integrated and thus unlike parentheticals under a radical orphanage approach like Haegeman (1991/2009)'s. Before we look at some of the properties of parentheticals, one note of caution: There is no general agreement as to whether parentheticals should receive an analysis as orphan constituents, nor is there extensive research literature on parentheticals. (See however McCawley (1982), Potts (2002a,b), and Dehé & Kavalova (2007).) As Haegeman, Shaer & Frey (2009, p. 350) put it: “Granting the theoretical possibility of orphans, the key question, then, is really what phenomena are and what phenomena are not plausibly analyzed in orphan terms.” CompFs in ContComps, however, are not plausibly analyzed as orphan constituents.

Recall from above that the main motivation for Beck, Oda & Sugisaki (2004) to analyze CompFs in ContComps as compositionally not integrated was the reported **variation in acceptability** with less plausible degree predicates. I repeat the relevant examples below.

- (51) a. *Mary bought a more expensive umbrella [than John did].*
b. *Mary bought a longer umbrella [than John did].*
c. [*Compared to what John bought*],
Mary bought a more expensive umbrella.
d. ?/??/*[*Compared to what John bought*],
Mary bought a longer umbrella.

(Beck, Hohaus & Tiemann 2012, p. 151, ex. (23))

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- (52) a. *Mae hat einen teureren Regenschirm gekauft [als Jo].*
Mae has a more.costly umbrella bought than Jo
'Mae bought a more expensive umbrella than Jo.'
- b. *Mae hat einen längeren Regenschirm gekauft [als Jo].*
Mae has a longer umbrella bought than Jo
'Mae bought a longer umbrella than Jo.'
- c. [*Im Vergleich dazu, was Jo gekauft hat*],
in+the comparison there+to what Jo bought has
hat Mae einen teureren Regenschirm gekauft.
has Mae a more.costly umbrella bought
'Compared to what Jo bought,
Mae bought a more expensive umbrella.'
- d. *?/??/*[Im Vergleich dazu, was Jo gekauft hat],*
in+the comparison there+to what Jo bought has
hat Mae einen längeren Regenschirm gekauft.
has Mae a longer umbrella bought
'Compared to what Jo bought,
Mae bought a longer umbrella.'

(Beck, Hohaus & Tiemann 2012, appendix, p. 4, ex. (14)-(15))

In order to establish whether ContComps with CompFs indeed exhibit acceptability effects due to the degree of difficulty posed by the necessary degree inference, I conducted a series of rating studies, which measure the acceptability of comparatives which vary in their plausibility and in the realization of their comparison standard. I report the results below. Crucially though, I do not have any evidence at this point that plausibility influences the acceptability for ContComps with a CompF to any greater degree than the acceptability for comparatives with a direct standard phrase.

3.1.1 Acceptability Rating Study for German

Pre-Study. In order to construct adequate items for the main study that differ in their plausibility, we conducted a pre-study with 36 participants, all of them native speakers of German, most of them undergraduate students at Tübingen university. Participation was voluntary with no reimbursement. We constructed 36 minimal pairs of questions with varying plausibility (fairly implausible/ very plausible). I provide a sample set of items from the study together with translations below.

3.1 Evidence in Favor of Compositional Integration

- (66) item no. 35a (plausible):
Wie naheliegend ist es auf einer Skala von 1 bis 5, dass man beim Frankieren verschiedener Briefe zunächst vergleicht, wie schwer die Briefe sind?
- (67) item no. 35b (implausible):
Wie naheliegend ist es auf einer Skala von 1 bis 5, dass man beim Frankieren verschiedener Briefe zunächst vergleicht, wie persönlich die Briefe sind?
- (68) translation for item no. 35a (plausible):
“On a scale from 1 to 5, how plausible would you initially consider comparing, when buying stamps for different letters, how much the letters weigh?”
- (69) translation for item no. 35b (implausible):
“On a scale from 1 to 5, how plausible would you initially consider comparing, when buying stamps for different letters, how personal the letters are?”

Those 36 pairs were distributed onto two lists by a Latin square design. The resulting lists were randomized and then manually manipulated so that no condition appeared more than three times in a row, and so that the same adjective never occurred twice in a row. No fillers were inserted. The resulting two questionnaire versions were uploaded onto an online survey and questionnaire tool, SurveyMonkey (URL: <http://www.surveymonkey.de>). Accessibility to the final questionnaires was provided by a direct link to the questionnaire. Assignment of questionnaire version to participants was random. Participants were first presented with an explanation, and the instructions in (70), for which I also provide an approximate translation.

- (70) Bitte lesen Sie die nachfolgenden 36 Fragen sorgfältig durch und entscheiden Sie ganz spontan darüber, wie plausibel und naheliegend Sie die jeweiligen Situationen einschätzen. Ihre Bewertung können Sie auf einer Skala von 1 (wenig plausibel) bis 5 (sehr plausibel) abgeben.

“Please read the 36 questions carefully and decide spontaneously how plausible you judge the respective situations. You can provide your judgment on a scale from 1 (fairly implausible) to 5 (very plausible).”

Participants were presented with one question per page, with one page suggesting a short break after 18 items. The plausibility judgment was provided on a labeled scale from 1 (*wenig plausibel*, ‘fairly implausible’)

to 5 (*sehr plausibel*, ‘very plausible’). The results were analyzed for mean and median rating. From the pre-study items, we selected the nine pairs for which the difference between the average ratings was greater than or equal to 2.5 and for which the difference between the median ratings was less than 3. We then additionally selected three items for which the difference between average ratings was greater than or equal to 2. Note that the item inspired by the literature did not meet these criteria but was additionally included in the main study.³⁵

Material and Research Design. Based on the twelve items selected from the pre-study we constructed twelve items for each of the four conditions in this acceptability study with a two-by-two between-subjects factorial design. As discussed above, variables were plausibility (implausible/plausible) and realization of comparison degree (direct/indirect). The four resulting conditions are specified in Table 3.1.

| comparison | [pla]: plausible | [impla]: implausible |
|--|----------------------|------------------------|
| [dir]: <i>als</i> (‘than’)-constituent | cond. 1: [pla,dir] | cond. 2: [impla,dir] |
| [indir]: CompF | cond. 3: [pla,indir] | cond. 4: [impla,indir] |

Table 3.1: Conditions for the Main Acceptability Rating Study

The target sentences from each condition came with the same neutral context sentence. I provide one set of items and their context sentence in (71) and (72).³⁶

- (71) *Marie und Philipp sind auf der Post gewesen.*
 Mary and Phil are on the post.office been
 ‘Mary and Phil have been to the post office.’
- (72) a. *Marie hat einen schwereren Brief frankiert als Philipp.*
 Mary has a heavier letter stamped than Phil
 ‘Mary stamped a heavier letter than Phil.’
 (condition 1: [pla,dir])
- b. *Marie hat einen persönlicheren Brief frankiert als Philipp.*
 Mary has a more.personal letter stamped than Phil
 ‘Mary stamped a more personal letter than Phil.’
 (condition 2: [impla,dir])

³⁵ The difference between median ratings for this item was 2.5.
 Average ratings for this item differed by 1.89.

³⁶ See appendix A.1 on page 195ff. for the complete list of items used in this study.

3.1 Evidence in Favor of Compositional Integration

- c. *Im Vergleich dazu, was Philipp frankiert hat,*
in+the comparison there+to what Phil stamped has
hat Marie einen schwereren Brief frankiert.
has Mary a heavier letter stamped
'Compared to what Phil stamped,
Mary stamped a heavier letter.'
(condition 3: [pla,indir])
- d. *Im Vergleich dazu, was Philipp frankiert hat,*
in+the comparison there+to what Phil stamped has
hat Marie einen persönlicheren Brief frankiert.
has Mary a more.personal letter stamped
'Compared to what Phil stamped,
Mary stamped a more personal letter.'
(condition 4: [impla,indir])

These twelve sets of items as well as 24 sets of filler items from phenomena at the semantics/pragmatics-interface were distributed onto four lists in a Latin square design. Two different randomizations were then applied to each list. The resulting eight questionnaire versions were uploaded unto the online questionnaire tool SurveyMonkey.

Participants. For the main study, we recruited 67 participants, the majority undergraduate and graduate students at Tübingen university. Recruitment of participants was via a university-internal mailing list of volunteers for linguistic experiments. Of those 67 participants recruited, 56 completed the questionnaire study. Age of participants ranged from 21 to 71 years with an average of 27 years of age. 43 female and 13 male subjects participated. Participants were reimbursed with a cash payment.

Procedure and Instructions. Access to the final questionnaires was provided by a direct link to the questionnaire. Assignment of questionnaire version to participants was random. Assignment of the link was via an e-mail, which also included an explanation and training items. Participants first read a brief introduction as well as the instructions in (73), and then had to provide acceptability judgments on a scale from 1 (*nicht akzeptabel*, 'not acceptable') to 5 (*vollkommen akzeptabel*, 'fully acceptable') for 36 items. Participants were presented with one context and one item per page. For every item as well as at the end of the study,

participants could optionally provide comments in a text box.

- (73) Im Nachfolgenden erheben wir die intuitive Akzeptabilität von Sätzen in bestimmten Kontexten. Bitte lesen Sie dazu zunächst den Kontextsatz sorgfältig durch und entscheiden Sie dann ganz spontan darüber, wie gut Sie den kursiv gedruckten Folgesatz in diesem Kontext finden. Ihre Bewertung können Sie auf einer Skala von 1 (nicht akzeptabel) bis 5 (vollkommen akzeptabel) abgeben.

“The present study elicits the intuitive acceptability of sentences in certain contexts. Please read the context sentence carefully first. Then, decide spontaneously on how acceptable the sentence in italics is for you in this context. You can submit your rating on a scale from 1 (not acceptable) to 5 (fully acceptable).”

Each of the eight questionnaire versions was completed by at least twelve and at most fifteen participants.

Predictions. Crucially, the analysis in Beck, Oda & Sugisaki (2004) predicts an interaction between the two independent variables, plausibility and realization of comparison degree, as visualized in Figure 3.1 with fictive mean acceptability ratings.

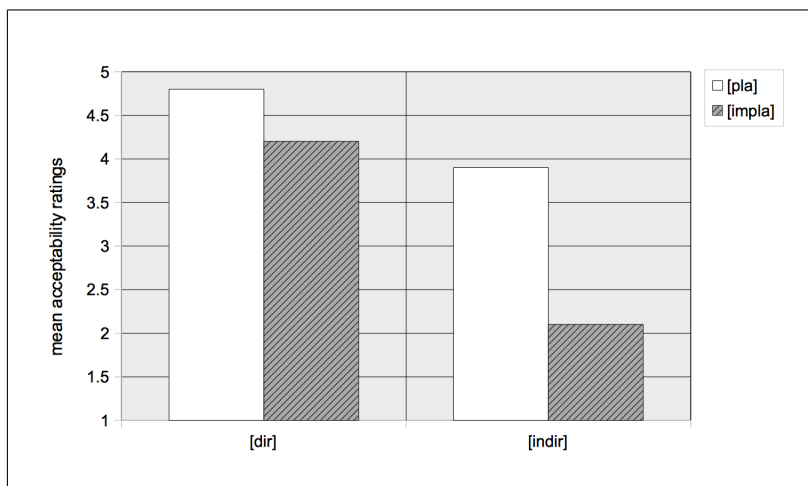


Figure 3.1: Predicted Pattern of Acceptability Ratings

ContComps with CompFs for which a value for the free degree variable

3.1 Evidence in Favor of Compositional Integration

has to be inferred on the basis of a less plausible comparison are predicted to be less acceptable on average than ContComps with CompFs for which a value for this free variable is easy to infer because it is highly plausible. This effect is due to greater variation in acceptability judgments in the case of less plausible comparisons. That is, (72-d) above should receive ratings worse than (72-c) because how much Phil’s letter weighs is hypothesized to be considerably more accessible as a value assignment for the free degree variable in this context than how personal its content is. Crucially, the difference in acceptability ratings between (72-c) and (72-d) is predicted to be bigger than the difference for (72-a) and (72-b).

We will likely find that ContComps with CompFs like (72-c) and (72-d) are slightly dispreferred due to their greater syntactic complexity and their low frequency in German, and thus receive a lower overall rating. We therefore expect a main effect regarding the realization of the standard of comparison. I consider it likely that plausibility will also affect the acceptability ratings for the comparatives with an *als* (‘than’)-constituent like (72-b), although this is not a prediction of the analysis *per se*. The analysis in Beck, Oda & Sugisaki (2004) crucially predicts that this effect is more robust for CompFs in ContComps than with comparatives where the standard of comparison is provided by an *als* (‘than’)-constituent and is thus compositionally determined.

Data Analysis and Statistics. Descriptive statistics were used to analyze the basic features of the data collected. Table 3.2 reports the mean rating for each condition.

| condition | mean rating |
|----------------------------|-------------|
| condition 1: [pla,dir] | 4.321 |
| condition 2: [impla,dir] | 3.905 |
| condition 3: [pla,indir] | 3.095 |
| condition 4: [impla,indir] | 2.839 |

Table 3.2: Mean Acceptability Ratings across Conditions for German

We also carried out mixed effect model logistic regression analyses using the R programming language and the package *lme4* from Bates (2005), with plausibility and realization of comparison standard as fixed, and subjects and items as random factors. Additionally, models with random slopes for both, subjects and items, were calculated. When an analysis

3 Data

of variance (ANOVA) revealed a significant difference between the two models, the more complex model was included in the analysis. (See also Barr et al. (2003).)

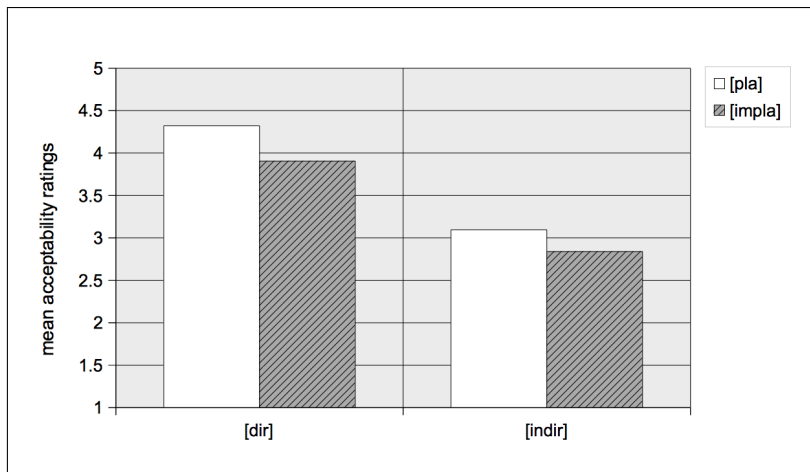


Figure 3.2: Mean Acceptability Ratings across Conditions for German

We observe a main effect for plausibility ($SE = .08$, $|t| = 4.03$, $p < .001$) and a main effect for realization of comparison standard ($SE = .07$, $|t| = 16.52$, $p < .001$). However, there is no significant interaction between these two variables ($SE = .13$, $|t| = 1.44$, $p > .1$).

Discussion. As expected, ContComps with a CompF are dispreferred in German when compared to comparatives with a direct standard phrase. Also, acceptability ratings for both types of comparatives are influenced by plausibility. Implausible ContComps with a CompF like (72-d) indeed have the lowest absolute acceptability, a result in line with the observations for German from Beck, Hohaus & Tiemann (2012).³⁷ However, there is no evidence that plausibility influences the acceptability ratings for ContComps with CompFs to any greater degree than it influences

³⁷ This result extends to the item from the literature in (52), for which acceptability ratings were elicited but which did not figure into the statistical analysis as the item did not meet the criteria from the pre-study. (For the exact wording of the item and the context sentence, see appendix A.1.) Mean acceptability for condition 1 [dir,pla] was 4.00 and 3.58 for condition 2 [dir,impla]. In condition 3 [indir,pla] and condition 4 [indir,impla] the mean acceptability ratings were 3.25 and 2.75 respectively.

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the acceptability ratings for comparatives with direct standard phrases. I conclude that the effect plausibility has on the acceptability of Cont-Comps cannot be attributed to the need to infer an implausible value assignment for the free degree variable. The results of this study do not provide evidence in favor of an approach that treats CompFs in German as orphan constituents. I present below an acceptability rating study which confirms that this conclusion extends to English as well.

3.1.2 Acceptability Rating Study for English

Pre-Study. In order to construct adequate items for the main study that differ in their plausibility, we conducted a pre-study with a total of 37 participants, all of them native speakers of English, most of them undergraduate and graduate students at universities in the United States. Participation was voluntary with no reimbursement.

We constructed 24 minimal pairs of questions with varying plausibility (fairly implausible/very plausible). All items were proofread by two native speakers of English. A sample set of items from the study is in (74) below.

- (74) a. item no. 12a (implausible):
When renting a moving van how likely is it that you consider first how fast the van is?
- b. item no. 12b (plausible):
When renting a moving van how likely is it that you consider first how big the van is?

Those 24 pairs of questions were distributed onto two lists by a Latin square design. No fillers were inserted. The resulting two questionnaire versions were uploaded onto an online survey and questionnaire tool, SurveyGizmo (URL: <http://www.surveygizmo.com>). Accessibility to the final questionnaires was provided by a direct link to the questionnaire. Assignment of questionnaire version to participants was random. Each participant was assigned a unique randomization.

Participants were first presented with a brief explanation and the instruction to "...read the questions carefully and decide spontaneously how plausible you judge the respective situations." They then had to provide plausibility judgments on a labeled scale from 1 ('fairly unlikely') to 5 ('very likely'). Participants were presented with one question per page, with one page suggesting a short break after twelve items.

3 Data

The results were analyzed for mean and median rating. From the pre-study items, we selected those twelve items for which the difference between average ratings exceeded 2 and for which the difference between median ratings was greater than or equal to 3. Note that the item inspired by the literature did not meet these criteria but again was additionally included in the main study.³⁸

Material and Research Design. On the basis of the twelve comparison contexts selected from the pre-study, we constructed twelve items for each of the four conditions in this study with a two-by-two between-subjects factorial design. Again, all items were proofread by two native speakers of English. As in the German study, variables were plausibility (implausible/plausible) and realization of comparison degree (direct/indirect). See Table 3.1 above for the resulting four conditions. Target sentences were presented along with a neutral context sentence. I provide one set of items with their context in (75) and (76).³⁹ Note that the items in (76) are truly minimal pairs in that they only differ in plausibility and the choice of *than* versus *compared to*. It is for this reason that we opted against testing other phrasal *than*-constituents such as *than Lauren* or a clausal *than*-constituent like *than Lauren rented*.

- (75) Context:
After graduation, David and Lauren were not longer eligible for student housing and they both had to move.
- (76) a. *David rented a bigger van than the one Lauren rented.*
condition 1: [pla,dir]
- b. *David rented a faster van than the one Lauren rented.*
condition 2: [impla,dir]
- c. *Compared to the one Lauren rented, David rented a bigger van.*
condition 3: [pla,indir]
- d. *Compared to the one Lauren rented, David rented a faster van.*
condition 4: [impl,indir]

The 12 sets of items as well as 24 sets of filler items from phenomena at the semantics/pragmatics interface were distributed onto four lists in Latin square design. The resulting questionnaire versions were then

³⁸ The difference between average ratings for this item was 1.29.

The median ratings for this item differed by 2.

³⁹ See appendix A.2 on page 199ff. for the other items tested in this study.

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uploaded into the online questionnaire tool SurveyGizmo. A different randomization was generated for each of the participants.

Participants. For the main study, we recruited 78 native speakers of English as workers on Amazon Mechanical Turk (URL: <https://www.mturk.com>),⁴⁰ of which 62 completed the questionnaire study. Participants came from four age groups (19 subjects between 18 and 25 years of age, 28 subjects between 26 and 39 years, 12 subjects between 40 and 55 years, and three subjects with more than 60 years of age). There were 27 female and 35 male participants. Participants were reimbursed via Amazon Mechanical Turk.

Procedure and Instructions. Access to the questionnaire was provided by a direct link. Distribution of participants to the four lists was random. Participants were presented with a brief introduction as well as with the instructions in (77) below.

(77) This study elicits the intuitive acceptability of sentences in certain contexts. You will be presented with a sentence in italics and a context in bold. Please decide spontaneously on how acceptable you consider the sentence in this context. A sentence is acceptable in a certain context if it makes sense and a native speaker could use it. You can submit your rating on a scale from 1 ('not acceptable') to 5 ('fully acceptable'). In addition, you may also comment on your judgment.

For each of the 36 items, participants had to provide an acceptability judgment on a scale from 1 ('not acceptable') to 5 ('fully acceptable'). Participants were presented with one context and one item per page. For every item as well as at the end of the study, participants could optionally provide comments in a text box. For each list, we had at least 15 and at most 17 participants.

Predictions. Again, the analysis in Beck, Oda & Sugisaki (2004) crucially predicts an interaction between the two independent variables, plausibility and realization of comparison degree. I refer the reader to the discussion for German as well as to Figure 3.1 above, and will only illustrate the predictions for the item set in (76) here.

⁴⁰ See *e.g.* Gibson, Piantadosi & Fedorenko (2011) for discussion of using Amazon's Mechanical Turk platform in linguistic experimentation.

The item in (76-d) is predicted to have the lowest overall acceptability as there will be variation among speakers as to how successful they are in inferring that the top speed of the moving van that Lauren rented is the intended value for the free degree variable of the ContComp. Following the line of argumentation in Beck, Oda & Sugisaki (2004), this value is much harder to infer from *the one Lauren rented* in this context than the cargo space the moving van has to offer. It is common sense to expect that plausibility should also affect the acceptability of (76-b) to a certain degree. However, this is not a prediction that follows from the semantic analysis and the effect should be considerably weaker than in the case of (76-d). Because of their low frequency, (76-c) and (76-d) are likely to receive somewhat lower ratings overall than (76-a) and (76-b). Again, these considerations are unrelated to the semantic analysis of these comparatives.

Data Analysis and Statistics. Descriptive statistics were used to describe the basic features of the data collected. Table 3.3 reports the mean rating for each condition.

| condition | mean rating |
|----------------------------|-------------|
| condition 1: [pla,dir] | 4.097 |
| condition 2: [impla,dir] | 3.339 |
| condition 3: [pla,indir] | 3.903 |
| condition 4: [impla,indir] | 3.124 |

Table 3.3: Mean Acceptability Ratings across Conditions for English

We also carried out mixed effect model logistic regression analyses using the R programming language and the package *lme4* from Bates (2005), with plausibility and type of construction as fixed, and subjects and items as random factors. Additionally, models with random slopes for both, subjects and items, were calculated. When an analysis of variance (ANOVA) revealed a significant difference between the two models, the more complex model was used.

As in the acceptability rating study for German, we again observe a main effect for plausibility ($SE = .08$, $|t| = 9.95$, $p > .001$) and a main effect for realization of comparison standard ($SE = .08$, $|t| = 2.31$, $p > .001$). There is however no significant interaction between the two ($SE = .16$, $|t| = .01$, $p > .1$).

3.1 Evidence in Favor of Compositional Integration

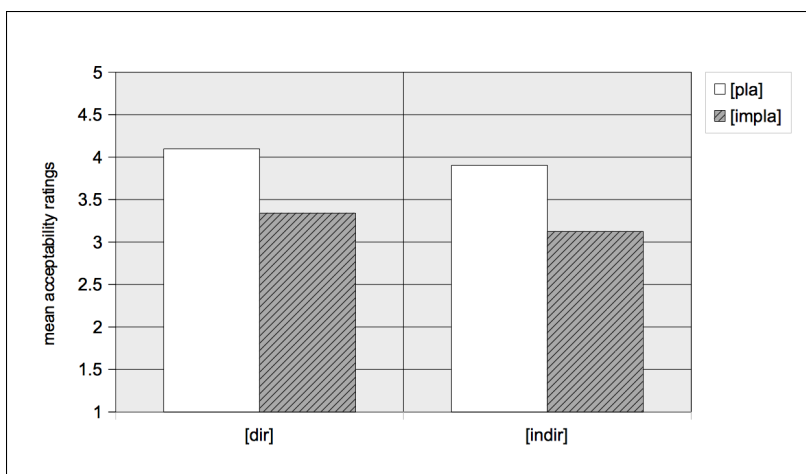


Figure 3.3: Mean Acceptability Ratings across Conditions for English

Discussion. As expected, CompFs are dispreferred in English compared to direct standard phrases. Also, acceptability ratings for both types of comparatives are influenced by plausibility. Implausible ContComps with a CompF like (76-d) indeed have the lowest absolute acceptability, a result in line with the observations from Beck, Oda & Sugisaki (2004) and Beck, Hohaus & Tiemann (2012).⁴¹

However, there is no evidence that plausibility influences the acceptability ratings for ContComps with a CompF to any greater degree than the ratings for comparatives with a direct standard phrase. I conclude that the effect plausibility has on the acceptability of ContComps with CompFs in English also cannot be attributed to the need to infer a less plausible value assignment for the free degree variable. Neither study thus provides support for an approach that treats CompFs in ContComps in English or German as orphan constituents that are compositionally not integrated.

⁴¹ This result does however not extend to the item from the literature in (51), for which acceptability ratings were elicited but which did not figure into the statistical analysis as it did not meet the criteria from the pre-study. (For the exact wording of the item and the context sentence, see appendix A.2.) Mean acceptability for condition 1 [dir,pla] was 3.93 and 3.67 for condition 2 [dir,impla]. In condition 3 [indir,pla] and condition 4 [indir,impla] the mean acceptability ratings were 3.27 and 3.35 respectively.

3.1.3 Beyond (the Lack of) Variation in Acceptability

A couple of other, syntactic properties of CompFs also support this conclusion: As far as clefts and variable binding are concerned, CompFs in ContComps behave like syntactically and compositionally integrated material. Verb-second (V2) phenomena in German also cast doubt on an analysis of CompFs as orphan constituents.

CompFs in ContComps are unlike parentheticals in that they can occur in **clefts**, unlike *e.g.* English *of course* in (78-b) below (cf. also Haegeman 1991/2009, p. 332).⁴² In German, CompFs pattern alike. For those speakers that accept *es ist... , dass*-clefts, the CompF may be clefted, as in (80), while more clearly parenthetical material such as the expressive *die Trulla* ('the ditz') in (81) may not.

- (78) a. *Of course, Mary did not show up.*
 b. **It is of course that Mary did not show up.*
- (79) a. *Compared to Peter, Mary is older.*
 b. *It is compared to Peter that Mary is older.*
- (80) *Es ist nur im Vergleich zu Peter, dass Maria älter ist.*
 it is only in+the comparison to Peter that Mary older is
 'It is compared to Peter that Mary is older.'
- (81) a. *Maria, die Trulla, war nicht da.*
 Mary the ditz was not there
 'Mary, the ditz, was not there.'
- b. **Es ist nur die Trulla, dass Maria nicht da war.*
 it is only the ditz that Mary not there was
 (Lit.) 'It is only the ditz that Mary was not there.'

Under an analysis of the CompF as a syntactic orphan, it should not

⁴² Anna Howell (p.c.) provided me with the following scenario:

- (i) **Context:**
 Benjamin and Martha are talking about an article on the price of universities in America.
- (ii) **Martha:** "This author doesn't know what he's talking about! He claims that Harvard is more expensive than other universities, but really it's no more expensive than Yale, or Brown, or any other private university." — **Benjamin:** "No, it's compared to public universities that Harvard is expensive."

Here, the use of the CompF in the cleft is much more natural than in (79).

3.1 Evidence in Favor of Compositional Integration

be visible to any syntactic operation (such as the movement underlying the construction of a cleft) and the above data are entirely unexpected. **Variable binding** into CompFs also requires that the CompF be compositionally integrated. In (82) and (83), a quantificational Determiner phrase (DP) binds a pronoun inside of the CompF. Assuming a quantificational semantics for interrogatives, the questions in (84) and (85), too, require that the question word bind its trace at Logical Form.

- (82) *In the target group, [every girl] was taller_c but weighed less compared to her mother.*
- (83) [*Jeder Austauschstudent*] *schnitt im Vergleich zu seinem*
 every exchange.student cut in+the comparison to his
deutschen Tandempartner bei dem Tübingen-Quiz besser ab.
 German tandem.partner at the Tübingen-quiz better off
 ‘Compared to their German language tandem, every of the exchange students did better at the Tübingen quiz.’
- (84) *Compared to whom is Mary older?*
 Logical Form: [*whom* [1, ⟨e⟩ [Q [... [*compared to* $t_{1,\langle e \rangle}$] ...]]]]
- (85) *Im Vergleich zu wem ist Maria gesprächiger?*
 in+the comparison to whom is Mary more.talkative
 ‘Compared to whom is Mary more talkative?’

I provide detailed analyses of these examples in section 6.1, once a semantics for CompFs is in place. Suffice it for now to say that the above data are incompatible with an analysis of CompFs as syntactic orphans.

Haegeman, Shaer & Frey (2009) additionally point out that in V2 languages such as German, syntactically independent clauses such as *Hans hat in Utrecht promoviert* (‘Hans did his Ph.D. in Utrecht’) in (86) can never function as the first constituent in V2 clauses. Parentheticals in German such as *am Rande bemerkt* (‘as a side remark’) may meet this **first-constituent criterion**. Crucially, they do not have to, though, as is illustrated in (87).

- (86) a. *Hans hat in Utrecht promoviert,*
 Hans has in Utrecht done.a.Ph.D.
aber seine Tochter studiert in Leiden.
 but his daughter studies in Leiden
 ‘Hans did his Ph.D. in Utrecht
 but his daughter studies in Leiden.’

3 Data

- b. **Hans hat in Utrecht promoviert,*
Hans has in Utrecht done.a.Ph.D.
studiert seine Tochter aber in Leiden.
studies his daughter but in Leiden
'Hans did his Ph.D. in Utrecht
but his daughter studies in Leiden.'

(Haegeman, Shaer & Frey 2009, p. 356, ex. (15))

- (87) a. *Am Rande bemerkt bin ich etwas enttäuscht...*
at+the edge noted am I somewhat disappointed
'Just as a side remark, I'm somewhat disappointed...'
b. *Am Rande bemerkt, ich bin etwas enttäuscht...*
at+the edge noted I am somewhat disappointed
'Just as a side remark, I'm somewhat disappointed...'

(Haegeman, Shaer & Frey 2009, p. 358, ex. (17))

While this behavior by itself is somewhat puzzling under an approach which analyzes parentheticals as syntactic orphans, what is crucial for the discussion here is that CompFs in ContComps in German pattern differently, *i.e.* the sentences in (88-b) and (89-b) are ungrammatical. If CompFs were compositionally not integrated, any kind of syntactic interaction would be unexpected.

- (88) a. *Im Vergleich zu Peter ist Maria älter.*
in+the comparison to Peter is Mary older
'Compared to Peter, Mary is older.'
b. **Im Vergleich zu Peter, Maria ist älter.*
in+the comparison to Peter Mary is older
'Compared to Peter, Mary is older.'
- (89) a. *Verglichen mit Peter ist Maria älter.*
compared with Peter is Mary older
'Compared to Peter, Mary is older.'
b. **Verglichen mit Peter, Maria ist älter.*
compared with Peter Mary is older
'Compared to Peter, Mary is older.'

On the basis of these data on V2 in German as well as from the data on clefting and variable binding in both languages, I conclude that a compositional analysis is desirable for CompFs in ContComps.

3.2 Evidence against Status as Argument

Although compositionally integrated, CompFs are not an argument of the degree operator. Evidence against Fults (2005, 2006)'s analysis comes from the **absence of island effects** in certain ContComps (cf. also Beck, Hohaus & Tiemann 2012, p. 152). Consider English (91) and German (92). In the context of (90), both sentences are unacceptable. The only interpretation available is one where comparison is between Peter and the value of Mary's gift for Sue, and thus absurd. The desired interpretation, where comparison is between the price of the respective gifts, is unavailable for (91) and (92). It is however (the only interpretation) available for (93) and (94), ContComps with a CompF.

- (90) **Context:**
 Mary and Peter have been invited to Sue's birthday party. Mary decided to buy a coffee-table book for 50 dollars for Sue. Peter got Sue a gift voucher for her favorite restaurant for 30 dollars.
- (91) #*Mary bought a gift* [**RelCl** *which was more expensive than Peter*].
- (92) #*Maria hat ein Geschenk gekauft,*
 Mary has a gift bought
 [**RelCl** *welches teurer war als Peter*].
 which pricier was than Peter
 'Mary bought a gift which was more expensive than Peter.'
-
- (93) [*Compared to Peter,*]
Mary bought a gift [**RelCl** *which was more expensive*].
- (94) a. [*Im Vergleich zu Peter*] *hat Maria ein Geschenk gekauft,*
 in+the comparison to Peter has Mary a gift bought
 [**RelCl** *welches teurer war*].
 which pricier was
 'Compared to Peter,
 Mary bought a gift which was more expensive.'
- b. *Maria hat [im Vergleich zu Peter] ein Geschenk gekauft,*
 Mary has in+the comparison to Peter a gift bought
 [**RelCl** *welches teurer war*].
 which pricier was
 'Compared to Peter,
 Mary bought a gift which was more expensive.'

Let's consider these data for a moment. First of all, what causes the unavailability of the relevant reading in (91) and (92)? In short, the relevant interpretation is unavailable because of the syntactic islands its derivation would violate. As the inventory of degree operators in German and English differs slightly, we will need to look at the languages individually for a more detailed explanation.

Let's take a closer look at German first, for which Tiemann (2009) and Tiemann, Hohaus & Beck (2012) argue on the basis of evidence from L1 acquisition that it lacks a phrasal comparative operator, *viz.* *-er*_{Kennedy (1997)} and *-er*_{Heim (1985)}. The example in (92) employs *-er*_{clausal}, repeated from (34) below. The sentence in (92) is thus only superficially phrasal and involves ellipsis. The ellipsis required for the intended interpretation is in (95), and a simplified Logical Form in Figure 3.4.

$$(34) \quad \llbracket -er_{\text{clausal}} \rrbracket = \lambda D'_{\langle d,t \rangle} . \lambda D_{\langle d,t \rangle} . \text{MAX}(D) > \text{MAX}(D')$$

- (95) *...*dass Maria ein Geschenk gekauft hat, welches teurer war als*
 that Mary a gift bought has which pricier was than
Peter ein Geschenk gekauft hat, welches teurer war.
 Peter a gift bought has which expensive was
 (Lit.) 'Mary bought a gift which was more expensive
 than Peter bought a gift which was expensive.'

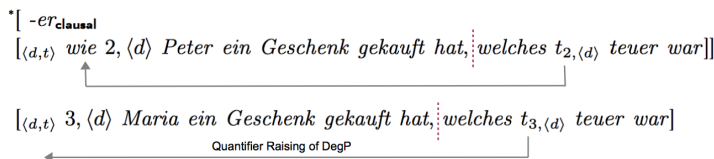


Figure 3.4: Movements and Islands at Logical Form

Two movements characterize this Logical Form: Quantifier movement of the Degree phrase and movement of a covert *wh*-element in the standard clause. Both movements trigger lambda abstraction over degrees and thereby create the two sets of degrees which the comparative operator combines with, in (96). Each of the movements violates a syntactic island, however. A Logical Form as sketched in Figure 3.4 is thus unavailable. The Degree phrase has to be interpreted within the relative clause.

- (96) a. $\lambda d_{\langle d \rangle} . \exists x [\text{gift}(x) \ \& \ \text{bought}(x)(\text{Peter}) \ \& \ \text{PRICE}(x) \geq d]$
 b. $\lambda d'_{\langle d \rangle} . \exists x [\text{gift}(x) \ \& \ \text{bought}(x)(\text{Mary}) \ \& \ \text{PRICE}(x) \geq d']$

3.2 Evidence against Status as Argument

This reasoning extends to English, with one additional consideration: English also has a phrasal comparative operator of type $\langle\langle d, \langle e, t \rangle \rangle, \langle e, \langle e, t \rangle \rangle\rangle$, namely *-er*_{Kennedy (1997)}, repeated in (29).

$$(29) \quad \llbracket -er_{\text{Kennedy (1997)}} \rrbracket = \lambda R_{\langle d, \langle e, t \rangle \rangle} \cdot \lambda x_{\langle e \rangle} \cdot \lambda y_{\langle e \rangle} \cdot \text{MAX}(\lambda d. R(d)(x)) > \text{MAX}(\lambda d'. R(d')(y))$$

As this operator is not scopally mobile, it is irrelevant to the derivation of the intended reading of (91). If we assume that CompFs in ContComps are an argument of the degree operator, the acceptability of (93) and (94) in the context of (90) is thus unpredicted. A clausal analysis does not lend itself to CompFs in the first place (and is not expected to derive the intended reading, as shown above). Any type of phrasal analysis would require that we syntactically derive the degree relation in (97), a relation between expense degrees and individuals such that there is a gift which the individual bought and the price of the gift exceeds or equals that degree. However, neither language has a mobile phrasal comparative operator to do that. Even if we were to assume such an operator, repeated from (58) below, it would have to move out of the relative clause island in a derivation of (97), as in the Logical Form in (98) on the next page.

$$(97) \quad \lambda d. \lambda x. \exists y [\text{gift}(y) \ \& \ \text{bought}(y)(x) \ \& \ \text{PRICE}(y) \geq d]$$

$$(58) \quad \llbracket -er_{\text{Heim (1985)}} \rrbracket = \lambda y_{\langle e \rangle} \cdot \lambda R_{\langle d, \langle e, t \rangle \rangle} \cdot \lambda x_{\langle e \rangle} \cdot \text{MAX}(\lambda d. R(d)(x)) > \text{MAX}(\lambda d'. R(d')(y))$$

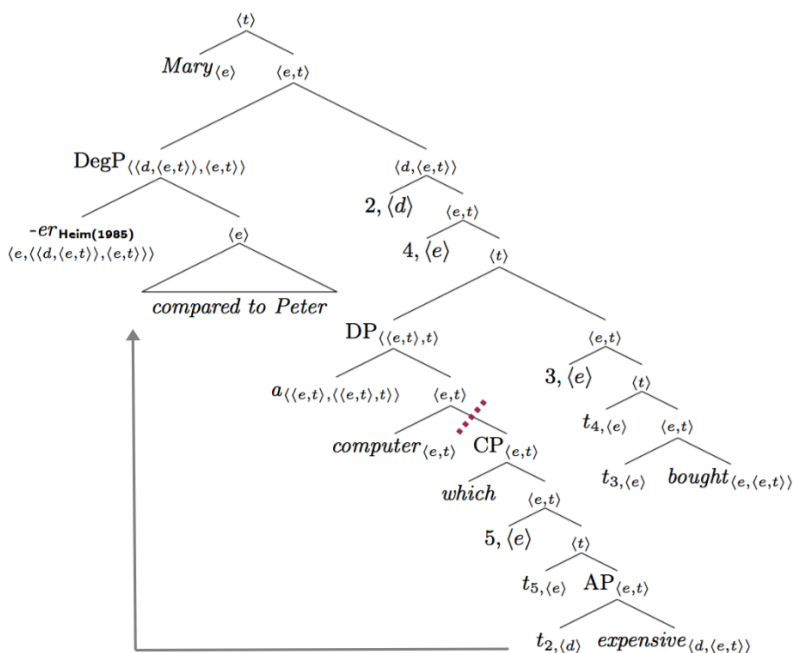
Two movements generate the interpretation in (97) for the sister constituent of the DegP in (98): First, the subject Noun phrase undergoes movement, and second, the Degree phrase undergoes Quantifier Raising and parasitically moves in between the subject and the binder created by its movement. Crucially, the last movement is prevented by the island.

I conclude that an analysis of CompFs as providing the comparative operator with a phrasal argument is not viable. A viable analysis of (93) and (94) has to be an analysis that interprets the comparative operator inside the scope island and the CompF outside of it, in the matrix clause.

Let's stay with these data for a moment longer, as they additionally make a case in favor of a compositional analysis of CompFs in ContComps: We find that the position of the CompF may affect the interpretation of the comparison. More precisely, the value assigned to the free degree variable in a ContComp also depends on the syntactic position of the CompF.

3 Data

(98) *



Such **position effects** are expected under a compositional analysis, where the interface between syntax and semantics is transparent. I have already briefly pointed out that the sensible, relative-clause external reading is the only available reading for (93) and (94): If the CompF attaches outside of the relative clause which contains the ContComp (RelCl-ext), a relative-clause internal interpretation, which we find with (91) and (92), is unavailable. The unacceptability of (99) and (100) provides further support for this conclusion.

(99) **[Compared to yesterday], Anna booked a flight
[RelCl that, today, is more expensive].*

(100) **[Im Vergleich zu gestern] hat Anna eine Flugverbindung
in+the comparison to yesterday has Anna a flight.connection
gebucht, [RelCl die heute teurer ist].
booked that today pricier is
'Compared to yesterday, Anna booked a flight
that, today, is more expensive.'*

3.2 Evidence against Status as Argument

- (101) *Anna booked a flight*
 [RelCl *that, today, is more expensive [compared to yesterday]*].

In both examples, the intended interpretation that Anna booked a flight connection which, today, costs more than yesterday is unavailable. We can express this meaning with a CompF but only if it attaches within the relative clause (RelCl-int), as in (101) and (102).

- (102) *Anna hat eine Flugverbindung gebucht, [RelCl die [im*
 Anna has a flight.connection booked that in+the
Vergleich zu gestern] heute teurer ist].
 comparison to yesterday today pricier is
 ‘Anna booked a flight
 that, compared to yesterday, is more expensive today.’

If both, the ContComp and the CompF are in the relative clause, as in (103) and (104), they actually share the non-sensical interpretation of their direct-standard-phrase equivalents, (91) and (92), in the already familiar context of (90).

One last example. If the CompF attaches within the relative clause, it can only manipulate the value of a free degree variable introduced by a ContComp in the relative clause. This is so, even if there is another free degree variable in the matrix clause, as in (105). Here, the most plausible reading would actually be one where Mary takes better care of the small boy than her colleague. This reading is unavailable. Instead, comparison is between the boy’s height and that of Mary’s colleague.

- (90) Context:
 Mary and Peter have been invited to Sue’s birthday party. Mary decided to buy a coffee-table book for 50 dollars for Sue. Peter got Sue a gift voucher for her favorite restaurant for 30 dollars.
- (103) #*Mary bought a gift [RelCl which,*
 [compared to Peter], was more expensive].
- (104) #*Maria hat ein Geschenk gekauft, [RelCl welches [im Vergleich*
 Mary has a gift bought which in+the comparison
zu Peter] teurer war].
 to Peter more.expensive was
 ‘Mary bought a gift which,
 compared to Peter, was more expensive.’

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- (105) *Maria beschäftigte sich häufiger mit dem Schüler, [RelCI der Mary occupied herself more.often with the pupil who [im Vergleich zu ihrem Kollegen Peter] kleiner war].*
 in+the comparison to her colleague Peter smaller was
 ‘Mary occupied herself more often with the pupil who, compared to her colleague, Peter, was smaller.’

In German, a CompF can also occur together with a ContComp inside of an Adjective phrase that is used attributively (AttrComp-int), as in (106). (In English, CompFs are ungrammatical in this position for what I hypothesize are independent syntactic reasons.) In the context from (90), (106) is unacceptable because the only interpretation is one under which comparison is between the price of the gift that Mary bought and Peter’s price. If we change the CompF in the example accordingly, as in (107), the sentence is of course acceptable in the context. Only an internal interpretation is thus possible for CompFs in this syntactic position.

- (106) #*Maria hat ein [[im Vergleich zu Peter] teureres] Geschenk gekauft.*
 Mary has a in+the comparison to Peter pricier gift bought
 ‘Mary bought a gift more expensive compared to Peter.’
- (107) *Maria hat ein [[im Vergleich zu Peter’s Geschenk] teureres] Geschenk gekauft.*
 Mary has a in+the comparison to Peter’s gift pricier gift bought
 ‘Mary bought a gift more expensive compared to Peter’s gift.’

Figure 3.5 provides a summary of the observed position effects.

| | RelCI-ext | RelCI-int | AttrComp-int (German only) |
|-------|-----------------------|-----------------------|-------------------------------|
| CompF | external reading only | internal reading only | internal reading only |

Figure 3.5: Summary of Position Effects with CompFs in ContComps

Crucially, while direct standard phrases are ungrammatical in RelCI-ext due to island violations, CompFs are not. Under an analysis of CompFs as syntactically and compositionally unintegrated material, the position of the CompF should not affect its interpretation. The above restrictions on the interpretation of the comparative are then unexpected.

3.3 Chapter Summary

Evidence in favor of a compositional analysis comes from the behavior of CompFs with respect to clefts, variable binding and, in German, V2 licensing, as well as from the positional effects observed. Acceptability ratings do not provide any evidence that plausibility influences Cont-Comps with CompFs to any greater degree than comparatives with a direct standard phrase. This result casts doubt on the empirical basis upon which the analysis of CompFs as orphan constituents proposed by Beck, Oda & Sugisaki (2004) is built. Yet, given their differential behavior with respect to syntactic islands, CompFs cannot be an argument of the degree operator, either, unlike direct standard phrases. We are thus able to formulate the following two conditions for an empirically adequate analysis of CompFs: We want (i) a compositional analysis, which yet explains the unfree behavior of the free degree variable in the presence of a CompF, and (ii) predicts the positional restrictions on the interpretation of the comparative. I provide such an analysis in the next chapter.

Part II

THE MAIN PROPOSAL

4 Analysis

Intuitively, CompFs restrict the situations a sentence can describe to only those situations in which comparison is with the individual introduced by the frame. If we pursue this intuition, there are two crucial ingredients to the analysis, situations and the notion of frame. I provide an introduction to both, situation semantics (section 4.1) and frame setters (section 4.2) below, and then spell out the analysis in detail (section 4.3). In short, frame setters add a definedness condition regarding the evaluation situation of a sentence and thereby indirectly restrict the permissible value assignments to the free variables in that sentence. This analysis meets the criteria for an empirically adequate analysis discussed above: Not only does the analysis provide an explanation for the effect these phrases have on the interpretation of the free variable in a ContComp (section 4.4), it also correctly predicts the position effects observed (section 4.5).

4.1 Adding in Situations

Situations are parts of possible worlds, *Weltausschnitte*, and as such are particulars. Their semantic type is $\langle s \rangle$. The possibilistic situation semantics I will adopt here is based on Kratzer (1989). (See also Kratzer (1998b, pp. 178-185), Cresswell (1991), Elbourne (2002, 2005), von Stechow (2005), F. Schwarz (2009), and Kratzer (2011) for overviews and discussion.) Worlds are special kinds of situations in that they are not proper parts of any other situation and thus maximal situations.⁴³ Consequently, the domain of situations is characterized by a part-whole structure: Any two situations which are part of a world can form a mereological sum. I will express the part relation between situations by \preceq , defined in terms of the mereological sum operation \oplus in that $s' \preceq s$ (*i.e.* the situation s' is a part of the situation s) only if $s' \oplus s = s$. The part relation is thus also restricted to situations from the same world. Any situation as well

⁴³ As Max J. Cresswell (1991, p. 78) puts it: „Wenn s schon alles sein könnte, was es gibt, dann könnte s eine mögliche Welt sein. Und alles, was eine mögliche Welt sein könnte, ist eine mögliche Welt. Mit anderen Worten: Situationen sind Welten. . . Wie klein eine Welt sein kann, ist eine metaphysische Frage. . . Alles was ich behaupte, ist, dass sie klein sein kann wie eine. . . Situation.“

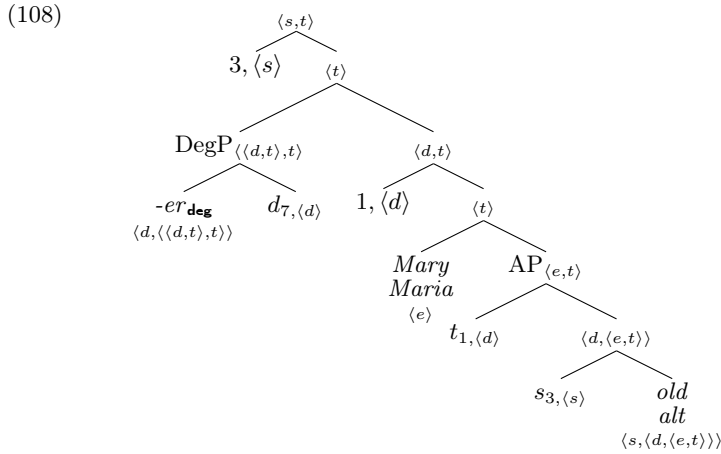
4 Analysis

as any individual is related to a unique world, which introduces the complication that we need a counterpart-relation to identify corresponding individuals and situations across worlds, as discussed in more detail in D. Lewis (1986). For our purposes, however, it will be sufficient to simplify and restrict ourselves to situations and individuals that are part of the actual world. Sentences denote propositions, sets of possible situations.

When we throw situations into the mix, the grammar generates the Logical Form in (108) for ContComps like (20) and (21) from above. The interpretation of this Logical Form is sketched in (109).

(20) *Mary is older.*

(21) *Maria ist älter.*
 Mary is older
 ‘Mary is older.’



- (109)
- $\llbracket old \rrbracket = \lambda s_{\langle s \rangle}. \lambda d_{\langle d \rangle}. \lambda x_{\langle e \rangle}. AGE(s)(x) \geq d$
 - $\llbracket [1 [Mary [t_{1, \langle d \rangle} [s_{3, \langle s \rangle} old]]]] \rrbracket^g = \lambda d. AGE(g(3, \langle s \rangle))(Mary) \geq d$
 - $\llbracket [3, \langle s \rangle [[-er_{deg} d_{7, \langle d \rangle}] [1 [Mary [t_{1, \langle d \rangle} [s_{3, \langle s \rangle} old]]]]]] \rrbracket^g = \lambda s. MAX(\lambda d. AGE(s)(Mary) \geq d) > g(7, \langle d \rangle)$

The interpretation the grammar assigns to (108) is the proposition in (109-c), a function which will yield true for an evaluation situation only if Mary’s age degree in that situation exceeds a contextually provided age degree. One remark on the lexical entry for the gradable predicate in (109-a) may be in order: A gradable predicate relates an individual

and a situation to the degrees to which that individual has a certain measurement in the situation. The situation argument is well-motivated as measurements may change across situations. Here is an example: My degree of tiredness in the situation I am currently in is not the same as in the situation I was in last night when I went to bed.

4.2 Introducing the Notion of Frame

Intuitively, CompFs provide a restriction on a set of situations such as (109-c). This intuition is reminiscent of the characterizations of frame setters in literature, two examples of which I report below. In (110), the proposition that Eva is popular is restricted by the frame setter in its applicability: Appropriate evaluation situations for (110) may not be located outside of Argentina. (See section 8.1 for further discussion.) In (111), as Jacobs (2001, p. 656) observes, “. . . the initial constituent of this sentence restricts the application of the proposition to certain possible situations, namely those in which the team wins.”

(110) [In Argentina], *Eva is still very popular.*
(Maienborn 2001, p. 191, no. (1-c))

(111) [Im Fall eines Sieges] *wird die Mannschaft eine Belobigung*
in+the case a victory will the team a commendation
durch den Staatspräsidenten erhalten.
by the state+president receive
'In the case of a victory,
the team will receive a commendation from the president.'
(Jacobs 2001, p. 655, no. (25))

Frame setters have been described as “. . . restrictive devices that set the scene for the rest of the sentence.” (Maienborn 2001, p. 225) They “. . . limit the applicability of the main predication to a certain restricted domain. . . . Typically, . . . [they] set a spatial, temporal, or individual framework within which the main predication holds.” (Chafe 1976, p. 50) When used by a speaker, the speaker “. . . claims here that the proposition holds true in a given domain; he does not commit himself to the truth of the proposition in any other domain.” (Bellert 1977, p. 346) Consistently, it has also been noted that a peculiar property of these phrases is their effect on any “unspecified. . . dimension of evaluation” (Krifka 2007, p. 46), as they “. . . lend themselves to restricting the domains of quantifiers and definites. . .” (Maienborn 2001, p. 228)

4 Analysis

I therefore suggest analyzing English *compared to*-phrases as well as German *im Vergleich zu*- and *verglichen mit*-phrases as frame setters. They are thus an instance of an already well-known phenomenon, which is however not very well understood: Apart from the above characterizations, which have an intuitive appeal, of course, the literature has very little to offer in terms of a comprehensive and explicit formal analysis. As Krifka (2007, p. 46) puts it: “It is still unclear how this should be understood more precisely.” I suggest below that frames add a domain restriction, a presupposition, on the set of situations a sentence denotes. This suggestion can be considered a formal implementation of Jacobs (2001, p. 656)’s definition of frame setting, in (112).

- (112) **Frame Setting:**
“In $(X Y)$, X is the frame for Y iff X specifies a domain of (possible) reality to which the proposition expressed by Y is restricted.”

Just like their semantic analysis, the syntactic position of frame setters is subject to much debate and on-going inquiry.⁴⁴ One line of approaches suggests that these adverbials may be generated freely (*e.g.* Ernst 2004), while the other suggests that frame adverbials have a dedicated base position but may undergo scrambling in languages like German (*e.g.* Frey 2003). Psycholinguistic investigations into acceptability ratings and readings times provide evidence in favor of the latter position (Störzer & Stolterfoht 2013). For the sake of explicitness, I assume that frame adverbials are generated in a dedicated base position within what I am going to call a Frame phrase. I envision an architecture of Logical Form that contains three different layers, as in (113) on the opposing page.⁴⁵ The top layer of Logical Form, to which I will refer as the management layer of Logical Form, serves information-structural purposes and also hosts Frame phrases.

As indicated in (113), frames are different from topics (cf. also Jacobs (2001) and Krifka (2007)), albeit both are located in the management layer of Logical Form. By topic I refer to sentence topic in the sense of Reinhart (1981), and not the discourse topic.⁴⁶ “A topic can be simply

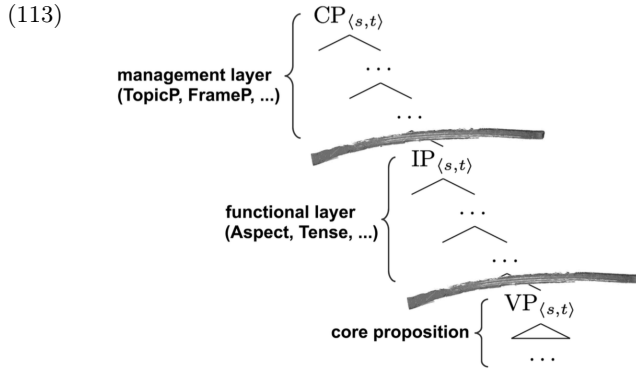
⁴⁴ As for instance witnessed by the research program of the Project B8 within the Tübingen Collaborative Research Center 833. See in particular Störzer (in prep.).

⁴⁵ Again, I gloss over any syntactic differences between English and German here, especially the fact that some varieties of German might not have an Inflection node. See *e.g.* Beck & Gergel (2014) for discussion and further references.

⁴⁶ See Endriss (2009, pp. 19-56) for an excellent overview.

4.3 Putting the Building Blocks Together

conceived of as being what a sentence is about.” (Endriss 2009, p. 19) To illustrate quickly: Take for instance the examples in (114) from Endriss (2009, p. 20, no. (2.1)). Intuitively, the sentence in (114-a) is about Clarissa, while the sentence (114-b) is about Dena.



-
- (114) a. *Yesterday, [Clarissa]_{Topic} visited Dena.*
 b. *Yesterday, [Dena]_{Topic} was visited by Clarissa.*

This is different for the two example in (110) and (111) from above: The sentence in (110) is clearly not about Argentina, but about Eva. Similarly, it would be inappropriate to conclude that (111) is about the case of a win, as Jacobs (2001, p. 656) observes. (See also Krifka (2007) for a similar argumentation.) I conclude from this brief discussion that we need both notions, topic and frame.

4.3 Putting the Building Blocks Together

Preview. Just like other Prepositional and Participle phrases, English *compared to Peter* as well as German *im Vergleich zu Peter* and *verglichen mit Peter*, as in our examples from (45) and (46), denote sets.

- (45) *Compared to Peter, Mary is older.*
 (46) *Im Vergleich zu Peter ist Maria älter.*
 in+the comparison to Peter is Mary older
 ‘Compared to Peter, Mary is older.’

They denote sets of situations, in which there is some kind of comparison with Peter, that is situations in which Peter is compared with someone

else along some dimension. The constituent to which they attach also denotes a set of situations, namely those situations in which Mary’s age exceeds a contextually provided degree. Crucially though, interpretation does not proceed via Predicate Modification, in (115), but rather with the help of the covert operator FRAME in (116), of which these phrases are an argument.

- (115) **Generalized Predicate Modification:**
(cf. Heim & Kratzer 1998, pp. 105-106, no. (14’))

If α is a branching node and $\{\beta, \gamma\}$ the set of its daughters, for any assignment g and any semantic type σ , α is in the domain of $\llbracket \]^g$ if both β and γ are and $\llbracket \beta \rrbracket^g$ and $\llbracket \gamma \rrbracket^g$ are both of type $\langle \sigma, t \rangle$. In this case, $\llbracket \alpha \rrbracket^g = \lambda m : m \in D_\sigma$ and m is in the domain of $\llbracket \beta \rrbracket^g$ and $\llbracket \gamma \rrbracket^g$. $\llbracket \beta \rrbracket^g(m) \ \& \ \llbracket \gamma \rrbracket^g(m)$.

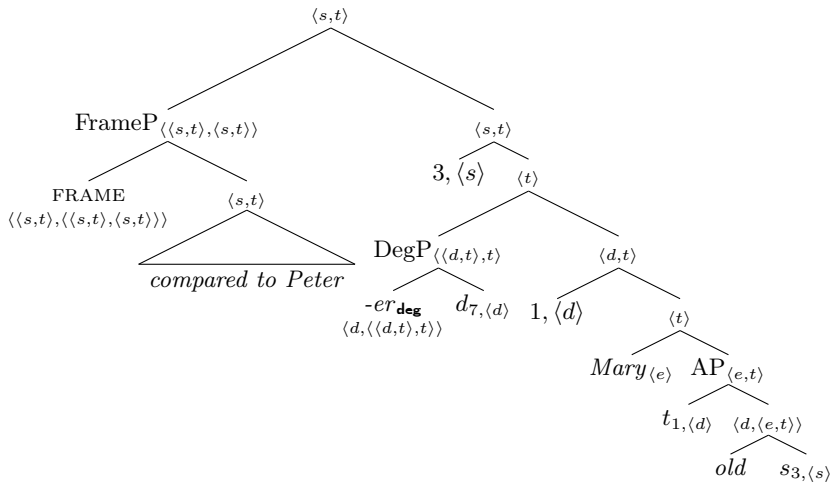
- (116) $\llbracket \text{FRAME} \rrbracket = \lambda p_{\langle s, t \rangle} . \lambda q_{\langle s, t \rangle} . \lambda s_{\langle s \rangle} : p(s) . q(s)$ -to be refined-

Frames restrict a set of situations to a subset of situations, they add a presupposition. Presuppositions are devices that introduce a domain of definition for a function that is a subset of its actual domain, the type-defined set, as in Heim & Kratzer (1998). Under this view, frames are not part of the assertion, an intuition shared by Störzer & Stolterfoht (2013, p. 60). They are indeed quite literally domain adverbials, to use the terminology of Bellert (1977, pp. 347-348).

In a specific evaluation situation, our examples in (45) and (46) assert that Mary is older than some contextually provided degree, and that they are only defined for situations in which this comparison is with Peter. This interpretation is derived on the basis of a Logical Form like (117) on the opposing page. While the denotation of *compared to Peter* specifies the restriction, it is the (yet preliminary) semantics of FRAME that adds this denotation of its sister constituent as a definedness condition to the sentence. With these ingredients, the Logical Form in (117) is interpreted as a partial function from situations to truth values: It is defined only for situations that are such that Peter is compared with someone along some dimension in those situations. It maps those situations to true only if the maximal degree to which Mary is old exceeds a contextually provided degree in those situations. The sentence will not be defined if the value assigned to the free degree variable is any other than Peter’s age. (More on this later.)

- (117)

4.3 Putting the Building Blocks Together



So, which situations are such that there is a comparison with Peter?

Internal Composition of the Frame Setter. To answer this question and thereby approach the compositional interpretation of the Frame phrase, let us consider what makes a comparison. The following four ingredients go into a comparison: two objects to be compared, a measurement or dimension along which comparison takes place, and lastly, one of five comparison relations ($>$, $<$, $=$, \geq , \leq). The denotations of both, the Participle phrases *compared to* from English and *verglichen mit* from German, as well as of the German Preposition phrase *im Vergleich zu* below, rely on these four ingredients:

The Participle denotes a relation between a situation and an individual such that there is a comparison involving this individual in the situation. So, there has to be another individual (of type $\langle e \rangle$) with which I compare this individual, some relation between degrees (of type $\langle d, \langle d, t \rangle \rangle$), and a measure function that maps both individuals to the relevant degree in the situation (of type $\langle s, \langle e, d \rangle \rangle$). In the lexical entry in (118), all of these requirements are introduced by existential quantification from the lexicon. As the degree operators in English and German use only two degree relations in their lexical entries, *viz.* the greater relation and the greater-than relation⁴⁷, I will assume for simplicity that the relation is explicit in the lexical entry of the participle, as in (119).

⁴⁷ See section 1.3 in the introduction for the lexical entries.

4 Analysis

(118) Lexical entry, first version:⁴⁸

$$\llbracket \text{compared to} \rrbracket = \llbracket \text{verglichen mit} \rrbracket =$$

$$\lambda s_{\langle s \rangle} \cdot \lambda y_{\langle e \rangle} \cdot \exists x_{\langle e \rangle}, \exists \mu_{\langle s, \langle e, d \rangle \rangle}, \exists R_{\langle d, \langle d, t \rangle \rangle} [R(\mu(s)(y))(\mu(s)(x))]$$

(119) Lexical entry, working version:

$$\llbracket \text{compared to} \rrbracket = \llbracket \text{verglichen mit} \rrbracket =$$

$$\lambda s_{\langle s \rangle} \cdot \lambda y_{\langle e \rangle} \cdot \exists x_{\langle e \rangle}, \exists \mu_{\langle s, \langle e, d \rangle \rangle} [\mu(s)(x) \geq \mu(s)(y)]$$

The Participle phrase has the structure in (120) and receives the interpretation in (121), (the characteristic function of) a set of situations in which Peter is being compared to some one, *i.e.* situations in which some individual exceeds or equals Peter along some dimension.

(120) Logical Form of Participle phrase:

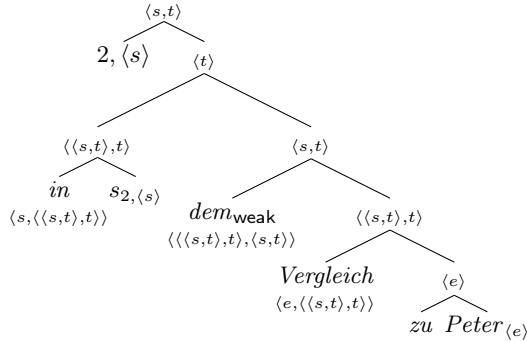
$$[\langle s, t \rangle \exists, \langle s \rangle [\llbracket \langle e, t \rangle \{ \text{compared/ verglichen} \} s_{3, \langle s \rangle} \rrbracket [\{ \text{to/ mit} \} \text{Peter}_{\langle e \rangle}]]]$$

(121) Interpretation of Participle phrase:

$$\lambda s_{\langle s \rangle} \cdot \exists x_{\langle e \rangle}, \exists \mu_{\langle s, \langle e, d \rangle \rangle} [\mu(s)(x) \geq \mu(s)(\text{Peter})]$$

The major difference between German *im Vergleich zu* and *verglichen mit* is their internal structure (and not so much the resulting interpretation). I suggest the Logical Form in (122) for *im Vergleich zu Peter*. At the core of the semantics of this prepositional phrase is the denotation of the noun *Vergleich*: The Noun phrase *Vergleich zu Peter* contributes the set of propositions that express comparisons with Peter, as in (123). The resulting set will be a set containing propositions like (124).

(122) Logical Form of Preposition phrase:



⁴⁸ I will not discuss the internal composition of the participle here (cf. *e.g.* Rapp (1997, 2014), Kratzer (2000), and I. Zimmermann (2003)).

4.3 Putting the Building Blocks Together

$$(123) \quad \llbracket \text{Vergleich} \rrbracket = \{p : \exists x \in D_{\langle e \rangle}, \exists \mu \in D_{\langle s, \langle e, d \rangle} \ [p = \lambda s_{\langle s \rangle}. \mu(s)(x) \geq \mu(s)(\text{Peter})]\}$$

$$(124) \quad \{\text{that Mary is older than Peter, that Susan is older than Peter, that Mary is taller than Peter, that Susan ran faster than Peter, that Mary is as old as Peter, that John is as heavy as Peter, ...}\}$$

I take the semantic contribution of the weak definite $-m$, which we find in *im Vergleich zu*, to generalize to types other than type $\langle e \rangle$. Its lexical entry is in (125-a). For the semantics of the preposition *in*, I refer the reader to *e.g.* von Stechow (2006). Again, I use an entry generalized to types other than locations. The preposition *in* in (125-b) only contributes the element-of-relation and could as well be considered semantically vacuous.

$$(125) \quad \text{For any semantic type } \langle \alpha \rangle:$$

- a. $\llbracket \text{der}_{\text{weak}} \rrbracket = \lambda M_{\langle \alpha, t \rangle} : \exists ! m \in D_{\langle \alpha \rangle} [M(m)]. \text{ im } [M(m)]$
- b. $\llbracket \text{in} \rrbracket = \lambda m_{\langle \alpha \rangle}. \lambda M_{\langle \alpha, t \rangle}. M(m)$

(F. Schwarz 2009, p. 148, no. (148))

We thence derive the interpretation in (126) for the Determiner phrase and the interpretation in (127) for the entire Preposition phrase, a set of situations in which there is a comparison with Peter, thus one of the propositions from the set in (124) above.

$$(126) \quad \text{Interpretation of Determiner phrase:}$$

$$\llbracket [\text{dem}_{\text{weak}} [\text{Vergleich} [\text{zu Peter}]]] \rrbracket =$$

$$\iota p [\exists x \in D_{\langle e \rangle}, \exists \mu \in D_{\langle s, \langle e, d \rangle} \ [p = \lambda s. \mu(s)(x) \geq \mu(s)(\text{Peter})]]$$

presupposition:

$$\exists ! p [\exists x \in D_{\langle e \rangle}, \exists \mu \in D_{\langle s, \langle e, d \rangle} \ [p = \lambda s. \mu(s)(x) \geq \mu(s)(\text{Peter})]]$$

$$(127) \quad \text{Interpretation of Preposition phrase:}$$

$$\llbracket [\text{in} [\text{dem}_{\text{weak}} [\text{Vergleich} [\text{zu Peter}]]]] \rrbracket =$$

$$\lambda s. (\iota p [\exists x \in D_{\langle e \rangle}, \exists \mu \in D_{\langle s, \langle e, d \rangle} \ [p = \lambda s. \mu(s)(x) \geq \mu(s)(\text{Peter})]])(s)$$

presupposition:

$$\exists ! p [\exists x \in D_{\langle e \rangle}, \exists \mu \in D_{\langle s, \langle e, d \rangle} \ [p = \lambda s. \mu(s)(x) \geq \mu(s)(\text{Peter})]]$$

The presupposition introduced by the weak definite here requires this to be a unique set of situations of this make-up. This particular presupposition is actually very weak.⁴⁹ We will pretty much ignore it and treat both CompFs in German as equivalents. To clarify, the fact that the denotation of some prepositional phrase that is interpreted as a frame

⁴⁹ I thank Florian Schwarz for discussion of this point.

4 Analysis

setter comes with a presupposition should not lead us to believe that this is the source of the presuppositionality of frame setters. It is not, the semantics of FRAME is.

In order to see which situations CompFs describe, it is useful to represent situations as tuples of those items which are minimally required in the situation described. The set (described by the characteristic function) in (121) contains situations like the ones in Table 4.1.

| | |
|----------|-----------------------------|
| s_1 | ⟨Mary, Peter, AGE, >⟩ |
| s_2 | ⟨Mary, Peter, HEIGHT, =⟩ |
| s_7 | ⟨Heather, Peter, HEIGHT, >⟩ |
| s_{12} | ⟨Brandon, Peter, WEIGHT, >⟩ |
| ... | ... |

Table 4.1: CompF situations exemplified

ContComps with a CompF are restricted in their interpretation to only these type of situations. Abstracting away from the question of the value assignment to the free degree variable in ContComps for now, Table 4.2 illustrates schematically what type of situations the ContComp *Mary is older* and its German equivalent describe.

| | |
|----------|-------------------------|
| s_3 | ⟨Mary, Brandon, AGE, >⟩ |
| s_5 | ⟨Mary, Heather, AGE, >⟩ |
| s_9 | ⟨Mary, Peter, AGE, >⟩ |
| s_{10} | ⟨Mary, Sean, AGE, >⟩ |
| ... | ... |

Table 4.2: ContComp situations exemplified

The interpretation of our basic type of examples in (45) and (46) is in (128). It is a function from situations of the type in Table 4.2 to truth values, defined only for situations of the type in Table 4.1.

$$(128) \quad \lambda s : \exists x_{\langle e \rangle}, \exists \mu_{\langle s, \langle e, d \rangle \rangle} [\mu(s)(x) \geq \mu(s)(\text{Peter})]. \\ \text{MAX}(\lambda d. \text{AGE}(s)(\text{Mary}) \geq d) > g(7, \langle d \rangle)$$

If the definedness condition is met, the only value assignment permissible for the free degree variable in (45) and its German equivalents is Peter's age in the situation. The next section will explain why in more detail, and also introduce a minimal refinement of the analysis of FRAME.

4.4 Variable Assignment Explained

To see why the only value assignment possible for the free degree variable in our examples is Peter’s age, consider two alternative assignments, Heather’s age and Peter’s height. In the first case, the assertion of the sentence will end up contradicting its presupposition: It asserts that in the evaluation situation, Mary is older than Heather, and presupposes that this situation is one in which Peter is being compared to someone. There are no such situations that minimally verify the assertion while at the same time meet the selectional restriction imposed by the CompF. Under such an assignment, the sentence is undefined. In the second case, the assertion of the sentence does not contradict the presupposition. However, only age degrees constitute possible values for the free variable, as age degrees can only be compared to age degrees. (See also von Stechow (2008) for discussion.) The sentence selects only situations of the type in Table 4.1, and situations like s_3 , s_5 , and s_{10} from Table 4.2, all of which would involve value assignments other than Peter’s age, are not in the domain of definition of the function in (128). Frame setters thus may manipulate value assignments to free variables via the definedness condition they impose on a sentence.

The above reasoning, however, relies on a crucial assumption that still needs to be made explicit. The analysis assumes that FRAME restricts a proposition to only those situations that minimally verify the content of the frame, hence the representation of CompF situations in Table 4.1. So far, nothing in the lexical entry of FRAME introduces such a requirement and, as a consequence, the part-whole structure of the domain of situations is a source of potential trouble for explaining the variable assignment in our example, as it is in other linguistic environments. (See section 5.2.) Why? The set of situations such that there is a comparison with Peter also contains situations, in which, for example, Peter’s height exceeds Mary’s height and Susan is tired, or in which Mary’s age exceeds Peter’s age and Mary’s age exceeds Susan’s age. While the former situation described here is unproblematic, the latter situation is a source of concern: $g(7, \langle d \rangle)$ being Susan’s age in the situation would also allow for the assertion to not contradict the presupposition and incorrectly constitute a viable value assignment to the free degree variable. Intuitively, Susan is entirely irrelevant in the evaluation situation. This intuition needs to be captured in the semantics. In the literature on situation semantics, one way to “... get rid of all sorts of irrelevant junk,” as von Fintel (2005, p. 2) poignantly puts it, is to appeal to minimal situations.

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I will do so, too, and suggest to refine the lexical entry of FRAME as in (129). Minimality is defined in (130).

$$(129) \quad \llbracket \text{FRAME} \rrbracket = \lambda p_{\langle s,t \rangle} . \lambda q_{\langle s,t \rangle} . \lambda s : \text{MIN}(p)(s) . q(s)$$

$$(130) \quad \llbracket \text{MIN} \rrbracket = \lambda p_{\langle s,t \rangle} . \lambda s_{\langle s \rangle} . p(s) \ \& \ \neg \exists s' [s' \prec s \ \& \ p(s')].$$

The minimal situations in a set of situations “... are those that do not have proper parts that are also in the set. They are the ones that contain just enough parts to support the proposition, they have no parts that can be removed such that the stripped-down situation still supports the proposition.” (von Stechow 2005, p. 2) With this refinement, our basic type of example in (45) receives the interpretation which we have implicitly been working with so far, in (131).

$$(131) \quad \lambda s : s \in \text{MIN}(\lambda s* . \exists x_{\langle e \rangle} . \exists \mu_{\langle s, \langle e, d \rangle} [\mu(s*)(x) \geq \mu(s*)(\text{Peter})]). \\ \text{MAX}(\lambda d . \text{AGE}(s)(\text{Mary}) \geq d) > g(7, \langle d \rangle)$$

I will provide further discussion of minimality of situations in the next chapter, in section 5.2, and also mention an alternative approach to excluding superfluous material from the frame situations, by exhaustification. The remainder of this chapter is dedicated to explaining the effect which the syntactic position of the CompF has on the interpretation of the free degree variable in a ContComp.

4.5 Position Effects Explained

A semantics for CompFs that relies on situations can also straightforwardly explain these interpretative effects. The pattern to be accounted for is repeated below, as Figure 4.1.⁵⁰

| | RelCl-ext | RelCl-int | AttrComp-int (German only) |
|-------|-----------------------|-----------------------|-------------------------------|
| CompF | external reading only | internal reading only | internal reading only |

Figure 4.1: Summary of Position Effects with CompFs in ContComps

I will first provide a detailed explanation of the data concerning relative clauses in English and German (RelCl-int and RelCl-ext), especially the

⁵⁰ CompFs outside of a relative clause that hosts a ContComp are referred to as RelCl-ext in the table. Use of a CompF inside of a relative clause with a ContComp is referred to as RelCl-int. AttrComp-int stands for occurrence of a CompF inside of an attributive comparative.

observed absence of island effects with CompFs. I will then turn to attributively used ContComps in German (AttrComp-int). In all cases, it will be crucial which set of situations the frame setter modifies.

Relative-Clause Internal Readings. Recall from section 3.2 that English (103) and (104) are unacceptable in the provided context. With the ContComp and the CompF both in the relative clause, the only standard of comparison possible is the elusive price attached to Peter (and not the price of the gift which Peter bought for Susan). Do also recall that for (105), the most plausible reading would actually be one where Mary takes better care of the small boy than her colleague does. This reading, too, is unavailable. Instead, comparison is between the boy's height and that of Mary's colleague.

(90) Context:

Mary and Peter have been invited to Sue's birthday party. Mary decided to buy a coffee-table book for 50 dollars for Sue. Peter got Sue a gift voucher for her favorite restaurant for 30 dollars.

(103) #*Mary bought a gift* [_{RelCl} *which, [compared to Peter], was more expensive*].

(104) #*Maria hat ein Geschenk gekauft, [RelCl welches [im Vergleich Mary has a gift bought which in+the comparison zu Peter] teurer war]*.
to Peter pricier was
'Mary bought a gift which, compared to Peter, was more expensive.'

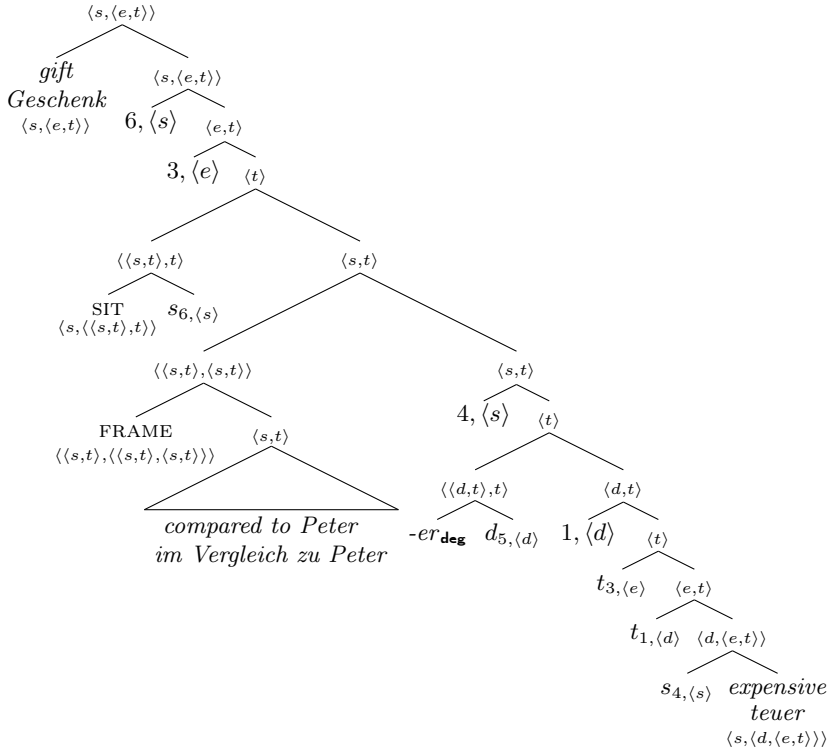
(105) *Maria beschäftigte sich häufiger mit dem Schüler, [RelCl der Mary occupied herself more.often with the pupil who [im Vergleich zu ihrem Kollegen Peter] kleiner war]*.
in+the comparison to her colleague Peter smaller was
'Mary occupied herself more frequently with the pupil who, compared to her colleague, Peter, was smaller.'

The short answer as to why the sentences (103) and (104) only receive a nonsensical interpretation (and why the sentence in (105) is not ambiguous) is as follows: The frame setter adds a selectional restriction to the set of relative-clause situations and thus can only manipulate free variables contained in this set of situations. For the longer answer, consider the Logical Form of the relevant noun phrase from (103) and (104)

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is in (132). A couple of remarks on this Logical Form are in order. I assume that nouns, like the English *gift* in (132), also come with a situation argument and are of type $\langle s, \langle e, t \rangle \rangle$, as in (133). (See also Kusumoto (1999, 2005) and F. Schwarz (2009, 2012).) The relative clause is of type $\langle s, \langle e, t \rangle \rangle$ as well. The two denotations are combined via the Extended Modification principle in (134).

(132) Logical Form of the Noun phrase:



(133) $\llbracket gift \rrbracket = \llbracket Geschenk \rrbracket = \lambda s_{\langle s \rangle} . \lambda x_{\langle e \rangle} . gift(s)(x)$

(134) Extended Modification:

(cf. Kusumoto 2005, p. 338, fn. 27)

If α is a branching node and $\{\beta, \gamma\}$ the set of its daughters, for any assignment g , α is in the domain of $\llbracket \alpha \rrbracket^g$ if both β and γ are, and $\llbracket \beta \rrbracket^g$ and $\llbracket \gamma \rrbracket^g$ are both of type $\langle s, \langle e, t \rangle \rangle$. In this case, $\llbracket \alpha \rrbracket^g = \lambda s : s \in D_{\langle s \rangle}$ and s is in the domain of $\llbracket \beta \rrbracket^g$ and $\llbracket \gamma \rrbracket^g . \lambda x : x \in D_{\langle e \rangle}$ and x is in the domain of $\llbracket \beta \rrbracket^g$ and $\llbracket \gamma \rrbracket^g . \llbracket \beta \rrbracket^g(s)(x) \ \& \ \llbracket \gamma \rrbracket^g(s)(x)$.

Crucially, the relative clause situations are not identical to the matrix clause situations but parts of these situation. This relationship is introduced here by the operator SIT of type $\langle s, \langle \langle s, t \rangle, t \rangle \rangle$, for which I assume the semantics in (135). Portner (1992) hypothesizes that the job of SIT is done by the Complementizer.

$$(135) \quad \llbracket \text{SIT} \rrbracket = \lambda s_{\langle d \rangle} . \lambda p_{\langle s, t \rangle} . \exists s' [s' \prec s \ \& \ p(s')]$$

Because of the existential quantifier in (135), the analysis faces the question of presupposition projection, just like every analysis which employs domain restrictions (and thus relies on partial functions). I follow here Tiemann (2014, p.131): “For existential statements, the reasoning is pretty straight forward: They are only defined if the intersection of both of the quantifier’s arguments is defined.” Extending this reasoning to the quantifier in (135), we get: For any $s \in D_{\langle s \rangle}$ and $p \in D_{\langle s, t \rangle}$, $\llbracket \text{SIT} \rrbracket(s)(p)$ is defined only if $\exists s' [s' \prec s \ \& \ s' \in \text{dom}(p)]$.⁵¹

The sister constituent to the frame setter in the Logical Form in (132) is assigned the interpretation in (136), a set of situations in which the price of some object exceeds a contextually provided degree. Table 4.3 illustrates what kind of situations are in the set. It is the domain of the characteristic function of this set that the frame setter restricts to those minimal situations in which comparison is with Peter, as in (137).

$$(136) \quad \llbracket [\langle s, t \rangle \ 4, \langle s \rangle [\text{-er}_{\text{deg}}] [1, \langle d \rangle [t_{3, \langle e \rangle} [t_{1, \langle d \rangle} [s_{4, \langle s \rangle} \textit{expensive}]]]]]] \rrbracket^g = \lambda s. \text{MAX}(\lambda d. \text{PRICE}(s)(g(3, \langle e \rangle)) \geq d) > g(5, \langle d \rangle)$$

| | |
|----------|---|
| s_7 | $\langle g(3, \langle e \rangle), \text{Peter}, \text{PRICE}, > \rangle$ |
| s_{21} | $\langle g(3, \langle e \rangle), \text{Matthew's watch}, \text{PRICE}, > \rangle$ |
| s_{23} | $\langle g(3, \langle e \rangle), \text{a flight ticket to Antalya}, \text{PRICE}, > \rangle$ |
| ... | ... |

Table 4.3: Relative-clause situations exemplified

$$(137) \quad \llbracket [\langle s, t \rangle [\text{FRAME} [\textit{compared to Peter}]] [4, \langle s \rangle [\text{-er}_{\text{deg}}] [1, \langle d \rangle [t_{3, \langle e \rangle} [t_{1, \langle d \rangle} [s_{4, \langle s \rangle} \textit{expensive}]]]]]] \rrbracket^g = \lambda s : s \in \text{MIN}(\lambda s*. \exists x_{\langle e \rangle} , \exists \mu_{\langle s, \langle e, d \rangle} [\mu(s*)(x) \geq \mu(s*)(\text{Peter})]) . \text{MAX}(\lambda d. \text{PRICE}(s)(g(3, \langle e \rangle)) \geq d) > g(5, \langle d \rangle)$$

⁵¹ This issue will come up again in section 6.1, where I discuss quantification and binding with CompFs.

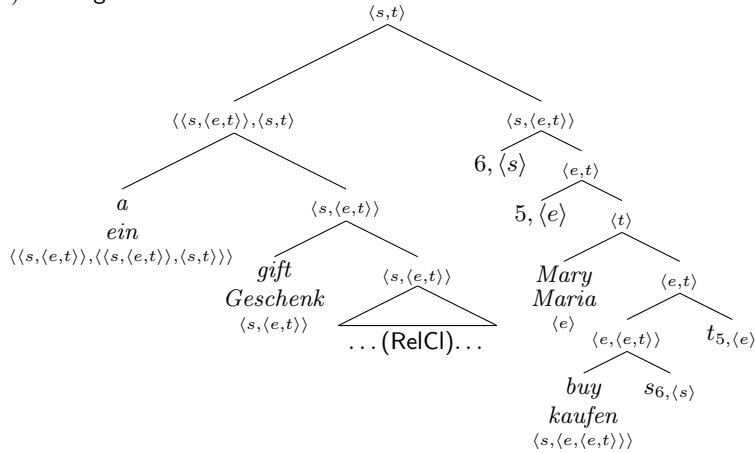
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Let's assume that both sets even contain such situations as s_7 and s_{20} , in which Peter's price is the standard of the comparison. The function in (137) is only defined for situations of the type in Table 4.4. Situations like s_{21} and s_{23} from Table 4.3 are not in its domain of definition. A price degree of Peter's in the situation is the only value assignment compatible with the presupposition. Material from the matrix clause in the Logical Form in (138) is irrelevant and a relative-clause external reading impossible, even if such a reading would be plausible (or if there is another ContComp in the matrix clause, like in the example in (105)).

| | |
|----------|--|
| s_{19} | $\langle \text{Mary, Peter, AGE, } > \rangle$ |
| s_{20} | $\langle g(3, \langle e \rangle), \text{Peter, PRICE, } > \rangle$ |
| s_{31} | $\langle \text{Brandon, Peter, WEIGHT, } = \rangle$ |
| s_{37} | $\langle \text{Gregory, Peter, DRESS SIZE, } = \rangle$ |
| ... | ... |

Table 4.4: Frame-setter situations exemplified, again

(138) Logical Form:⁵²



⁵² If we analyze the indefinite in these sentences as a weak indefinite, it should only allow for an interpretation that is dependent on the situation of the matrix predicate (cf. e.g. Kusumoto 1999; Keshet 2008). The Logical Form in (138) employs the following lexical entry, adopted from Kusumoto (1999, p. 130, no. (101)): $\llbracket a \rrbracket = \llbracket ein \rrbracket = [\lambda p_{\langle s, \langle e, t \rangle \rangle} \cdot \lambda q_{\langle s, \langle e, t \rangle \rangle} \cdot \lambda s_{\langle s \rangle} : \exists x_{\langle e \rangle} [p(s)(x) \ \& \] \cdot \exists x_{\langle e \rangle} [p(s)(x) \ \& \ q(s)(x)]]$. Again, one would need to think about the projection behavior of this quantifier as well. See e.g. Tiemann (2014) for discussion.

Obviously, if the frame setter attaches to the matrix clause, it adds a restriction to a different set of situations, which is reflected in interpretation. It is to these relative-clause external readings we turn next.

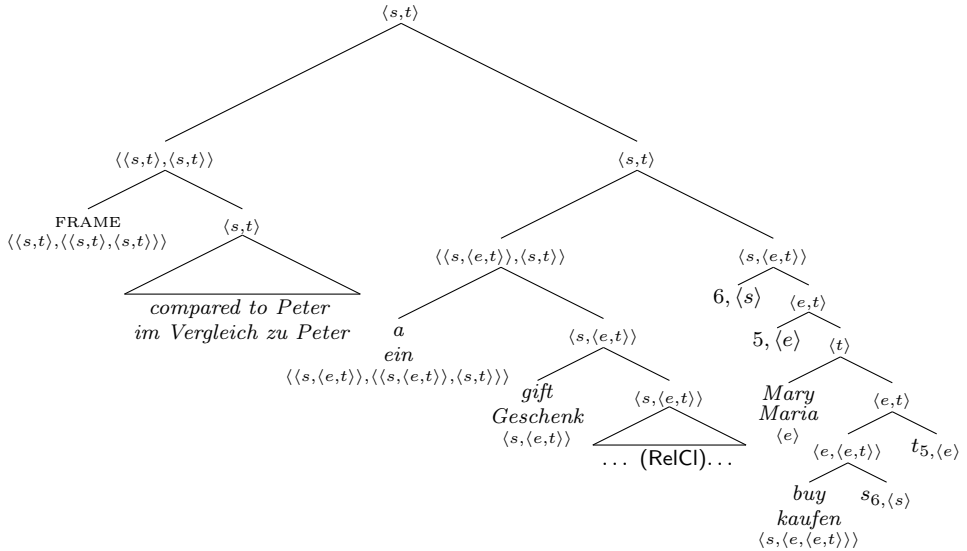
Relative-Clause External Readings. I repeat the relevant examples in (93) and (94) below, along with their context. Here, the price of some gift which Peter bought must be the standard for the comparison. This interpretation is derived from the Logical Form in (139).

(90) Context:
 Mary and Peter have been invited to Sue’s birthday party. Mary decided to buy a coffee-table book for 50 dollars for Sue. Peter got Sue a gift voucher for her favorite restaurant for 30 dollars.

(93) [[*Compared to Peter*], [*Mary bought a gift* [_{RelCl} *which was more expensive*]]].

(94) [*Im Vergleich zu Peter*] *hat Maria ein Geschenk gekauft*,
 in+the comparison to Peter has Mary a gift bought
 [_{RelCl} *welches teurer war*].
 which more.expensive was
 ‘Compared to Peter, Mary bought a gift which was more expensive.’

(139) Logical Form:



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Its interpretation is in (140), a function from situations to truth values restricted in its domain to only those situations in which comparison is with Peter. Given the restriction on the domain, the free variable in (140) is assigned the degree that is the price of a gift that Peter bought as a value. Why is that? In brief, this is the only value assignment that will allow for the situation to be a minimal comparison situation with Peter.

$$\begin{aligned}
 (140) \quad & \lambda s : s \in \text{MIN}(\llbracket \text{compared to Peter} \rrbracket). \\
 & \exists x [\text{gift}(s)(x) \ \& \ \text{bought}(s)(x)(\text{Mary}) \\
 & \ \& \ \exists s' [s' \prec s \ \& \ \text{MAX}(\lambda d. \text{PRICE}_{s'}(x) \geq d) > g(5, \langle d \rangle)]] = \\
 & \lambda s : s \in \text{MIN}(\lambda s*. \exists x_{\langle e \rangle}, \exists \mu_{\langle s, \langle e, d \rangle \rangle} [\mu(s*)(x) \geq \mu(s*)(\text{Peter})]). \\
 & \exists x [\text{gift}(s)(x) \ \& \ \text{bought}(s)(x)(\text{Mary}) \\
 & \ \& \ \exists s' [s' \prec s \ \& \ \text{PRICE}_{s'}(x) > g(5, \langle d \rangle)]]
 \end{aligned}$$

To see this, let's first consider the denotation of the sentence without the frame setter again. It's the characteristic function of a set of situations in which Mary buys a certain thing as a gift and its price exceeds a contextually provided degree. The frame setter now adds the restriction that the function is only defined for minimal situations in which Peter is compared with an other individual along some dimension. The situation depicted in Figure 4.2 is prototypically such.

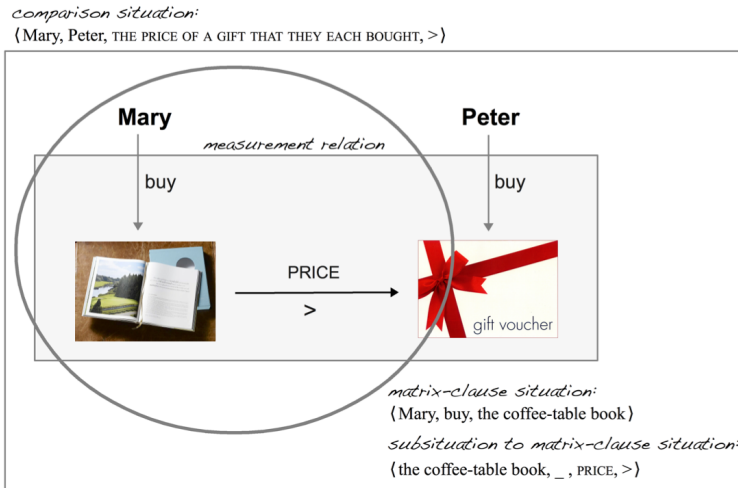


Figure 4.2: Exemplified Situation

It is a minimal situation in which comparison is between Peter and Mary with respect to the price of a gift they each bought. The comparison thus relies on a somewhat complex measurement relation, a relation between an individual and the price of a certain gift that they bought. Note that if this is the comparison we are after, there is nothing superfluous in the situation in Figure 4.2. The function in (140) is thus defined in this situation. It will also yield true as this is indeed a situation in which there is a gift and Mary bought that gift and there is a subsituation in which the price of the gift exceeds a contextually provided degree, here the price of a gift that Peter bought. Other value assignments would result in a violation of minimality. For instance, the price of a gift Peter once received from Susan would not do as a standard for the comparison, as it would make the buying relationship, Mary and Mary's gift superfluous in the situation.

The example in (141) serves to illustrate the same point. The sentence can only express a comparison between Peter and Mary but not one between Peter and Konstantin. Again, only the relative-clause external reading is available, although both are equally plausible.

- (141) *Im Vergleich zu Peter hat Maria ein Buch gekauft,*
 in+the comparison to Peter has Mary a book bought
welches Konstantin stärker interessiert.
 which Konstantin stronger is.interested
 = 'Konstantin is more interested in the book
 that Mary bought than in the book that Peter bought.'
 ≠ 'Konstantin is more interested in the book
 that Mary bought than Peter is.'

Under the available reading, the free degree variable is assigned the degree to which Konstantin is interested in the book which Peter bought. A sample situation is in Figure 4.3. If we want to measure of Konstantin the degree to which he is interested in the books that Mary and Peter bought, the situation will have to include these two books as well as Mary and Peter buying them.

The unavailable reading requires as value assignment the degree to which Peter is interested in the book which Mary bought. Under such a value assignment, illustrated in Figure 4.4, minimality would be violated: In the case of the situation sketched in Figure 4.4, the situation from the domain of definition, what I refer to as comparison situation, would have to additionally contain Mary and her buying the coffee-table book as a

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gift, which it may not because of the minimality requirement. To be more precise, the sentence would be undefined with this value assignment as the described situation is not in the domain of definition.

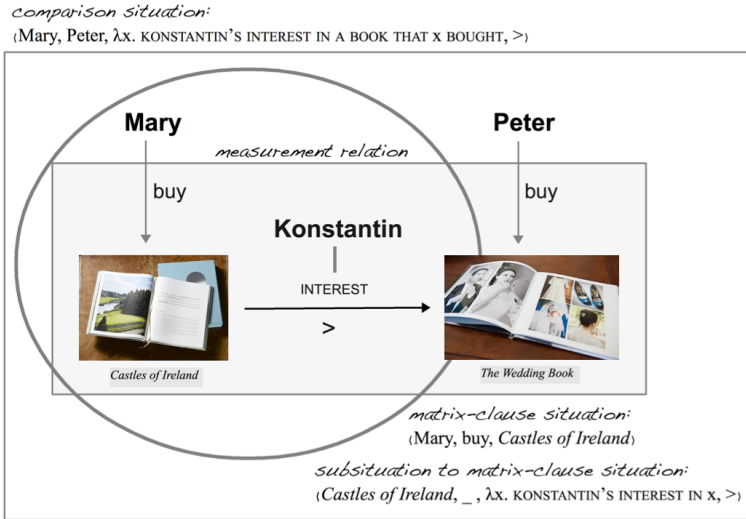


Figure 4.3: The Available Reading Exemplified

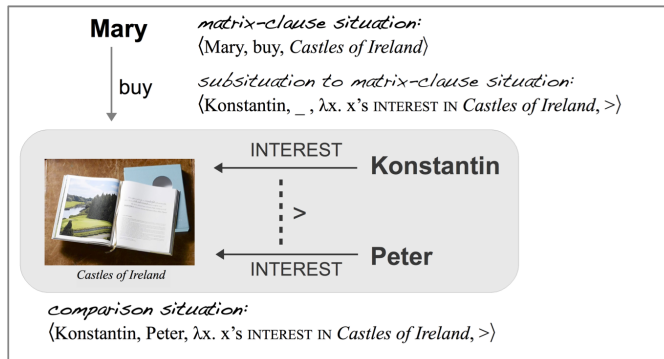


Figure 4.4: The Unavailable Reading Exemplified

We correctly predict the effects the position of the frame setter has on interpretation when it comes to ContComps in relative clauses.

Attributive-Internal Readings. I will only briefly discuss the observed position effects in attributive cases in German, as the above explanations extend to these data. Crucially, the analysis needs to account for the fact that (106) is unacceptable in the provided context as it cannot express a comparison between the cost of Mary's gift and that of John's.

- (90) Context:
 Mary and Peter have been invited to Sue's birthday party. Mary decided to buy a coffee-table book for 50 dollars for Sue. Peter got Sue a gift voucher for her favorite restaurant for 30 dollars.
- (106) #*Maria hat ein* [[*im Vergleich zu Peter*] *teureres*]
 Mary has a in+the comparison to Peter more.expensive
Geschenk gekauft.
 gift bought
 'Mary bought a gift more expensive compared to Peter.'

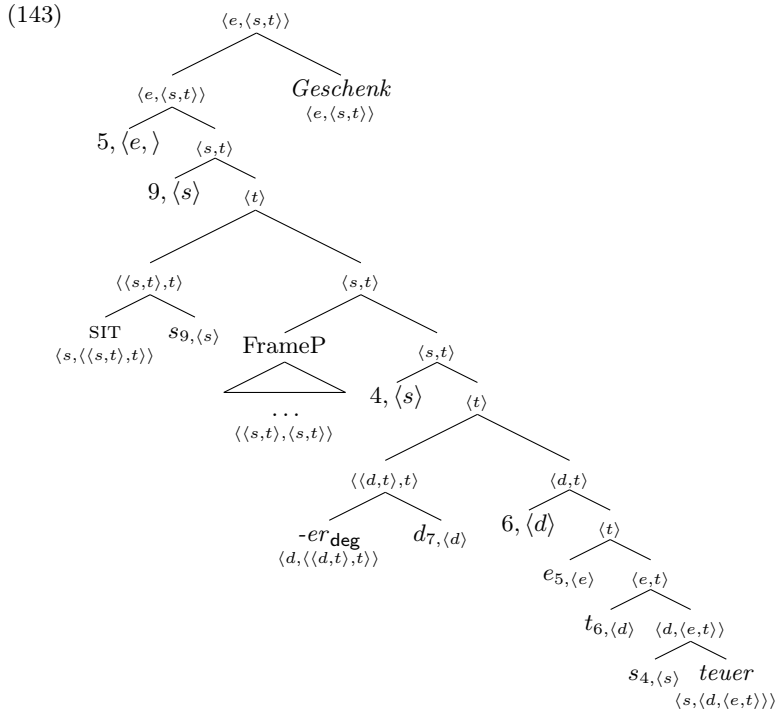
As the frame setter is able to attach within the Adjective phrase, I conclude that there has to be a constituent of propositional status (of type $\langle s, t \rangle$) for it to attach to. What superficially looks like a simple Adjective phrase thus has more structure to it, along the lines of (143).

Independent evidence for the propositional status of attributive Adjective phrases comes from the distribution of the German discourse particle *wohl* ('presumably'). Just like a Frame phrase, the particle requires an argument of type $\langle s, t \rangle$, but may occur inside an adjective phrase, as M. Zimmermann (2004) observes. An example is in (142).

- (142) *Peter ist in* [_{DP} *das*] [_{AP} *wohl beste*] *Restaurant von Berlin*]
 Peter is in the presumably best restaurant of Berlin
gegangen.
 went
 'Peter went to a restaurant
 which presumably is the best restaurant in Berlin.'
 (M. Zimmermann 2004, p. 281, no. (65))

Informally speaking, the German particle *wohl* weakens the commitment of the speaker to a proposition. However, in (142), it does not take scope over the entire sentence: The speaker has no doubts regarding the fact that Peter went to a certain restaurant, but may not be quite certain as to whether it is indeed the best restaurant in Berlin. In order to derive that interpretation, the particle has to attach within the Determiner phrase, which must make available an argument of the right semantic type.

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Returning to the interpretation of (143), the situations in the set that is an argument of the frame setter must be subsituations of the situations in which the noun as well as the rest of the sentence are evaluated. In the Logical Form in (143), this is a result of SIT. Without the presence of SIT, the CompF would end up adding a restriction onto the same set of situations it would add a restriction to if it attached higher up in the structure, as in (144).

$$(144) \quad \lambda s : s \in \text{MIN}(\llbracket \text{compared to Peter} \rrbracket). \\ \exists x [\text{gift}(s)(x) \ \& \ \text{PRICE}(s)(x) > g(7, \langle d \rangle) \ \& \ \text{buy}(s)(x)(\text{Mary})]$$

We are thus able to make an interesting observation about the status of what appear to be attributive Adjective phrases: In German, they may have propositional status. As the main focus of this dissertation is on how frame setters influence assignments to free variables, I will not explore this issue any further.

4.6 Chapter Summary

Chapter 3 concluded that an empirically adequate analysis of CompFs in ContComps is a compositional analysis, which accounts for the unfree behavior of the free degree variable and predicts the positional restrictions on the interpretation of ContComps. The analysis presented in this chapter meets these criteria. The main ingredients of the analysis are the semantics of FRAME and the minimality requirement on situations. Frame setters restrict the domain of definition of a function from situations to truth values. The requirement that these situations be minimal with respect to the content of the frame then severely restricts which value assignments are still available for a free variable. Depending on the position of the frame setter, the restriction is added to a different set of situations, which is reflected in the interpretation. Unlike the analyses discussed in chapter 2, the analysis takes serious the semantic contribution of the lexical material contained within the frame setter and is thus compositionally much more transparent. The next chapter explores some consequences of this analysis.

5 Discussion

CompFs and their impact on the value assignment to the free degree variable in a ContComp are a *par-excellence* example of the glue in natural language meaning. Albeit the connection between the frame setter and the free variable is not as tight as it is in the case of variable binding, the underlying mechanism is effective and simple. In this chapter, I will further explore the two key devices in this mechanism, namely presuppositions and minimality of situations, in sections 5.1 and 5.2.

5.1 The Presuppositional Status of Frames

In section 4.3 of the previous chapter, I explicitly rejected the idea that the interpretation of a frame setter in a sentence proceeds via Generalized Predicate Modification. Instead, I introduced a covert operator, FRAME, repeated in (116), that adds the denotation of its first argument as a domain restriction onto the function that is its second argument.

$$(129) \quad \llbracket \text{FRAME} \rrbracket = \lambda p_{\langle s,t \rangle} \cdot \lambda q_{\langle s,t \rangle} \cdot \lambda s_{\langle s \rangle} : \text{MIN}(p)(s) \cdot q(s)$$

Under the view adopted here, presuppositions are just that, devices to introduce a domain of definition for a function that is a subset of its type-defined domain, as in Heim & Kratzer (1998, pp. 73-83). The result is a partial function.

It might be useful to compare FRAME to a more familiar presupposition trigger like English *again*. Intuitively, this adverb and its German counterpart *wieder* introduce the presupposition that the situation described has happened once before, as in the example in (145) from Wilkie Collins' *The Woman in White* (1860).

$$(145) \quad I \text{ tried } \underline{\textit{again}} \text{ to lift the veil that hung between this woman and me.}$$

presupposition: I have tried before to lift that veil.

A lexical entry for both adverbs is in (146), where \ll indicates temporal precedence. As in the case of FRAME, the first argument of this presupposition trigger ends up as part of the domain condition and is irrelevant for the value description. In the case of (146), however, the

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first argument is going to be a free variable. Because of this anaphoricity, the presupposition is thus context dependent in a different way than the presupposition introduced by FRAME.

$$(146) \quad \llbracket \textit{again} \rrbracket = \llbracket \textit{again} \rrbracket = \lambda t'_{\langle i \rangle} . \lambda p_{\langle i, t \rangle} . \lambda t_{\langle i \rangle} : t' \ll t \ \& \ p(t') . p(t)$$

(Beck 2007, p. 16, no. (11))

Support for a presuppositional analysis of frame setters comes from the very clear intuition that if the sister constituent of the CompF does not express a comparison, the resulting sentences are very odd, but not clearly true or false. My intuition about both, (147) and (148), is that I first get told that I am about to expect a comparison of some kind, which is then followed by something I cannot possibly perceive as such.

(147) #*Compared to Peter, the keys were in the drawer.*

(148) #*Im Vergleich zu Maria scheint heute Nachmittag die Sonne.*
 in+the comparison to Mary shines today afternoon the sun
 ‘Compared to Mary, it’s sunny this afternoon.’

In more technical terms, the sentences are unacceptable due to presupposition failure. There simply are no situations that, for (148), minimally satisfy the presupposition, and yet verify the assertion that it is sunny this afternoon. If the denotation of the frame setter were to combine with the denotation of its sister via Generalized Predicate Modification, the sentence in (147) would denote the set of situations in which the keys are in the drawer and Peter is being compared with someone along some dimension. For example, this set would contain the situation in which I add a minimal situation in which the keys are in the drawer to the minimal situation in which Peter’s age exceeds Mary’s. While evaluation situations of this makeup may be somewhat unusual, they are certainly possible, and our intuitions about (147) and (148) should be much clearer. However, (147) and (148) behave more like the cases of presupposition failure with *again* and its German equivalent. I provide examples below. Both presuppose that at some performance before yesterday, Mado sang the high C, and assert that she did so yesterday. The presupposition is not satisfied in the context of (149). As a result, the sentences are unacceptable.

(149) Context:
 Being an alto, Mado has never sung the high C in concert.

(150) #*At a performance yesterday, she had to sing the high C again.*

5.1 The Presuppositional Status of Frames

- (151) #*Gestern hat sie bei einem Konzert wieder das hohe C gesungen.*
 yesterday has she at a concert again the high C sang
 ‘Yesterday, she again sang the high C in concert.’

Note however that while the presupposition failure in (150) and (151) is due to an inappropriate context, it results from an incompatibility of the presupposition and the assertion in the case of (147) and (148).

Further support for a presuppositional analysis of frame setters comes from their behavior with respect to presupposition holes. Holes let presuppositions go through, that is the presupposition of a sentence can neither be negated nor questioned, unlike the assertion itself. (See *e.g.* Karttunen (1973).) This projection behavior is illustrated for *again* in (152) and (153). Both sentences presuppose that Anna ate a quinoa salad some time before this week.

- (152) *Anna did not eat quinoa salad again this week.*

- (153) *Did Anna eat a quinoa salad again this week?*

The examples with frame setters, in (154) and (155), behave just like that. Even though the assertion that Mary’s age in the evaluation situation exceeds some contextually provided degree is negated or questioned, the sentences still presuppose that the situation in which these sentences are evaluated are situations in which there is a comparison with Peter. A similar observation can be made for (156), suggested to me by Sigrid Beck: While Fritz doubts that Hans is taller than Paul, there is no doubt as to the fact that Paul is the standard of the comparison.

- (154) *Es ist nicht der Fall, dass Maria älter ist verglichen mit Peter.*
 it is not the case that Mary older is compared with Peter
 ‘It is not the case that Mary is older, compared to Peter.’

- (155) *Ist Maria im Vergleich zu Peter älter?*
 is Mary in+the comparison to Peter older
 ‘Is Mary older compared to Peter?’

- (156) *Fritz bezweifelt, dass Hans im Vergleich zu Paul größer ist.*
 Fritz doubts that Hans in+the comparison to Paul taller is
 ‘Fritz doubts that Hans is taller compared to Paul.’

In conclusion, a presuppositional analysis of frame setters is not only intuitively correct but also empirically superior to an analysis that relies on Generalized Predicate Modification. Let us now turn the discussion to the second ingredient of the analysis, minimality of situations.

5.2 Minimality of Situations

The mechanism of restricting the interpretation of a free variable with a frame setter requires that the evaluation situation contain no superfluous material. We implemented this requirement in section 4.4 above by having FRAME select minimal situations.

$$(129) \quad \llbracket \text{FRAME} \rrbracket = \lambda p_{\langle s,t \rangle} \cdot \lambda q_{\langle s,t \rangle} \cdot \lambda s_{\langle s \rangle} : \text{MIN}(p)(s) \cdot q(s)$$

$$(130) \quad \llbracket \text{MIN} \rrbracket = \lambda p_{\langle s,t \rangle} \cdot \lambda s_{\langle s \rangle} \cdot p(s) \ \& \ \neg \exists s' [s' \prec s \ \& \ p(s')].$$

I have only briefly discussed this requirement so far but will remedy this shortcoming here. I will proceed as follows: I will first relate my analysis to the literature on situation semantics and point out some other cases which require minimality. We will then address a problem that has been pointed out for this specific definition of minimality in the literature. Further empirical evidence in favor of some version of a minimality restriction on situations in the analysis of frame setters will conclude the section: Minimality allows us to correctly predict not only the absence of subcomparative readings with CompFs but also certain ambiguities in more complex situations.

5.2.1 Minimal Worries in the Literature

The part-whole structure of the domain of situations, discussed in section 4.1 above, is not only a source of potential trouble in frame setting, but also when it comes to quantifying over situations, an observation going back to Berman (1987) and Heim (1990). Take (157), for instance, which naively should be interpreted as true if there is exactly one situation in the set of situations that are such that Natalia is inside the Cologne cathedral in that situation.

$$(157) \quad \textit{Natalia has been inside the Cologne cathedral only once.}$$

Even if it is true that Natalia has been inside the Cologne cathedral only once, this fact will be reflected in countless situations, many of them containing a lot of irrelevant material, *e.g.* the situation in which Natalia is inside the Cologne cathedral and has a Kölsch in one of the local bars afterwards or the situation in which she meets a friend at the train station first and then walks over to and into the cathedral. The set of situations that are such that Natalia is inside the Cologne cathedral in the situation thus never is a singleton set. Intuitively, the only situation

that counts towards the truth of the example in (157) is a situation which contains nothing irrelevant, in which only what von Fintel (2005) calls the truth makers, a term from the philosophical literature, are retrieved. To capture this intuition, Berman (1987) suggests that the situations we quantify over are minimal. For (157), the minimal situations in the set of situations that are such that Natalia is inside the cologne cathedral in these situations are situations which have no proper parts that are also elements of that set.

- (158) MINIMALITY:
 For any situation s and any set of situations p ,
 s is a minimal situation if and only if $p(s) \ \& \ \neg\exists s' [s' \prec s \ \& \ p(s')]$.

Berman (1987), Heim (1990) and Elbourne (2002, 2005) put this notion of minimality of situations to use in the analyses of donkey sentences such as (159), discussed first by the medieval philosopher Walter Burleigh⁵³ and brought to the attention of linguists by Peter T. Geach (1962). (See also Kratzer (2011, pp. 20-23) for an overview and some discussion.)

- (159) *If a man owns a donkey, he beats it.*
 (cf. Geach 1962, p. 118, no. (18))

These type of sentences pose a challenge because of the pronoun *it*, which is not bound, but, at first sight, also lacks a unique referent (cf. also Heim & Kratzer 1998, pp. 277-298). The latter is also true of the variant of (159) in (160), which employs the definite description *the donkey*. The situation-semantic analysis of (159) sketched in (161) analyzes pronouns as covert definite descriptions.

- (160) *If a man owns a donkey, he beats the donkey.*
- (161) $\lambda s'' . \forall s' [[s' \preceq s'' \ \& \ s' \in$
 $\text{MIN}(\lambda s . \exists x, \exists y [\text{man}(s)(x) \ \& \ \text{donkey}(s)(y) \ \& \ \text{own}(s)(y)(x)])]$
 $\rightarrow \exists s''' [s''' \succeq s' \ \& \ \text{beat}(s''')(tz [\text{donkey}(s')(z)])(x)]]]$

What is more important for us, however, is that quantification is over minimal situations. For any situation s'' , the sentence in (159) is true if and only if for every situation s' that is a part of s'' and a minimal situation such that a man x owns a donkey, there is a situation s''' of

⁵³ Peter Seuren (2010, p. 169) traces down the history of the example to the sentence *Omnis homo habens asinum videt illum*. ('Every man owning a donkey sees it.') in the first volume of Walter Burleigh's *De Puritate Artis Logicae* ('On the Purity of the Art of Logic'), written in 1326.

which s'' is a part and in which x beats the donkey unique to s' . All situations involved in the value description of the function in (161) are related either directly or indirectly to the situation variable s'' , for which, ultimately, the evaluation situation is inserted to derive a truth value. Crucially for our discussion, the antecedent of the conditional introduces the restriction that quantification is only over those subsituations of the evaluation situation that are minimal situations in which a man owns a donkey. Those situations have just one donkey in them, which allows for the definite description *the donkey* in (160), or, as in (159), the corresponding pronoun to be used. Clearly, the minimality condition is thus essential for the situation-semantic analysis of donkey sentences. Other constructions that have been argued to rely on minimal situations in their semantics include English gerunds (Portner 1992), infinitival adjuncts in Spanish (Alonso-Ovalle 2002), and determiners in German (F. Schwarz 2009, 2012). Under the analysis presented in chapter 4, frame setters are another construction that make the case for minimality of situations.

While it is clear that the grammar needs a way to select those situations that contain no material superfluous to the evaluation of the truth of a proposition, it has been pointed out that the formulation of the minimality condition in (158) is problematic. I will focus here on just one particular worry about minimality that extends to CompFs, and point the reader to Reinhart (1986), von Stechow (2004, 2005), Casati & Varzi (1999), Kratzer (2011), and Weatherston (2014) for further discussion.

Here it is: Informally speaking, when it comes to a situation, minimality does not know where to stop. It will not only eliminate irrelevant parts from a situation but also minimize all of the relevant parts. The latter result is undesired. Consider situation s_1 depicted in Figure 5.1, from Kratzer (2011, p. 25).

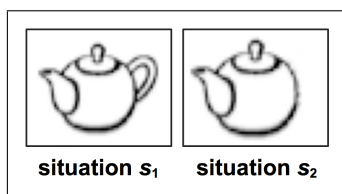


Figure 5.1: The Case of the Tea Pot

Intuitively, this is a minimal situation in which there is a teapot. It is however not so by definition, because of situations like s_2 :

“There is a potential glitch in the above piece of reasoning. It assumes that when an individual is a teapot in a world, no proper part of that individual is also a teapot in that world. This assumption can be questioned, however. . . . we might reason as follows: My teapot would remain a teapot if we chipped off a tiny piece. Chipping off pieces from teapots doesn’t create new teapots, so there must have been smaller teapots all along. We might feel that there is just a single teapot sitting on the table, but upon reflection we might have to acknowledge that there are in fact many overlapping entities that all have legitimate claims to teapothood. The unexpected multitude of teapots is a source of headaches. . . .”
(Kratzer 2011, pp. 25-26)

This “Problem of the Many” (Unger 1980) is also a source of headaches for minimal comparison situations. Consider the example in (162), along with its interpretation.⁵⁴ The sentence presupposes that the evaluation situation s^* is a minimal situation such that Sigrid is being compared to someone along some dimension.

- (162) *Compared to Sigrid, Thilo has a faster computer.*
 $\exists y [\text{computer}(s^*)(y) \ \& \ \text{SPEED}(s^*)(y) > g(7, \langle d \rangle) \ \& \ \text{own}(s^*)(y)(\text{Thilo})]$
presupposition:
 $s^* \in \text{MIN}(\lambda s. \exists x_{\langle e \rangle}, \mu_{\langle s, \langle e, d \rangle \rangle} [\mu(s)(x) \geq \mu(s)(\text{Sigrid})])$

Intuitively, the minimal situation in this example contains Sigrid, Thilo, the greater-than relation, and the complex measure function in (163-a). The free degree variable in (162) is assigned the speed of Sigrid’s computer as its value. Following Kratzer (2011)’s reasoning, however, the complex measure function μ_1 has the measure function μ_2 , in (163-b), as one of its parts. Without further assumptions, minimality will therefore exclude the situation I just described and require that measure functions never have any parts which in turn are also measure functions.

- (163) a. $\mu_1 = \lambda s_{\langle s \rangle}. \lambda x_{\langle d \rangle}. \text{SPEED}(x\text{'s computer})$
 b. $\mu_2 = \lambda s_{\langle s \rangle}. \lambda x_{\langle d \rangle}. \text{SPEED}(x)$

We cannot let that happen, just like in the case of the tea pot. As von Fintel (2005, p. 5) concludes: “So, we need something bigger than minimal situations, but that still excludes irrelevant, extraneous parts.

⁵⁴ Thank you to Sigrid Beck and Arnim von Stechow for discussion. I provide a simplified assertion here for expository purposes and abstract away from any sub-situations which the Adjective Phrase might introduce. See section 4.5 above.

In other words, we need to do two things: (i) Eliminate irrelevant parts, (ii) Count (maybe maximal) chunks.” However, this dissertation is not the right place to pursue this topic much further, as such a venture would require an investigation of a much wider range of constructions. I will assume that whatever notion of minimal situations is going to work in the end will also apply to CompF. This Problem of the Many in situation semantics may be a source of unease for some, but: “It should be emphasized that what is happening here in a situation-based framework is not really the fault of the framework. . . . There is nothing special in the situation-based account, it just makes it more obvious that we have issues to address.” (von Stechow 2005, p. 8)

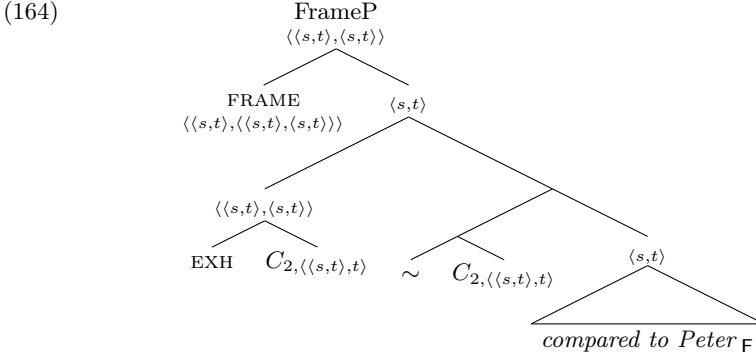
5.2.2 Minimality versus Exhaustivity

Before we move on, let me sketch an alternative route to excluding superfluous material from the frame situations: Kratzer (2011, pp. 36-39) envisions an analysis under which exhaustive interpretation are a result of minimality. Reversing this idea, one might pursue an analysis which derives some of the effects of minimality with the help of another mechanism which has been proposed in the literature to derive exhaustive interpretations, that is the exclusion of contextual alternatives by a covert operator (Spector 2006; Fox 2007). Let me briefly sketch this idea for CompFs: In the case of our go-to example from (45), we would above all like to exclude multiple-comparison situations, that is situations in which, *e.g.* Mary is older than Peter and Mary is older than Susan. We thus one to make sure that we restrict our proposition to situations in which Peter is the only individual being compared to someone. This result can also be achieved by assuming that *Peter* is focused and that this focus is exhaustively interpreted within the Frame phrase. Such an approach would require the Logical Form in (164) for the Frame phrase.

On the technical side, focus triggers the generation of alternatives and a second-layer of semantic interpretation.⁵⁵ The covert squiggle operator \sim , defined in (165), evaluates these alternatives and introduces the presupposition that the denotation of a covert variable is a subset of (or equal to) this set of alternatives. The interpretation of the covert variable also serves to restrict the exhaustivity operator EXH, in (166), which excludes all of the alternatives as false.

⁵⁵ The implementation I adopt here is in the tradition of Rooth (1985, 1992). For a proper introduction to alternative semantics, I refer the reader to Beck (2006, 2015). The section on Contrastive frames in chapter 8 also has more details.

(45) *Compared to Peter_F, Mary is older.*



(165) The Squiggle Operator \sim :

If α is a tree $[[\sim C] \beta]$, then:

$[[\alpha]_{\text{O}}^g$ is defined only if $[[C]_{\text{O}}^g \subseteq [[\beta]_{\text{Alt}}^g$.

If defined, $[[\alpha]_{\text{O}}^g = [[\beta]_{\text{O}}^g$ and $[[\alpha]_{\text{Alt}}^g = \{[[\beta]_{\text{O}}^g\}$.

(166) $[[\text{EXH}]] = \lambda s_{\langle s \rangle} \cdot \lambda C_{\langle\langle s,t \rangle, t\rangle} \cdot \lambda p_{\langle s,t \rangle} \cdot$
 $p(s) \ \& \ \forall q [C(q) \ \& \ p \neq q \rightarrow \neg q(s)]$

Under this setup, the Participle phrase still has as its ordinary semantic interpretation a set of situations in which Peter is being compared to someone. Its alternative semantic interpretation will be a set of sets of situations such that alternatives to Peter are being compared to someone. For instance, the alternative semantic interpretation will include the set of situations in which Sue is being compared to someone. Exhaustification excludes all of the (contextually relevant) alternative comparisons as false. Our example will then presuppose that the evaluation situation is such that no one but Peter is being compared to someone. Situations in which multiple comparisons are taking place will not meet this presupposition, and Susan's age will no longer be a competitor for the interpretation of the free degree variable.

Unlike minimality, exhaustivity, *via* the placement of focus, allows us to target interpretative alternatives to specific constituents in the CompF and exclude them from the evaluation situation. While this gets rid of superfluous other comparisons in the situation, such as the one between Mary and Susan, it does not rid a situation of any other superfluous material: In the case of the unacceptable example from (147), exhaustivity will not exclude the keys in the drawer from the evaluation situation.

5 Discussion

(147) #*Compared to Peter, the keys were in the drawer.*

As a consequence, a situation in which Mary is older than Peter and the keys are in the drawer will meet the selectional restrictions imposed by the CompF. It will also make the assertion true. Contrary to intuitions, the sentence is thus expected to be acceptable.

I will leave the further evaluation of exhaustivity in the interpretation of Frame to future research, just like the interesting question of whether minimality and exhaustivity can really be seen as competing mechanisms in the analysis of the grammar of natural language. For the remainder of this dissertation, I will assume that FRAME restricts a proposition to those situations which minimally verify the content of the frame setter.

5.2.3 Further Predictions of Minimality in Frames

Further support for assuming some kind of minimality in the analysis of frames comes from the absence of subcomparative readings with CompFs in ContComps, and from the availability of multiple values for the free degree variable in more complex situations, both of which are predicted by minimality. As mentioned in section 2.3, Fults (2005, pp. 152-153) observes that ContComps with what I analyze as frame setters do not allow for subcomparative readings. While the subcomparatives in (168) and (169) are acceptable in the context of (167), the ContComp with the frame setter in (170) and (171) are not, despite the commensurability of height and length.

(167) Context:



(168) *The ladder is longer than the house is high.*
(cf. also Büring 2007, p. 38, no. (2-a))

(169) *Die Leiter war länger als das Haus hoch.*
the ladder was longer than the house high
'The ladder was longer than the house was high.'

- (170) ??*Compared to the house, the ladder is longer.*
- (171) #*Im Vergleich zum Haus ist die Leiter länger.*
 in+the comparison to+the house is the ladder longer
 ‘Compared to the house, the ladder is longer.’

In terms of our analysis, the unacceptability of (170) and (171) tells us that the height of the house is not a possible value for the free degree variable of the ContComp. This is a result of minimality, which does not allow for more than one measure function in a minimal comparison situation: A situation that contains the ladder, the house, the greater-than relation and HEIGHT as well as LENGTH as the dimension for the comparison is not a situation that is in the domain of definition determined by the frame setter.⁵⁶

If the situations described are more complex, multiple value assignments for the free variable that is an argument of the comparative operator are permissible, despite minimality of situations. The sentence in (172), for instance, is therefore ambiguous.

- (172) *Im Vergleich zu Peter hat Maria Hans ein Geschenk gekauft,*
 in+the comparison to Peter has Mary Hans a gift bought
welches teurer war.
 which pricier was
 ‘Compared to Peter, Mary bought Hans a gift
 which was more expensive.’

It allows for a reading in which comparison is between the price of Mary’s gift for Hans and the price of Peter’s gift for Hans (reading 1), as well as for a reading in which comparison is between the price of Mary’s gift for Hans and the price of Mary’s gift for Peter (reading 2). I sketch a minimal situation for each of these readings in Figures 5.2 and 5.3. Minimality of situations thus does not necessarily mean that there is only one possible value assignment for a free variable in the presence of a CompF. While frame setters severely restrict the permissible values for a free variable, often to a singleton set, the example in (172) shows that this need not always be the case.

⁵⁶ It would however be, if we were to adopt exhaustification instead of minimality. Under this approach, only situations in which anything but the house is being compared are not in the domain. A situation in which both the height and the length of the house are being measured would thus still meet the presupposition, and the unavailability of subcomparative readings is unexpected.

5 Discussion

minimal comparison situation:

$\langle \text{Mary, Peter, } \lambda x. \text{ THE PRICE OF THE GIFT THAT } x \text{ BOUGHT FOR HANS, } \rangle$

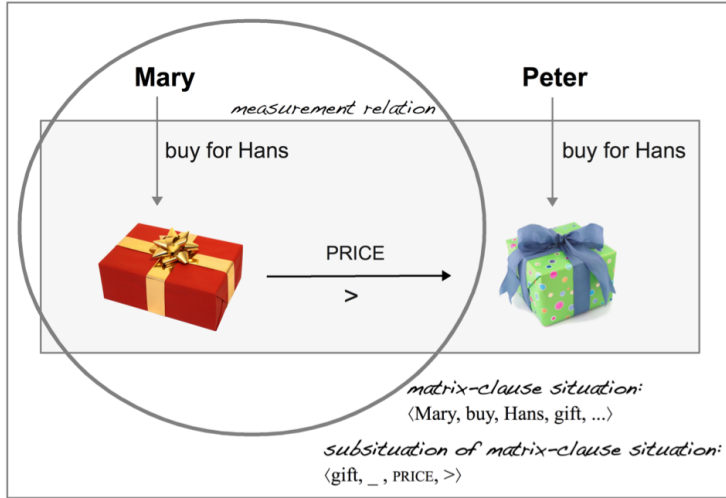


Figure 5.2: Reading 1 exemplified

minimal comparison situation:

$\langle \text{Hans, Peter, } \lambda x. \text{ THE PRICE OF THE GIFT THAT MARY BOUGHT FOR } x, \rangle$

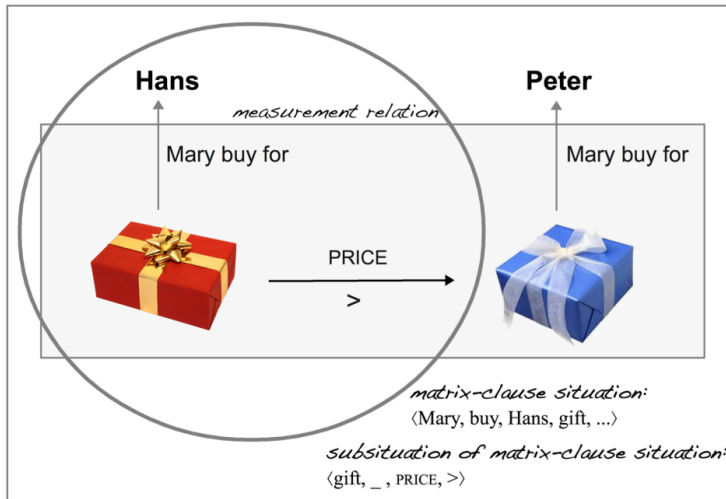


Figure 5.3: Reading 2 exemplified

5.3 Chapter Summary

In this chapter, we have pursued a more detailed investigation of the two key devices in the mechanism by which frame setters manipulate variable assignments. As far as presuppositionality is concerned, CompFs behave like other presupposition triggers: The presupposition introduced by FRAME projects, and leads to unacceptability if not satisfied. As far as minimality of situations is concerned, we have seen that such a requirement is independently needed in situation semantics, although its precise nature remains a topic for further research. Assuming some mechanism for excluding superfluous material from the evaluation situation correctly predicts that subcomparative readings are absent with CompFs and that the CompF need not narrow down the permissible value assignments to a free variable to a singleton set.

Part III

MORE ON COMPARISON

6 Comparison Frames Continued

The present chapter gives us the opportunity to see frame setting at work in wider range of comparison constructions, as the discussion turns back to some of the data discussed in chapter 1 and chapter 3: In section 6.1, I present an analysis of the binding data with CompFs. We will then finally turn our attention away from ContComps, and extend the analysis to CompFs in other degree constructions, in section 6.2.

6.1 Binding into Frame Setters

In section 3.1.3 above, I argued that evidence for a compositional analysis of CompFs comes from variable binding: In (83), repeated from above, the quantificational Determiner phrase binds the possessive pronouns inside the Frame phrase. In (84) from above, the *wh*-word binds its trace at Logical Form, as sketched.

- (83) *Jeder Austauschstudent schnitt im Vergleich zu seinem*
every exchange.student cut in+the comparison to his
deutschen Tandempartner bei dem Tübingen-Quiz besser ab.
German tandem.partner at the Tübingen-quiz better off
‘Compared to their German language tandem,
every exchange student did better at the Tübingen quiz.’

- (84) *Compared to whom is Mary older?*
Logical Form: [*whom* [1, $\langle e \rangle$] [Q [... [*compared to* $t_{1, \langle e \rangle}$] ...]]]]

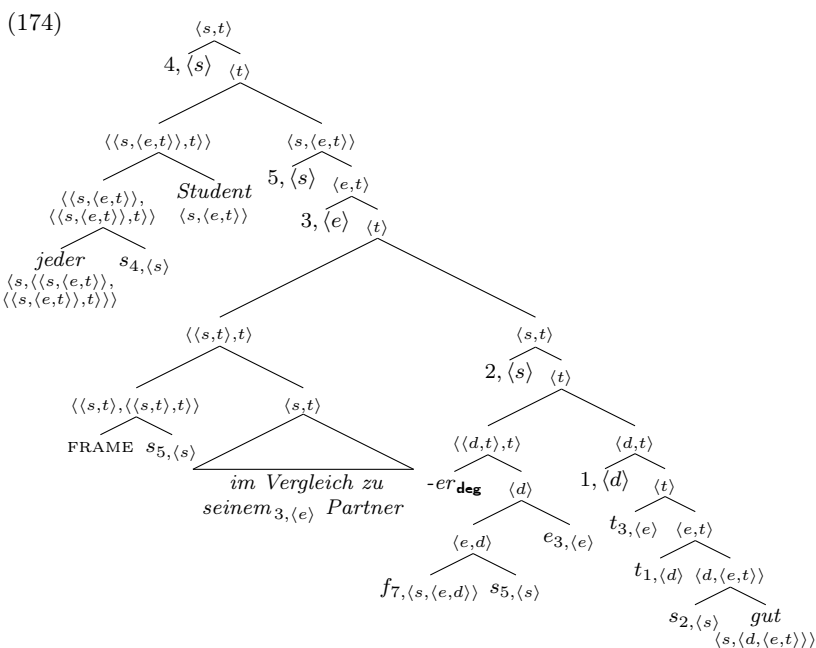
From the theoretical perspective, the data are also interesting in three other respects: First, binding targets material contained within the Frame phrase, and thus material which is going to be interpreted as part of the presupposition. Second, the presupposition introduced by the CompF is dependent on the quantifier in these examples. Third, the degree variable that provides the standard of comparison in these examples also depends on the quantifier, which we can capture if we assume that it is internally complex. Precedents for all three aspects of the analysis exist in the literature (*e.g.* Martí Martínez (2003) and Beck (2007)), which I also report below. I spell out the analysis of the examples in turn. As

6 Comparison Frames Continued

for (83), I will use a simplified version of the original example, in (173).

- (173) *Jeder Student war im Vergleich zu seinem Partner besser.*
 every student was in+the comparison to his partner better
 ‘When compared to their partner,
 every student performed better.’

In the Logical Form for (173), in (174), the quantificational Determiner phrase *jeder Student* (‘every student’) scopes above the Frame phrase and binds the possessive pronoun inside it. Note that in order to specify a lexical entry for the quantificational determiner, in (175), where the semantic type of both arguments is parsimonious (type $\langle s, \langle e, t \rangle \rangle$), I schönfinked FRAME in an other way than before (type $\langle s, \langle \langle s, t \rangle, \langle \langle s, t \rangle, t \rangle \rangle \rangle$) instead of type $\langle \langle s, t \rangle, \langle \langle s, t \rangle, \langle s, t \rangle \rangle \rangle$. At Logical Form, the correct type for the last argument of the quantificational determiner is then derived by inserting a lambda-binder over situations in-between the quantificational Determiner phrase and the lambda-binder over individuals created by its movement. (See F. Schwarz (2012, pp. 460-461) for discussion of a question related to this Logical Form, namely whether predicates are of type $\langle e, \langle s, t \rangle \rangle$ or of the semantic type $\langle s, \langle e, t \rangle \rangle$.)



Before we look at the compositional interpretation of (174), let us first consider what a situation which would make (173) true would look like. I provide a visualization in Figure 6.1. Such a situation would have a subsituation for every single student in the situation, and every of these subsituations could be extended into a minimal situation in which comparison is with the partner of that student, such that the performance of that student exceeds a certain degree. This degree varies with the student and the subsituation.

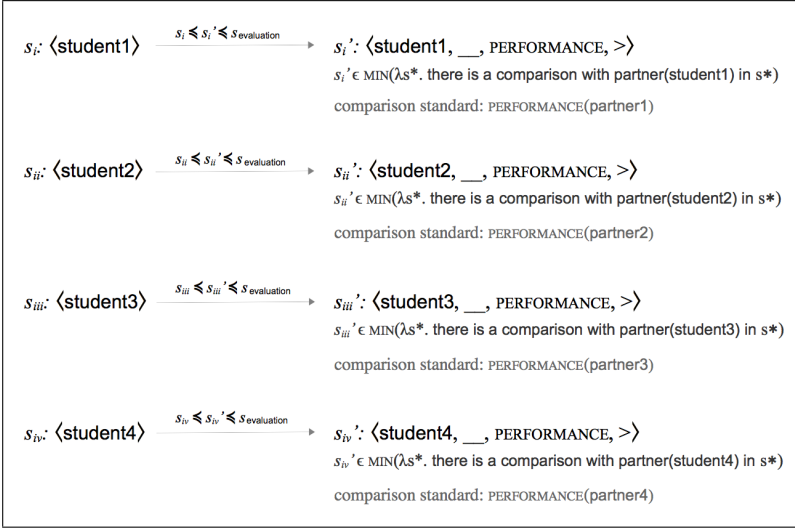


Figure 6.1: *Jeder Student war im Vergleich zu seinem Partner besser.*

To capture the latter fact, an analysis under which there is one free degree pronoun in the ContComp will not do. Instead, the desired interpretation is derived by assuming that the standard of comparison in (174) has a hidden internal structure to it, consisting of a variable of type $\langle e \rangle$ and a variable of type $\langle s \rangle$, both of which are bound by the quantifier, and a free variable of type $\langle s, \langle e, d \rangle \rangle$ that assigns to its arguments a certain degree. The value assigned to this free variable in the example is a function which maps a situation and an individual to the degree to which the individual did well. The interpretation of the Logical Form in (174) furthermore involves the quantificational determiner *jeder* ('every'), with the lexical entry in (175). Ignoring the contribution of the CompF for a moment, we derive the truth conditions in (176).

6 Comparison Frames Continued

$$(175) \quad \llbracket \textit{every} \rrbracket^{57} = \llbracket \textit{jeder} \rrbracket = \lambda s_{\text{evaluation}\langle s \rangle} \cdot \lambda P_{\langle s, \langle e, t \rangle \rangle} \cdot \lambda Q_{\langle s, \langle e, t \rangle \rangle} \cdot \\ \forall x, \forall s [s \preceq s_{\text{evaluation}} \ \& \ s \in \text{MIN}(\lambda s * . P(s*)(x)) \\ \rightarrow \exists s' [s_{\text{evaluation}} \succeq s' \succeq s \ \& \ Q(s')(x)]]$$

(cf. Elbourne 2005, p. 51)

(cf. also F. Schwarz 2012, p. 452, no. (43))

The sentence is true if for every individual x and for every situation s such that s is a part of the evaluation situation and a minimal situation in which x is a student, there is a situation s' such that s' is a part of the evaluation situation and an extension of s and x 's performance in s' exceeds a contextually provided degree associated with x in s' . The CompF additionally restricts s' to an element of the set of those minimal situations in which the unique tandem partner of x is being compared to someone, as in the truth conditions of (174) in (177). If s' is to be a minimal comparison situation with the respective tandem partner, $g(7, \langle s, \langle e, d \rangle \rangle) = \lambda s_{\langle s \rangle} \cdot \lambda x_{\langle e \rangle} \cdot \text{PERFORMANCE}(s)(x)$.

$$(176) \quad \forall x \in D_{\langle e \rangle}, \forall s \in D_{\langle s \rangle} [s \preceq s_{\text{evaluation}} \ \& \ s \in \text{MIN}(\lambda s * . \text{student}(s*)(x)) \\ \rightarrow \exists s' \in D_{\langle s \rangle} [s_{\text{evaluation}} \succeq s' \succeq s \ \& \\ \text{PERFORMANCE}(s')(x) > g(7, \langle s, \langle d, e \rangle \rangle)(s')(x)]]$$

$$(177) \quad \forall x \in D_{\langle e \rangle}, \forall s \in D_{\langle s \rangle} [s \preceq s_{\text{evaluation}} \ \& \ s \in \text{MIN}(\lambda s * . x \text{ is a student in } s*) \\ \rightarrow \exists s' \in \text{MIN}(\lambda s * . \exists y \in D_{\langle e \rangle}, \exists \mu_{\langle s, \langle e, d \rangle \rangle} \\ [\mu(s*)(y) \geq \mu(s*)(\iota z [z \text{ is a partner of } x \text{ in } s*])] \\ [s_{\text{evaluation}} \succeq s' \succeq s \ \& \ \text{PERFORMANCE}(s')(x) > g(7, \langle s, \langle e, d \rangle \rangle)(s')(x)]]]$$

Obviously, the question that arises here is in how far the presupposition introduced by FRAME projects in such a quantified statement.⁵⁸

For the situation-less lexical entries for the quantificational determiners *some* and *every* in (178) and (179), Heim & Kratzer (1998, p. 153) point out: “The lexical entries we have given for *every*, *some*, *no*, *more than two*, etcetera, all define total functions. They thus guarantee that *every* α , *some* α , *no* α , . . . always have a semantic value. . .” To see this, consider a case where there is no $x \in D_{\langle e \rangle}$ that meets the presupposition of p in (179). We end up with the empty set as first set. As the empty set is a subset of every set, the quantified statement will be true. “In other words, quantifying determiners, as we have treated them so far, never give rise to presuppositions. But we have no good reason to assume that this is

⁵⁷ The use of $s_{\text{evaluation}}$ in (175) is merely intended to facilitate reading and not as a selectional restriction upon the first argument.

⁵⁸ The same question also arises for the presupposition triggered by the possessive pronoun, of course, which we will ignore here.

generally correct for all quantifying determiners of natural languages.’ (Heim & Kratzer 1998, p. 153) This statement is not only valid for (178) and (179), but also for the situation-semantic lexical entry for *every* in (175).

$$(178) \quad \llbracket \textit{some} \rrbracket = \lambda p_{\langle e,t \rangle} \cdot \lambda q_{\langle e,t \rangle} \cdot \{x \in D_{\langle e \rangle} : p(x) \text{ is defined and true}\} \\ \cap \{y \in D_{\langle e \rangle} : q(y) \text{ is defined and true}\} \neq \emptyset$$

$$(179) \quad \llbracket \textit{every} \rrbracket = \lambda p_{\langle e,t \rangle} \cdot \lambda q_{\langle e,t \rangle} \cdot \{x \in D_{\langle e \rangle} : p(x) \text{ is defined and true}\} \\ \subseteq \{y \in D_{\langle e \rangle} : q(y) \text{ is defined and true}\}$$

For the quantifiers in (178) and (179), Tiemann (2014, pp. 129-133) therefore proposes the definedness conditions in (180) and (181). Her evidence comes from acceptability judgments and the processing of the German presupposition trigger *wieder* (‘again’). Existential statements presuppose that there is at least one individual for which the first argument of the quantifier is defined and true, and for which the second argument is defined. Universal statements presuppose that there is at least one individual for which the first argument of the quantifier is defined and true, and that for all individuals for which the first argument is defined and true, the second argument is also defined.

$$(180) \quad \text{For any } p, q \in D_{\langle e,t \rangle}, \llbracket \textit{some} \rrbracket(p)(q) \text{ is only defined if} \\ \{x \in D_{\langle e \rangle} : p(x) \text{ is defined and true}\} \cap \{y \in D_{\langle e \rangle} : q(y) \text{ is defined}\} \neq \emptyset.$$

$$(181) \quad \text{For any } p, q \in D_{\langle e,t \rangle}, \llbracket \textit{every} \rrbracket(p)(q) \text{ is only defined if} \\ \{x \in D_{\langle e \rangle} : p(x) \text{ is defined and true}\} \neq \emptyset \ \& \\ \{x \in D_{\langle e \rangle} : p(x) \text{ is defined and true}\} \subseteq \{y \in D_{\langle e \rangle} : q(y) \text{ is defined}\}.$$

Extending this analysis to (175), which has both universal and existential quantification, we arrive at the definedness conditions in (182).⁵⁹ Applied to our example in (173), the sentence asserts (177) and presupposes (183). Most importantly for the analysis of CompFs, the sentence presupposes that every student comes with a minimal situation in which they are compared to their partner, as in Figure 6.1.

$$(182) \quad \text{For any } s^* \in D_{\langle s \rangle} \text{ and } P, Q \in D_{\langle s, \langle e,t \rangle \rangle}, \\ \llbracket \textit{every} \rrbracket(s^*)(P)(Q) \text{ is only defined if} \\ \exists s \in D_{\langle s \rangle}, \exists x \in D_{\langle e \rangle} [s \preceq s^* \ \& \ P(s)(x) \text{ is defined and true}] \\ \text{and } \forall s \in D_{\langle s \rangle}, \forall x \in D_{\langle e \rangle} [s \preceq s^* \ \& \ P(s)(x) \text{ is defined and true}] \\ \rightarrow \exists s' [s^* \succeq s' \succeq s \ \& \ Q(s')(x) \text{ is defined}]$$

⁵⁹ I thank Sonja Tiemann (p.c.) for discussion.

6 Comparison Frames Continued

- (183) **presupposition:**
 $\exists x \in D_{\langle e \rangle}, \exists s \in D_{\langle s \rangle} [s \preceq s_{\text{evaluation}} \ \& \ s \in \text{MIN}(\lambda s*. x \text{ is a student in } s*)]$
and $\forall x \in D_{\langle e \rangle}, \forall s \in D_{\langle s \rangle} [s \preceq s_{\text{evaluation}} \ \& \ s \in \text{MIN}(\lambda s*. x \text{ is a student in } s*) \rightarrow \exists s' [s_{\text{evaluation}} \succeq s' \succeq s \ \& \ s' \in \text{MIN}(\lambda s*. \text{there is a comparison with } \iota z [z \text{ is a partner of } x \text{ in } s*])]]]$

Before we move on to the interrogative example, let me point out that the possibility of covert internal structure to free functional variables on which the analysis of our example relies as well as the possibility of binding presuppositional material have been explored before. I report in (184) an example, which is based on the German example in (185) from Heim (1991, p. 508, no. (91)) and in which the covert domain restriction of the quantificational determiner *no* needs to be internally complex in order to capture the fact that its interpretation is dependent on the quantifier *only one class*, as sketched situation-less in (186). (See also von Stechow (1994), Martí Martínez (2003), and Beck (2007).)

- (184) *Only one class was so bad that no student passed the exam.*
- (185) *Nur eine Klasse war so schlecht,*
only one class was so bad
dass kein einziger Schüler die Prüfung bestand.
that no single pupil the exam passed
‘Only one class was so bad that not a single pupil passed the exam.’
- (186) $[[\textit{only one class}] [1, \langle e \rangle] [t_{1, \langle e \rangle} \textit{ was so bad that } [\textit{IP} [[\textit{no} [f_{7, \langle e, \langle e, t \rangle}] e_{1, \langle e \rangle}] \textit{ student}] \textit{ passed}]]]]]]$
with $g(7, \langle e, \langle e, t \rangle \rangle) = \lambda y_{\langle e \rangle}. \lambda x_{\langle e \rangle}. x \text{ is in } y$

To conclude with Beck (2007, p. 23): “The view that emerges from this discussion is that quite generally, natural language variables can be more complex than appearance would indicate, and that that complexity is reflected in their syntactic structure.” The covert variable for the standard of comparison in ContComps is just another case in point, as is the free temporal variable that the adverb *again* and its German equivalent take as an argument, as Beck (2007) argues. Recall from the discussion of the lexical entry in (146) in section 5.1 that this adverb comes with a free temporal variable, whose interpretation, too, may depend on a quantifier. An example is in (187), where there is no one referent for the free temporal variable.

- (146) $[[\textit{again}]] = \lambda t'_{\langle i \rangle}. \lambda p_{\langle i, t \rangle}. \lambda t_{\langle i \rangle} : t' \ll t \ \& \ p(t'). p(t)$

- (187) a. Context:
 In 1995, 1996 and 1998, Bill was sick on Labor Day.
 b. *In each of these years, he was sick again on Thanksgiving.*
 (Beck 2007, p. 24, no. (32))

The sentence presupposes that in every contextually relevant year, Bill was sick on Labor Day (and that Labor Day is before Thanksgiving). I sketch Beck (2007, pp. 24-25)'s analysis of (187) in (188). Crucially, the first argument of *again* is internally complex. It consists of a free function of type $\langle i, i \rangle$ and a temporal variable which is bound by the temporal quantifier.

- (188) $\forall t [(g(3, \langle i, t \rangle))(t) \ \& \ \text{year}(t) \rightarrow$
 $\llbracket \text{again} \rrbracket((g(7, \langle i, i \rangle))(t))(\lambda t'. \text{sick}(t')(Bill))(Thanksgiving \text{ in } t)]$
 with $g(3, \langle i, t \rangle) = \{1995, 1996, 1998\}$
 and $g(7, \langle i, i \rangle) = \lambda t_{\langle i \rangle}. \text{the Labor Day in } t$

What (188) also has in common with the analysis of the CompF example above is that it involves a binding relationship between a quantificational element and material that ends up being presuppositional. Sigrid Beck (p.c.) comments that there might even be bound occurrences of the first time variable of *again*. Her example is in (189), with a restitutive reading. (See e.g. von Stechow (1996) and Beck (2005) for the different readings of *again* and its German counterpart.)

- (189) *Jeden Morgen trennten sich die Schwestern*
 every morning separated themselves the sisters
und trafen sich abends wieder.
 and met themselves at.nights again
 'Every morning, the sisters parted and met again at night.'

The relevant presupposition of the sentence in (189) is that the sisters have been together every morning.

Under a quantificational approach to the semantics of interrogatives (Karttunen 1977; Groenendijk & Stokhof 1984), the question from (84), too, involves such a binding relationship as well as an internally complex degree variable that is dependent on a quantifier.

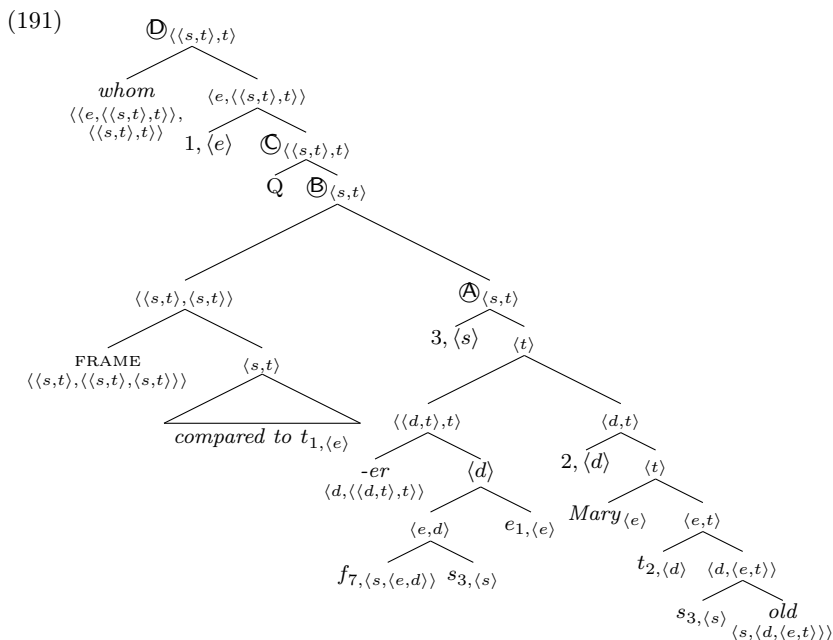
- (84) *Compared to whom is Mary older?*

6 Comparison Frames Continued

Questions denote sets of propositions, namely the set of possible answers to the question. The propositions in the set for (84) vary with respect to their presupposition and their comparison standard. This set, somewhat informally, looks like (190), with $g(7, \langle s, \langle e, d \rangle \rangle) = \lambda s_{\langle s \rangle} . \lambda x_{\langle e \rangle} . \text{AGE}(s)(x)$.

- (190) $\{ \lambda s : s \in \text{MIN}(\text{Peter is being compared in } s) . \text{Mary's age exceeds } (g(7, \langle s, \langle e, d \rangle \rangle))(s)(\text{Peter}) \text{ in } s ; \lambda s : s \in \text{MIN}(\text{Susan is being compared in } s) . \text{Mary's age exceeds } (g(7, \langle s, \langle e, d \rangle \rangle))(s)(\text{Susan}) \text{ in } s ; \lambda s : s \in \text{MIN}(\text{Bobbi is being compared in } s) . \text{Mary's age exceeds } (g(7, \langle s, \langle e, d \rangle \rangle))(s)(\text{Bobbi}) ; \lambda s : s \in \text{MIN}(\text{Liz is being compared in } s) . \text{Mary's age exceeds } (g(7, \langle s, \langle e, d \rangle \rangle))(s)(\text{Liz}) \text{ in } s ; \dots \}$

I adopt here an analysis under which the question word, in (192-b), contributes existential quantification over individuals and obligatorily undergoes movement to derive an interpretable structure, in (191). The covert question operator Q , in (192-a), is essential in deriving a set of propositions as the denotation of the question.⁶⁰



⁶⁰ I could as well have adopted an alternative-semantics approach to the semantics of interrogatives (Beck 2006, 2015). See also Krifka (2011) for a recent overview on interrogative semantics.

6.2 Frame Setters in Other Degree Constructions

- (192) a. $\llbracket \mathbb{Q} \rrbracket = \lambda p_{\langle s,t \rangle} \cdot \lambda q_{\langle s,t \rangle} \cdot q = \lambda s \cdot p(s)$
 b. $\llbracket \text{whom} \rrbracket = \lambda P_{\langle e, \langle \langle s,t \rangle, t \rangle \rangle} \cdot \lambda p_{\langle s,t \rangle} \cdot \exists x_{\langle e \rangle} [P(x)(p)]$

The most important steps of the compositional interpretation of (191) are in (193) to (196). The result is (197), the set of partial functions described in (190).

- (193) $\llbracket \mathbb{A} \rrbracket^g = \lambda s_{\langle s \rangle} \cdot \text{AGE}(s)(\text{Mary}) \geq d > (g(7, \langle s, \langle e, d \rangle \rangle))(s)(g(1, \langle e \rangle))$
- (194) $\llbracket \mathbb{B} \rrbracket^g = \lambda s : s \in \text{MIN}(\lambda s^* \cdot \exists x_{\langle e \rangle}, \mu_{\langle s, \langle e, d \rangle \rangle} [\mu(s^*)(x) \geq \mu(s^*)(g(1, \langle e \rangle))]) \cdot \text{AGE}(s)(\text{Mary}) > (g(7, \langle s, \langle e, d \rangle \rangle))(s)(g(1, \langle e \rangle))$
- (195) $\llbracket \mathbb{C} \rrbracket^g = \lambda q_{\langle s,t \rangle} \cdot q =$
 $\lambda s : s \in \text{MIN}(\lambda s^* \cdot \exists x_{\langle e \rangle}, \mu_{\langle s, \langle e, d \rangle \rangle} [\mu(s^*)(x) \geq \mu(s^*)(g(1, \langle e \rangle))]) \cdot \text{AGE}(s)(\text{Mary}) > (g(7, \langle s, \langle e, d \rangle \rangle))(s)(g(1, \langle e \rangle))$
- (196) $\llbracket \mathbb{D} \rrbracket^g = \lambda x_{\langle e \rangle} \cdot \lambda q_{\langle s,t \rangle} \cdot q =$
 $\lambda s : s \in \text{MIN}(\lambda s^* \cdot \exists x_{\langle e \rangle}, \mu_{\langle s, \langle e, d \rangle \rangle} [\mu(s^*)(x) \geq \mu(s^*)(g(1, \langle e \rangle))]) \cdot \text{AGE}(s)(\text{Mary}) > (g(7, \langle s, \langle e, d \rangle \rangle))(s)(x)$
- (197) $\llbracket \mathbb{E} \rrbracket^g = \lambda p_{\langle s,t \rangle} \cdot [\exists x \in D_{\langle e \rangle} [p =$
 $\lambda s : s \in \text{MIN}(\lambda s^* \cdot \exists x_{\langle e \rangle}, \mu_{\langle s, \langle e, d \rangle \rangle} [\mu(s^*)(x) \geq \mu(s^*)(g(1, \langle e \rangle))]) \cdot \text{AGE}(s)(\text{Mary}) > (g(7, \langle s, \langle e, d \rangle \rangle))(s)(x)]]$

As far as the value assignment to the free variable in (191) is concerned, we can probably see most clearly in (196) that if the set of situations that are the possible answers to the question are restricted to minimal situations in which there is a comparison with x , then x has to be compared with Mary along the dimension of age, *ergo* it is necessary that $g(7, \langle s, \langle e, d \rangle \rangle) = \lambda s_{\langle s \rangle} \cdot \lambda x_{\langle e \rangle} \cdot \text{AGE}(s)(x)$.

Up to now, this chapter essentially was concerned with housekeeping in that we explored various aspects of the analysis of CompFs in ContComps in greater detail. In the remainder of the chapter, I will show that the analysis extends to CompFs in other degree constructions.

6.2 Frame Setters in Other Degree Constructions

For expository reasons, the focus of this dissertation so far has been on CompFs in ContComps. However, CompFs are not restricted in their distribution to ContComps but occur with the Positive, in Superlatives and Equatives, as we have seen in chapter 1. This distribution is another property that distinguishes CompFs from direct standard phrases,

which are lexically selected for and may only occur in comparatives. Crucially, in all of the other comparison cases, the CompF also restricts the value of a free variable associated with the degree operator. The analysis presented in chapter 4 can easily be extended to these other comparison constructions as there is no restriction on the semantic type of the variable whose value assignment the frame setter may manipulate.

The discussion will proceed as follows: We will tackle the other degree constructions one-by-one. I will first provide a brief introduction to the semantics of the constructions. We will then take another look at the examples from the introduction and discuss their analysis. (See also section 1.3.1 above.) Let's start with the Positive.

The Positive has by far the most elusive semantics of all of the degree operators. As Kennedy (2007b, p. 6) puts it: "... it is a bit paradoxical that the most morphosyntactically simple form of a gradable predicate turns out to be the hardest to adequately characterize in terms of a compositional semantic analysis." Intuitively, for sentences such as English (198) to be considered true, Mary's height needs to meet some contextually provided standard for tallness.

(198) *Mary is tall.*

I will follow von Stechow (2009) and assume that this reading is derived by a covert Positive operator POS, in (199), which is a universal quantifier over what is contextually considered the neutral interval on the respective degree scale. For discussion of alternative proposals, I refer the reader to Fara (2000), Kennedy (2007b), Bale (2008, 2011), von Stechow (2009), B. Schwarz (2010), and Solt (2011).

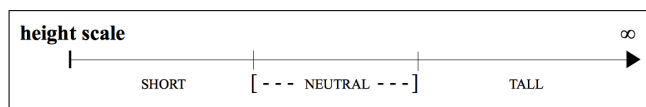


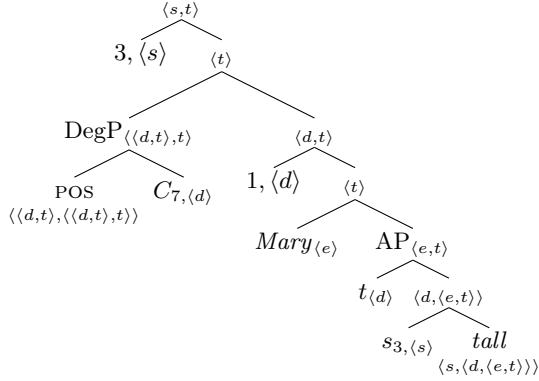
Figure 6.2: The Partition of the Height Scale

Under this analysis, our basic example in (198) has the Logical Form in (200) and is assigned the interpretation in (202). For convenience, I also provide the lexical entry of the gradable predicate, in (201).

(199) $\llbracket \text{POS} \rrbracket = \lambda C_{\langle d,t \rangle} . \lambda D_{\langle d,t \rangle} . \forall d [(g(7, \langle d, t \rangle))(d) \rightarrow D(d)]$
with C the neutral segment on the respective degree scale

6.2 Frame Setters in Other Degree Constructions

(200)



(201) $\llbracket tall \rrbracket = \lambda s_{\langle s \rangle} . \lambda d_{\langle d \rangle} . \lambda x_{\langle e \rangle} . \text{HEIGHT}(s)(x) \geq d$

(202) $\lambda s . \forall d [(g(7, \langle d, t \rangle))(d) \rightarrow \text{HEIGHT}(s)(\text{Mary}) \geq d]$

However, von Stechow (2009, p. 221) points out for (202): “There is a glitch here. In the limiting case, the height of [Mary] might coincide with the right border of the neutral interval. Then, [the sentence] should be true in a scenario where [Mary] belongs to the things that are neither tall nor short. In order to avoid this unwelcome consequence, we have to add the stipulation that the right border of the neutral interval counts as positive tallness. I will assume this henceforth.” What matters for our purposes is that, just like in the case of the ContComp, the first argument of the degree quantifier POS is a free variable. This free variable is of a different semantic type than the degree variable in ContComps, as it denotes a set of degrees. In addition, POS adds the presupposition that this set of degrees constitute the neutral segment on the scale. Its interpretation may be additionally restricted by a CompF presupposition, as in the examples below, repeated from the introduction.

- (15)
- a. *Planets are very small_C [compared to stars],...*
 - b. *[Compared to many coffee houses], the place is huge_C.*
 - c. *In Deutschland geht es uns [verglichen mit Menschen in anderen Ländern] doch richtig gut_C.*
 “Compared to people in other countries,
 we live really well in Germany.”
 - d. *Doch [im Vergleich zu ähnlichen Auktionen aus der jüngeren Vergangenheit] fiel das letzte Gebot am Donnerstag günstig_C aus.*

6 Comparison Frames Continued

“Compared to similar auctions from the recent past however, the last bid on Thursday was low.”

In the case of (15-c), for instance, the frame setter restricts the proposition to minimal situations in which there is a comparison with some plurality of people from countries other than Germany. The free variable of type $\langle d, t \rangle$ that comes with POS must thus refer to the set of happiness degrees of those people.

It is instructive to compare the denotation of a ContComp with a CompF to that of a Positive with the same frame setter: Consider a variant of our go-to example in (203) and its Positive counterpart in (204). Both have in common the meaning that Mary’s age exceeds Peter’s age. For the Positive with the CompF, two additional meaning components have been identified, namely that it is not the case that Peter is actually tall and that it is also not the case that Mary is actually tall. (See *e.g.* Sawada (2009).)

- (203) *Compared to Peter, Mary is taller.*
 $\lambda s_{\langle s \rangle}. \text{HEIGHT}(s)(\text{Mary}) > g(7, \langle d \rangle)$
 presupposition:
 $s \in \text{MIN}(\lambda s*. \exists x_{\langle e \rangle}, \mu_{\langle s, \langle e, d \rangle \rangle} [\mu(s*)(x) \geq \mu(s*)(\text{Peter})])$
- (204) *Compared to Peter, Mary is tall.*
 $\lambda s_{\langle s \rangle}. \forall d [g(7, \langle d, t \rangle)(d) \rightarrow \text{HEIGHT}(s)(\text{Mary}) > d]$
 presuppositions:
 $s \in \text{MIN}(\lambda s*. \exists x_{\langle e \rangle}, \mu_{\langle s, \langle e, d \rangle \rangle} [\mu(s*)(x) \geq \mu(s*)(\text{Peter})])$
 $g(7, \langle d, t \rangle)$ is the neutral segment on the degree scale

Under our analysis, the meaning component that Peter is not tall arises because of the presupposition of the Positive operator, which requires the free variable to provide the neutral segment on the height scale, *viz.* those height degrees with which someone would not yet count as tall but also not as small. Because of the CompF, the set containing Peter’s height is the only permissible value for $g(7, \langle d, t \rangle)$ in (204). In order for the free variable to be assigned this value, we have to accommodate that Peter thus does not count as tall if this information has not yet been available. The meaning component that Mary is not tall on other hand is an implicature, resulting *e.g.* from the maxim of quantity. If I had wanted to say that Mary is tall with respect to the global standards of the speaker community, I would have done so instead of uttering (204).

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Up next is the Equative, which also comes in a contextual variant (ContEqu), such as German (205). Intuitively, the sentence is true in a situation if Mary’s height equals a contextually provided degree, say Peter’s height. A lexical entry for the degree operator in ContEqu is in (206). This operator differs from $-er_{\text{deg}}$ only with respect to the degree relation employed: While it is the greater-than relation in the case of the comparative, it is the greater-than-or-equal relation in the case of the equative. (See von Stechow (1984a), Beck (2011), and Hohaus & M. Zimmermann (2014) for further discussion.) It is commonly assumed that the perceived exactly-reading of equatives is a scalar implicature, which can also be canceled. To see this, consider (207), which Georg, who might want to brag about his achievements, might easily follow up with: “In fact, the mountain I climbed was even higher than that.”

(205) *Maria ist auch so groß.*
 Mary is too so tall
 ‘Mary is as tall, too.’

(206) $\llbracket so_{\text{deg}} \rrbracket = \lambda c_{\langle d \rangle} . \lambda D_{\langle d, t \rangle} . \text{MAX}(D) \geq d$

(207) a. Context:

Am Montag unterhalten sich die begeisterten Bergsteiger unter meinen Kollegen über die Touren, für welche sie das vergangene Wochenende genutzt haben. Georg gibt an, auf 2.185 Meter Höhe zur Kreuzspitze in den Ammergauer Alpen gestiegen zu sein. Leon, von dem ich weiß, dass er auf dem Großen Hundstod in Berchtesgarden mit 2.593 Metern Höhe war, sagt zu Georg:⁶¹

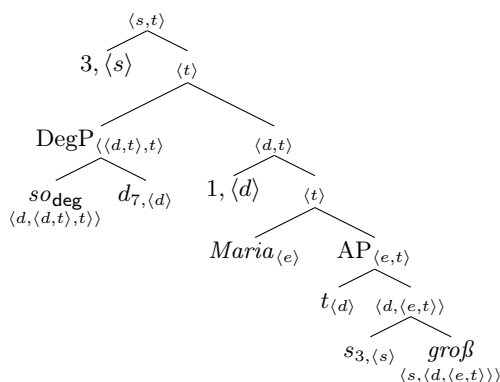
b. *So hoch wie du bin ich am Wochenende auch gestiegen.*
 so high like you am I at+the weekend also climbed
 ‘I climbed a mountain as high this weekend, too.’

The Logical Form in (208) generates the interpretation in (209) for the ContEqu, a set of situations in which Mary’s height exceeds or equals a contextually provided degree. A CompF might target the interpretation of this degree and restrict it, as in the examples in (17).

⁶¹ Translation: “Two of my colleagues are passionate hikers and, as it is Monday, discuss which mountains they climbed on the weekend. Georg reports to have climbed up to 2,185 meters, to the Kreuzspitze in the Ammergau Alps. Leon, of whom I know that he climbed the Großer Hundstod in Berchtesgarden (with a height of 2,593 meters), tells Georg:

6 Comparison Frames Continued

(208)



(209) $\lambda s. \text{MAX}(\lambda d. \text{HEIGHT}(s)(\text{Mary})) \geq g(7, \langle d \rangle)$

- (17) a. [*Compared to my other baked oatmeal recipe*],
this one is just as_C good!
- b. *Though Nadia's artists are doing well at home and in various parts of the world, [compared to work from other Arab countries] Moroccan art is just not as_C big.*
- c. *Die Preise der X-Reisen können [verglichen mit herkömmlichen Reisen] genauso_C teuer, teurer oder billiger sein.*
 “Dynamic travel packaging can be exactly as expensive, more expensive or less expensive.”
- d. *Die Benutzeroberfläche wirkt [im Vergleich zu anderen... Navis] peppiger, ist aber genauso_C übersichtlich und logisch aufgebaut.*
 “Compared to other GPS navigation systems, the user interface looks much more upbeat but is exactly as clearly arranged and logically structured.”

If we consider the sentence in (17-a), it denotes a set of situations such that the maximal degree to which the recipe for baked oatmeal with blueberries is good in these situations exceeds or equals the contextually provided degree. To this set (or the characteristic function thereof), the frame setter *compared to my other baked oatmeal recipe* adds the restriction that these situations must be minimal and such that there is a comparison with the recipe for breakfast baked oatmeal, the referent of the definite description. The CompF thus restricts the denotation domain to situations in which this recipe exceeds or equals some other entity along some dimension. Given minimality of situations, only the

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degree to which the other recipe is good is thus a possible value for the free variable.

Superlatives, such as the English example in (210), intuitively express a special kind of comparison, namely that Mary is taller than everyone else that is contextually relevant. The lexical entry in (211) from Heim (1985, p. 19, no. (3)) captures this intuition. (For further discussion, see Szabolcsi (1986), Heim (1999), and Sharvit & Stateva (2000, 2002).) I spell out the Logical Form in (212) and its interpretation in (213): The sentence is true in an evaluation situation only if for every individual in the contextually provided set, Mary's height exceeds their height.

(210) *Mary is the tallest.*

(211) $\llbracket \text{-est} \rrbracket = \lambda C_{\langle e,t \rangle} \cdot \lambda R_{\langle d, \langle e,t \rangle \rangle} \cdot \lambda x_{\langle e \rangle} \cdot$
 $\forall y [C(y) \ \& \ y \neq x \rightarrow \text{MAX}(\lambda d. R(d)(x)) > \text{MAX}(\lambda d'. R(d')(y))]$

(212)

(213) $\lambda s. \forall y [(g(7, \langle e, t \rangle))(y) \ \& \ y \neq \text{Mary} \rightarrow$
 $\text{MAX}(\lambda d. \text{HEIGHT}(s)(\text{Mary}) \geq d) > \text{MAX}(\lambda d'. \text{HEIGHT}(s)(y) \geq d')]$

A CompF has the effect of narrowing down this set of contextually provided individuals. Consider the following examples.

- (18) a. [*... compared to other towns*] *it* (i.e. the town of Marfa)
was the best-looking and most_C practical.
- b. [*Compared to its crosstown rivals*],
Ford is the furthest along in its recovery from the recession...
- c. *Die Spareinlagen sind bei der Commerzbank, [verglichen mit den anderen beiden Großbanken], am stärksten_C gestiegen.*
 “Compared to the two other big banks, Commerzbank has had the largest rise in saving deposits.”

6 Comparison Frames Continued

- d. *Die Fondsmanager wählen nämlich zumeist aus jeder Branche die Unternehmen aus, die [im Vergleich zu ihren Konkurrenten] die besten_C Umwelt- und Sozialkriterien vorweisen können.*

“In fact, portfolio managers usually select those companies from every sector that demonstrate the best environmental and social criteria compared to their competitors.”

The sentence in (18-a), for instance, asserts that for every item in the comparison set, the maximal degree to which the town of Marfa, in Texas, is nice and practical in the evaluation situation exceeds the maximal degree to which all of the items are nice and practical in this situation. It presupposes that the proposition is a comparison with other relevant towns, making the set of those towns the only possible referent for the free variable of type $\langle e, t \rangle$.

In conclusion, while this has not been the place to discuss the considerable variety of approaches to the semantics of the different degree operators in any detail, all of them may be context dependent in their interpretation and rely on an argument which provides the reference for the comparison, be it of type $\langle e, t \rangle$, $\langle d \rangle$ or $\langle d, t \rangle$. The great advantage of the analysis of frame setters as adding a presupposition to the proposition, a set of situations, is that it is compatible with any of these lexical entries.

The distribution of CompFs in English in German is, however, not restricted to comparative constructions in the narrow sense, *viz.* constructions built around a gradable adjective. CompFs also occur with nominal and verbal scalar predicates. Examples are in (214) and (215).

(214) Nominal Comparisons:

- a. *That’s an eight percent decrease_c [compared to 2009].*⁶²
- b. *The latest data estimate that 1 in 88 American children has some form of autism spectrum disorder. That’s a 78-percent increase_c [compared to a decade ago].*⁶³
- c. *Zwischen Januar und Juli 2013 wies Turkish Airlines [verglichen mit dem Vorjahreszeitraum] einen Anstieg_c um 25,8 Prozent bei*

⁶² Doug Roberson, “Getting Back to Basics,” *Atlanta Journal Constitution*, March 27, 2011, p. 8c.

⁶³ Miriam Falco, “CDC: U.S. kids with autism up 78 percent in past decade,” *Cable News Network (CNN)*, March 29, 2012 (URL: <http://www.cnn.com/2012/03/29/health/autism/>, accessed August 29, 2014).

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den weltweiten Flugticketverkäufen auf.⁶⁴

“Between January and July 2014, Turkish Airlines showed a rise in worldwide ticket sales by 25.8 percent, compared to the same period the year previous.”

- d. *Der Umsatz (von Samsung) im vierten Quartal wurde auf etwa 59 Billionen Won geschätzt. Das wäre [im Vergleich zu 2012] ein Plus_c von 5,2 Prozent.*⁶⁵

“Estimates had Samsung’s sales figures in the last quarter at around 59 trillion Won. That would be an increase by 5.2 percent, compared to 2012.”

(215) Verbal Comparisons:

- a. *The number of UK university applicants has dropped_c by 8.7 percent [compared to last year], . . .*⁶⁶
- b. *BYD (an automobile manufacturer) said sales of its so-called new-energy vehicles had grown_c compared to a year earlier.*⁶⁷
- c. *Die Zahl rechter Straftaten ist im vergangenen Jahr [verglichen mit dem Vorjahr] erneut gestiegen_c.*⁶⁸
- d. *In Ost wie West ist die Konsumquote allerdings [im Vergleich zu 1998] gesunken_c.*⁶⁹

“Compared to last year, the number of offenses committed by right-wing extremists rose again this year.”

“Compared to 1998, the private consumption index for Eastern as well as Western Germany dropped, however.”

Nouns such as *increase*, in (214-b), and verbs such as *to drop*, in (215-a), encode a comparison that, too, requires a standard, without subcatego-

⁶⁴ „Zunahme des Türkei-tourismus,“ *Finanznachrichten*, July 10, 2013 (URL: <http://tinyurl.com/fn072013>, accessed September 1, 2014).

⁶⁵ „Samsung enttäuscht nicht nur mit Zahlen,“ *Der Tagesspiegel*, January 7, 2014 (URL: <http://tinyurl.com/tagesspiegel20140107>, accessed September 1, 2014).

⁶⁶ Jeevan Vasagar, “Number of UK university applicants drops 8.7 percent, Ucas figures show,” *The Guardian*, January 30, 2012 (URL: <http://gu.com/p/35543>, accessed August 29, 2014).

⁶⁷ “Carmaker BYD sees shares rebound after 8 percent fall,” *British Broadcasting Company (BBC) Business News*, August 25, 2014 (URL: <http://www.bbc.com/news/business-28924020>, accessed September 1, 2014).

⁶⁸ „Bundesinnenminister Friedrich: Zahl rechter Straftaten gestiegen,“ *Die Tageszeitung*, March 3, 2013 (URL: <http://www.taz.de/!113382/>, accessed September 1, 2014).

⁶⁹ „Staat schießt Privathaushalten Geld zu,“ *Frankfurter Allgemeine Zeitung*, December 2, 2012 (URL: <http://www.faz.net/-gqe-pmvn>, accessed September 1, 2014).

6 Comparison Frames Continued

rizing for a particular phrase to provide this standard. The standard of the comparison thus has to be inferred entirely from the context (or be manipulated by a CompF). I will discuss here the analysis of a verbal comparison, namely (216). Intuitively, the comparison is between two different situations, with Thorsten’s weight in the prior situation being 22 pounds less.

- (216) *Thorsten hat im Vergleich zu 2012 zehn Kilo zugenommen.*
 Thorsten has in+the comparison to 2012 ten kilo gained
 ‘Compared to 2012, Thorsten has gained 22 pounds of weight.’

To start us off, I provide a lexical entry for the scalar verb *zunehmen* (‘to gain weight’) in (217), which will do for our purposes. I have no particular reason for the order of arguments proposed for this verb. Among its arguments are the aforementioned contextually provided prior situation and a differential degree. If no differential measurement is provided, we can assume that the latter argument slot will be subject to existential closure. The function τ maps a situation onto its temporal extension. (For further discussion of the semantics of scalar verbs, see *e.g.* von Stechow (1996), Beck (2005), Beavers (2008), and Kennedy & Levin (2008).)

- (217) $\llbracket \textit{zunehmen} \rrbracket = \lambda s_{\langle s \rangle} . \lambda c_{\langle s \rangle} . \lambda d_{\langle d \rangle} . \lambda x_{\langle e \rangle} .$
 $\exists s' [s' \prec s \ \& \ \text{WEIGHT}(s')(x) \geq \text{WEIGHT}(c)(x) + d]$
 with $c \prec s \ \& \ \tau(c) \ll \tau(s')$

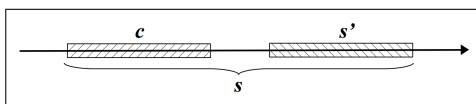


Figure 6.3: Relationship between Weight Situations

Applied to the example in (216) without the CompF, we derive (218). The sentence would thus be true of a situation only if it contains a subsituation in which Thorsten’s weight is at least ten kilos more than it was in a contextually provided situation which is also a part of the overall situation and temporally precedes the subsituation, as sketched in Figure 6.3. The CompF restricts the domain of the function in (218) to minimal situations in which there is a comparison with the year of 2012.

- (218) $\lambda s_{\langle s \rangle} . \exists s' [s' \prec s \ \& \ \text{WEIGHT}(s')(\text{Thorsten}) + 10 \text{ kg}$
 $\leq \text{WEIGHT}(g(7, \langle s \rangle))(\text{Thorsten})]$
 with $g(7, \langle s \rangle) \in \{s^* : s^* \prec s \ \& \ \tau(s^*) \ll \tau(s')\}$

Only if the temporal extension of $g(7, \langle s \rangle)$ is that year can this restriction be met. We can additionally infer that the situation in which Thorsten weighs ten kilos more than before is after 2012.

I would like to conclude this section with a few remarks on usage. If the grammar provides a straightforward compositional alternative to a degree construction with a CompF (in the form of a function-argument structure of operator and comparison standard), as is the case for our go-to example, there is a strong preference for that alternative. Thus, a ContComp with a CompF is in most cases in competition with a comparative with a direct standard phrase.

- (219) a. *Compared to Peter, Mary is older.*
 b. *Mary is older than Peter.*

Recall from chapter 3 that this was also reflected in the acceptability ratings reported for English and German: There was a strong main effect for type of construction; ContComps with a frame setter generally received lower acceptability ratings than their direct-standard-phrase alternatives. Recent findings from processing (Reuland 2001; Koornneef 2008; Koornneef et al. 2011) suggest that there might be a general preference on part of the language processor for bound variables over free variables. A consequence of this preference is that the niche in which frame setters prosper are those comparison constructions for which more compositionally direct structures are unavailable, either lexically, as is the case for the Positive and the nominal and verbal comparisons discussed above, or syntactically.

6.3 Chapter Summary

In the first half of this chapter, quantifier-dependent readings of CompFs and of the degree standard of comparison allowed us to put some fairly cool semantic machinery to work: Tiemann (2014)'s proposal for presupposition projection through quantifiers, and internally complex variables, partially bound and partially free. In the second half of this chapter, we turned to CompF outside of ContComps. Unlike direct-standard phrases, CompFs occur with a wide range of comparison constructions, and the analysis can easily account for this distribution. We will see in chapter 8 that frame setters, being a wonderful example of the glue in the composition of meaning in natural language, are in fact not limited to

6 *Comparison Frames Continued*

comparison constructions. For now, we will stay within the realm of comparison, as we explore the crosslinguistic predictions of the analysis in the next chapter. The distributional properties of a standard phrase will therein serve as a useful diagnostic.

7 The Crosslinguistic Perspective

In order to understand and model how meaning emerges from the interaction of syntactic structure, lexicon, composition principles, and context, as this dissertation sets out to do, our "... empirical base needs to be as broad as possible." (Matthewson 2011, p. 269). Endangered and under-represented languages, as K. David Harrison so adequately puts it, "... enormously widen and deepen our view of what is possible within the human mind. ... As we delve into languages, many revelatory discoveries await us." (Harrison 2007, p. 236) Let's delve right in.

7.1 The Typology of Comparison Standards

Given the analysis presented in chapter 4, there are two possible compositional strategies for determining the standard of a comparison. This section lays out the resulting typology of comparison standards. Section 7.2 discusses in some detail data from an Austronesian language, Sāmoan, and will locate this under-represented language within the typology. Section 7.3 investigates a number of languages from the literature with respect to how standards are determined in a comparison. Section 7.4 aims at putting together the resulting crosslinguistic picture.⁷⁰

The first of the two compositional strategies for determining the standard in a comparison is exemplified by *than*- and *als*-constituents in English and German, which are an argument of the comparative operator. I will refer to this as the **direct strategy**. In those languages, a degree operator can, however, also take a free variable as its argument, whose value assignment is in turn manipulated by a CompF. I will refer to this strategy as the **indirect strategy**. Languages might differ in whether they have both strategies at their availability, as outlined in Table 7.1.

The idea that there might potentially be different routes to a comparative meaning as far as the compositional status of the standard of the comparison is concerned originated with Beck, Oda & Sugisaki (2004). (See also Kennedy (2009) and Beck, Hohaus & Tiemann (2012) for dis-

⁷⁰ See page ix in the frontmatter for a list of the abbreviations used in the glosses.

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cussion.) Recall that their analysis of what I have identified as frame setters in comparatives was introduced in section 2.1 of chapter 2. Although I dismissed the particular implementation of the analysis they propose, the crosslinguistic predictions remain.

| indirect strategy \ direct strategy | available | unavailable |
|---|-----------------|-----------------|
| available | pattern 1: ✓, ✓ | pattern 2: ✓, ✗ |
| unavailable | pattern 3: ✗, ✓ | pattern 4: ✗, ✗ |

Table 7.1: Typology of Comparison Standards

Languages that exhibit pattern 1 employ both of the compositional strategies. English and German are examples for such languages. A language with pattern 2 will pursue the indirect strategy only, whereas a language with pattern 3 will only have the direct strategy available. Lastly, pattern 4 describes languages in which the standard of comparison can neither be overtly realized as an argument nor manipulated indirectly by a frame setter. Patterns 3 and 4 might be somewhat unlikely for independent reasons: The mechanism of indirectly manipulating value assignments to free variables that I presented in chapter 4 is not unique to degree constructions. (See also chapter 8.) It would therefore be somewhat surprising for a language to not use it then, albeit this is a logical possibility. For a language to fit pattern 4, all degree constructions would solely depend on context for the reference point of a comparison. From the perspective of English and German, this might feel like a loss of the tight control over meaning which both of the compositional strategies offer, as determining the standard for a comparison would be left entirely to the context. Languages of this type are thus representatives of a contextual strategy, which Beck, Hohaus & Tiemann (2012) assume to be universally available.

7.2 The View from Sāmoan

In the typology developed above, Sāmoan is a language which exhibits pattern 2: Comparison standards in the language may only be realized as free variables, whose interpretation may be guided by a frame setter. This is not the only variation we observe between Sāmoan and English,

however: Variation additionally concerns the functional lexicon, as the two languages also differ with respect to their degree operators. Before we look at this variation in more detail, let me provide a brief introduction to the language.

7.2.1 The Sāmoan Language

Sāmoan is a Polynesian language and a member of the Austronesian language family; cf. Figure 7.1 to Figure 7.3. The language has approximately 370,000 speakers worldwide (M. P. Lewis 2009), with around 200,000 speakers living on the Pacific islands of Sāmoa and American Sāmoa. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) currently does not categorize the language as vulnerable or endangered (Moseley 2010). In view of the consequences of global warming for the archipelago⁷¹ and the strong pressure from English⁷², the language's vitality may however not be taken for granted.

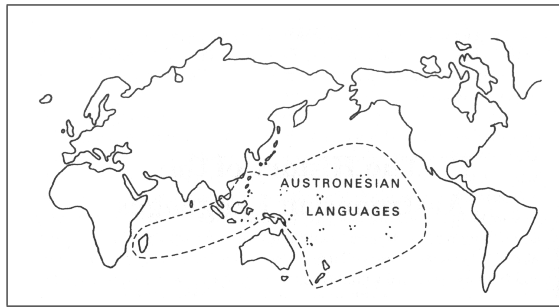


Figure 7.1: Austronesian languages (Lynch 1998, p. 46)

Standard reference works on the language include Downs (1949), Milner (1966), Marsack (1975), Mosel & Hovdhaugen (1992), Hunkin (1992), Mosel & So'o (1997), Simanu (2002), and Ma'ia'i (2010).⁷³ There is little work on the language from a theoretical viewpoint except for Pawley (1966), Clark (1969), Pizzini (1971), Chung (1972), Chung (1978), Moyses-Faurie (1997), Mosel (2004), Homer (2009), C. Donohue & M.

⁷¹ See Taule'alo (1998), Young (2007), and Grant (2014) for more information.

⁷² See Wilson (2010), Kruse Va'ai (2011), and Vague (2014) for discussion.

⁷³ There are also a number of reference works from the German colonial period (Funk 1893; Neffgen 1903; Jensen 1925/1926) as well as by British missionaries (Pratt 1878; Churchward 1926).

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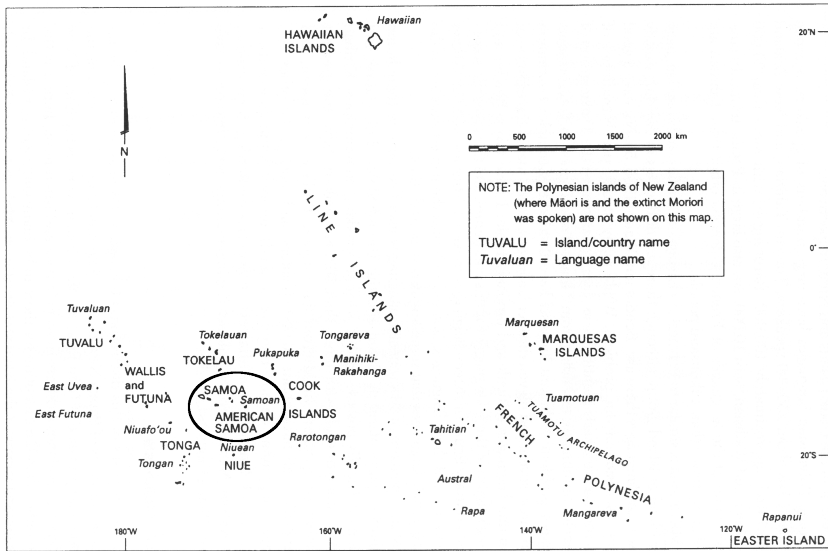


Figure 7.2: Languages of Polynesia (Lynch 1998, p. 29)

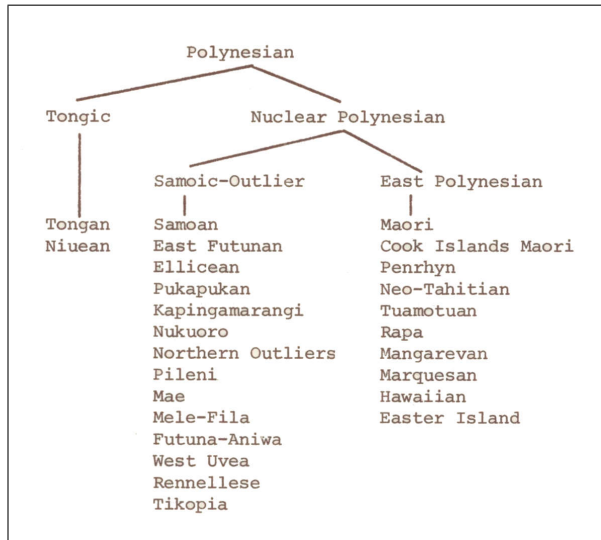


Figure 7.3: Classification of Polynesian Languages (Chung 1978, p. 8)

Donohue (2010), Herd, Macdonald & Massam (2011), Koopman (2012), and Collins (2015), all of which discuss syntactic issues. From the viewpoint of formal semantics, the language is thus truly under-researched.

Unless otherwise indicated, the data presented come from original fieldwork with Sāmoan native speakers conducted by myself. In working with native speaker consultants, I used the elicitation techniques presented in Matthewson (2004, 2011). (See also Bower (2008) and Chelliah & de Reuse (2011).) Tasks included translations, acceptability judgments and storyboards. I provide a brief description of each these three types of tasks below.

(220) Overview over Elicitation Techniques

(i) Translation tasks:

Speakers provided translations of sentences from either German or English to Sāmoan. Each sentence was accompanied by a picture or a short text in either the target or the working language to contextualize the translation.

(ii) Acceptability judgment tasks:

Speakers were asked to judge the acceptability of sentences in certain situations. Those situations were illustrated with a picture or described in a short text in either the target or the working language.

(iii) Storyboards:

Speakers were told a story with the help of a series of pictures in the working language and then re-told the story in the target language with the help of the pictures.

A total of 19 native speakers from both Sāmoas contributed to this research. Data were collected in Germany, during a fieldwork trip to the Sāmoan islands of Savai'i and Upolu in September and October of 2011, and during a trip to the Hawai'ian island O'ahu in the United States in May and June of 2014. Data were also drawn from Sāmoan print and online publications. I report examples in their original orthography, resulting in variation when it comes to the use of the macron to indicate vowel length as well as the inverted comma to indicate the glottal stop.⁷⁴ The Sāmoan language has three registers which differ in their lexical inventory and, most of all, pronunciation: (i) a formal register,

⁷⁴ The use of these diacritics is highly controversial and inconsistent among native speakers, and a subject to much debate.

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often referred to as *t*-style language or, in Sāmoan, *le tautala lelei* ('the good language'), (ii) a colloquial register, often called *k*-style language or *le tautala leaga* ('the bad language'), and (iii) a register for oratory. All examples come from the formal register but I expect the results to generalize.

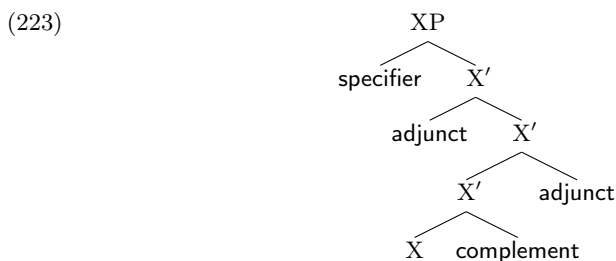
Before we turn to comparison constructions, let me also briefly point out some key features of Sāmoan grammar. In what follows I provide a brief introduction to word order, case marking, temporal-aspectual marking, and the determiner system.

The basic word order of Sāmoan sentences is verb-subject-object (VSO). Prototypical clauses are (221) and (222). These two clauses only differ in their case marking, to which we will return in a moment.

- (221) *Sa 'ai e le alii le i'a.*
 TAM eat PREP. DET. chief DET. fish
 'The chief ate the fish.'
 (Mosel & Hovdhaugen 1992, p. 423, ex. (9.62))

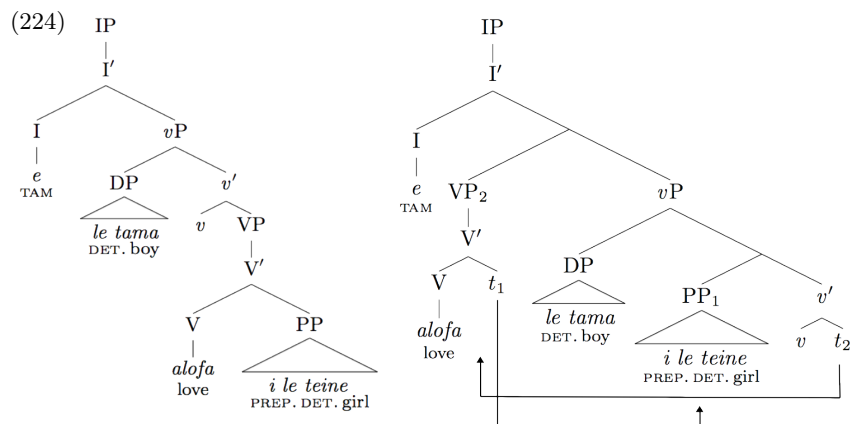
- (222) *E alofa le tama i le teine.*
 TAM love DET. boy PREP. DET. girl
 'The boy loves the girl.'
 (Mosel & Hovdhaugen 1992, p. 428, ex. (9.91))

How is the word order that we see in (221) and (222) derived? I assume some kind of universal template for building syntactic structures such as the X-bar schema (Chomsky 1981) in (223), from which the surface word order is derived via movement operations. As to their exact nature, there exist a number of proposals in the literature on Austronesian syntax. (See Potsdam (2009) for a concise overview and further references.)



For Sāmoan, Collins (2015) presents compelling evidence that the entire Verb phrase undergoes movement on the way to Surface Structure. I

illustrate his proposal for the example from (221) in (224): First, the object Determiner phrase moves to out of the Verb phrase, which then in turn is moved to a position above the subject Determiner phrase but below the syntactic position of TAM. I adopt this proposal for explicitness but assume that interpretation proceeds from a Logical Form derived from the underlying structure in (224).



Another type of movement in the grammar of Sāmoan, which we will rely on later to diagnose syntactic islands and the syntactic position of CompFs, is focus movement to a position above I. Focus movement is restricted to Determiner phrases, and moved material is obligatorily marked with the particle ‘*o*’, which Hohaus & Howell (2014) take to indicate the presence of alternatives. Examples are provided in (225) and (226). Interrogative pronouns must obligatorily undergo focus movement and may not remain *in situ*. Hence the ungrammaticality of (227).

(225) [*‘O le tama*]₁ e alofa t₁ i le teine.
 FOC. DET. boy TAM love PREP. DET. girl
 ‘It is the boy who loves the girl.’

(226) [*‘O ai*]₁ e alofa t₁ i le teine?
 FOC. who TAM love PREP. DET. girl
 ‘Who loves the girl?’

(227) **E alofa (‘o) ai i le teine?*
 TAM love FOC. who PREP. DET. girl
 ‘Who loves the girl?’

Let us return to the two example sentences in (221) and (222) above, which also illustrate the Sāmoan case system: In (221), the preposition *e* marks ergative case on the agent Determiner phrase, while there is no overt case marking on the patient Determiner phrase of the sentence. (The latter type of case marking is often also referred to as absolutive.) In (222), the agent Determiner phrase bears no overt case, whereas all other arguments of the verb are marked with the preposition *i*. I assume that the prepositions *e* and *i* are semantically vacuous and required for syntactic reasons.

In all of the Sāmoan examples which we have seen so far, tense and aspect were indicated by a particle immediately preceding the verb. Most of the examples we will encounter will use the general particle *e*, which does not contribute “any particular aspectual or temporal relationship” (Mosel & Hovdhaugen 1992, p. 365), but which I perceive to rather provide some kind of default existential closure operation. Furthermore, the inventory of Sāmoan TAM includes the past markers *sā* and *na*, the progressive marker ‘*o lo‘o*, the future ‘*o le‘ā*, and ‘*ua*, which probably is the most elusive in terms of its semantics. It has been categorized as contributing the meaning of a perfect, but I think it might rather indicate a change of state. (For a more detailed overview, see Mosel & Hovdhaugen (1992, pp. 140, 337-370).)

The determiner that frequently will show up in the examples is the singular, specific determiner *le* (glossed as DET.). The absence of a determiner indicates that the phrase is specific and plural. The singular indefinite determiner in Sāmoan is *se*, and the plural indefinite determiner *ni*. (See also Marsack (1975, pp. 23-25).)

7.2.2 Sāmoan Degree Constructions

The Sāmoan inventory of degree constructions is restricted to the unmarked form of the gradable predicate and to the comparative construction. Examples of both types of constructions are in (228) and (229).

- (228) *E matua Malia.*
 TAM old Mary
 ‘Mary is old.’
 ‘Mary is the oldest.’
- (229) *E matua atu Malia.*
 TAM old DIR. Malia
 ‘Mary is older.’

Other constructions which are built around the gradable predicate are absent from the language: Sāmoan lacks degree questions, measure phrase constructions, and equatives, as Hohaus (2010, 2012a) observes. I repeat the relevant examples below.

- (230) a. **O le ā umi Malia?*
 FOC. DET. what tall Mary?
 ‘How tall is Mary?’
- b. *O le ā le umi o Malia?*
 FOC. the what DET. height of Mary?
 ‘What is Mary’s height?’
- (231) a. #*E umi Malia i le lima futu.*
 TAM tall Mary PREP. DET. five foot
 ‘Mary is five foot tall.’
- b. *E lima futu le umi o Malia.*
 TAM five foot DET. height of Mary
 ‘Mary’s height is five foot.’
- (232) *E tutusa le umi o Malia ma Ioane.*
 TAM same(pl.) DET. height of Mary and John
 ‘Mary’s and John’s height are the same.’

This data might suggest that Sāmoan comparison constructions do not make use of the semantic type of degrees (and are thus unlike their German and English relatives).⁷⁵ In Hohaus (2010, 2012a), I argue against such a view and in favor of a degree semantics for (228) and (229) because of the availability of differential measure phrases in the comparative. A key example is (233), whose analysis must be degree-based.

- (233) *E umi atu Malia i le lua inisi i lō lona uso.*
 TAM tall DIR. Mary PREP. DET. two inch PREP. COMP. her sister
 ‘Mary is two inches taller than her sister.’

Degree predicates such as *matua* (‘old’) from (228) and (229) above thus are of type $\langle d, \langle e, t \rangle \rangle$, just like their English and German counterparts, and share their lexical entry, in (234).

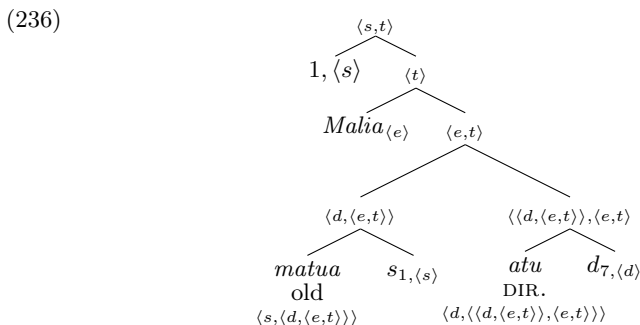
- (234) $\llbracket \textit{matua} \text{ (‘old’) } \rrbracket = \lambda s_{\langle s \rangle} . \lambda d_{\langle d \rangle} . \lambda x_{\langle e \rangle} . \text{AGE}_s(x) \geq d$

⁷⁵ For further discussion of variation of this kind, I refer the reader to Beck et al. (2009) as well as to Bochnak (2013a,b). For technical details, see also Klein (1980), Krasikova (2008), and Doetjes, Constantinescu & Součková (2009).

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The example in (228) employs a covert operator, which differs from its English and German relatives, and which will be discussed in more detail below. In the ContComp in (229), the comparative meaning enters the composition through *atu* (‘away’), whose lexical entry is in (235). (I am disregarding the differential degree argument slot here.) The grammar then generates for (229) the Logical Form in (236)⁷⁶, which shares the interpretation of its counterparts in English and German, in (237).

$$(235) \quad \llbracket \textit{atu} \rrbracket = \lambda c_{\langle d \rangle} . \lambda R_{\langle d, \langle e, t \rangle \rangle} . \lambda x_{\langle e \rangle} . \text{MAX}(\lambda d . R(d)(x)) > c$$



$$(237) \quad \lambda s_{\langle s \rangle} . \text{MAX}(\lambda d . \text{AGE}_s(\textit{Malia}) \geq d) > g(7, \langle d \rangle)$$

Both, the comparative and the unmarked form can combine with a prepositional phrase (PP), in which case they are truth-conditionally equivalent. An example is in (238).

- (238) a. *E matua Malia i lō Pita.*
TAM old Mary PREP. COMP. Peter
 ‘Mary is older than Peter.’
- b. *E matua atu Malia i lō Pita.*
TAM old DIR. Mary PREP. COMP. Peter
 ‘Mary is older than Peter.’

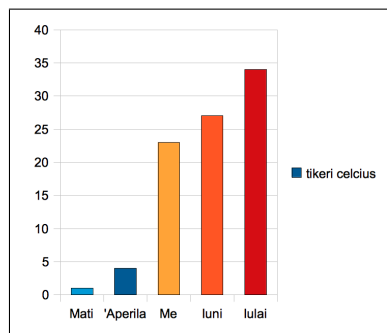
There is a certain amount of variation within and between speakers regarding the Preposition used to determine the standard for the compar-

⁷⁶ For the surface structure, the constituent containing both the gradable predicate as well as the directional particle would move above the subject. That way, comparatives, too, provide evidence in favor of a Verb-phrase raising approach to the predicate-initial word order of Sāmoan. Head movement of only the predicate would separate the directional particle from the predicate at the surface, resulting in an ungrammatical linear order. (See the discussion in subsection 7.2.1 above.)

ison: Other locative PPs acceptable in (238) are *nai lō Pita*, with *nai* ('from'), and *iā Pita* ('at Peter'). The particle *lō*, which according to Milner (1966, p. 109) is unique to comparisons, is optional for some few speakers as well. This variation has no semantic reflex, however. Here, I argue for an analysis of the *i lō*-phrase and all its variants as CompFs (and against an analysis as arguments of the respective degree operator as in Hohaus (2010) and Hohaus (2012a)).⁷⁷ Before we look at the evidence for such an analysis, we need to consider the semantics of (228).

Variation in the Semantics of the Unmarked Form. The unmarked form of a gradable predicate in Sāmoan receives an interpretation that is essentially superlative, an observation Holmer (1966, pp. 27-28) makes for several Oceanic languages. (See also Hohaus (2012b).) Consider the sentence in (240), which is unacceptable in the context of (239) and was rejected by my language consultants with comments such as: *E mafanfana Iulai*. ('July is warm.')

(239) Context: The Temperature Chart



(240) #*E mafanfana Iuni*.
 TAM warm June
 'June is warm.'

The example in (242), which is unacceptable in the context of (241), illustrates the same point. Its rejection was followed up by comments such as: *E puta Iosefo*. ('Ioseph is fat.')

The sentence in (244), too, is unacceptable in a context in which the English or German Positive would be perfectly fine. The rejection was commented upon as follows by one

⁷⁷ Note that the focus of neither Hohaus (2010) nor of Hohaus (2012a) is the analysis of these prepositional phrases.

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of the language consultants: *E umi Falani. 'O Malia e puupu'u.* ('Frank is tall. Mary is short.')

In the context of (245), on the other hand, the sentence in (246) is acceptable, despite the fact that Perth does have quite a large number of inhabitants.

(241) Context: Obesity



(242) #*E puta Ioane.*
 TAM fat John
 'John is fat.'

(243) Context: The Basketball Players

E 1,82 mita le umi o Malia. E 1,86 mita le umi o Ioane.
 (Mary's height is 6 feet. John's height is 6 feet 2 inches.)



(244) #*E umi Malia.*
 TAM tall Mary
 'Mary is tall.'

(245) Context: Inhabitants

| | |
|------------------------|------------------|
| Apia (Samoa) | 37.708 tagata |
| Perth (Australia) | 1.234.364 tagata |
| Auckland (New Zealand) | 1.320.700 tagata |
| Philadelphia (America) | 1.449.634 tagata |

- (246) *E lē toatele tagata i Perth.*
 TAM not HUM.+many people in Perth
 ‘Not many people live in Perth.’

Lastly, consider situation in (247-a), which describes two, clearly very tall women. In this situation, the continuation to the acceptable comparison in (247-b) is unacceptable and judged incoherent and contradictory.⁷⁸ Thus, (239) to (247) reveal a substantial difference between Sāmoan and English, which needs to be accounted for.

- (247) a. Context: Mary and Temukisa
 Mary’s height: 185 centimeter
 Temukisa’s height: 190 centimeter
- b. *E umī Temukisa iā Malia.*
 TAM tall Temukisa PREP. Mary
 #‘*Ae e umī fo’i Malia.*
 but TAM tall also Malia
 ‘Temukisa is taller than Mary. But Mary is also tall.’

The pattern of acceptability judgments displayed above is expected if the unmarked gradable predicate is interpreted with the help of the covert operator in (248). The first argument of SUP is a free variable of type $\langle d, t \rangle$, which contributes the reference degrees for the comparison.

- (248) $\llbracket \text{SUP} \rrbracket = \lambda C_{\langle d, t \rangle}. \lambda R_{\langle d, \langle e, t \rangle \rangle}. \lambda x_{\langle e \rangle}. \forall d [C(d) \rightarrow \text{MAX}(\lambda d'. R(d')(x)) > d]$

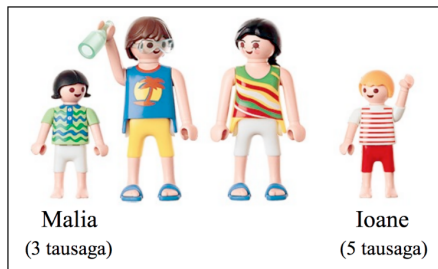
Note that if the set denoted by C is a singleton set, as in (243), the resulting reading is a comparative one. With larger sets, we derive a superlative interpretation. If a context makes salient some subset of degrees, this is also available as a value for C .

For instance, some consultants accept (250) in the context in (249), where comparison can easily be restricted to the set of the family’s children (or to be more precise, the set with Mary’s age). Similar contexts evoked comments such as the following during elicitation: “Oh, I’m not counting her in.”

⁷⁸ I would like to thank Malte Zimmermann and Sigrid Beck for suggesting that I elicit these type of examples. I would also like to report one consultant’s explanation for rejecting the continuation in (247-b): ‘We are in trouble here. . . . Comparison standards just work differently. You always need someone to compare to.’

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(249) Context: The Family⁷⁹



(250) *E matua Ioane.*
 TAM old Ioane
 ‘John is old.’

Support for an analysis under which the contextual restriction is of type $\langle d, t \rangle$ as in (248), rather than of type $\langle e, t \rangle$ as in the lexical entry in (251), from Beck (2011, p. 1350, no. (56)), comes from the availability of intensional comparisons with the unmarked form.

(251) $\llbracket \text{SUP} \rrbracket = \lambda C_{\langle e, t \rangle} \cdot \lambda R_{\langle d, \langle e, t \rangle \rangle} \cdot \lambda x_{\langle e \rangle} \cdot$
 $\forall y [C(y) \ \& \ y \neq x \rightarrow \text{MAX}(\lambda d. R(d)(x)) > \text{MAX}(\lambda d'. R(d')(y))]$

In the case of intensional comparison, the context will often only make salient a set of degrees, but not a set of individuals. I illustrate this with the help of three examples from Sāmoan below: In (252), the salient set of degrees is the set of age degrees up to 16 years. In (254), the value for the contextual variables is the set of degrees of traffic volume that would have allowed the family to get to the airport in time for their flight. In the last example from Villalta (2007b, p. 14, no. (41)), the context in (256) makes available the set containing the height degree at which Mary intends to place the picture.

(252) Context: The Driving License

In order to get a driver’s license in the United States, you have to be at least 16 years old. Paul’s 16th birthday was yesterday.

(253) *Ua matua Paul.*
 TAM old Paul
 (Lit.) ‘Paul is now old.’
 ‘Paul is now old enough.’

⁷⁹ Mary’s age is three years and John’s age is five years.

(254) Context: The Road to the Airport

It is Monday and we are flying to Auckland to visit family. We are on the way to Faleolo Airport but there is a lot of traffic and we are running late. Our mother says:

(255) *Ua pisi le auala 'ile malae va'alele*

TAM busy DET. roadway to+DET. airport

e taunuu tonu ai i le taimi.

TAM arrive exactly PRN. PREP. DET. time

(Lit.) 'The road to the airport is busy that we arrive on time.'

'The road to the airport is too busy for us to arrive on time.'

(256) Context: The Picture

Suppose that Mary is in fact small but tall enough to reach the place where she wants to hang up a picture.

(257) *E mafai na tautau e Malia le ata,*

TAM possible TAM hang by Mary DET. picture

ona e umi.

because TAM tall

(Lit.) 'It is possible that Mary hangs up the picture as she is tall.'

'Mary is able to hang up the picture because she is tall enough.'

Interim Summary and Discussion. In conclusion, there is variation between Sāmoan on the one and English as well as German on the other hand when it comes to the interpretation of the unmarked form of a gradable predicate. All of the languages employ a covert operator, which however has a superlative meaning in Sāmoan. The inventory of degree operators in Sāmoan is summarized again in (258).

- (258) a. $\llbracket \text{SUP} \rrbracket = \lambda C_{\langle d,t \rangle} \cdot \lambda R_{\langle d, \langle e,t \rangle \rangle} \cdot \lambda x_{\langle e \rangle} \cdot \forall d [C(d) \rightarrow \text{MAX}(\lambda d'. R(d')(x)) > d]$
 b. $\llbracket \text{atu} \rrbracket = \lambda C_{\langle d \rangle} \cdot \lambda R_{\langle d, \langle e,t \rangle \rangle} \cdot \lambda x_{\langle e \rangle} \cdot \text{MAX}(\lambda d. R(d)(x)) > c$

The comparative operator is a fairly recent addition to the language, as I discuss in Hohaus (2010, 2012a), and a result of language contact between Sāmoan and English. I hypothesize here that only with the introduction of this operator, decomposition of the unmarked construction into the gradable predicate and the covert operator SUP became necessary. This diachronic perspective also explains why there is a certain amount of overlap between the two constructions when it comes to carving up the pie of comparative meanings. More specifically, the range of comparative

meanings the directional comparative in Sāmoan may express is a subset of the meanings of the unmarked form in the language.

7.2.3 Comparison Standards in Sāmoan


The *i lō*-Preposition phrase and its variants determine the reference for the comparison when combining with either, the unmarked form of the gradable predicate or the Comparative. I argue in favor of an analysis of these prepositional phrases as frame setters. The general strategy I will pursue is already familiar from chapter 3: The types of readings that are available for the Comparative and the unmarked form in Sāmoan would require degree relations that need to be derived syntactically. As the required movement would violate certain islands, I conclude that the relationship between the comparative operator and the phrase which introduces that standard of comparison must be indirect.

7.2.3.1 (Absence of) Island Effects with Complex Noun Phrases

I will first introduce the available readings of the relevant degree constructions and show that the available readings require a syntactically derived degree relation. I will then show that the movement required to derive the underlying degree relation violates a syntactic island. Each of the three sections to come will have that structure.

Below are three examples with specific, complex Noun phrases that express a grammatical comparison in Sāmoan.⁸⁰ I also provide a German equivalent with an English translation for each of these Sāmoan examples to illustrate the variation. Note that while the example in (266) is acceptable, there is a preference for using the more explicit *le malaga mai Siamani* ('the journey from Germany'), which is however not relevant for the discussion here.

(259) Context: Savings

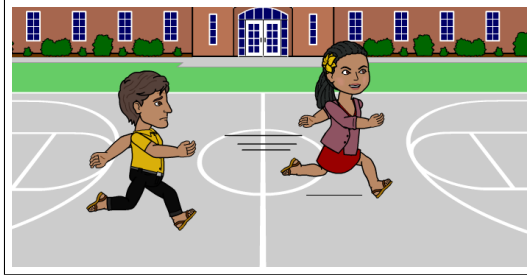
| | | |
|---|-----------------------------|-----------------------------|
|  CENTRAL PACIFIC BANK | <u>bank statement</u> | <u>bank statement</u> |
| | account holder: Malia Tupua | account holder: Falani Dufu |
| | balance: 7.520,- | balance: 1.278,- |

(260) *E sili atu [le mauoloa o Malia] i lo Falani.*
 TAM much DIR. DET. wealth of Mary PREP. COMP. Frank
 'The wealth of Mary is more compared to Frank.'

⁸⁰ Data of this type are also reported in Villalta (2007b,c).

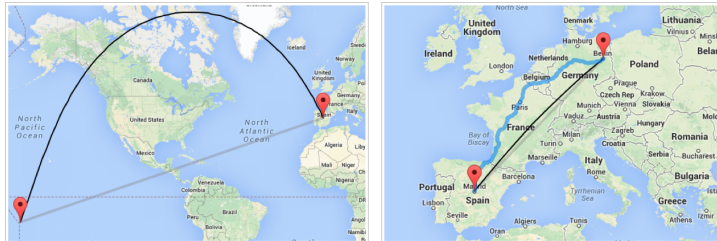
- (261) #*Die Ersparnisse von Maria sind mehr als Frank.*
 the saving of Mary are more than Frank
 ‘The savings of Mary are more than Frank.’

(262) Context: The Race



- (263) *E saosaoa [le momo‘e a Malia] i lo Falani.*
 TAM fast DET. run of Mary PREP. COMP. Frank
 ‘Mary’s running was fast compared to Frank.’
- (264) #*Die Zeit von Maria war besser als Frank.*
 DET. time of Mary was better than Frank
 (Lit.) ‘Mary’s time was better than Frank.’

(265) Context: Travelling to Spain⁸¹



- (266) *E umi atu [le malaga mai Samoa] i lo Siamani.*
 TAM long DIR. DET. journey from Sāmoa PREP. COMP. Germany
 ‘Compared to Germany, the journey from Sāmoa is longer.’
- (267) #*Die Anreise von Sāmoa dauert länger als Deutschland.*
 the to+journey from Sāmoa takes longer than Germany
 ‘The journey from Sāmoa takes longer than Germany.’

⁸¹ Maps retrieved from Stephan Georg, *Luftlinie: Entfernungsrechner* (URL: <http://www.luftlinie.org/>, accessed July 9, 2014).

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In all of (260), (263) and (266), a derivation with the direct strategy would require movement of the Degree phrase as the relevant degree relation is not provided lexically. To see this, consider (268), (269) and (270). I specify the lexically provided degree relation in (a). However, in none of the cases is this the required degree relation, in (b).

(268) Savings

- a. $\lambda d_{\langle d \rangle}. \lambda x_{\langle e \rangle}. \text{AMOUNT}(x) \geq d$
- b. $\lambda d_{\langle d \rangle}. \lambda x_{\langle e \rangle}. \text{AMOUNT}(\text{the assets of}(x)) \geq d$

(269) The Race

- a. $\lambda d_{\langle d \rangle}. \lambda x_{\langle e \rangle}. \text{SPEED}(x) \geq d$
- b. $\lambda d_{\langle d \rangle}. \lambda x_{\langle e \rangle}. \text{SPEED}(\text{the running of}(x)) \geq d$

(270) Travelling to Spain

- a. $\lambda d_{\langle d \rangle}. \lambda x_{\langle e \rangle}. \text{LENGTH}(x) \geq d$
- b. $\lambda d_{\langle d \rangle}. \lambda x_{\langle e \rangle}. \text{LENGTH}(\text{the journey to Spain from}(x)) \geq d$

Derivation of the required degree relation violates a syntactic island. To see that the type of Noun phrases used above indeed constitute islands for movement, just like in English and German (cf. also Ross (1967) and much subsequent work, *e.g.* Davies & Dubinsky (2003)), consider the data in (271) to (274). Movement out of the Preposition phrase that is contained in a Determiner phrase with the specific determiner *le* results in ungrammaticality, as in (a). Movement of the entire Preposition phrase, as in (b), is also ungrammatical as the particle ‘*o*’ requires its sister constituent to be a Determiner phrase (cf. Hohaus & Howell 2014).

(271) *E fiafia le tama i [le ta'avale o Pita].*
 TAM like DET. boy PREP. DET. car of Peter
 ‘The boy likes Peter’s car.’

- (272) a. **[‘O ai] e fiafia le tama i [le ta'avale o _]?*
 FOC. who TAM like DET. boy PREP. DET. car of
 (Lit.) ‘Who does the boy like the car of?’
- b. **[‘O o ai] e fiafia le tama i [le ta'avale _]?*
 FOC. of who TAM like DET. boy PREP. DET. car
 (Lit.) ‘Of whom does the boy like the car?’
- c. *[‘O le ta'avale o ai] e fiafia ai le tama _?*
 FOC. DET. car of who TAM like ANAPH. DET. boy
 ‘Whose car does the boy like?’

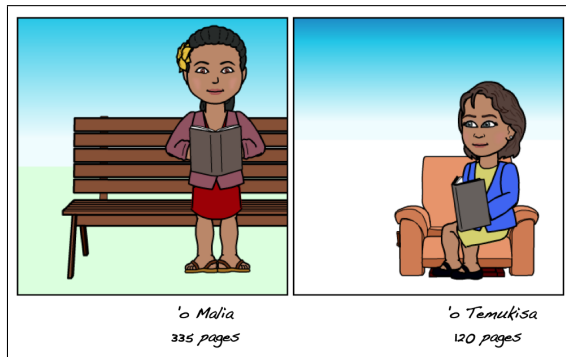
- (273) *Sa umi [le malaga mai Samoa].*
 TAM(past) long DET. journey from Sāmoa
 ‘The journey from Sāmoa was long.’
- (274) a. **['O fea] sa umi [le malaga mai _]?*
 FOC. where TAM(past) long DET. journey from
 (Lit.) ‘Where was the journey long from?’
- b. **['O mai fea] sa umi [le malaga _]?*
 FOC. from where TAM(past) long DET. journey
 (Lit.) ‘From where was the journey long?’
- c. *['O le malaga mai fea] sa umi _ ?*
 FOC. DET. journey from where TAM long
 (Lit.) ‘The journey from where was long?’

Under the direct strategy, such movement would however be required to derive a Logical Form for the examples above. I conclude from the discussion that Sāmoan employs the indirect strategy.

7.2.3.2 (Absence of) Island Effects with Relative Clauses

Below are three examples of acceptable comparatives that involve relative clauses. As above, I provide the argument-status German equivalent with a translation to illustrate the contrast in acceptability. As there are no overt relative pronouns in Sāmoan, the examples have been annotated with syntactic brackets for readability. Although the syntactic position of the CompF is inconsequential for the argumentation here, note that the CompF attaches outside of the relative clause in all of the examples below. We will return to its syntactic position in subsection 7.2.3.3.

(275) Context: Reading



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- (276) [E *umi atu le* [NP *tusi* [ReICI *na faitau e Malia*]]
 TAM long DIR. DET. book TAM(past) read ERG. Mary
 [*i lo Temukisa*].
 PREP. COMP. Temukisa
 ‘Compared to Temukisa, the book which Mary read is longer.’

- (277) #*Das Buch, welches Maria gelesen hat,*
 the book which Mary read has
ist länger als Temukisa.
 is longer than Temukisa
 ‘The book which Mary read is longer than Frank.’

- (278) Context: The Food for Tupe
 Malia prepared a big dish of really nice palusami and taro for Tupe.
 For Telesia, she heated up some soup from a can that she bought at
 a store.⁸²

- (279) [E *lelei atu le* [NP *mea'ai* [ReICI *na fai e*
 TAM good DIR. DET. thing+eat TAM(past) make ERG.
Malia mo Tupe]] [*nai lo Telesia*]].
 Mary for Tupe from COMP. Theresa
 ‘Compared to Theresa, the food which Mary made for Tupe is better.’

- (280) #*Das Essen, welches Maria für Tupe gemacht hat,*
 the food which Mary for Tupe made has
ist besser als Theresa.
 is better than Theresa
 ‘The food which Mary made for Tupe is better than Theresa.’

- (281) Context: The New Car

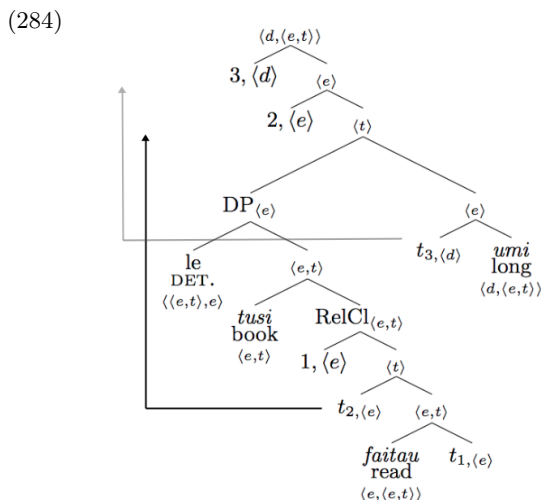
| <i>Malia</i> | <i>Falani</i> |
|----------------------------|------------------------|
| <i>Mercedes Benz W 205</i> | <i>Hyundai Elantra</i> |
| <i>\$75,000,-</i> | <i>\$14,800,-</i> |

- (282) [E *taugata atu le* [NP *taavale*
 TAM expensive DIR. DET. car
 [ReICI *sa faatau e Malia*]] [*i lo Falani*]].
 TAM(past) buy ERG. Mary PREP. COMP. Frank
 ‘Compared to Frank,
 the car which Mary bought is more expensive.’

⁸² *Palusami* is a traditional (and very delicious) Sāmoan dish consisting of baked parcels made out of taro leaves and filled with onions and coconut milk.

- (283) #*Das Auto, welches Maria gekauft hat,*
 the car which Mary bought has
ist teurer als Frank.
 is more.expensive than Frank
 ‘The car which Mary bought is more expensive than Frank.’

Under the direct strategy, the derivation of the relevant reading would require movement out of the relative clause: All of the comparisons are build around a derived measure and thus degree relation: For (276), the context in (275) requires a relation between individuals and the page length of the book that they have read. Derivation of this relation in the syntax would require movement of the Noun phrase headed by *Malia* out of the relative clause, as in (284).⁸³ In the context in (278), the required degree relation for (279) is between the eater and the quality of the food prepared for her by Mary. The context in (281) demands for (282) a relation between the buyer of a car and the price of that car.

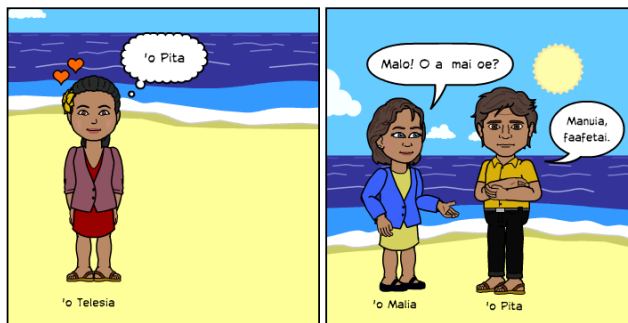


Just like in English and German, Sāmoan relative clauses are islands for movement. Movement out of an island results in ungrammaticality, as I illustrate for interrogative pronouns in (285) to (291). The sentences in (289-b) and (291-b) are grammatical alternatives offered by the the language consultants that avoid the island violation.

⁸³ As a direct compositional analysis does not crucially rely on situations, I present a simplified, situation-less Logical Form here.

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(285) Context: The Boy⁸⁴



(286) ‘O lo‘o talanoa Malia i le [tama
 TAM(prog.) talk Mary PREP. DET. boy
 [RelCl e alofa i ai Telesia]].
 TAM love PREP. PRN. Theresa
 ‘Mary is talking to the boy whom Theresa loves.’

(287) *['O ai] ‘o lo‘o Malia i le [tama
 FOC. who TAM(prog.) Mary PREP. DET. boy
 [RelCl e alofa i ai _]]?
 TAM love PREP. PRN.
 (Lit.) ‘Who is Mary talking to the boy that _ loves?’

(288) Context: Imagine that!

a. Na talanoa Malia ma le teine e lē fiafia
 TAM talk Mary with DET. girl TAM not like
 i le lakapi.
 PREP. DET. rugby
 ‘Mary talked to the girl who does not like rugby.’

b. Imagine you did not understand the last part of the sentence and want to inquire for the thing that the girl does not like.

(289) a. *['O le fea taaloga] na talanoa Malia ma le
 FOC. DET. which game TAM(past) talk Mary with DET.
 [teine [RelCl e lē fiafia i ai]]?
 girl TAM not like PREP. PRN.
 (Lit.) ‘Which game did Mary talk with the girl
 who does not like _?’

⁸⁴ Mary says to Peter: “Hello! How are you?” – Peter replies: “Fine, thank you.”

- b. [*‘O le fea taalaoga*] *e lē fiafia i ai le*
 FOC. DET. which game TAM not like PREP. PRN. DET.
teine lea [RelCI *na talanoa ma Malia*]?
 girl DEM.sg. TAM(past) talk with Mary
 ‘Which game does this girl who talked Mary not like?’

(290) Context: Le Siva

- a. *‘O lo‘o siva le [teine*
 TAM(prog.) dance DET. girl
 [RelCI *na talanoa i ai Malia*]].
 TAM(past) talk PREP. PRN. Mary
 ‘The girl who Mary had talked to was dancing.’
- b. Imagine you did not understand the last part of the sentence and want to inquire about who talked to the girl.
- (291) a. **[‘O ai] ‘o lo‘o siva [le [teine*
 FOC. who TAM(prog.) dance DET. girl
 [RelCI *na talanoa i ai _*]]]?
 TAM(past) talk PREP. PRN.
 ‘Who was dancing the girl that _ talked to?’
- b. *‘O ai na talanoa i [le [teine*
 FOC. who TAM(past) talk PREP. DET. girl
 [RelCI *‘o lo‘o siva*]]]?
 TAM(prog.) dance
 ‘Who talked to the girl that is dancing?’

I conclude that the direct strategy cannot be applied to Sāmoan. Rather, the relation between the respective degree operator and the *i lō*-phrase must be more indirect, as in the case of a CompF.

7.2.3.3 The Position of the Prepositional Phrase

In all of the Comparatives in the previous section, in (276), (279) and (282), the syntactic position of both, the degree operator and the CompF is in the matrix clause. I repeat (276) below, where this syntactic structure is indicated by the bracketing. How can we tell that this is the correct bracketing and that the CompF is not part of the relative clause? If the Determiner phrase containing the relative clause undergoes focus

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movement to a sentence-initial position⁸⁵, the CompF would move along if its attachment site was inside the relative clause. This prediction is not borne out: Of (292) and (293), only (292) is acceptable to native speakers in the relevant context.

- (276) [E *umi atu* [le [tusi [RelCl *na faitau e Malia*]]]
 TAM long DIR. DET. book TAM(past) read ERG. Mary
 [i *lo Temukisa*]].
 PREP. COMP. Temukisa
 ‘Compared to Temukisa, the book which Mary read is longer.’

- (292) [‘O le [tusi [RelCl *na faitau e Malia*]]] e *umi*⁻
 FOC. DET. book TAM(past) read ERG. Mary TAM long
atu _ [i *lo Temukisa*].
 DIR. _ PREP. COMP. Temukisa
 ‘Compared to Temukisa, it is the the book which Mary read that is longer.’

- (293) #[‘O le [tusi [RelCl *na faitau e Malia i lo*
 FOC. DET. book TAM(past) read ERG. Mary PREP. COMP.
Temukisa]]] e *umi atu* _.
 Temukisa TAM long DIR.
 ‘The book which Mary read compared to Temukisa is longer.’

Just like in English and German⁸⁶, the comparative operator and the CompF must however not necessarily co-occur in either the relative or the matrix clause. External readings of a comparative in a relative clause require the CompF to attach outside of that clause, as in the example in (295). With a degree standard appropriate in the context, internal readings require a position of the *i lō*-phrase inside the relative clause, as in the example in (296). Note that in both positions, relative-clause internally and externally, the CompF must occur at the very right edge of the clause, and I am not aware of any material which is allowed to succeed it.

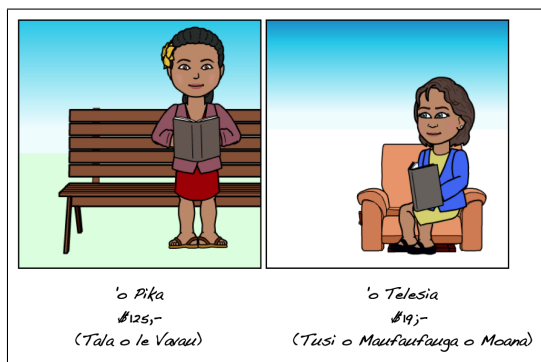
Let me add one final note of caution regarding these data: All of the examples which involve focus movement are, although acceptable, fairly unnatural for native speakers. I attribute this to the fact that the moved constituent is fairly heavy on the one hand, and, on the other, to the fact that these examples give rise to gardenpath effects due to the fact that

⁸⁵ See subsection 7.2.1 above.

⁸⁶ See section 3.2 for the data, and section 4.5 for their analysis.

Sāmoan relative clauses lack an overt relative pronoun. Take (295) in the context provided in (294), where I have observed repeatedly during elicitation that native speakers stumble and re-read the sentence when they come across the tense-aspect marker of the matrix clause, *'o lo'o*. When reading the sentence they start assigning the structure in (297), which they have to revise when they encounter the tense-aspect marker of the main clause. There is a strong preference to avoid these kind of structural ambiguities.

(294) Context: Reading⁸⁷



(295) [[*'O le [tusi [e taugata atu]] 'o lo'o faitau e*
 FOC. DET. book TAM expensive DIR. TAM(prog.) read ERG.
Pika [i lō Telesia]].
 Pika PREP. COMP. Theresa

'Compared to Theresa,
 Pika is reading the book which is more expensive.'

(296) '*O le [tusi [e taugata atu [i le \$100,-]]*
 FOC. DET. book TAM expensive DIR. PREP. DET.
'o lo'o faitau e Pika.
 TAM(prog.) read ERG. Pika PREP. COMP. Theresa

'Pika is reading the book
 which is more expensive than a hundred dollars.'

(297) [[*'O le tusi] e taugata atu _] ...*
 FOC. DET. book TAM expensive DIR.
 'The book is more expensive...'

⁸⁷ Pika is reading a collection of traditional Sāmoan legends. Theresa is reading a children's book that tells the story of Moana through her diary entries.

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In summary, the CompF in Sāmoan is not restricted to occur within the clause containing the comparative operator, and we find the same interpretative effects of its position relative to the comparative operator that I have discussed for English and German in chapter 3:

| | RelCl-ext | RelCl-int | AttrComp-int (German only) |
|-------|-----------------------|-----------------------|-------------------------------|
| CompF | external reading only | internal reading only | internal reading only |

Figure 7.4: Summary of Position Effects with CompFs

External readings are available only if the CompF attaches outside of the relative clause (RelCl-ext), while attaching the CompF inside a relative clause (RelCl-int) gives rise to internal readings only. The interpretation of CompF in attributive comparatives has not been discussed here, as gradable predicates may not be used attributively in Sāmoan: The sentence in (298) is ungrammatical.

- (298) **Sā faitau e Tinei le [[taugata atu [tusi]].*
 TAM(past) read ERG. Tinei DET. expensive DIR. book
 ‘Tinei read the more expensive book.’

The data I discuss next might initially seem to provide further support for a CompF analysis: Under the direct approach, their analysis would require movement out of a subject out of a subject clause, which, across languages, is frequently disallowed. Not so in Sāmoan, however.

7.2.3.4 (Absence of) Subject Clause Subject Island Effects

Consider the comparative in (300), which has a syntactic structure that was produced with a fairly high frequency in production tasks. The sentence is acceptable in the context provided. Under a direct strategy, the interpretation of (300) would require a degree relation between time degrees of lighting a fire and the respective individual that lit the fire.

- (299) Context: A Fire on the Beach



Both, Mareko and loane wanted to light a fire on the beach that evening. As it was very windy and somewhat wet, it was quite difficult to get the fire started. Mareko had his fire going after ten minutes; loane's fire had finally caught on after 15 minutes.

- (300) *E umi atu [CP ona tau faaola e Ioane le afi]*
 TAM long DIR. that try light ERG. John DET. fire
nai lo Mareko.
 from COMP. Marc
 ‘Compared to Marc, John trying to light the fire took longer.’

The degree relation used in this comparison is not lexically provided. It needs to be derived at the level of Logical Form by movement of both, the comparative operator and, crucially, of the subject Noun phrase headed by *Ioane* out of the subject clause. While such movement is subject to an island constraint in many languages (cf. *e.g.* Ross 1967), it appears not to be in Sāmoan, as illustrated in (301).

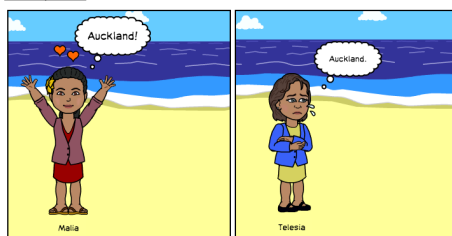
- (301) [[‘*O ai*] *e umi atu* [CP *ona tau fa‘aola* _ *le afi*]]? –
 FOC. who TAM long DIR. that try light _ DET. fire
 ‘*O Ioane.*
 FOC. John
 ‘Who took longer to light the fire?’ – ‘John.’

Just as any diagnostic, the island diagnostic for frame-setter status thus relies on a certain amount of background elicitation. It may, of course, only be applied in a fieldwork setting if the construction under investigation does indeed constitute a syntactic island in the language. In Sāmoan, subject clause subjects do not, and the data presented in this subsection are thus compatible with the direct and the indirect analysis.

7.2.3.5 Usage Outside of Degree Constructions

However, distribution provides us with another argument in favor of Sāmoan pursuing an indirect compositional strategy in degree constructions: Just like English and German CompFs, *i lō*-phrases may also occur outside of comparison constructions, as in (303) and (305).

- (302) Context: Auckland



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- (303) *E fiafia Malia i Aukilani [i lo Telesia].*
 TAM like Mary PREP. Auckland PREP. COMP. Theresa
 ‘Mary likes Auckland, compared to Theresa.’

- (304) Context: Visitors to the Islands of Sāmoa

| 2012 | 2013 |
|----------------|----------------|
| 1,750 visitors | 3,400 visitors |

- (305) *I le [tausaga [RelCl e 2013]] na lipoti mai*
 PREP. DET. year TAM TAM(past) report DIR.
ai e Falani [le siitia o le numera o tagata asiasi
 ANAPH. ERG. Frank DET. rise of DET. number of person visit
mai i Samoa] [i lo le [tausaga [RelCl e 2012]]].
 DIR. PREP. Samoa PREP. COMP. DET. year TAM
 ‘For the year 2013, Frank reported a rise in the number of visitors to Sāmoa, compared to the year 2012.’

Under an analysis where the *i lō*-phrase is subcategorized for by the degree operator and is an argument of the operator, this distribution is unexpected. I conclude yet again that a CompF analysis of Sāmoan comparison constructions is empirically more adequate. Before I spell out the analysis in more detail, let me comment on a popular diagnostic from the literature, which, for Sāmoan, is unsuitable to uncover the distinction between the direct and the indirect strategy in comparatives.

7.2.3.6 Irrelevance of Crisp Judgments as a Diagnostics

For English, Kennedy (2007b) discusses so-called crisp judgments as a way to distinguish his notions of implicit and explicit comparison:⁸⁸ If comparison is between a 50-page and 100-page book, both (306-a) and (306-b) are acceptable. However, in a context in which comparison is between a 99-page and 100-page book, only (306-b) is acceptable.

- (306) a. *This book is long compared to that book.*
 b. *This book is longer compared to that book.*
 (Kennedy 2007b, pp. 17-18)

⁸⁸ See footnote 32 on page 27 for the definitions. Implicit comparison and the indirect strategy as introduced in Beck, Oda & Sugisaki (2004) and Beck, Hohaus & Tiemann (2012) are often confused, which is why I briefly show here that the crisp judgment effect is irrelevant to the discussion of the indirect strategy.

Crisp judgment effects have been put to use crosslinguistically in the analyses of *e.g.* Sawada (2009), Pearson (2010), Bogal-Allbritten (2013), and Bochnak (2013a). However, when it comes to Sāmoan (and to distinguishing between the indirect and the direct strategy in general), the analysis of the inventory of Sāmoan degree operators predicts no such effects should occur as the unmarked form of the gradable predicate in Sāmoan degree constructions does not share the semantics of its English counterpart. This prediction is correct. Consider the example in (308) below, originally from Villalta (2007b, p4, ex. (8)), but re-elicited. Unlike its English equivalent, the Sāmoan sentence is perfectly acceptable in the context of (307).

(307) Context: Arctic Temperatures

Suppose that we are in the Antarctic, and that today we had -40 degrees, while yesterday we had -41 degrees.

(308) *E mafanafana nei i lō ananafi.*
 TAM warm today PREP. COMP. yesterday
 ‘It is warm today compared to yesterday.’

The crisp judgment effect, if observed, is not relevant when determining whether a language pursues a direct or indirect compositional strategy. The effect only allows for conclusions regarding the semantics of the form of the degree predicate employed.

7.2.4 Applying the Analysis

Evidence in favor of Sāmoan being a type-2 language, which only employs the indirect strategy to determine the standard of a comparison, came from the absence of island effects in certain configurations and the distribution of the *i lō*-phrase. How exactly is this indirect strategy realized in the language? In this respect, Sāmoan does not differ from English and German in any significant way.

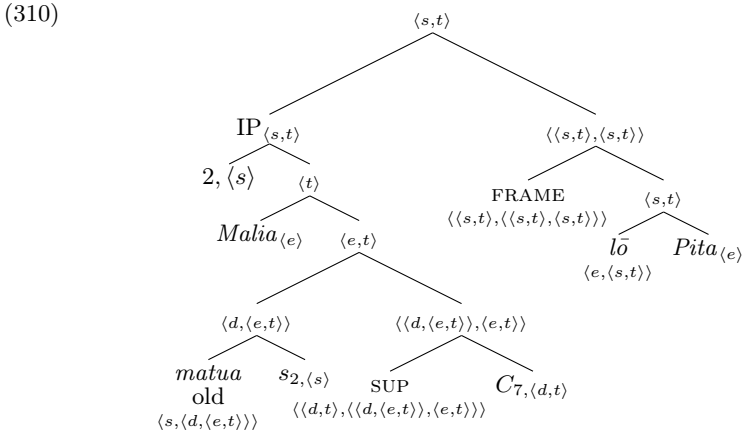
CompFs in Sāmoan, too, occupy a fairly high syntactic position at Logical Form. For reasons of explicitness, let us assume that the Frame phrase is the functional projection above IP and that the CompF attaches to its right, as sketched in (310) for the basic example from (238) above. The interpretation of the CompF, too, relies on the operator FRAME, repeated from (116) in (309-a), and its first argument, too, denotes a set of situations in which Peter is being compared with someone. This

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denotation is built from the meaning of the referential Noun phrase and the particle $\bar{l}\bar{o}$, which is informally often characterized as signaling a comparison. It thus shares the semantic of English *compared to* and German *verglichen mit*, in (309-b). The preposition *i* does not make any substantial contribution to the interpretation of the CompF and is considered semantically vacuous.

(238) *E matua Malia i l̄o Pita.*
 TAM old Mary PREP. COMP. Peter
 ‘Compared to Peter, Mary is old.’

- (309) a. $\llbracket \text{FRAME} \rrbracket = \lambda p_{\langle s,t \rangle} . \lambda q_{\langle s,t \rangle} . \lambda s_{\langle s \rangle} : \text{MIN}(p)(s) . q(s)$
 b. $\llbracket \bar{l}\bar{o} \rrbracket = \lambda y_{\langle e \rangle} . \lambda s_{\langle s \rangle} . \exists x_{\langle e \rangle} . \exists \mu_{\langle s, \langle e, d \rangle \rangle} [\mu(s)(x) > \mu(s)(y)]$
 c. $\llbracket \text{SUP} \rrbracket = \lambda C_{\langle d,t \rangle} . \lambda R_{\langle d, \langle e, t \rangle \rangle} . \lambda x_{\langle e \rangle} .$
 $\forall d [C(d) \rightarrow \text{MAX}(\lambda d' . R(d')(x)) > d]$



This Logical Form in (310) receives the, by now familiar, interpretation in (311), a function from those minimal situations in Peter exceeds some other individual along some dimension to true if and only if in these situations, the maximal degree to which Mary is old exceeds every degree in the comparison set.

(311) $\lambda s : s \in \text{MIN}(\lambda s* . \exists x_{\langle e \rangle} , \exists \mu_{\langle s, \langle e, d \rangle \rangle} [\mu(s*)(x) > \mu(s*)(\text{Peter})]) .$
 $\forall d [(g(7, \langle d, t \rangle))(d) \rightarrow \text{MAX}(\lambda d' . \text{AGE}(s)(\text{Mary}) \geq d') > d]$

Value assignments to the free variable of type $\langle d, t \rangle$ that are compatible with the presupposition are the set containing all of Peter’s age degrees or the singleton set containing the maximal degree to which Peter is old.

7.3 The View from Other Languages

Interim Summary and Discussion. In the typology of comparison standards, Sāmoan is a type-2 language in that it only pursues an indirect strategy when it comes to determining the standard of a comparison. In addition, there is a certain amount of lexical variation in the inventory of degree operators between English and German on the one and Sāmoan on the other hand. Future research will have to identify frame setters in the language that apply to constructions other than degree constructions.

A more general question that the typology laid out in section 7.1 and the discussion of Sāmoan in this section raise is whether the absence of a direct compositional strategy to comparison standards in type-2 languages is a reflex of a more general property of those languages. In more technical terms, is Sāmoan a language that more frequently relies on a maybe even greater variety of free functional variables (and mechanisms to manipulate them) than, for instance, English and German?⁸⁹

7.3 The View from Other Languages

For now, let us return to the strategies that are crosslinguistically available when it comes to determining the standard of a comparison. This section further explores the four patterns discussed in Table 7.1, repeated below for convenience, and discusses selected languages as candidates for each pattern. Given the section on Sāmoan, it should however be clear that only very thorough fieldwork will be able to ultimately determine for a given language whether a certain phrase is an argument of a degree operator or can be analyzed as a CompF.

| <div style="display: inline-block; transform: rotate(-45deg);"> direct strategy indirect strategy </div> | direct strategy | available | unavailable |
|---|-----------------|-----------------|-----------------|
| available | | pattern 1: ✓, ✓ | pattern 2: ✓, ✗ |
| unavailable | | pattern 3: ✗, ✓ | pattern 4: ✗, ✗ |

Table 7.1: Typology of Comparison Standards

⁸⁹ In the words of my friend Mele Maualaivao, is Sāmoan not as “lazy” a language as English because there is a greater degree of context dependency? To approach such a question for Sāmoan, the temporal interpretation of clauses without overt tense-aspect markers (cf. Mosel & Hovdhaugen 1992, pp. 370-374) and the use of silent personal pronouns in the language come to mind.

While a certain distribution of a CompF candidate may be suggestive of such an analysis, it is really the behavior with respect to syntactic islands that will need to be investigated.

7.3.1 Languages with both Compositional Strategies

Tajiki. The Persian language Tajiki, spoken in Tajikistan and parts of Uzbekistan, is another Indo-European language that appears to have both compositional strategies at its availability: Karvovskaya (2014) argues that while the prepositional phrase *az Aziza* ('from Aziza') in (312) is an argument of the phrasal comparative operator *-tar*, the Participle phrase in (313) is not, but rather indirectly manipulates the free degree variable of a ContComp.

- (312) *Malohat [az Aziza] baland-tar ast.*
 Malohat from Aziza tall-er is
 'Maloha is taller than Aziza.'
 (cf. Karvovskaya 2014, p. 2, no. (5))

- (313) [*Az Aziza dida*] *Malohat baland-tar ast.*
 from Aziza see(ptcp.) Malohat tall-er is
 (Lit.) 'Seen from Aziza, Malohat is taller.'
 (cf. Karvovskaya 2014, p. 3, no. (22-a))

Her argument is based on the differential distribution of the two phrases. Only the Participle phrase may occur in a number of comparison constructions other than the comparative proper, as in the Superlative in (314), and with *ad-hoc* scales around nouns with an evaluative usage, such as *qasr* ('palace') in (315).

- (314) [*Ax onxo *(dida)*] *Malohat baland-tarin duxtar ast.*
 from them see(ptcp.) Malohat high-est girl is
 'Compared to them, Malohat is the tallest girl.'
 (cf. Karvovskaya 2014, p. 3, no. (17))
- (315) *Khona-i man [az khona-i apaa-m *(dida)]*
 house-POSS. 1sg. from house-POSS. sister-1sg. see(ptcp.)
qasr ast.
 palace is
 'Compared to my sister's house, my house is a palace.'
 (cf. Karvovskaya 2014, p. 3, no. (16))

Although I do not have any data regarding the behavior of *az... dida*-phrases with respect to free degree variables within syntactic islands, the data are very suggestive of a CompF analysis.

7.3.2 Languages with an Indirect Compositional Strategy Only

Japanese. Beck, Oda & Sugisaki (2004)'s idea that across languages, there might be variation as to the compositional status of standard phrases, was mostly inspired by the data from Japanese. Ever since, the status of *yor*i-phrases in Japanese comparatives such as (316) has been a subject of debate (as has the internal syntactic structure of these phrases, which is however only incidental here).

- (316) *Taro-wa [Hanako-yori] ookii.*
 Taro-TOP. Hanako-PREP. big
 'Taro is bigger than Hanako.'

According to Beck, Oda & Sugisaki (2004), Oda (2008), and Beck, Hohaus & Tiemann (2012), Japanese is a language that exhibits pattern 2. Hayashishita (2009), Shimoyama (2012), and Sudo (2014) oppose such a view. The number of individual data points brought forward in the debate is considerable, and I will only report those data which are most relevant to the question at hand. I will proceed as follows: I will first review the data which Beck, Oda & Sugisaki (2004) use to argue against a direct strategy, and then attempt to apply the island diagnostic from chapter 4. Although this attempt fails, we will add two new observations on the way. The variation between Japanese and English might however be located outside of the typology developed here.

Beck, Oda & Sugisaki (2004) and Oda (2008) provide four reasons why *yor*i-phrases in Japanese comparatives are not an argument of a covert comparative operator: (i) the distribution of *yor*i-phrases, which may occur outside of comparatives, (ii) the possibility of multiple *yor*i-phrases in a comparative, (iii) the ambiguity of father-son examples, and (iv) plausibility effects on interpretation.

(i) Just like other CompF, *yor*i-phrases occur in a number of other environments: Consider the sentences in (317) and (318). Under an analysis of *yor*i-phrases as subcategorized for by the comparative operator and interpreted as its argument, the well-formedness of both sentences is unexpected. (ii) This reasoning extends to the example in (319), with multiple *yor*i-phrases.

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- (317) *Ken-wa [yooroppa-yori] amerika-ni iku-koto-ni kimeta.*
 Ken-TOP. Europe-PREP. America-to go-fact-DAT. decided
 ‘Ken decided to go to America rather than Europe.’
 (Beck, Oda & Sugisaki 2004, p. 295, no. (17))
- (318) *Shuueki-wa [2012-nen yori-mo] 12 paasento ochikon-da.*
 returns-TOP. 2012-year yori-PART. percent decline-past
 ‘Compared to the year of 2012,
 sales have dropped by twelve percent.’
-
- (319) *John-wa [Mary-ga yonda yori] [Bill-ga yonda yori]*
 John-TOP. Mary-NOM. read PREP. Bill-NOM. read PREP.
[Sue-ga yonda yori] nagai hon-o yonda.
 Sue-NOM. read PREP. long book-ACC. read
 ‘John read a longer book than any of Mary, Bill and Sue did.’
 (Oda 2008, p. 146, no. (154))

What is more, *yori*-phrases exhibit a number of interpretive effects in which they clearly differ from English *than*-phrases: The type of examples which we above referred to as Father-Son Examples (iii) are ambiguous in Japanese, as indicated by the paraphrases in (320). In addition, there is a difference in acceptability between (322) and (323), and variation in acceptability with respect to (323). (This observation goes back to Ishii (1991, pp. 124-125).)

- (320) *Watashi-no musuko-wa watashi yori se-ga takai.*
 I-NOM. son-TOP. I PREP. height-NOM. tall
 = ‘My son’s height exceeds my height.’
 = ‘My son is taller than I was at his age.’
 (Oda 2008, p. 55-56, no. (97))
- (321) *My son is taller than me.*
 = ‘My son’s height exceeds my height.’
 ≠ ‘My son is taller than I was at his age.’
-

- (322) *Kenji-wa [[Mariko-ga katta] yori-mo] takai*
 Kenji-TOP. Mariko-NOM. bought yori-PART. expensive
kasa-o kaimasita.
 umbrella-ACC. bought
 ‘Compared to what Mariko bought,
 Kenji bought a more expensive umbrella.’

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- (323) ?**Kenji-wa* [[*Mariko-ga katta*] *yori-mo*] *nagai*
 Kenji-TOP. Mariko-NOM. bought PREP.-PART. long
kasa-o kaimasita.
 umbrella-ACC. bought
 ‘Compared to what Mariko bought,
 Kenji bought a longer umbrella.’

While (i) to (iii) strongly suggest an analysis of *yori*-phrases as CompF, (iv) is empirically problematic as well as irrelevant for my implementation of the indirect analysis:

Recall from section 2.1 above that under Beck, Oda & Sugisaki (2004)’s analysis, *compared to*-phrases and their crosslinguistic equivalents are syntactic orphans, which are not syntactically integrated and not interpreted by the same interpretation function. Thus, the *yori*-phrase, too, merely serves to pragmatically infer a value assignment for the free degree variable introduced by the comparative operator. The difference in acceptability between (322) and (323) as well as the variable acceptability of (323) is then explained as follows: The inference from the maximum of the relevant set of items Hanako bought to their length as a value for the free degree variable, they argue, is considerably less straightforward than the inference of their price. Speakers are successful to varying degrees when it comes to inferring less plausible comparison values. In section 3.1, I argued against this specific analysis also because, for English and German, this effect of plausibility on acceptability was not more substantial for ContComps with CompFs than it was for comparatives with an overt standard phrase in the acceptability-rating studies conducted. For Japanese, Hohaus, Oda & Hehl (2014) report converging results from an acceptability-rating study with 61 participants conducted at Tokyo Keizai University. The study compared the effect of the difficulty of inferring the required comparison degree for the comparative and a construction for which only a direct compositional analysis is available, the equative-like construction in (324) and (325). Plausibility, which had been determined by a pre-study, was used as a measure for difficulty in their study.

- (324) *Kenji to Mariko-ga katta kasa-no nedan-wa onaji*
 Kenji and Mariko-NOM. buy(past) umbrella-GEN. price-TOP. same
gurai deshita.
 degree copula(past)
 ‘Kenji and Mariko bought umbrellas whose price was the same.’

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- (325) *Kenji to Mariko-ga katta kasa-no nagasa-wa*
Kenji and Mariko-NOM. buy(past) umbrella-GEN. length-TOP.
onaji gurai deshita.
same degree copula(past)
'Kenji and Mariko bought umbrellas whose length was the same.'

Crucially, Hohaus, Oda & Hehl (2014) observe neither a main effect for plausibility or for type of construction, nor any interaction between the two. Both sets of filler items investigated yielded statistically significant effects, however. Despite the difficulty of interpreting null results like these, they conclude that the results cast doubt on the little data reported in the literature and on an analysis which is crucially designed to explain these kind of data.

While the analysis of CompFs in ContComps presented here predicts the same crosslinguistic typology of comparison standards as Beck, Oda & Sugisaki (2004)'s, it should be clear that it does not predict that ContComps with CompFs are influenced in their acceptability by plausibility to any greater degree than any other construction. The two key devices of the mechanism by which a CompF narrows down the permitted value assignments to the free degree variable of a ContComp, the presuppositionality of FRAME and minimality of situations, do so very efficiently. As a result, variation in acceptability (iv), whatever the status of the data may ultimately be, is not relevant when deciding whether to analyze *yor*i-phrases in Japanese comparatives as frame setters. The distribution of *yor*i-phrases (i), their iterativity (ii), and the ambiguity of Father-Son type of examples (iii), however, suggest that Japanese is indeed a pattern-2 language.

Does the island diagnostic support such a view, too? Unfortunately, the diagnostic cannot be applied. *Yori*-phrases must appear within the clause that contains the gradable predicate and may not appear outside of the relative clause if this is the clause that contains the comparative. I refer to this observation as syntactic dependency. In this respect, *yor*i-phrases behave unlike English, German, and Sāmoan CompFs but just like *e.g.* English *than*-constituents. However, even in the relative-clause internal position, readings are available that are impossible for direct-standard phrases in English and German. I refer to this observation as variation in interpretation. Taken together, these two observations are not compatible with either of the outlined strategies without further assumptions. Before we discuss these repercussions in more detail, though,

let us have a look at the data: The island diagnostic for frame setters developed in chapter 3 requires that the comparative be contained inside of a syntactic island and the CompF be able to attach outside of this island. Head-external relative clauses in Japanese meet the first prerequisite: They appear to constitute island for movement. Scrambling out of a relative clause results in ungrammaticality, as in (326). Moreover, binding out of a relative clause, which would require movement out of the clause at the level of Logical Form, appears to not be possible, as is illustrated in (327).⁹⁰

- (326) ??*[*Ano hon-o*] *John-ga* [DP [RelCI _ *katta*] *hito-o*]
 that book-ACC. John-TOP. buy(past) person-ACC.
 sagasteiru rasi.
 looking-for seem
 (Lit.) ‘It is that book which it seems
 that John is looking for the person who bought _.’
 (Saito 1985, p. 246, no. (146-a))

- (327) **Kangofu-wa* [DP [RelCI *dono-isha-mo_i* *yoku shitteiru*]
 nurse(fem.)-TOP. every-doctor-also well know
 kare-no_i kanja-ni] *aisatsusuru.*
 his-DAT. patient-DAT. greet
 (Lit.) ‘The nurse greeted his_i patient,
 whom [every doctor]_i knew well.’

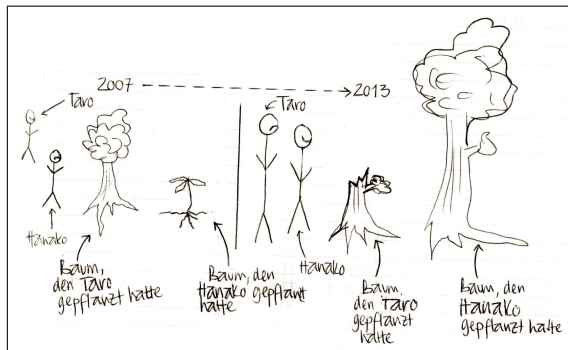
The second prerequisite for the island diagnostic is not met, however: The *yor*i-phrase may not attach outside of the relative clause. I illustrate this syntactic dependency with the help of the comparative in (329), which is acceptable in the context of (328). Both, the *yor*i-phrase and the gradable predicate are within the relative clause. Attaching the *yor*i-phrase outside of the relative clause, in (330) and (331), results in ungrammaticality. Note that in simpler structures, scrambling of the *yor*i-phrase to a sentence-initial position is not prohibited, as is illustrated in the variant of (316) in (332). Under an analysis of *yor*i-phrases as frame setters, this behavior is unexpected and would have to be explained by additional syntactic restrictions. Under an analysis of *yor*i-phrases as an argument of a covert degree operator, on the other hand, the ungrammaticality of

⁹⁰ The syntactic analysis of Japanese relative clauses is somewhat controversial, as is the status of head-external relative clauses as islands. Obviously, it is thus crucial for the investigation how exactly Japanese relative clauses are to be analyzed syntactically and it is inexcusable to gloss over such an important point.

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(330) and (331) would be expected, and the result of moving the Degree phrase out of an island.

(328) Context: Tree Comparison:⁹¹



(329) *Taro-wa* [DP [RelCl *suunenmae-ni-wa* [Hanako-yori-mo]
Taro-TOP. some.years.ago-to-TOP. Hanako-yori-PART.
ooki-katta] *ki-o*] *ueta.*
big-past tree-ACC. plant(past)

‘Taro had planted a tree
which some years ago was bigger compared to Hanako.’

(330) **[Hanako-yori-mo]* *Taro-wa* [DP [RelCl *suunenmae-ni-wa*
Hanako-yori-PART. Taro-TOP. some.years.ago-to-TOP.
ookikatta] *ki-o*] *ueta.*
big(past) tree-ACC. plant(past).

‘Compared to Hanako, Taro planted a tree
which some years ago was bigger.’

(331) ??**Taro-wa* [*Hanako-yori-mo*] [DP [RelCl *suunenmae-ni-wa*
Taro-TOP. Hanako-yori-PART. some.years.ago
ookikatta] *ki-o*] *ueta.*
big(past) tree-ACC. plant(past)

‘Compared to Hanako, Taro planted a tree
which some years ago was bigger.’

⁹¹ The picture is the result of an interactive drawing during an elicitation session whose meta language was German. Crucially, in 2007, the tree which Taro had planted was bigger than the tree which Hanako had planted. In 2013, however, the tree which Hanako had planted was bigger than the tree which Taro had planted. The way the story is set up is such that there are potentially two readings of (329) available; I will come back to this. What matters is that (329) is acceptable.

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- (332) [Hanako-yori] Taro-wa ookii.
 Hanako-yori Taro-TOP. big
 ‘Compared to Hanako, Taro is bigger.’

My second observation is however not compatible with such an analysis: For all six native speakers I consulted, *yor*i-phrases allow for *prima facie* wide-scope, external readings in a position inside the relative clause in (333) to (334). In these examples, they are in fact the only readings available. Thus, there is agreement that in (333), comparison must be between Hanako’s and Taro’s hair. As for (334), speakers agree that the sentence must express a comparison with Hanako’s presentation. Uniformly, (335) is judged as expressing a comparison with Hanako’s dissertation. Under the direct strategy, these readings should not be available, as they involve a degree relation which requires movement out of the island. Yet, even under the indirect approach, they are still somewhat unexpected.

- (333) Taro-wa [DP [Re|Cl *izen-wa* [Hanako-yori-mo] *nagakatta*
 Taro-TOP. before-TOP. Hanako-yori-PART. long(past)
kami-o] *ima-wa mijikakusiteiru.*
 hair-ACC. now-TOP. keep.short

(Lit.) ‘Taro now keeps her hair short,
 which before was longer compared to Hanako.’

‘Taro now keeps her hair short,
 which before was longer than Hanako’s hair.’

- (334) Taro-wa [DP [Re|Cl [Hanako-yori-mo] *omosirokatta to*
 Taro-TOP. Hanako-yori-PART. interesting(past) that
omou] *happyo-o mi-ttu*] *ageta.*
 thought presentation-ACC. three-CL. give(past)

(Lit.) ‘Taro named three presentations
 which he thought were more interesting compared to Hanako.’

‘Taro named three presentation
 which he thought were more interesting than Hanako’s presentation.’

- (335) Taro-wa [DP [Re|Cl *hakaseronbun-ga* [Hanako-yori-mo]
 Taro-TOP. dissertation-NOM. Hanako-yori-PART.
nagakatta] *subeteno gakusei-o*] *hometa.*
 long(past) all student-ACC. praise(past).

(Lit.) ‘Taro praised all students
 whose dissertation was longer compared to Hanako.’

‘Taro praised all students
 whose dissertation was longer than Hanako’s dissertation.’

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Take the last example in (335), for instance. The direct approach predicts the denotation in (336-a) for the relative clause, although the comparison appears to employ the degree relation in (336-b). Deriving this degree relation at Logical Form is not possible due to the restrictions imposed on movement by the island. Adopting the analysis of English CompF inside relative clauses from section 4.5 above, the indirect approach, too, predicts only a relative-clause internal reading: In (337), the *yor*i-phrase restricts the relative-clause situations to those minimal situations in which Hanako is the standard of some comparison. Minimality disallows Hanako's dissertation from entering the evaluation situations. Thus, the only permissible value assignment to the free degree variable in (337) is Hanako's length. I do not provide the relative-clause denotation here, but rather that of a smaller constituent, as I would like remain non-committal towards the projection behavior of the existential quantifier over situations that we have been assuming in (336-b).

- (336) a. $\lambda s_{\langle s \rangle}. \lambda x_{\langle e \rangle}. \exists s' [s' \prec s \ \& \ \text{MAX}(\lambda d. \text{LENGTH}(s')(x'\text{'s dissertation})) > \text{MAX}(\lambda d'. \text{LENGTH}(s')(\text{Hanako}))]$
 b. $\lambda s_{\langle s \rangle}. \lambda d_{\langle d \rangle}. \lambda x_{\langle e \rangle}. \text{LENGTH}(s)(x'\text{'s dissertation})$
- (337) $\lambda s'_{\langle s \rangle} : s' \in \text{MIN}(\lambda s*. \exists x_{\langle e \rangle}. \exists \mu_{\langle s, \langle e, d \rangle \rangle} [\mu(s*)(x) > \mu(s*)(\text{Hanako})])].$
 $\text{MAX}(\lambda d. \text{LENGTH}(s')(g(3, \langle e \rangle))'\text{'s dissertation})) > g(7, \langle d \rangle)$

Under both accounts, it is thus expected that internal readings are also available for *yor*i-phrases inside of a relative clause: For (329), it was reported that only a reading in which comparison is between Hanako and the tree which Taro had planted was available. Also, the sentence in (338) was judged to only have an interpretation in which Taro raced Hanako's dog yesterday, that is comparison is between the speed of Taro's running and the speed at which Hanako's dog ran.

- (338) *Hanako-wa* [DP[RelCl] *kinou* [Taro-yori] *hayaku hashitta*
 Hanako-TOP. yesterday Taro-yori fast run(past)
inu-wo] *katteiru*.
 dog-ACC. have(animals)
 'Hanako has a dog which yesterday ran faster than Taro.'

I leave the reader with these observations and a few directions for further research as far as Japanese is concerned: If we want to pursue a CompF analysis of Japanese comparatives, there has to be an additional restriction on the syntactic position of frame setters in Japanese that

explains syntactic dependency. Variation in interpretation does not follow from either analysis at this point. Here, further empirical research is needed first anyway. Under a CompF approach, an explanation will most likely posit additional variation in the situation-semantics architecture of Japanese relative clauses. Under a direct approach, there might be variation in the internal make up of the standard phrase: Maybe there is a covert, context-dependent function which provides a mapping from an individual to a relevant degree associated with the individual within the *yor*i-phrase, as sketched in (339). For Japanese, such a solution has been contemplated by Hayashishita (2009). It is also advocated for Turkish in Hofstetter (2012).

- (339) $\llbracket \text{Hanako yori} \rrbracket = (g(5, \langle e, d \rangle))(\text{Hanako})$
 with *e.g.* $g(5, \langle e, d \rangle) = \lambda x_{\langle e \rangle}. \text{LENGTH}(x\text{'s dissertation})$

In any case, Japanese has another candidate for a CompF construction, in the form of (340). To my knowledge, this construction has received very little attention in the semantics literature, apart from Kubota & Matsui (2010) and a footnote in Kennedy (2009, draft p. 22, fn. 8), but unfortunately, I will not be able to change this fact.

- (340) $[\text{Maria-}\{to/ni\} \text{ kurabete}] \text{ Peter-wa ookii.}$
 Mary- $\{with\ to\}$ compare Peter-TOP. big
 ‘Peter is bigger compared to Mary.’

To conclude, the distribution of Japanese *yor*i-phrases as well as the availability of multiple *yor*i-phrases are suggestive of the indirect strategy. Syntactic dependency, however, is *prima facie* only compatible with the direct strategy. The observed variation in interpretation is unexpected under either approach. Japanese definitely teaches us a lesson about semantic fieldwork in that even if the type of data to test are entirely clear from the perspective of the semantic analysis, eliciting the right kind of data and interpreting the results may be far from trivial. This said, I am aware of one other language which is a good candidate for a language that pursues an indirect strategy only: Washo, a Native-American language isolate.

Washo. Bochnak (2013a) argues that Washo lacks a semantic type $\langle d \rangle$ and consequently any degree operators. In terms of the parameters proposed in Beck et al. (2009), the language has a negative setting of the Degree Semantics Parameter, in (341). In our typology, Washo could

thus either be a language that exhibits pattern 2, just like Sāmoan, or even a language that exhibits pattern 4 in that it relies entirely on context for the evaluation of a comparison.

(341) Degree Semantics Parameter:

A language { does/ does not } have gradable predicates (type $\langle d, \langle e, t \rangle \rangle$ and related), i.e. lexical items that introduce degree arguments.

(Beck et al. 2009, p. 19, no. (62))

The latter pattern is excluded, though, because a number of locative prepositional phrases may combine with an unmarked vague predicate, and, as Bochnak (2013a) proposes, indirectly interact with its interpretation. An example of such a locative comparative is in (342-a). Locative comparatives are a secondary strategy to comparison in Washo aside from the conjoined comparative, in (342-b).

(342) a. The Locative Comparative in Washo:

| | | |
|-----------------------------------|---------------------|------------------------|
| <i>t'é:liwlu delkáykayi?</i> | <i>k'é?i</i> | <i>šáwlamhu lélew</i> |
| <i>t'e:liwlu de-?il-kaykay-i?</i> | <i>k'-e?-i</i> | <i>šawlamhu lelew</i> |
| man | NMLZ-ATTR-tall-ATTR | 3-COP-IPFV girl beside |

(Lit.) ‘The man is tall next to the girl.’

(Bochnak 2013a, p. 4, no. (4-b))

b. The Conjoined Comparative in Washo:

| | | |
|-----------------------------------|---------------------|---|
| <i>t'é:liwlu delkáykayi?</i> | <i>k'é?i</i> | <i>šáwlamhu delkáyayi?é:s</i> |
| <i>t'e:liwlu de-?il-kaykay-i?</i> | <i>k'-e?-i</i> | <i>šawlamhu de-?il-kaykay-i?-e:s</i> |
| man | NMLZ-ATTR-tall-ATTR | 3-COP-IPFV girl NMLZ-ATTR-tall-ATTR-NEG |
| <i>k'á?áš</i> | | |
| <i>k'-e?-a?-š</i> | | |
| 3-COP-AOR-SR | | |

(Lit.) ‘The man is tall, the girl is not tall.’

(Bochnak 2013a, p. 4, no. (4-a))

We can assume a lexical entry along the lines of (343) for the stem *-kaykay-* (‘tall’), which relies on a contextually supplied set of individuals with respect to which its type $\langle e \rangle$ argument counts as tall in a situation.

$$(343) \quad \llbracket \text{-kaykay- (‘tall’)} \rrbracket = \lambda s_{\langle s \rangle} . \lambda C_{\langle e, t \rangle} . \lambda x_{\langle e \rangle} . x \text{ counts as tall in } s \text{ with respect to } C$$

An analysis of the prepositional phrase *šawamhu lelew* (‘beside the girl’) as a CompF, or maybe even a locative frame, as Bochnak (2013a) suggests, seems promising.

In sum, the discussion of Washo illustrates that languages which have a negative setting of the Degree Semantics Parameter can only ever exhibit pattern 2 or pattern 4. The last part of this section discusses another language which has been characterized as lacking a degree ontology, Motu, but suggests that it patterns unlike Washo in that it pursues an exclusively contextual strategy.

7.3.3 Languages with a Direct Compositional Strategy Only

Before we turn to Motu, let me briefly review pattern 3, which describes languages that solely rely on the direct strategy. Such languages would lack CompFs (and potentially frame setters altogether). A lack of comparison frames is ultimately a lexical choice. A more general absence of frame setters could be due to a difference in the architecture of the management layer of Logical Form in that the language lacks Frame phrases. It could also be due to the absence of presuppositions in general: The language would then be unable to apply a mechanism which relies on a presupposition to essentially contribute an indirect description of a free functional variable in the assertion. I do not know of any languages which fit this description. It appears that when it comes to context and composition in comparison constructions, languages don't want to make do entirely without context.

7.3.4 Languages with a Contextual Strategy Only

Motu. Motu, an Oceanic language spoken in Papua New Guinea, relies entirely on context when it comes to the standard of a comparative and is thus a representative of pattern 4 in the typology. Villalta (2007a,d) observes that Motu only employs conjoined comparatives:

- (344) a. Context: Mary and Frank
 Suppose that Mary is 30 years old and Frank is 28 years old.
- b. *Mary lagani-na na bada, to Frank lagani-na*
 Mary years-POSS.3sg. TOP. big but Frank years-POSS.3sg.
na maraki.
 TOP. small
 (Lit.) 'Mary's years are big but Frank's years are small.'
 'Mary is older than Frank.'

(Villalta 2007a, p. 3, no. (6))

7 The Crosslinguistic Perspective

- (345) a. Context: The Weather
Suppose that today we had 25 degrees,
while yesterday we had 20 degrees.
- b. *Hari dina na siahu, to varani na dia siahu.*
today sun TOP. hot but yesterday TOP. not hot
(Lit.) ‘The sun today is hot but yesterday it was not hot.’
‘It’s hotter today than it was yesterday.’
- (Villalta 2007a, p. 5, no. (14))

Conjoined comparatives bi-clausal structures in which an unmarked predicate and its antonym or a negation are juxtaposed. The language lacks any other type of comparison constructions, in particular differential comparatives, measure phrase constructions, degree questions, superlatives, and equatives. Beck et al. (2009) conclude that there is thus no evidence for a degree semantics underlying (344) and (345). There is also no evidence in the comprehensive data collected by Villalta (2007a,d) that the interpretation of an unmarked predicate can in any way be manipulated by overt linguistic material. Its interpretation is entirely dependent on context.

7.4 Chapter Summary

One of the results of the extensive semantic research on comparison constructions crosslinguistically in the past two decades is that languages choose very different roads to arrive at the same comparative meaning. This chapter, with its focus on the different strategies by which languages determine the standard of a comparison, confirms this insight.

The chapter’s *Herzstück*, my fieldwork on Sāmoan, discusses a language in which the directional comparative is a fairly recent innovation, and, along with Hohaus (2010, 2012a,b), provides a very first description of this Oceanic language from the perspective of formal semantics. As a pattern-2 language, Sāmoan exclusively makes use of what I have called the indirect strategy: Across its degree constructions, it uses CompFs to add a presupposition to a sentence, which in turn narrows down the permissible value assignments to the free variables of both, the ContComp and the Superlative. I also identified Washo, a native American language isolate, as another language that might pattern like Sāmoan.

English and German, two Germanic languages from the Indo-European

language family, as well as Tajiki, a Persian language from the same language family also use the indirect strategy. However, they additionally have what I have called the direct strategy available to them: At least some degree operators in those languages select certain phrases as arguments to provide the standard in a comparison. They are thus pattern-1 languages.

I was not able to provide an example of a pattern-3 language, which exclusively relies on such a direct strategy, but we have seen an example of a language, Motu, another Oceanic language, which has neither of the compositional strategies at its disposal and must rely on a contextual strategy in degree constructions. Motu is a pattern-4 language.

| indirect strategy \ direct strategy | available | unavailable |
|---|---|---|
| available | pattern 1: ✓, ✓ <i>English, German, Tajiki</i> | pattern 2: ✓, ✗ <i>Sāmoan, Washo</i> |
| unavailable | pattern 3: ✗, ✓ — | pattern 4: ✗, ✗ <i>Motu</i> |

Table 7.2: Language Examples for the Typology of Comparison Standards

As far as Japanese is concerned, although I introduced the language as a candidate for the indirect strategy, it is unclear at this stage where to locate Japanese in the typology. I have however contributed to the discussion two observations, syntactic dependency and variation in interpretation, which will hopefully be useful to future research.

The variation observed in this chapter is not random. The typology of strategies for comparison standards is ultimately determined by systematic variation in the functional lexicon of the grammars of natural languages as well as by systematic syntactic variation. In the lexicon, the availability of degree operators and the type of argument they subcategorize for as well as the availability of the covert operator FRAME determine the place of a language in the typology. In the syntax, the availability of Frame phrases in what I have referred to as the management level of the architecture is decisive for the pattern.

Part IV

MORE ON FRAMES

8 Further Applications of Frame

Variables in the grammar of natural language may occur as bound or free. They rely either on a binder or the context in their interpretation, a relationship mediated in both cases by the variable assignment function. (See in particular chapter 9 in Heim & Kratzer (1998).) For those situations in which we do not want to go down the binding road –maybe because we cannot–, but also do not want to leave the interpretation entirely up to context, the mechanism introduced in chapters 4 and 5 opens up another avenue. Frames allow us to add a domain restriction to the set of situations a sentence denotes, thereby also indirectly restricting the set of permissible value assignments to a free variable, often to a singleton set. I have explained this presuppositional mechanism in detail for free functional variables in degree constructions but it should have become clear that the notion of frame and the effects it may have on the available values for a free variable are not restricted to degree constructions.

The scope of the proposal will also become clear in this chapter, in which I apply the analysis to several other frame setters and investigate their interpretative effects on a number of different contextual variables. The contextual variables we will encounter have all featured prominently in the semantics literature:

Free temporal variables as well the contextual domain restriction of quantifiers, whose interpretation may be restricted by Locative frames, are the topic of section 8.1. Exceptive frames may guide the interpretation of the contextual domain restriction of universal quantifiers, as we will see in section 8.2. Modal frames help determine the contextually provided accessibility relation of modal operators, a relationship which we will investigate in section 8.3. Contextual focus alternatives, which will be discussed in the section 8.4, can be controlled with the help of Contrastive frames. Section 8.1 also includes a comparison between my situation-semantics, presuppositional analysis of frames and Maienborn (2001)'s analysis of locative frame setters, the only formal analysis in the literature that I am aware of.

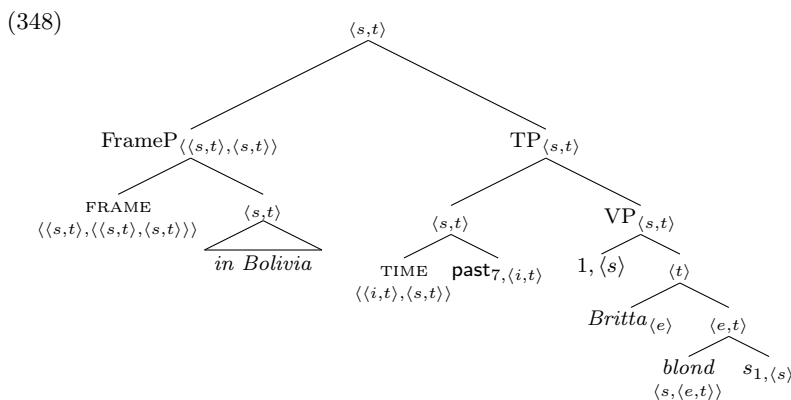
8.1 Locative Frames, Tenses and Quantifier Domains

Maienborn (2001) observes that Locative frames setters (LocFs) frequently affect the temporal interpretation of a sentence but also “...lend themselves to restricting the domains of quantifiers...” (Maienborn 2001, p. 228) I will discuss two such examples here, (346) and (347).

(346) [In Bolivia], Britta was_{C,⟨i,t⟩} blond.
(Maienborn 2001, p. 197, no. (14))

(347) [In Mexiko] ist jeder_{C,⟨e,t⟩} Strand öffentlich.
in Mexico is every beach public
'In Mexico, all beaches are open to the public.'

The sentence in (346) is commonly perceived to mean that Britta had blond hair during her time in Bolivia, whereas in (347), the generalization does only apply to beaches in Mexico. Restating the observation for (346) in more technical terms, the LocF restricts the permissible value assignments to the free temporal variable in the Logical Form in (348).



I assume that there is a covert operator TIME, in (349-b), which mediates the relationship between a situation s and its temporal extension $\tau(s)$, a set of time points.⁹² Its first argument is the past temporal pronoun of type $\langle i, t \rangle$, in (349-c), which comes with the presupposition that all of the time points in the set that it is assigned as a value precede the utterance

⁹² As situation semantics allows us to construct *e.g.* a situation out of two smaller situations that need not necessarily be temporally adjacent, it seemed appropriate to work with sets of individual time points here rather than time intervals.

time.⁹³ The Preposition phrase *in Bolivia*, in (349-a), denotes a set of situations s such that their spatial extension $\zeta(s)$, a set of locations equals the set of locations, for which Bolivia is a name.⁹⁴ With the additional requirement that these situations be minimal, FRAME adds this denotation as a domain restriction to the interpretation of the Tense phrase, the function in (350-b). The result is (350-c).

- (349) a. $\llbracket \textit{in Bolivia} \rrbracket = \lambda s_{\langle s \rangle}. \zeta(s) = \textit{Bolivia}$
 b. $\llbracket \textit{TIME} \rrbracket = \lambda p_{\langle i, t \rangle}. \lambda s_{\langle s \rangle}. \tau(s) = p$
 c. $\llbracket \textit{past}_{7, \langle i, t \rangle} \rrbracket^g = g(7, \langle i, t \rangle)$
 with $g(7, \langle i, t \rangle)$ such that $\forall t [(g(7, \langle i, t \rangle))(t) \rightarrow t \ll t_{\text{now}}]$
 d. $\llbracket \textit{blond} \rrbracket = \lambda s_{\langle s \rangle}. \lambda x_{\langle e \rangle}. \textit{blond}(s)(x)$
- (350) a. $\llbracket [\textit{VP} \dots] \rrbracket = \lambda s_{\langle s \rangle}. \textit{blond}(s)(\textit{Britta})$
 b. $\llbracket [\textit{TP} \dots] \rrbracket^g = \lambda s_{\langle s \rangle}. \tau(s) = g(7, \langle i, t \rangle) \ \& \ \textit{blond}(s)(\textit{Britta})$
 c. $\llbracket \llbracket [\textit{FrameP} \dots] \dots \rrbracket^g = \lambda s : s \in \text{MIN}(\lambda s*. \zeta(s*) = \textit{Bolivia}).$
 $\tau(s) = g(7, \langle i, t \rangle) \ \& \ \textit{blond}(s)(\textit{Britta})$
 with $g(7, \langle i, t \rangle)$ such that $\forall t [(g(7, \langle i, t \rangle))(t) \rightarrow t \ll t_{\text{now}}]$

A minimal situation whose geographic extension is Bolivia is a situation which does not have any parts that are not located in Bolivia. Obviously, if only situations with this spatial profile are in the domain of the function in (350-c), the set of past times which are the temporal extension of these situations have to be such that Britta was in Bolivia at those times.

Maienborn (2001) observes that LocFs sometimes gives rise to a second, epistemic interpretation. Such an interpretation is also available for the present-tense version of (346), in (351), namely that in Bolivia, Britta is believed to be blond. I suggest that the availability of this epistemic interpretation is not an indicator of “semantic indeterminacy” –attributed to LocFs by Maienborn (2001, p. 226), as we will see in section 8.1.1– but is in fact a case of structural ambiguity. The epistemic reading of (346) is a result of interpreting a Logical Form along the lines of (352): The proposition that Britta is blond is embedded under a covert epistemic modal, in (353-a), whose individual-level argument is quantified off by the generic operator GEN, in (353-b), which is essentially a universal quantifier. (See Pearson (2013) for similar LF configurations, and Krifka

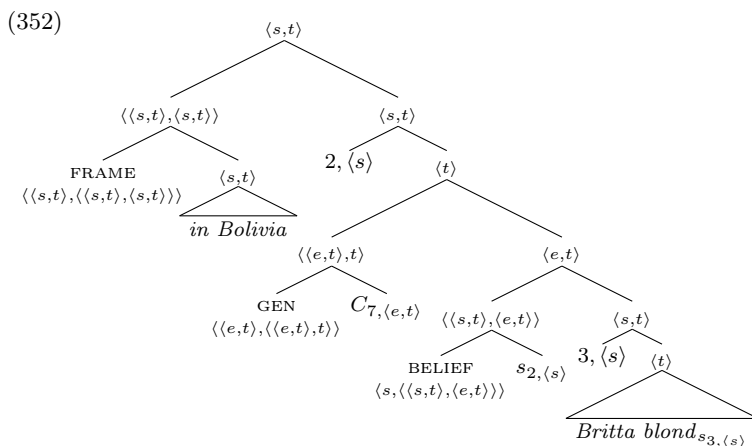
⁹³ The idea of treating tenses as pronouns goes back to Kratzer (1998a). For a quantificational analysis, see Kusumoto (1999, 2005). For an overview over both approaches, I refer the reader to Hohaus & Beck (2011).

⁹⁴ For a more sophisticated semantics of spatial prepositions, see von Stechow (2006).

8 Further Applications of Frame

et al. (1995), Krifka (1995a) as well as Carlson (2011) for discussion of the semantics of the generic operator.) The grammar generates the interpretation in (354) for (351), a function whose domain are Bolivia situations. Its value description is that all of the contextually provided individuals believe in the blondness of Britta in those situations.

(351) *In Bolivia, Britta is blond.*



- (353) a. $\llbracket \text{BELIEF} \rrbracket = \lambda s_{\langle s \rangle} \cdot \lambda p_{\langle s, t \rangle} \cdot \lambda x_{\langle e \rangle} \cdot \forall s' [s' \in \cap \{q \in D_{\langle s, t \rangle} : x \text{ believes in } s \text{ that } q\} \rightarrow p(s')]$
 b. $\llbracket \text{GEN}_{\text{(simplified)}} \rrbracket = \lambda C_{\langle e, t \rangle} \cdot \lambda Q_{\langle e, t \rangle} \cdot \forall x [C(x) \rightarrow Q(x)]$

- (354) $\lambda s : s \in \text{MIN}(\lambda s^* \cdot \zeta(s^*) = \text{Bolivia}) \cdot \forall x, \forall s' [(g(7, \langle e, t \rangle))(x) \& s' \in \cap \{q : x \text{ believes in } s \text{ that } q\} \rightarrow \text{blond}(s')(Britta)]$

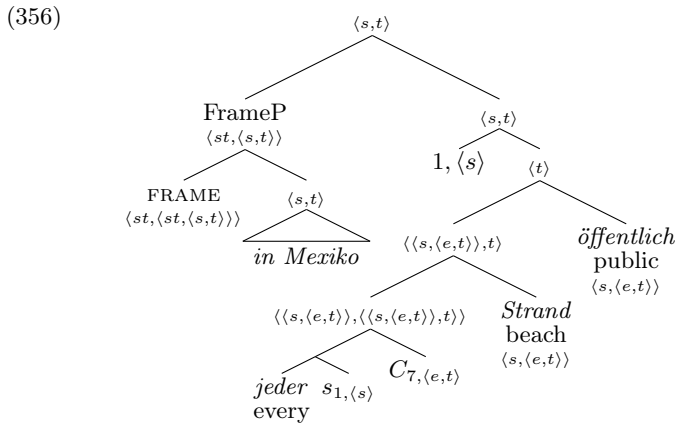
The LocF thus restricts the situations from which the believe situations are accessed to Bolivia, but not the blondness situations. As a consequence, possible values for $g(7, \langle e, t \rangle)$ must be individuals which are located in Bolivia.

LocFs may of course also affect the contextual domain restriction of an overt quantificational determiner, as is the case for universal *jeder* in the example in (347), repeated from above. I provide a Logical Form in (356), which is going to derive the meaning components in (357): In an evaluation situation s^* , the sentence will assert that for all subsituations of the evaluation situation and for all contextually provided entities which are beaches in these subsituations, these beaches are open to the

public in the respective subsituations. The sentence presupposes that the evaluation situation is a minimal situation which has as its geographic extension Mexico. This presupposition is the contribution of the LocF.

- (347) *In Mexiko ist jeder Strand öffentlich.*
 in Mexico is every beach public
 ‘In Mexico, all beaches are open to the public.’

- (355) a. $\llbracket \text{in Mexiko} \rrbracket = \lambda s_{\langle s \rangle}. \text{LOC}(s) = \text{Mexico}$
 b. $\llbracket \text{jeder}_{(\text{simplified})} \text{ (‘every’)} \rrbracket =$
 $\lambda s_{\langle s \rangle}. \lambda C_{\langle e, t \rangle}. \lambda P_{\langle s, \langle e, t \rangle \rangle}. \lambda Q_{\langle s, \langle e, t \rangle \rangle}.$
 $\forall y, \forall s' [C(y) \ \& \ s' \preceq s \ \& \ P(s')(y) \rightarrow Q(s')(y)]$



- (357) $\forall y, s [s \preceq s^* \ \& \ \text{beach}(s)(y) \ \& \ C(x) \rightarrow \text{public}(s)(y)]$
 presupposition: $s^* \in \text{MIN}(\lambda s. \text{LOC}(s) = \text{Mexico})$

The lexical entry assumed here for the quantificational determiner, in (355-b), is from F. Schwarz (2012, p. 452, no. (43)), albeit slightly modified. Under this analysis, *jeder* (‘every’) introduces universal quantification over both, individuals and situations. To see that this is desirable, consider the simpler proposition $p = \lambda s_{\langle s \rangle}. \forall x [C(x) \ \& \ \text{beach}(s)(x) \rightarrow \text{public}(s)(x)]$. If we were to restrict the domain of this function with the LocF and thus require that s not only be of type $\langle s \rangle$ but also a minimal situation whose geographic extension is Mexico, we might get into trouble with the spatial properties of the beaches we quantify over: Geographically, there are no beaches which cover all of Mexico. In (357), the quantification is restricted to subsituations of the evaluation situa-

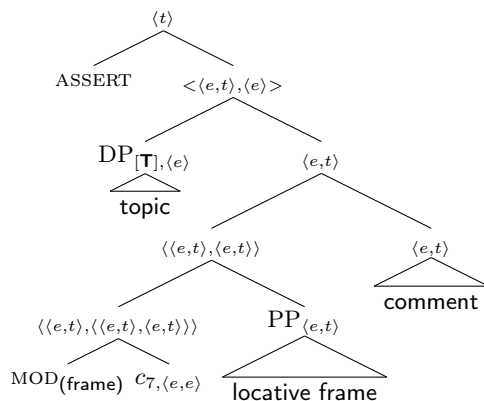
tion, which thus may comprise smaller areas. As these will still have to be located within Mexico, $g(7, \langle e, t \rangle)$ cannot refer to entities which are located outside of Mexico. The LocF thus indirectly narrows down the quantifier's domain.

Note that unlike CompFs, the restriction LocFs place on the set of possible values on the free functional variables in (348), (352) and (356) are fairly lenient in comparison, a result of the differences in the lexical material employed within the frame. In this respect, LocFs also differ from exceptive frames (ExcFs), to which we are going to turn in a moment, in section 8.2. Before we do, let us briefly consider how this analysis of LocFs compares to the analysis proposed in Maienborn (2001).

8.1.1 The Analysis of Locative Frames in Maienborn (2001)

Under Maienborn (2001)'s analysis, LocFs interact with the topic-comment structure of a sentence: As "... devices for restricting the application of the comment to the topic of a sentence" (Maienborn 2001, p. 233), they attach between the topic and the comment, as sketched in (358) for a sentence in which the subject is the aboutness topic. Her analysis thus incorporates information-structural considerations, which is desirable, but which I pretty much have been putting aside for my analysis.

(358)



The interpretation of LocFs relies on a special, context-dependent modification operation, in (359), which combines with a contextually provided function of type $\langle e, e \rangle$ as its first argument. It then takes as arguments two properties and an entity, and maps them onto true if the property denoted by the frame adverbial is true of a "semantically underspecified

referent” (the result of applying the contextually provided function to the entity that is an argument of $\text{MOD}_{(\text{frame})}$) and the other property is true of the entity itself. In the grammar, the topic feature on the Determiner phrase induces a structured meaning for a proposition, which reflects the topic-comment structure of the sentence. This structure is resolved by the covert operator ASSERT (and the topic applied to as an argument to the comment) if a number of felicity conditions on the common ground and the discourse are met. (See Krifka (1992, p. 48, no. (69)) for details.)

$$(359) \quad \llbracket \text{MOD}_{(\text{frame})} \rrbracket = \lambda c_{\langle e, e \rangle} \cdot \lambda p_{\langle e, t \rangle} \cdot \lambda q_{\langle e, t \rangle} \cdot \lambda x_{\langle e \rangle} \cdot p(c(x)) \ \& \ q(x)$$

It is a unique feature of LocFs, according to Maienborn (2001, p. 232), that they do not denote a property of the topic but of some entity related to the topic: “Hence, I claim that frame-setting modifiers express a locative constraint on a semantically underspecified referent... This is the constant, grammatically determined meaning contribution lying behind all their [*i.e.* frame-setting modifiers] potential utterance meanings.” In (358), this meaning contribution is the result of the contextually provided mapping function of type $\langle e, e \rangle$. Beyond that, I do not understand this aspect of Maienborn (2001)’s analysis particularly well. As far as I do, this ingredient of the analysis is supposed to capture that the effect that frame setters have on interpretation, especially with respect to contextually variables, is always somewhat indirect. Under my account, this indirectness is a result of the situation-semantics analysis and the presuppositionality of FRAME.⁹⁵

Applied to the example from (347), this analysis derives (360): It is true only if all contextually salient beaches are open to the public and located in Mexico, if we set aside the discourse restrictions of ASSERT and additionally assume that the context provides an identity function as a value for $g(2, \langle e, e \rangle)$. The individual steps of the interpretation are sketched in (362). This interpretation is based on the Logical Form in (361), assuming with Maienborn (2001) that the quantificational Determiner phrase is the topic of the sentence.⁹⁶

- (347) *In Mexiko ist jeder Strand öffentlich.*
in Mexico is every beach public
‘In Mexico, all beaches are open to the public.’

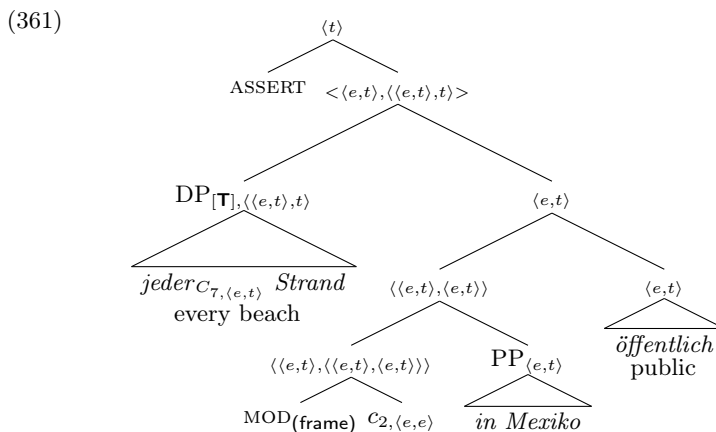
⁹⁵ Maienborn (2001, p. 208), too, observes that LocFs are “...not part of what is asserted.” This is however not reflected in the semantics of $\text{MOD}_{(\text{frame})}$.

⁹⁶ Quantificational Determiner phrases are usually assumed not to be able to function as aboutness topics. See *e.g.* Hinterwimmer (2011).

8 Further Applications of Frame

$$(360) \quad \forall x [(g(7, \langle e, t \rangle))(x) \ \& \ \text{beach}(x) \\ \rightarrow \text{location}((g(7, \langle e, e \rangle))(x)) \subseteq \text{Mexico} \ \& \ \text{public}(x)]$$

The locative prepositional phrase denotes a set of individuals such that their location is contained within or equal to the set of locations referred to as Mexico, in (362-b). Frame modification intersectively combines this denotation with the comment, yielding (362-c). Still assuming an identity mapping for $g(2, \langle e, e \rangle)$, this is property of being located in Mexico and being open to the public.



$$(362) \quad \begin{aligned} \text{a.} \quad & \llbracket [\text{DP} \dots] \rrbracket^g = \lambda Q_{\langle e, t \rangle}. \forall x [(g(7, \langle e, t \rangle))(x) \ \& \ \text{beach}(x) \rightarrow Q(x)] \\ \text{b.} \quad & \llbracket [\text{PP} \dots] \rrbracket = \lambda y_{\langle e \rangle}. \text{location}(y) \subseteq \text{Mexico} \\ \text{c.} \quad & \llbracket \llbracket [\text{MOD}_{\text{frame}} \dots] \dots \rrbracket \rrbracket^g = \\ & \lambda z_{\langle e \rangle}. \text{location}((g(7, \langle e, e \rangle))(z)) \subseteq \text{Mexico} \ \& \ \text{public}(z) \end{aligned}$$

Crucially, the LocF denotation thus ends up in what is often referred to as the nuclear scope of the quantification and nowhere close from restricting the domain of the quantification. Assuming other values for the mapping function will not change this either. While Maienborn (2001)'s insightful discussion of frame setters has been a source of inspiration for the analysis proposed here, the implementation she sketches is less successful in accounting for the interpretative effects of LocFs.

8.2 Exceptive Frames and Quantifier Domain Restrictions

Exceptive phrases such as *except for* and *with the exception of* in English as well as German *mit Ausnahme von* are also amendable to an analysis as frame setters, as Exceptive frames (ExcFs). Consider the following examples:

(363) ... everything I own is paid for, [*except for my house*].⁹⁷

(364) [*With the exception of 2,*
all ordinary prime numbers are odd numbers].⁹⁸

(365) [*Mit Ausnahme von Vitamin B 12,*
verfügen Trauben über alle B Vitamine,...]⁹⁹
“With the exception of vitamin B12,
grapes contain all of the B-vitamins,...”

In all of the above examples, ExcFs indirectly add a restriction to the domain of a universal quantifier: In (363), for instance, the speaker uses the *except for*-phrase to subtract their house from the set of things they own, the domain of the universal quantifier. In (364), the exceptive phrase is used to exclude the number 2 from the set of ordinary prime numbers for the purposes of universally quantifying over them, and in (365), the vitamin B12 is excluded from the set of B-vitamins which are claimed to all be contained by grapes. Before we turn to the analysis, we can take away the following observation about the semantics of these exceptives from this informal discussion: ExcFs bring about a subtraction of the entity contained in the frame from the set described by the first argument of the quantificational determiner. The element to be exempted therefore has to be an element of the set described. There is also an implicature that the quantification would come out as false if the entity in question had not been subtracted and that it thus is not an element of the set that is described by the second argument of the quantificational determiner. To see this more clearly, consider (366), which is an example where the implicature that Dr. Samuels does not have an

⁹⁷ DeWayne Wickham, “Democrats Cannot Take Black Vote for Granted,” *USA Today*, September 3, 2012, comment (URL: <http://tinyurl.com/USAToday200120903>, accessed September 10, 2014.)

⁹⁸ Les Evans, *Complex Numbers and Vectors* (Victoria: Acer Press, 2006), p. 59.

⁹⁹ „Die Edelreben wurden einst von Mönchen gepflegt,“ *Mannheimer Morgen*, September 23, 2000. COSMAS-item M00/SEP.57986.

8 Further Applications of Frame

alibi is cancelled by the subsequent sentence. (See however von Fintel (1994, pp. 102-103) for further discussion.) For English, von Fintel (1994, p. 115) additionally observes that despite superficial similarities as far as their semantic contribution is concerned, *except for*- and *with the exception of*-phrases differ from other exceptive phrases such as *but*-phrases, which are the focus of his discussion and for which he provides a fully compositional analysis (albeit with some adventurous syntax). They do so semantically, an example of which is the minimal pair in (366) and (367), as well as syntactically, as you can see in (368) and (369).

- (366) Well, [*except for Dr. Samuels*], everybody has an alibi, inspector. —
Let's go see Dr. Samuels to find out if he's got one, too.
(Hoeksema 1990, p. 167, no. (5))
- (367) Well, [everybody [*but Dr. Samuels*]] has an alibi, inspector. —
??Let's go see Dr. Samuels to find out if he's got one, too.
(von Fintel 1994, p. 102, no. (9))
- (368) [No one [*but the famous detective*]] suspected the cook.
- (369) a. No one, [*except for the famous detective*], suspected the cook.
b. [*Except for the famous detective*], no one suspected the cook.
c. No one suspected the cook, [*except for the famous detective*].
(von Fintel 1994, p. 115, no. (36))

As von Fintel (1994, p. 115) concludes: “This positional freedom makes free exceptives crucially different from *but*-phrases. I will assume without much argument that it is not possible to consider sentence-peripheral free exceptives as being related to their associated quantifier... Suppose then that free exceptives are base-generated as sentence adjuncts... If free exceptives are sentence adjuncts syntactically, the simplest possible semantic treatment would of course be to interpret them at the sentence-level.” Such a treatment, also suggested by Hoeksema (1987), is however rejected. And indeed, Hoeksema (1987)'s proposal of interpreting this type of exceptives as removing the excepted set from the context for the modified sentence would result in uninterpretability for sentences such as (370), in which the second occurrence of *John* would then lack a referent. (We have observed a similar problem for Kennedy (2007a, 2009)'s analysis of CompFs in section 2.2 above.)

- (370) [*Except for John*], everybody likes John.
(von Fintel 1994, p. 117, no. (42))

8.2 Exceptive Frames and Quantifier Domains

An interpretation of these prepositional phrases as ExcFs, however, avoids the problem of the uninterpretability of (370), while at the same time positing a Logical Form in which these phrases attach high, along the lines of [... [FrameP FRAME [*except for* ...]] [IP ...]]. Apart from FRAME, the semantic contribution of ExcFs is ultimately determined by the lexical material in the first argument of the operator. In the example in (371), for which I will sketch an analysis in the remainder of this section, this is the Preposition *except for*. I provide a lexical entry in (373), along with a lexical entry based on von Stechow (1994), in (372), for comparison. Before I briefly point out some differences between (372) and (373), let me explain (373) with the help of (371) first.

- (371) *Except for Verena,*
every viola player in the orchestra dreaded the treble clef.
- (372) $\llbracket \textit{except for} \rrbracket = \lambda x_{\langle e \rangle} \cdot \lambda R_{\langle \langle e, t \rangle, \langle \langle e, t \rangle, t \rangle \rangle} \cdot \lambda p_{\langle e, t \rangle} \cdot \lambda q_{\langle e, t \rangle} \cdot$
 $R(\{y : p(y)\} \setminus \{x\})(q) \ \& \ \neg R(p)(q)$
 (cf. von Stechow 1994, p. 117, no. (43))
- (373) $\llbracket \textit{except for} \rrbracket = \lambda x_{\langle e \rangle} \cdot \lambda s_{\langle s \rangle} \cdot \exists p_{\langle s, \langle e, t \rangle \rangle} \cdot \exists q_{\langle s, \langle e, t \rangle \rangle}$
 $[p(s)(x) \ \& \ \forall y [p(s)(y) \ \& \ y \neq x \rightarrow q(s)(y)]]$

Applied to the denotation of *Verena*, the semantics in (373) returns (375-a), a set of situations such that there is some set of which Verena is an element in the situation, and another set of which every element of the first set that is not Verena is also an element. FRAME adds this as a domain restriction to the characteristic function of the set of situations such that everyone that is a viola player in the orchestra in the situation and fulfills the contextual restriction also dreads the treble clef in that situation, in (375-b). The lexical entry for the universal quantifier used to derived this function is in (374). The result of adding the denotation of the Frame phrase is (375-c). The frame restricts (375-c) to minimal situations that are such that for some set of which Verena is also an element there is a subset which excludes Verena such that every member is an element of some other set, *e.g.* situations such that every student but Verena arrived late, situations such that that everyone but Verena owned a car, situations such that every viola player but Verena dreaded the treble clef, and so on.

- (374) $\llbracket \textit{every (simplified)} \rrbracket = \lambda s_{\langle s \rangle} \cdot \lambda C_{\langle e, t \rangle} \cdot \lambda p_{\langle s, \langle e, t \rangle \rangle} \cdot \lambda q_{\langle s, \langle e, t \rangle \rangle} \cdot$
 $\forall z [p(s)(z) \ \& \ C(z) \rightarrow q(s)(z)].$

8 Further Applications of Frame

- (375) a. $\llbracket [\textit{except for Verena}] \rrbracket = \lambda s_{\langle s \rangle} \cdot \exists p_{\langle s, \langle e, t \rangle \rangle} \exists q_{\langle s, \langle e, t \rangle \rangle} [p(s)(\textit{Verena}) \ \& \ \forall y [p(s)(y) \ \& \ y \neq \textit{Verena} \rightarrow q(s)(y)]]$
- b. $\llbracket [\textit{every}_{C_{7, \langle e, t \rangle}} [\textit{viola player in the orchestra}] [\textit{dread the treble clef}]] \rrbracket^g =$
 $\lambda s_{\langle s \rangle} \cdot \forall z [\textit{viola player in the orchestra}(s)(z) \ \& \ g(7, \langle e, t \rangle) \rightarrow \textit{dread the treble clef}(s)(z)]$
- c. $\lambda s_{\langle s \rangle} : s \in \text{MIN}(\lambda s^* \cdot \exists p_{\langle s, \langle e, t \rangle \rangle} \exists q_{\langle s, \langle e, t \rangle \rangle} [p(s^*)(\textit{Verena}) \ \& \ \forall y [p(s^*)(y) \ \& \ y \neq \textit{Verena} \rightarrow q(s^*)(y)]]).$
 $\forall z [\textit{viola player in the orchestra}(s)(z) \ \& \ (g(7, \langle e, t \rangle))(z) \rightarrow \textit{dread the treble clef}(s)(z)]$

The presupposition thus restricts value assignments to the free variable in the assertion to $g(7, \langle e, t \rangle) = \{v : v \neq \textit{Verena}\}$, which will result in the exclusion of Verena from the set of viola players in the orchestra for the purposes of quantification. The additional meaning of (371) that Verena is not element of the set of those that dread the treble clef is an implicature resulting from the conversational maxim of quantity: If I had wanted to say that every of the viola players including Verena dreads this particular clef, I would have used the stronger statement. I did not and therefore, that statement must not be true and Verena not dread the treble clef.

The most substantial difference between this analysis and the one based on (372) is of course that the interface between syntax and semantics is fairly transparent here, unlike in the case of (372), which requires a Logical Form along the lines of $\llbracket [\textit{except for XP}] \textit{every} \textit{NP} \textit{VP} \rrbracket$. This is really the only major improvement I offer here on von Stechow (1994)'s analysis. There are however three more differences between (372) and (373) which I would like to point out, the first immediately related to the question of Logical Form because of the argument structure of the Preposition. Note that in (372), the determiner itself is also an argument of the Preposition. The reason for this is that *except for*-phrases may occur with a number of other quantificational items, *e.g.* in (376-a) to (376-d). I restricted myself to those cases in which quantification was most obviously universal.

- (376) a. $[\textit{Except for Mondays}], \textit{there is always plenty of theater productions to see in Washington, D.C.}$ ¹⁰⁰

¹⁰⁰ Forum post "Evening Activities?" *TripAdvisor*, October 29, 2008 (URL: <http://tinyurl.com/TripAdvisor20081029>, accessed September 12, 2014).

8.3 Modal Frames and Accessibility Relations

- b. [Except for my father], my family was very religious.¹⁰¹
- c. [Except for worker ants],
most adult Hymenoptera have two pairs of wings.¹⁰²
- d. [Except for his father],
few men have profoundly influenced him.¹⁰³

The second difference between (372) and (373) is that (372) does not require its first argument to be an element of the set denoted by its third argument, *i.e.* for our example in (371), Verena would not be required to be a viola player in the orchestra: Set subtraction is also defined in cases in which Verena is not an element of the set of viola players in the situation. In those cases, set difference would just return the very same set again, an undesired consequence. The last difference concerns the status of the third meaning component identified above: (372) includes as part of the value description that the quantification has to be false in those cases in which the subtraction operation has not taken place. Note however that in the text, von Fintel (1994, p. 117) acknowledges that this requirement is “. . . plausibly imposed by pragmatic considerations.” (von Fintel 1994, p. 117) This is the view I adopted above.

The main advantage of analyzing some exceptive phrases as ExcFs is however not semantic but rather syntactic in nature in that such an analysis allows for a more transparent relationship between Surface Structure and Logical Form.

8.3 Modal Frames and Accessibility Relations

Let me briefly take stock. So far, we have seen examples of frames that indirectly effect the interpretation of (i) free variables associated with degree operators (CompFs), (ii) temporal variables (LocFs), and (iii) the domain restriction of quantificational determiners (LocFs, ExcFs). In this section, I discuss how frame setters may guide the interpretation

¹⁰¹ “Luke, Lorelai, and a Baby,” *Gilmore Girls* fan fiction, May 15, 2006 (URL: <https://www.fanfiction.net/s/2939333/1/If-Luke-Danes>, accessed September 12, 2014).

¹⁰² Vera Krischik, “Hymenoptera,” University of Minnesota Ent 4015 class handout, Spring 2014 (URL: <http://www.entomology.umn.edu/cues/4015/handouts/Hymenopteraf.pdf>, accessed September 12, 2014).

¹⁰³ “Maryasha Zlobinskaya: At the Front Lines,” *Jewish Family and Children’s Services of Southern Arizona* (URL: <http://jfcstucson.org/maryasha-zlobinskaya/>, accessed September 12, 2014).

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of another type of quantificational domain restriction, namely that of modals. In standard accounts of modality, for which I refer the reader to the excellent overview in von Fintel & Heim (2011), modals are quantifiers over possible worlds (or in our case, possible situations). The modal force of the quantifier is lexically determined, at least in English and German.¹⁰⁴ Not so the accessibility relation, which restricts the quantification to certain possible situations.¹⁰⁵ Kratzer (1981, 1991) argues that this accessibility relation is provided by context, although there might be additional lexical restrictions.

$$(377) \quad \llbracket \text{possibility modal} \rrbracket = \lambda p_{\langle s,t \rangle} \cdot \lambda q_{\langle s,t \rangle} \cdot \exists s' [p(s') \ \& \ q(s')]$$

$$(378) \quad \llbracket \text{necessity modal} \rrbracket = \lambda p_{\langle s,t \rangle} \cdot \lambda q_{\langle s,t \rangle} \cdot \forall s' [p(s') \rightarrow q(s')]$$

Modal frames (ModFs) may manipulate the accessibility relation and thus which worlds (or possible situations) are chosen for the purpose of interpretation, as in the example from Kratzer (1991, p. 639, no. (5)) and the corpus examples in (381) to (382).

$$(379) \quad [In \ view \ of \ the \ available \ evidence], \\ Jockl \ \underline{must} \ have \ been \ the \ murderer.$$

$$(380) \quad [In \ view \ of \ this \ evidence], \ we \ \underline{must} \ say \dots \\ that \ the \ holistic \ and \ anti-equalitarian \ interpretation \ of \ justice \ in \ the \\ Republic \ was \ an \ innovation, \dots \quad ^{106}$$

$$(381) \quad [For \ all \ I \ know], \ there's \ \underline{probably} \ an \ all-Catholic \ hockey \ channel. \quad ^{107}$$

$$(382) \quad [According \ to \ some \ researchers], \ video \ games \ \underline{can} \ be \ an \ important \ tool \\ to \ attract \ and \ hold \ student \ interest. \quad ^{108}$$

In (379), for instance, quantification ends up being restricted to those possible situations which are compatible with what the evidence available to the speaker knows in the actual situation, and the example receives

¹⁰⁴ This is not universally the case across languages.

See *e.g.* Rullmann, Matthewson & Davis (2008).

¹⁰⁵ In fact, modals rely on both, a modal base and one or several ordering sources in their interpretation, which I collapse here into the accessibility relation. See *e.g.* Kratzer (1991), Rubinstein (2011) and, of course, von Fintel & Heim (2011).

¹⁰⁶ Karl R. Popper (⁵1966), *The Open Society and its Enemies: The Spell of Plato* (Princeton: Princeton University Press), p. 92.

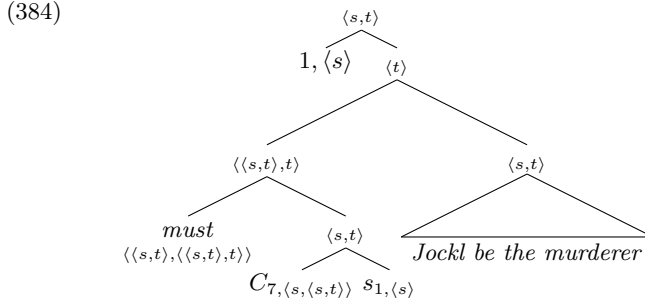
¹⁰⁷ "On the Radio: Stay Tuned," Columbia Broadcasting System (CBS) Morning Radio, May 30, 2004. CoCA-item.

¹⁰⁸ Linda S. Hagedorn & Agustina V. Purnamasari (2012), "A Realistic Look at STEM and the Role of Community Colleges," *Community College Review* 40 (2): 145-164.

8.3 Modal Frames and Accessibility Relations

an epistemic reading. How do these effects of ModFs on the readings of the modal come about? Let us first consider the Logical Form and its interpretation of this modal claim with the frame setter, in (384) and (385). Glossing over details of the temporal interpretation of the sentence as well as over the definite determiner, the sentence is true of an evaluation situation if in all situations accessible via the contextually provided relation, Jockl is a murderer.

(383) *Jockl must be the murderer.*



(385) $\lambda s_{\langle s \rangle}. \forall s' [(g(7, \langle s, \langle s, t \rangle \rangle))(s)(s') \rightarrow \text{murderer}(s')(Jockl)]$

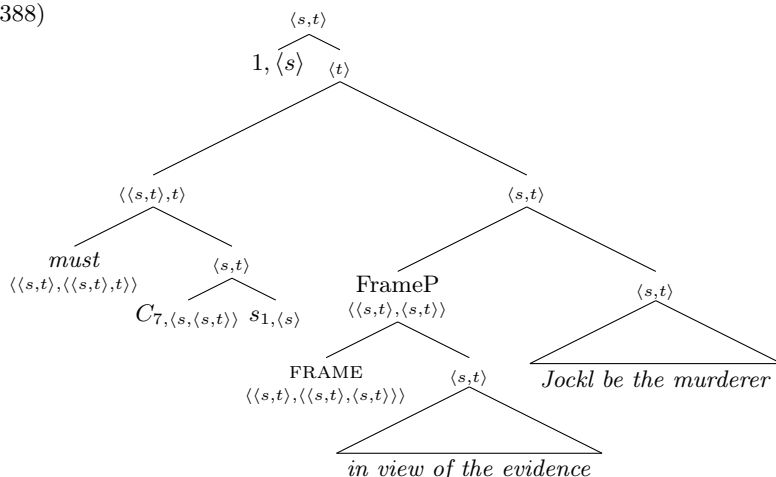
The ModF denotes a set of possible situations, in (386), which are compatible with all the evidence in the evaluation situation. Adding this as a restriction on the evaluation situations of (385) by attaching the ModF above the modal would however not yield the desired result of restricting the domain of quantification of the modal. Rather, it would restrict the situation from which I access the situations which are being quantified over. Depending on the accessibility relation, nothing would then prevent us from accessing possible situations in which the evidence is no longer true. ModFs must therefore attach somewhere in the scope of the modal, as in (388), for instance. The result is a function whose domain are minimal situations which are compatible with the evidence in the evaluation situation, and whose value description is that Jockl is a murderer in those situations, in (387).

(386) $\llbracket \text{in view of the evidence} \rrbracket =$
 $\lambda s_{\langle s \rangle}. s \in \cap \{p \in D_{\langle s, t \rangle} : p \text{ is compatible with the evidence in } g_{1, \langle s \rangle}\}$

(387) $\lambda s' : s' \in \text{MIN}(\lambda s. s \in$
 $\cap \{p \in D_{\langle s, t \rangle} : p \text{ is compatible with the evidence in } g_{1, \langle s \rangle}\}).$
 $\text{murderer}(s')(Jockl)$

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(388)



If we now combine the modal with the denotation in (387) and an evaluation situation s^* , we derive the familiar assertion in (390) for our example, namely that in all contextually accessible possible situations, Jockl is a murderer. What about the presupposition, though? In order to answer this question, we have yet to address the projection behavior of modal quantifiers. As I am not aware of any literature on the topic, I assume the definedness conditions in (389), modelled after the definedness conditions discussed for quantifiers of type $\langle \langle e, t \rangle, \langle \langle e, t \rangle, t \rangle \rangle$ in Tiemann (2014, pp.129-133). (See also section 6.1 above for further discussion.) Crucially for our purposes, modal quantifiers are only defined if their first argument, the set of possible situations accessible from a particular situation, is a subset or equal to the the set of situations which meet the definedness conditions of their second argument. That is the definedness condition introduced by the Frame phrase in our example. Kratzer (1991)'s example thus presupposes that the context provides a domain of quantification which is a subset or equal to the set of minimal situations which are compatible with all the evidence in the evaluation situation. This is the desired interpretation.

- (389) For any $p, q \in D_{\langle s, t \rangle}$ and any $s \in D_{\langle s \rangle}$,
 $\llbracket \text{must} \rrbracket(p)(q)$ is only defined if
 $\{s' \in D_{\langle s \rangle} : p(s') \text{ is defined and true}\} \neq \emptyset$ &
 $\{s' \in D_{\langle s \rangle} : p(s') \text{ is defined and true}\} \subseteq \{s'' \in D_{\langle s \rangle} : q(s'') \text{ is defined}\}$

- (390) **assertion:**
 $\forall s' [(g(7, \langle s, \langle s, t \rangle \rangle))(s^*)(s') \rightarrow \text{murderer}(s')(\text{Jockl})]$
presupposition:
 $(g(7, \langle s, \langle s, t \rangle \rangle))(s^*) \subseteq \text{MIN}(\llbracket [\text{ModF} \dots] \rrbracket) \Leftrightarrow$
 $(g(7, \langle s, \langle s, t \rangle \rangle))(s^*) \subseteq$
 $\text{MIN}(\lambda s. s \in \cap \{p : p \text{ is compatible with the evidence in } s^*\})$

To summarize, the analysis of ModFs relies not only on the semantics of FRAME but also on two additional assumptions, one about the projection behavior of modal quantifiers, the other about the syntactic position of the frame setter in these sentences. While both assumptions require further research, let me briefly comment on the syntactic position of ModF: It is indeed interesting that the Frame phrase must attach below the modal. I can only speculate about the reasons, but here is one idea: Maybe modal quantifiers operate on maximal situations, that is possible worlds, rather than just any possible situations, as we assume above. Frame setters do not and thus have to attach at Logical Form to a position which –sizewise– still makes all kinds of situations available. A covert head right below the modal would then relate these situations to the worlds which they are a part of. Related to this question is the observation that in the case of a ModF, an overt modal is actually not always required: Both sentences in (391) are grammatical.

- (391) a. *For all I know, Mary is at home right now.*
 b. *For all I know, Mary might be at home right now.*

This is predicted, considering the interpretation of (391-a): Under our current analysis, the sentence will only be defined in an evaluation situation if it is a minimal situation which is compatible with all I know in the evaluation situation. The sentence will be true only if Mary is at home in the evaluation situation.

8.4 Contrastive Frames and Focus Alternatives

In this section, I add one more more context-dependent construction to this showreel for the applications of frame: Contrastive frames (CFs) may constrain the alternatives in the interpretation of focus and thereby the free variable which we find with the alternative-evaluating operator squiggle operator and with alternatives-sensitive operators.

This section will focus on one such CF, German *im Gegensatz zu*, in examples such as (392) to (394), where the frame expresses a contrast

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with the focused constituent from the main clause. Before we discuss these examples and spell out the analysis for this CF, let me first briefly introduce some basics of alternative semantics. Further good candidates for CFs in German and English, will be pointed out later in this section.

- (392) [Im Gegensatz zu vielen anderen Unternehmen] klagt *Gildemeister*_F nicht über einen Mangel an Fachkräften.¹⁰⁹
“Unlike many other companies, Gildemeister does not complain about a shortage of skilled workers.”
- (393) [Im Gegensatz zu damals] übernachteten die Jugendlichen heute_F jedoch zusammen in der Jugendherberge und nicht mehr in den einzelnen Familien.¹¹⁰
“Unlike in the past, the teenagers now stay together at youth hostels and not with host families anymore.”
- (394) [Im Gegensatz zu Steinbrück], der sich mehrfach aus dem Fenster gelehnt hat, schwieg *Steinmeier*_F bis zum Beginn des Parteitages.¹¹¹
“Unlike Steinbrück, who stucked his neck out repeatedly, Steinmeier remained silent until the beginning of the party convention.”

When evaluating the sentence in (395), where *Nadine* is focused, we usually also take consideration contextually salient alternatives to her, such as *Sonja*, *Konstantin*, *Sara*, *Sigrid*, and *Polina*. Intuitively, we are not only assuming that Nadine laughed but also that this not the case for any of the alternatives.

- (395) *Nadine*_F laughed.

These intuitions can be captured formally by a system which makes use a second layer of semantic interpretation, the alternative semantic interpretation $\llbracket \cdot \rrbracket_{\text{Alt}}$, as proposed in Rooth (1985, 1992). (See Beck (2006, 2015) for a recent overview and a contemporary implementation.) For our example, the ordinary semantic interpretation of *Nadine* is (396-a), of course, while the alternative semantic interpretation in (396-a), triggered by the focus, is the set in (396-b), the type domain.

¹⁰⁹ „Auftragsschub erwartet,“ *Hannoversche Allgemeine Zeitung*, September 19, 2007, p. 13. COSMAS-item HAZ07/SEP.05880.

¹¹⁰ „Mehr als Prinz Charles und mäßiges Essen,“ *Hannoversche Allgemeine Zeitung*, August 25, 2008, p. 20. COSMAS-item HAZ07/AUG.01779.

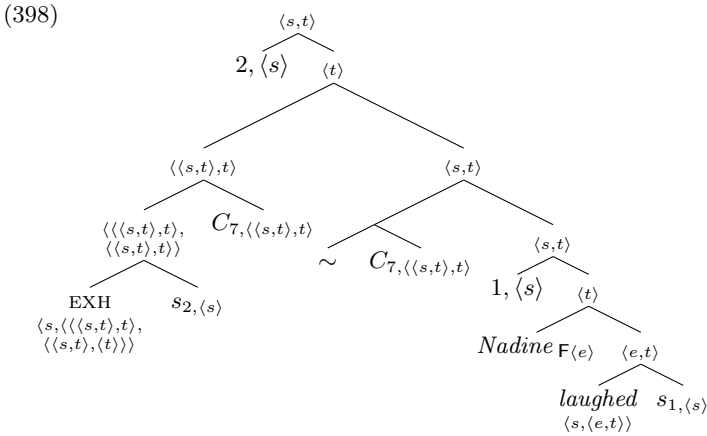
¹¹¹ „Frank-Walter Steinmeier,“ *Hannoversche Allgemeine Zeitung*, October 27, 2007, p. 3. COSMAS-item HAZ07/OKT.08191.

8.4 Contrastive Frames and Focus Alternatives

- (396) a. $\llbracket \text{Nadine}_{\mathbf{F}} \rrbracket_{\mathbf{O}} = \text{Nadine}$
 b. $\llbracket \text{Nadine}_{\mathbf{F}} \rrbracket_{\mathbf{Alt}} = D_{\langle e \rangle}$

At Logical Form, alternatives are evaluated by the covert squiggle \sim operator, in (397), who comes with a free variable, the focus anaphor. To the interpretation of this free variable, \sim adds the presupposition that it be a subset or equal to the alternatives which have been built in the structure at this point.¹¹² For our example, this is the presupposition that free variable denotes a set containing alternatives such as $[\lambda s_{\langle s \rangle}. [\text{laughed}(s)(\text{Sonja})]]$ and $[\lambda s_{\langle s \rangle}. [\text{laughed}(s)(\text{Konstantin})]]$, in (399).

- (397) **The Squiggle Operator \sim :**
 If α is a tree $[[\sim C] \beta]$, then:
 $\llbracket \alpha \rrbracket_{\mathbf{O}}^g$ is defined only if $\llbracket C \rrbracket_{\mathbf{O}}^g \subseteq \llbracket \beta \rrbracket_{\mathbf{Alt}}^g$.
 If defined, $\llbracket \alpha \rrbracket_{\mathbf{O}}^g = \llbracket \beta \rrbracket_{\mathbf{O}}^g$ and $\llbracket \alpha \rrbracket_{\mathbf{Alt}}^g = \{\llbracket \beta \rrbracket_{\mathbf{O}}^g\}$.



- (399) $\llbracket [[\sim C_{7, \langle \langle s, t \rangle, t \rangle}] \dots] \rrbracket_{\mathbf{O}}^g = \lambda s. \text{laughed}(s)(\text{Nadine})$
presupposition:
 $g(7, \langle \langle s, t \rangle, t \rangle) \subseteq \{p \in D_{\langle s, t \rangle} : \exists x \in D_{\langle e \rangle} [p = \lambda s'. \text{laughed}(s')(x)]\}$

Its value may serve as a domain restriction for a number of alternatives-

¹¹² Beck (2015, draft, Appendix) correctly points out that in this system, the rule of Predicate Abstraction is not well-defined and suggests an alternative semantics which employs distinguished variables instead. As many readers will be already familiar with the implementation used here, I decided to ignore this severe complication. The analysis of CFs applies across frameworks anyway.

8 Further Applications of Frame

sensitive operators such as the covert exhaustivity operator, with the somewhat simplified semantics in (400), which will do for our purposes. (But see *e.g.* Krifka (1995b), Fox & Hackl (2006), and Fox (2007).) At the level of Logical Form, this is achieved by stipulating that both contextual variables bear the same index, as in (398). This Logical Form receives the interpretation in (401). The sentence is true in an evaluation situation if Nadine laughed and all contextually salient alternatives which are presupposed to be of the shape that someone but Nadine laughed are false in that situation. A sample value assignment which would fulfill the presupposition is $g(7, \langle\langle s, t \rangle, t \rangle) = \{\lambda s. \text{laughed}(s)(\text{Sonja}); \lambda s. \text{laughed}(s)(\text{Konstantin}); \lambda s. \text{laughed}(s)(\text{Sara}); \lambda s. \text{laughed}(s)(\text{Sigrid})\}$. All of the propositions contained in this set would have to be false in the evaluation situation for the sentence to be true.

$$(400) \quad \llbracket \text{EXH} \rrbracket = \lambda s_{\langle s \rangle}. \lambda C_{\langle\langle s, t \rangle, t \rangle}. \lambda p_{\langle s, t \rangle}. p(s) \ \& \ \forall q [C(q) \ \& \ p \neq q \rightarrow \neg q(s)]$$

$$(401) \quad \llbracket [2, \langle s \rangle [\dots]] \rrbracket^g =$$

$\lambda s. \text{laughed}(s)(\text{Nadine}) \ \&$
 $\forall q [(g(7, \langle\langle s, t \rangle, t \rangle))(q) \ \& \ q \neq [\lambda s. \text{laughed}(s)(\text{Nadine})] \rightarrow \neg q(s)]$

presupposition:
 $g(7, \langle\langle s, t \rangle, t \rangle) \subseteq \{p \in D_{\langle s, t \rangle} : \exists x \in D_{\langle e \rangle} [p = \lambda s'. \text{laughed}(s')(x)]\}$

In the presence of a frame setter, the contextual alternatives under consideration are severely restricted.¹¹³ Consider (402), for instance, where the only two alternatives are the proposition that Nadine thought the joke funny and Sara thought the joke funny. The latter proposition is excluded as false.

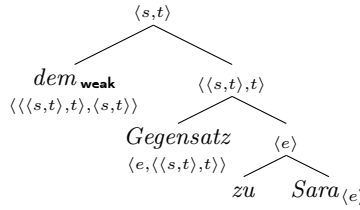
$$(402) \quad [\textit{Im Gegensatz zu Sara}] \textit{ fand Nadine}_{\text{F}} \textit{ den Witz lustig.}$$

in+the contrast to Sara found Nadine the joke funny
‘Unlike Sara, Nadine thought the joke funny.’

¹¹³ I naively assume that the focus on *Nadine* in both, (395) and (402) is of the same type, namely exhaustive focus with an H* L-L% contour in the Tones and Break Indices (ToBi) notation. The intonational contour of (402) is actually more complex, in that *Nadine* appears to be marked as a contrastive topic by a L+H* L-H% contour, and *lustig* by an exhaustive focus. The alternatives under consideration will thus be of a different makeup, namely sets of questions rather than sets of propositions. (See Büring (1997, 2003, 2015) but also Constant (2014).) This different type of alternatives will also be reflected in the semantics of the alternatives-sensitive operator. As far as the manipulation of the alternative set by the CF is concerned, the reasoning will however not differ from the naive approach.

This restriction is a result of the semantics of FRAME and the lexical semantics of its first argument, the Preposition phrase, for which we are going to suggest that it denotes those minimal situations in which a certain property is false of Sara but true of someone else. The internal structure of the Preposition phrase is in (403), and a lexical entry for *Gegensatz zu* in (404-a): For any individual it provides the set of propositions of the shape that some property does not hold for that individual and yet holds of another individual, *e.g.* (404-b) and (404-c). Combined with the lexical entry for the weak definite, repeated from chapter 4, this yields the proposition of the shape that some property is false of Sara but true of somebody else, in (406), presupposing that there is such a unique proposition in the context. (Obviously, in the case of our example this is going to be the proposition that Nadine thought the joke funny but Sara did not.) I assume that the preposition *in* is semantically vacuous.

(403)



- (404) a. $\llbracket \text{Gegensatz} \rrbracket = \lambda x_{\langle e \rangle}. \{p : \exists R_{\langle s, \langle e, t \rangle \rangle}, \exists y_{\langle e \rangle} [p = \lambda s. R(s)(y) \ \& \ \neg R(s)(y)]\}$
- b. $\llbracket \text{Gegensatz zu Sara} \rrbracket = \{p : \exists R_{\langle s, \langle e, t \rangle \rangle}, \exists y_{\langle e \rangle} [p = \lambda s. [R(s)(y) \ \& \ \neg R(s)(\text{Sara})]]\}$
- c. {that Nadine thought the joke funny and Sara did not, that Saskia laughed at the joke and Sara did not, that Sonja already knew the joke and Sara did not, that Vera was there when the joke was told and Sara was not, . . . }

(405) $\llbracket \text{der}_{\text{weak}} \rrbracket = \lambda P_{\langle \langle s, t \rangle, t \rangle} : \exists ! p \in D_{\langle s, t \rangle} [P(p)]. \iota p [P(p)]$

(406) $\llbracket \text{im Gegensatz zu Sara} \rrbracket = \iota p [\exists R_{\langle s, \langle e, t \rangle \rangle}, \exists y_{\langle e \rangle} [p = \lambda s. R(s)(y) \ \& \ \neg R(s)(\text{Sara})]]$

presupposition:

$$\exists ! p [\exists R_{\langle s, \langle e, t \rangle \rangle}, \exists y_{\langle e \rangle} [p = \lambda s. R(s)(y) \ \& \ \neg R(s)(\text{Sara})]]$$

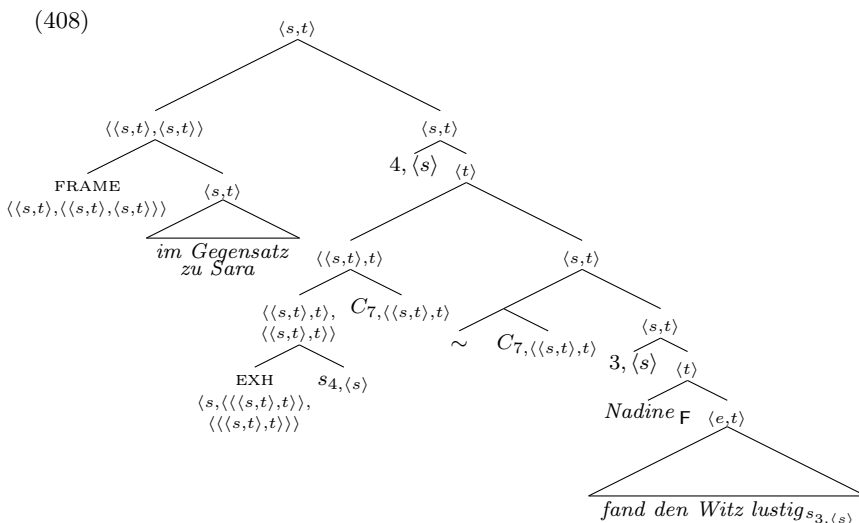
FRAME adds this denotation as a presupposition onto the set of situations in (407), those situations in which Nadine thought the joke funny and in

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which all contextually provided alternatives of the shape that someone thought the joke funny are false. The Logical Form which is the basis for this operation is in (408).

$$(407) \quad \lambda s. \text{Nadine thought the joke funny in } s \ \& \ \forall q [(g(7, \langle \langle s, t \rangle, t \rangle))(q) \ \& \ q \neq [\lambda s. \text{Nadine thought the joke funny in } s] \rightarrow \neg q(s)]$$

presupposition: $g(7, \langle \langle s, t \rangle, t \rangle) \subseteq \{p \in D_{\langle s, t \rangle} : \exists x \in D_{\langle e \rangle} [p = \lambda s'. x \text{ thought the joke funny in } s']\}$



The result of interpreting this Logical Form is in (409): A function from those minimal situations which are an element of the unique contextually salient proposition of the shape that some property is false of Sara but true of somebody else to true only if Nadine thought the joke funny and all of the contextually relevant propositions of the shape that someone thought the joke funny are false in those situations.

$$(409) \quad \lambda s : s \in \text{MIN}(\iota p [\exists R_{\langle s, \langle e, t \rangle \rangle}, \exists y_{\langle e \rangle} [p = \lambda s'. R(s')(y) \ \& \ \neg R(s')(Sara)]]).$$

Nadine thought the joke funny in s &
 $\forall q [(g(7, \langle \langle s, t \rangle, t \rangle))(q) \ \& \ q \neq [\lambda s''. \text{Nadine thought the joke funny in } s''] \rightarrow \neg q(s)]$
 additional presuppositions:
 $g(7, \langle \langle s, t \rangle, t \rangle) \subseteq \{p \in D_{\langle s, t \rangle} : \exists x \in D_{\langle e \rangle} [p = \lambda s'. x \text{ thought the joke funny in } s']\}$
 $\exists! p [\exists R_{\langle s, \langle e, t \rangle \rangle}, \exists y_{\langle e \rangle} [p = \lambda s. R(s)(y) \ \& \ \neg R(s)(Sara)]]$

8.4 Contrastive Frames and Focus Alternatives

In (409), the CF restricts the sentence to situations whose make-up is such that they contain Sara as well as another individual and a property which is true of that other individual in those situations but not of Sara herself. These situations are asserted to be such that the property of finding the joke funny is true of Nadine and false of relevant alternatives. Given the restriction, however, the only relevant alternative to Nadine can be Sara here. In technical terms, $g(7, \langle \langle s, t \rangle, t \rangle)$ may only assigned the set containing the proposition that Sara did not think the joke funny and the proposition that Nadine thought the joke funny.

What about CFs in English and other CFs in German? Let me add some informal discussion of a couple of other CFs. Other examples from German are *im Kontrast zu*, in (410), and *im Unterschied zu*, in (411). The analysis also extends to English *in contrast to*, an example of which I provide in (412).

- (410) [*Im Kontrast zu Dole, der die Unterwanderung der USA durch illegale Einwanderer, Homosexuelle, liberale Abtreibungsfreunde und Sozialschnorrer beenden will,*] *ist Clintons_F Botschaft betont positiv.*¹¹⁴

“Clinton’s message is most demonstratively positive, which makes him contrast with Dole, who wants to put an end to the infiltration of the United States by illegal immigrants, homosexuals, liberal abortion advocates and welfare recipients.”

- (411) [*Im Unterschied zu anderen Anbietern*] *lässt Playmobil_F die eigenen Spielsachen von einem unabhängigen Institut prüfen.*¹¹⁵

“In contrast to other suppliers, Playmobil has their own toys tested by an independent institute.”

- (412) [*In contrast to Missouri’s fans*], *the players_F, especially the seniors, welcomed Haith.*¹¹⁶

As for (410), the sentence asserts that Bill Clinton’s message in the electoral campaign may be characterized as positive which is not true of other alternatives. The frame setter restricts these to his Republican

¹¹⁴ „Der republikanische US-Präsidentschaftskandidat bläst zu einem verzweifelten Endspurt,“ *Nürnberger Nachrichten*, November 2, 1996, p. 4. COSMAS-item NUN96/NOV.00056.

¹¹⁵ „Playmobil profitiert von deutschem Werk,“ *Hannoversche Allgemeine Zeitung*, February 9, 2008, p. 13. COSMAS-item HAZ08/FEB.01762.

¹¹⁶ Marlen Garcia, “Faith in Haith pays,” *USA Today*, January 24, 2012, p. 1C.

competitor, Bob Dole. The example in (411) asserts that Playmobil has its products tested by an independent testing laboratory while other companies do not. By virtue of the CF, these companies must be other toy companies. To the English example in (412), the frame adds the presupposition that the sentence is only defined if the evaluation situation is a minimal situation in which there is a certain property which is true of some other entity in the situation but false of the fans, here of the Missouri Tigers men's basketball team. As in the German examples, this presupposition indirectly restricts the compatible value assignments to the free variable introduced with the squiggle and with the alternatives-sensitive exhaustivity operator: The assertion of the sentence is that the players welcomed Frank Haith (F.H.), the new coach, in the situation but that all other contextually relevant propositions of the form that someone welcomed F.H. are false in the situation. The only proposition compatible with the situational restriction of the CF here is that the fans of the Missouri Tigers welcomed F.H. in the situation.

Let's take a step back and have a look at the bigger picture: The discussion of CFs shows that FRAME is in fact not the only operator in natural language that allows us to manipulate the value assignment to a free variable. As we have just seen, the focus-evaluating operator squiggle, in (397), too, does exactly that. In the Logical Forms above, the squiggle restricts the domain variable of EXH, a focus-sensitive operator (FocOp): In the process of evaluating a focus, it introduces the presupposition that the free variable that comes along with it receives a value that is a subset or equal to the set of focus alternatives of the constituent it attaches to. By stipulation, the domain variable of a alternatives-sensitive quantifier has the same index and semantic type as this free variable.

- (413) a. Alternative Evaluation:
 $[[\text{FocOp } C_{7, \langle \alpha, t \rangle}] \dots [[\sim C_{7, \langle \alpha, t \rangle}] [_{\langle \alpha \rangle} \dots \text{XP}_F \dots]]]$
- b. Frame Setting:
 $[[\text{FRAME } [_{\langle s, t \rangle} \dots]] [_{\langle s, t \rangle} \dots c_{\langle \alpha \rangle} \dots]]$

What both operators thus have in common is that they use presuppositions as a tool to bring about the desired interpretative effect. Unlike the squiggle, though, FRAME does not explicitly specify the variable whose value it is going to restrict. This relation is entirely indirect and mediated through the description of a set of situations. As far as the content of the presupposition is concerned, the squiggle operator relies completely

on the structure it attaches to. FRAME relies on the lexical semantics of its complement, from which the still compatible value assignments yet have to be inferred. While the squiggle is thus restricted to a limited set of constructions, namely those which rely on an alternative layer of semantic interpretation, Frame phrases are not. As mediators of the context dependency of natural language expressions, both, the squiggle and FRAME, are however instances of the same type of presuppositional glue in the composition of meaning.

8.5 Chapter Summary

Frame phrases are not restricted to degree constructions, and neither is their effect on the interpretation of contextual variables. Maienborn (2001)'s analysis of LocFs does not capture this effect, unlike the analysis developed for CompFs in chapters 4 and 5, which can also easily be extended not only to LocFs but also to ExcFs, ModFs and CFs.

| Frame | Example | Free Variable Targeted |
|-------|--------------------------------|---|
| CompF | <i>im Vergleich zu Peter</i> | comparison standards (types $\langle d \rangle$, $\langle d, t \rangle$, $\langle e, t \rangle$) |
| LocF | <i>in Mexico</i> | domain of quantification (type $\langle e, t \rangle$) free temporal variables (type $\langle i, t \rangle$) |
| ExcF | <i>except for Verena</i> | domain of quantification (type $\langle e, t \rangle$) |
| ModF | <i>in view of the evidence</i> | accessibility relation (type $\langle s, \langle s, t \rangle \rangle$) |
| CFs | <i>im Gegensatz zu Sara</i> | focus alternatives (type $\langle \langle s, t \rangle, t \rangle$) |

Table 8.1: Frame Setters and the Interpretation of Contextual Variables

This chapter has thus showcased examples of frame setters interacting with the interpretation of the most prominent examples of contextual variables at Logical Form. The list of free variables frame setters may manipulate in their value assignment is however very likely not complete, as is the list of frame setters discussed in this dissertation (and their analysis). In this respect, I want this chapter to be understood above all as having sketched an agenda for future research on free variables and frame setting.

9 Concluding Remarks

I think of this dissertation as a case study of the interface between semantics and pragmatics, composition and context. Free variables are the mediators at this interface. They are syntactically represented but assigned an appropriate value from the context by the assignment function. Frame setters interfere with this value assignment as they may considerably restrict the set of appropriate values for a free variable.

The starting point of our investigation was the syntax and semantics of comparison frames (CompFs) and the interpretation of contextually provided standards in degree constructions. The next section provides a summary of how the investigation proceeded from there. It ends with some general conclusions on what we have learned about contextual variables and how they are restricted in their interpretation by presuppositions.

The analyses of CompFs in the literature vary with respect to whether CompFs are treated as compositionally integrated, whether they are an argument of the degree operator, and, as a result as to the semantic type assumed for their denotation, as we have seen in chapter 2. What all of the existing analyses of CompFs have in common is that they treat them as essentially an isolated phenomenon. Chapter 3 provided evidence in favor of the compositional integration of CompFs but against an analysis as an argument of the degree operator. For both English and German, there is no evidence that the plausibility-dependent variation in acceptability of Contextual Comparatives (ContComps) with CompFs, because of which Beck, Oda & Sugisaki (2004) and Beck, Hohaus & Tiemann (2012) argue for an analysis of CompFs as compositionally unintegrated material, is any greater than for comparatives with direct standard phrases. Data from variable binding and topicalization as well as, in German, V2-licensing also provide support for a compositional analysis. The absence of island effects with ContComps in relative clauses and the related effects of the syntactic position on the interpretation of the comparison standard are incompatible with an analysis such as Fulst (2005, 2006)'s, which treats CompFs as an argument of the degree operator.

9 Concluding Remarks

In chapter 4, I suggested analyzing CompFs as an instance of a well recognized phenomenon, as frame setters. In the absence of an explicit formal analysis of frame setters, I provided a situation-semantics analysis of my own. In the architecture of Logical Form, FRAME heads a projection within the management layer, which is located above the core proposition and above the functional layer.

$$(129) \quad \llbracket \text{FRAME} \rrbracket = \lambda p_{\langle s,t \rangle} \cdot \lambda q_{\langle s,t \rangle} \cdot \lambda s_{\langle s \rangle} : \text{MIN}(p)(s) \cdot q(s)$$

FRAME, repeated in (129), adds the denotation of its first argument, restricted to minimal situations, as a domain restriction to the characteristic function of the set of situations its second arguments denotes. Such a presuppositional analysis can successfully account for the effect CompFs have on the interpretation of the free degree variable in ContComps, for the position effects, and for the absence of islands effects in certain syntactic configurations. Chapter 5 allowed us to step back and reflect upon the two core ingredients of the analysis, the presuppositional status of frames and minimality of situations. Frame setting relies on evaluation situations which contain no superfluous material, just like quantification over situations, for instance. In chapter 6, I provided an analysis of the binding data from chapter 3, which required that the presupposition introduced by FRAME was adequately treated in the lexical entries of quantifiers, as in Tiemann (2014). The chapter concluded with analyses of CompFs in other degree constructions.

An understanding of indirect standard phrases is crucial for understanding crosslinguistic variation in degree constructions when it comes to how the standard of the comparison is compositionally arrived at, a point also made by Beck, Oda & Sugisaki (2004) and Beck, Hohaus & Tiemann (2012). Chapter 7 therefore explored the resulting typology of comparison standards. Languages differ as to whether they have both compositional strategies, the indirect and the direct strategy, at their disposal, or whether they only pursue a contextual strategy when determining the standard of a comparison. On the basis of data from my fieldwork on Sāmoan, I argued that this language is unlike English and German in that it lacks a direct compositional strategy. Evidence in favor of such an analysis comes from the distribution of standard phrases and the absence of island effects. I went on to discuss several other languages with respect to their place in the typology, among them Tajiki (CompFs and direct standard phrases), Washo (only CompFs), and Motu (entirely context dependent). As far as Japanese is concerned, it is unclear where

to locate the language in the typology. Nevertheless, I have contributed two new empirical observations to the discussion of the status of *gori*-phrases, syntactic dependency and variation in interpretation.

We left the realm of degree constructions in chapter 8, where I extended my analysis to four representative cases where we observe an interaction between a frame setter and the value assignment to a free variable: Locative frames (LocFs) and Exceptive frames (ExcFs), which both indirectly fix the interpretation of quantifier-domain variables, Modal frames (ModFs), which determine the accessibility relation of a modal, and lastly, Contrastive frames (CFs), which restrict the available focus alternatives. To conclude this summary, I think it is fair to say that frame setters are thus a fascinating example of how intricate meaning composition in natural language actually is.

So, what have we learned about the grammar of free variables in the course of this dissertation? I can identify two core results: First, free variables may be syntactically complex, just as von Stechow (1994), Martí Martínez (2003), and Beck (2007) observe. Syntactic complexity allows us to account for quantifier-dependent readings of these variables. Second, and most importantly, presuppositions may restrict the permissible value assignments to free variables. Frame setters, which introduce a presupposition regarding the makeup of the evaluation situation, exploit this possibility.

A Material Used in the Acceptability Rating Studies

A.1 Main Items for German

- (414) **item no. 0: „Regenschirm“**
*Karin und Jan haben gestern Nachmittag
dringend einen Schirm gegen den Regen gebraucht.*
- a. **cond. 1 [pla,comp]:**
Karin hat einen teureren Regenschirm gekauft als Jan.
 - b. **cond. 2 [impla,comp]:**
Karin hat einen längeren Regenschirm gekauft als Jan.
 - c. **cond. 3 [pla,cont]:**
*Im Vergleich dazu, was Jan gekauft hat,
hat Karin einen teureren Regenschirm gekauft.*
 - d. **cond. 4 [impla,cont]:**
*Im Vergleich dazu, was Jan gekauft hat,
hat Karin einen längeren Regenschirm gekauft.*
- (415) **item no. 1: „Motorboot“**
*Felix und Hannah sind am Wochenende
auf der Insel Mainau gewesen.*
- a. **cond. 1 [pla,comp]:**
*Felix hat mit einem schnelleren Motorboot übergesetzt
als Hannah.*
 - b. **cond. 2 [impla,comp]:**
*Felix hat mit einem saubereren Motorboot übergesetzt
als Hannah.*
 - c. **cond. 3 [pla,cont]:**
*Im Vergleich dazu, womit Hannah übergesetzt hat,
hat Felix mit einem schnelleren Motorboot übergesetzt.*
 - d. **cond. 4 [impla,cont]:**
*Im Vergleich dazu, womit Hannah übergesetzt hat,
hat Felix mit einem saubereren Motorboot übergesetzt.*

A Material Used in the Acceptability Rating Studies

- (416) **item no. 2: „Zug“**
Lisa und Stefan haben sich am Vormittag am Bahnschalter beraten lassen.
- cond. 1 [pla,comp]:**
Lisa hat einen schnelleren Zug gebucht als Stefan.
 - cond. 2 [impla,comp]:**
Lisa hat einen längeren Zug gebucht als Stefan.
 - cond. 3 [pla,cont]:**
Im Vergleich dazu, was Stefan gebucht hat, hat Lisa einen schnelleren Zug gebucht.
 - cond. 4 [impla,cont]:**
Im Vergleich dazu, was Stefan gebucht hat, hat Lisa einen längeren Zug gebucht.
- (417) **item no. 3: „Pfanne“**
Simon und Katrin haben nach dem Mittagessen gemeinsam den Abwasch gemacht.
- cond. 1 [pla,comp]:**
Simon hat eine schmutzigere Pfanne gespült als Katrin.
 - cond. 2 [impla,comp]:**
Simon hat eine teurere Pfanne gespült als Katrin.
 - cond. 3 [pla,cont]:**
Im Vergleich dazu, was Katrin gespült hat, hat Simon eine schmutzigere Pfanne gespült.
 - cond. 4 [impla,cont]:**
Im Vergleich dazu, was Katrin gespült hat, hat Simon eine teurere Pfanne gespült.
- (418) **item no. 4: „Koffer“**
Lena und David haben bei ihren Freunden Koffer für einen Kurztrip ausgeliehen.
- cond. 1 [pla,comp]:**
Lena hat sich einen größeren Koffer ausgeliehen als David.
 - cond. 2 [impla,comp]:**
Lena hat sich einen teureren Koffer ausgeliehen als David.
 - cond. 3 [pla,cont]:**
Im Vergleich dazu, was David sich ausgeliehen hat, hat Lena sich einen größeren Koffer ausgeliehen.
 - cond. 4 [impla,cont]:**
Im Vergleich dazu, was David sich ausgeliehen hat, hat Lena sich einen teureren Koffer ausgeliehen.

- (419) **item no. 5: „Mäuse“**
Meine Katzen Mimi und Mo sind in der Nacht auf Mäusefang gewesen.
- a. **cond. 1 [pla,comp]:**
Mimi hat mehr Mäuse gefangen als Mo.
 - b. **cond. 2 [impla,comp]:**
Mimi hat größere Mäuse gefangen als Mo.
 - c. **cond. 3 [pla,cont]:**
Im Vergleich dazu, was Mo gefangen hat, hat Mimi mehr Mäuse gefangen.
 - d. **cond. 4 [impla,cont]:**
Im Vergleich dazu, was Mo gefangen hat, hat Mimi größere Mäuse gefangen.
- (420) **item no. 6: „Leiter“**
Martin und Lea haben am Wochenende das undichte Garagendach repariert.
- a. **cond. 1 [pla,comp]:**
Martin hat eine höhere Leiter aufgestellt als Lea.
 - b. **cond. 2 [impla,comp]:**
Martin hat eine breitere Leiter aufgestellt als Lea.
 - c. **cond. 3 [pla,cont]:**
Im Vergleich dazu, was Lea aufgestellt hat, hat Martin eine höhere Leiter aufgestellt.
 - d. **cond. 4 [impla,cont]:**
Im Vergleich dazu, was Lea aufgestellt hat, hat Martin eine breitere Leiter aufgestellt.
- (421) **item no. 7: „Kamm“**
Laura und Markus haben sich vor dem Spiegel ihre Haare gekämmt.
- a. **cond. 1 [pla,comp]:**
Laura hat einen größeren Kamm benutzt als Markus.
 - b. **cond. 2 [impla,comp]:**
Laura hat einen schwereren Kamm benutzt als Markus.
 - c. **cond. 3 [pla,cont]:**
Im Vergleich dazu, was Markus benutzt hat, hat Laura einen größeren Kamm benutzt.
 - d. **cond. 4 [impla,cont]:**
Im Vergleich dazu, was Markus benutzt hat, hat Laura einen schwereren Kamm benutzt.

A Material Used in the Acceptability Rating Studies

- (422) **item no. 8: „Lampe“**
*Nina und Thomas haben letzte Woche
ihr gemeinsames Arbeitszimmer neu eingerichtet.*
- a. **cond. 1 [pla,comp]:**
Nina hat eine hellere Lampe aufgestellt als Thomas.
 - b. **cond. 2 [impla,comp]:**
Nina hat eine schwerere Lampe aufgestellt als Thomas.
 - c. **cond. 3 [pla,cont]:**
*Im Vergleich dazu, was Thomas aufgestellt hat,
hat Nina eine hellere Lampe aufgestellt.*
 - d. **cond. 4 [impla,cont]:**
*Im Vergleich dazu, was Thomas aufgestellt hat,
hat Nina eine schwerere Lampe aufgestellt.*
- (423) **item no. 9: „Firmenwagen“**
*Anja und Sven sind beide
zum ersten Mal einen Firmenwagen gefahren.*
- a. **cond. 1 [pla,comp]:**
Sven ist einen schnelleren Wagen gefahren als Anja.
 - b. **cond. 2 [impla,comp]:**
Sven ist einen lauterer Wagen gefahren als Anja.
 - c. **cond. 3 [pla,cont]:**
*Im Vergleich dazu, was Anja gefahren ist,
ist Sven einen schnelleren Wagen gefahren.*
 - d. **cond. 4 [impla,cont]:**
*Im Vergleich dazu, was Anja gefahren ist,
ist Sven einen lauterer Wagen gefahren.*
- (424) **item no. 10: „Kopfkissen“**
Lukas und Sarah haben in den Ferien bei Freunden übernachtet.
- a. **cond. 1 [pla,comp]:**
*Lukas hat auf einem bequemeren Kopfkissen
geschlafen als Sarah.*
 - b. **cond. 2 [impla,comp]:**
Lukas hat auf einem älteren Kopfkissen geschlafen als Sarah.
 - c. **cond. 3 [pla,cont]:**
*Im Vergleich dazu, worauf Sarah geschlafen hat,
hat Lukas auf einem bequemeren Kopfkissen geschlafen.*
 - d. **cond. 4 [impla,cont]:**
*Im Vergleich dazu, worauf Sarah geschlafen hat,
hat Lukas auf einem älteren Kopfkissen geschlafen.*

- (425) **item no. 11: „Briefmarken“**
Marie und Philipp sind auf der Post gewesen.
- a. **cond. 1 [pla,comp]:**
Marie hat einen schwereren Brief frankiert als Philipp.
 - b. **cond. 2 [impla,comp]:**
Marie hat einen persönlicheren Brief frankiert als Philipp.
 - c. **cond. 3 [pla,cont]:**
Im Vergleich dazu, was Philipp frankiert hat, hat Marie einen schwereren Brief frankiert.
 - d. **cond. 4 [impla,cont]:**
Im Vergleich dazu, was Philipp frankiert hat, hat Marie einen persönlicheren Brief frankiert.
- (426) **item no. 12: „Lineal“**
Jonas und Anna haben einen Abschnitt in ihrem Schulaufsatz sauber durchgestrichen.
- a. **cond. 1 [pla,comp]:**
Jonas hat ein längeres Lineal verwendet als Anna.
 - b. **cond. 2 [impla,comp]:**
Jonas hat ein breiteres Lineal verwendet als Anna.
 - c. **cond. 3 [pla,cont]:**
Im Vergleich dazu, was Anna verwendet hat, hat Jonas ein längeres Lineal verwendet.
 - d. **cond. 4 [impla,cont]:**
Im Vergleich dazu, was Anna verwendet hat, hat Jonas ein breiteres Lineal verwendet.

A.2 Main Items for English

- (427) **item no. 0: “umbrellas”**
When it suddenly started raining on their afternoon walk, Jessica and Michael badly needed an umbrella.
- a. **cond. 1 [pla,comp]:**
Jessica bought a cheaper umbrella than the one Michael bought.
 - b. **cond. 2 [impla,comp]:**
Jessica bought a longer umbrella than the one Michael bought.
 - c. **cond. 3 [pla,cont]:**
Compared to the one Michael bought, Jessica bought a cheaper umbrella.
 - d. **cond. 4 [impla,cont]:**
Compared to the one Michael bought, Jessica bought a longer umbrella.

A Material Used in the Acceptability Rating Studies

- (428) **item no. 1: “windows”**
*It’s springtime again! –
Time for Trevor and Ashley to do some cleaning around the house.*
- a. **cond. 1 [pla,comp]:**
Trevor cleaned a dirtier window than the one Ashley cleaned.
 - b. **cond. 2 [impla,comp]:**
Trevor cleaned a thicker window than the one Ashley cleaned.
 - c. **cond. 3 [pla,cont]:**
*Compared to the one Ashley cleaned,
Trevor cleaned a dirtier window.*
 - d. **cond. 4 [impla,cont]:**
*Compared to the one Ashley cleaned,
Trevor cleaned a thicker window.*
- (429) **item no. 2: “guide books”**
*After a long day in New York City,
Amanda and Matt were unsure about where to go for dinner.*
- a. **cond. 1 [pla,comp]:**
*Amanda consulted a more recent guide book
than the one Matt consulted.*
 - b. **cond. 2 [impla,comp]:**
*Amanda consulted a longer guide book
than the one Matt consulted.*
 - c. **cond. 3 [pla,cont]:**
*Compared to the one Matt consulted,
Amanda consulted a more recent guide book.*
 - d. **cond. 4 [impla,cont]:**
*Compared to the one Matt consulted,
Amanda consulted a longer guide book.*
- (430) **item no. 3: “sweaters”**
*Before leaving the house on a cold and snowy night, Josh and Sarah
went hunting through their closets for appropriate clothing.*
- a. **cond. 1 [pla,comp]:**
Josh picked a warmer sweater than the one Sarah picked.
 - b. **cond. 2 [impla,comp]:**
Josh picked a more expensive sweater than the one Sarah picked.
 - c. **cond. 3 [pla,cont]:**
*Compared to the one Sarah picked,
Josh picked a warmer sweater.*
 - d. **cond. 4 [impla,cont]:**
*Compared to the one Sarah picked,
Josh picked a more expensive sweater.*

- (431) **item no. 4: “advice”**
Jennifer and Andrew were each looking for advice regarding a job they had been offered.
- a. **cond. 1 [pla,comp]:**
Jennifer asked a more experienced friend for advice than the one Andrew asked.
 - b. **cond. 2 [impla,comp]:**
Jennifer asked a taller friend for advice than the one Andrew asked.
 - c. **cond. 3 [pla,cont]:**
Compared to the one Andrew asked, Jennifer asked a more experienced friend for advice.
 - d. **cond. 4 [impla,cont]:**
Compared to the one Andrew asked, Jennifer asked a taller friend for advice.
- (432) **item no. 5: “moving vans”**
After graduation, David and Lauren were no longer eligible for student housing and they both had to move.
- a. **cond. 1 [pla,comp]:**
David rented a bigger van than the one Lauren rented.
 - b. **cond. 2 [impla,comp]:**
David rented a faster van than the one Lauren rented.
 - c. **cond. 3 [pla,cont]:**
Compared to the one Lauren rented, David rented a bigger van.
 - d. **cond. 4 [impla,cont]:**
Compared to the one Lauren rented, David rented a faster van.
- (433) **item no. 6: “museums”**
Last night, Meagan and Justin were in their hotel room, browsing through their travel guides and deciding on museums to visit in the morning.
- a. **cond. 1 [pla,comp]:**
Meagan suggested a more renowned museum than the one Justin suggested.
 - b. **cond. 2 [impla,comp]:**
Meagan suggested a taller museum than the one Justin suggested.
 - c. **cond. 3 [pla,cont]:**
Compared to the one Justin suggested, Meagan suggested a more renowned museum.
 - d. **cond. 4 [impla,cont]:**
Compared to the one Justin suggested, Meagan suggested a taller museum.

A Material Used in the Acceptability Rating Studies

- (434) **item no. 7: “GPS”**
*Daniel and Amber are way behind their schedule.
They rush to their cars to get to an appointment.*
- a. **cond. 1 [pla,comp]:**
Daniel took a faster route than the one Amber took.
 - b. **cond. 2 [impla,comp]:**
Daniel took a more scenic route than the one Amber took.
 - c. **cond. 3 [pla,cont]:**
Compared to the one Amber took, Daniel took a faster route.
 - d. **cond. 4 [impla,cont]:**
*Compared to the one Amber took,
Daniel took a more scenic route.*
- (435) **item no. 8: “basketball players”**
*Melissa and James coach their respective high schools’ basketball teams.
Their teams were scheduled to play against each other this Saturday.*
- a. **cond. 1 [pla,comp]:**
Melissa used a taller player as center than the one James used.
 - b. **cond. 2 [impla,comp]:**
*Melissa used a more talkative player as center
than the one James used.*
 - c. **cond. 3 [pla,cont]:**
*Compared to the one James used,
Melissa used a taller player as center.*
 - d. **cond. 4 [impla,cont]:**
*Compared to the one James used,
Melissa used a more talkative player as center.*
- (436) **item no. 9: “ladders”**
*After the latest thunderstorm,
Robert and Emily each had to fix their leaking garage roof.*
- a. **cond. 1 [pla,comp]:**
Robert used a taller ladder than the one Emily used.
 - b. **cond. 2 [impla,comp]:**
Robert used a wider ladder than the one Emily used.
 - c. **cond. 3 [pla,cont]:**
Compared to the one Emily used, Robert used a taller ladder.
 - d. **cond. 4 [impla,cont]:**
Compared to the one Emily used, Robert used a wider ladder.

- (437) **item no. 10: “nannies”**
Rachel and John are both single parents and are working shifts at the county hospital. They were thus both looking for a nanny for their children.
- a. **cond. 1 [pla,comp]:**
Rachel hired a more reliable nanny than the one John hired.
 - b. **cond. 2 [impla,comp]:**
Rachel hired a taller nanny than the one John hired.
 - c. **cond. 3 [pla,cont]:**
*Compared to the one John hired,
Rachel hired a more reliable nanny.*
 - d. **cond. 4 [impla,cont]:**
Compared to the one John hired, Rachel hired a taller nanny.
- (438) **item no. 11: “sleeping bags”**
Brandon and Kayla are preparing for a camping trip to Yosemite National Park over the Memorial Day weekend.
- a. **cond. 1 [pla,comp]:**
Brandon packed a warmer sleeping bag than the one Kayla packed.
 - b. **cond. 2 [impla,comp]:**
Brandon packed a longer sleeping bag than the one Kayla packed.
 - c. **cond. 3 [pla,cont]:**
*Compared to the one Kayla packed,
Brandon packed a warmer sleeping bag.*
 - d. **cond. 4 [impla,cont]:**
*Compared to the one Kayla packed,
Brandon packed a longer sleeping bag.*
- (439) **item no. 3: “pans”**
Amy and Travis were both doing their dishes in the common kitchen of their residence hall last night.
- a. **cond. 1 [pla,comp]:**
When I came in, Amy was cleaning a dirtier pan than the one Travis was cleaning.
 - b. **cond. 2 [impla,comp]:**
When I came in, Amy was cleaning a more expensive pan than the one Travis was cleaning.
 - c. **cond. 3 [pla,cont]:**
*Compared to the one Travis was cleaning,
Amy was cleaning a dirtier pan.*
 - d. **cond. 4 [impla,cont]:**
*Compared to the one Travis was cleaning,
Amy was cleaning a more expensive pan.*

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